ASSESSMENT OF THE USE, COMPETENCE OF TEACHERS AND STUDENTS IN INFORMATION AND COMMUNICATION TECHNOLOGY IN TERTIARY INSTITUTIONS IN KADUNA STATE, NIGERIA

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PhD/EDUC/44000-2012-2013

A THESIS SUMMITTED TO THE SCHOOL OF POST GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DOCTORATE DEGREE IN EDUCATION (CURRICULUM & INSTRUCTION) IN THE DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND CURRICULUM, FACULTY OF EDUCATION, AHMADU BELLO UNIVERSITY, ZARIA.

SEPTEMBER 2018

DECLARATION

I hereby declare that the work in this thesis entitled "Assessment of the Use, Competence of Teachers and Students in Information and Communication Technology in Tertiary Institutions in Kaduna State, Nigeria" has been carried out by me in the Department of Educational Foundations and Curriculum. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another Degree or Diploma in this or any other Institution.

_____ _____

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CERTIFICATION

This thesis entitled Assessment of the Use, Competence of Teachers and Students in Information and Communication Technology in Tertiary Institutions in Kaduna State, Nigeria by OLUCHI MARY IKOH meets the regulation governing the award of the degree of Doctor of Philosophy in Education (Curriculum and Instruction) of the Ahmadu Bello University, Zaria.

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DEDICATION

This research work is dedicated to my parents Late Nwankwo Benson Ikoh, and Nwayibuaku Lydia Ikoh, my sisters late Elizabeth Nene Ngodo and Ifesiolu Hannah Ikoh and my friend late Rahila.

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ABSTRACT

This research work assessed teacher and students' competence and the use of Information Communication Technology in Tertiary Institutions in Kaduna State in Nigeria. The statement of the problem was the challenges of integrating information and communication technology ICT into tertiary institutions was a very big task, many teachers and students still lack adequate training and competence in using computer as a tool for effective teaching and learning. Six objectives of the study, determine the extent of use of Information and Communication Technology by teachers in teaching in tertiary institutions in Kaduna State Nigeria; find out how often Information and Communication Technology is used by students for learning in tertiary institutions in Kaduna State Nigeria; Six research questions To what extent do teachers use ICT in teaching in tertiary institutions in Kaduna State of Nigeria What is the extent of students ICT use in learning in the tertiary institutions in Kaduna State of Nigeria and six hypotheses were formulated to guide the study. The study reviewed two theories: Vyotsky's Theory and Zone of Proximal Development (ZPD) and social learning theory. It adopted descriptive ex-post-facto design. The instruments used were questionnaires the population of teachers was 2234 and that of the students 5801 from tertiary institution while Simple random sampling was used to sample out 322 teachers and 380 students. The IBM version 23 SPSS (statistical package for social sciences was used for the analysis. The X^2 square was used for testing the hypotheses. All hypotheses were tested at 0.05 alpha level of significance. The summary of the major findings in the use of Information and Communication Technology frequency of usage in teaching ICT was high especially as majority could shut down and start up computer on their own safely and use it for typing of examinations and tests. Majority of them could operate and use

computer system with software packages and they also acquired skills to operate word processing. In conclusion, P Value 000.0 is lower than 0.05, there is significant difference existing between teachers and students on the ICT level of usage; the teachers have higher level of ICT usage than the students. All the six hypothesis are rejected. The study recommended that policies need to be put in place by the Federal and State Government for the improvement of ICT infrastructure, and provision of uninterrupted power supply for effective use and skills competence in the development of ICT. Contribution to knowledge information communication and technology shall lead the teachers and students to human progress, lifelong education, future career, which was employment and knowledge based education in tertiary institutions in Kaduna State, Nigeria.

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OPERATIONAL DEFINITION OF TERMS

Information and Communication Technology: This is seen as the acquisition, processing, storage and dissemination of information by means of computer, office machine, telecommunication and Internet.

Assessment:- Refers to an opinion or a judgement about somebody or something that has been thought about very carefully, the act of judging or forming an opinion about somebody or something.

Competence: This refers to achievement or ability to do something, being able to deal effectively with self and the world.

Use: The manner in which the teachers employ the available ICT classroom instructions using their skills knowledge and ability to organize, store, retrieve and disseminations of information this also shall mean the ability of both teachers and student to use technologies to enhance teaching and learning processes.

Challenge: This refers to the problems encountered by the teacher and students in the use of ICT in Tertiary Institutions in Kaduna State.

Teaching: Is a service profession, it is also an art because it involves guiding directing and stimulating learning, It involves the possession of a body of specialized knowledge.

Learning: This refers to another form of change which comes as a result of experience.

Tertiary Institution: Refer to Universities, Polytechnics and College of Education in Kaduna State.

Information and Communication Technology in Tertiary Institutions: This refers to the using equipment and other aspects and processing of information in all aspects of teaching and learning in the tertiary institutions in Kaduna State.

Kaduna State: Is a state within the country and a part of the Northern States.

ABBREVIATIONS

AISI: African Information society Institute

ANOVA: Analysis of Variance

ATM: Asynchronous Transfer Machine

BBC: British Broadcasting Corporation

CD-ROM: Compact Disc Read-only-memory

CMI: Computer Managed Instruction

CNN: Cable News Network

COE: College of Education

DBI: Digital Bridge Institute

FCOE: Federal College of Education

FWA: Fixed Wireless Access

GPCS: Global Personal Communication Services

GSM: Global System for Mobile

IICD: Integrated Institute for Communication and Development

IIIR: International Information Review

ILS: Integrated Learning System

ISP: Internet Service Provider

IT: Information Technology

MIS: Management Information System

N.C.C.E: National Commission for Colleges of Education

N.C.E:	Nigeria Certificate in Education
NBTE:	National Board for Technical Education
NCC:	National Communication Commission
NEAR NET:	Nigeria Education, Academic Research Network
NERDC:	National Education Research and Development Council
NESCN:	Network of Education Service Centre of Nigeria.
NITDA:	National Information Technology Development Agency
NITEL:	Nigerian Telecommunication Limited
NNTEP:	Northern Nigeria Teacher Education Project
NPE:	National Policy on Education
NUC:	National Universities Commission
NUNET:	Nigerian Universities Network
NUNGS:	Nigerian University Teacher Education Project
PTO:	Private Telephone Operators
RINA:	Regional Information Network for Africa
SDH:	Synchronus Digital Hierachy
TRCN:	Teachers Registration Council of Nigeria Mobil Service
UNESCO:	United Nation Education Scientific and Cultural Organization
UPE:	Universal Primary Education
USAID:	United States Agency for International Development

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information and Communication Technology (ICT) is an organized combination of hardware, software, communication, networks, and data resources that collects, transforms and disseminates information in an organization. In as much as the classroom has become congested, there is the need to move from the congested classroom which has become obsolete or old fashioned to a modern system of the use of ICT to enhance and improve teaching and learning. Having the competence in ICT skills for teaching goes beyond just knowing how to operate a system, but having the competence in the skills to facilitate teaching and learning. The researcher is of the view that even the very few computers and ICT facilities available are not used for teaching, but are mainly used for day to day administrative and managerial activities as most departments do not use computer laboratories, except departments that trains students in this discipline.

The National Policy on Information Technology (2001) stressed that the trend today is moving from learning to use information and communication technology to using information and communication technology to learn. and that what most teachers posses was Computer Assisted Instruction Skills, and this computer assisted instruction has hardly been part of the teaching content or course content therefore, it necessitates a more focus teacher target and information and communication technology teaching content which should be freely delivered by these tertiary institutions of the study since that is what is now needed by the teachers and students respectively.

Therefore it is necessary for teachers and students to undergo training to be competent in the use of ICT and to have the right potentials to enable them to know how to operate and manipulate ICT for the teachers in their professional practices and for the students in their contextual task. The study therefore assessed the use and competence of teachers and students in information and communication technology in tertiary institutions in Kaduna State, Nigeria.

Overtime, teachers and students have used various technologies before the advent of ICT, they used technologies ranging from chalk board, black board, slide, projector, print media, overhead projector, which have proved to be obsolete. The evolution of ICT came a long way which led to globalization of ICT and the level of sophistication of modern technology increased by moving from the use of crude tools.

With the tremendous technological changes in the last two decades of the 20th Century, it is expected that there should be movement from using ICT to using it to learn. Therefore, it is imperative to integrate the use of ICT into the tertiary institutions, so that it can be used to learn, and to move from the traditional book material which the students are still using and for the teachers of ICT to embrace the course content to improve the teaching and learning of ICT in the tertiary institutions. It is a fact that enormous increase in the use of electronically controlled equipment has substituted for human judgement in a wide range of skills from middle to low level. It is in the light of this that Coulter, Feldman and Konold (2000) opined that (ICT) is beginning to play an important role in Education. They further stresses that (ICT) provides available and rich sources of information to students: in content for learning in most course areas which allows the users to engage in enquiry by exploring nearly unlimited resources available on the ICT. They also

articulated that Textbooks are often outdated, but most website resources are often current and updates frequently. Instruction is less teacher centered as students' curiosity drives their learning. Allow students to learn at their own pace and that the (ICT) can be accessed anytime of the day.

In recognition of the programmed role of Information and Technology in advancing knowledge and skill necessary for functioning in the world, there is an urgent need to integrate information and communication Technology (ICT) into education in tertiary institutions in Nigeria Today, the demand for educational technology is high, and when technology is used thoughtfully, the results, are gratifying; it is technology that enables people to learn and to interact in all fields of educational endeavours.

When ICT is used in teaching and learning in education, the learning shift from the teacher centered model to a learner centered model (NTI, 2006). Haddad and Jurich (2002) observed that when ICT is used in teaching and learning in education, the teacher becomes less the sole voice of authority and more of facilitation, mentor and coach: from "sage on the stage" to "sage by the side". Man power development has been revealed to depend on tertiary institutions they produce both the technical, administrative and research components that drive the economy produce, food and services in the society.

The world is fast moving into a global village where the language of Information Technology is very vital and essential in all areas of human endeavours. Information Technology has brought about new ways of doing old things in all spheres of human activities. Effective and efficient utilization of ICT in the developed world has greatly improved research in all areas of human endeavours: agriculture, education, security, science and technology, economy, communication, health, trade and so on.

The world of today is characterized by revolutionary advances powered by Information and Communication Technology (ICT). The world is being reduced to a global village through the use of information and communication technology thus, ICT promotes national development and better relationship with other nations. ICT refers to the electronic and communication devices associated with human interactive materials that enable users to employ them for a whole range of teaching and learning process. Today, it is an increasingly powerful tool for participating in global markets, promoting political accountability, improving the delivery of basic services and enhancing local development opportunities (UNDP, 2006). ICT facilities influence and affect peoples' private and corporate work life in one way or the other. These ICT facilities are all encompassing in areas like technology, socialization, politics, economics and education, for global transformation. Therefore, it becomes pertinent for teachers, who serve as key implementers of the nation's educational policy, to be well-informed and adequately equipped with ICT facilities in order to function productively in this age of information explosion and technological advancement.

The Federal Ministry of Education (2010) identifies the role of ICT policy on education amongst others as:

The policy provides the needed guidance on what is expected in the entire process of ICT integration in education to all stakeholders in education. Its' implementation, therefore, should lead to a speedy transformation of the teaching, learning and administration of education. This in turn will foster the production of graduates in the education system that can survive in the contemporary society, sustain national development and compete globally (p.3).

The realization of this policy statement lies basically in the capability of the key implementers of the nation's educational policy that is, teachers to integrate ICT-Driven instructional aids effectively through Computer Assisted mode of Instruction (CAI) in their day to day classroom activities for effective pedagogy. It is clear that ICT is a world of its own, it has various diversified aspects. Communication is the process by which people exchange information, or express their thoughts and feelings. Most communication is done by the use of words. In driving conversation and other person to person communication, we use our natural voice. But when our thought and feelings have to be heard at long distance television, telegraph, the internet and satellites. Each of these means of communication has solved the problem of communication at one time or the other. Information and Communication Technology is about the discovery of new ways of communicating faster and more easily at anytime in human life. In the past, information could only be passed from one person to another by word of mouth then letters, telegrams, telex and Telephone came into use, now fax, Global System of Mobile Communication (GSM) and the internet are used. These means arose as needs of society demanded that the present day communication are electronic based.

The need for this study became paramount in that the classroom is no more conducive enough for teaching and learning, because of moving from traditional method of teaching and learning to a modern method which is the Information Communication and Technology. It is therefore necessary to introduce new method like chalkboard and whiteboards which can improve teaching and learning in the tertiary institutions.

Peter, (2010) it has revolutionized the way in which people communicate with each other. Users can search for information about any topic using the ICT today, important part of

our day to day life the ICT is used in diverse fields, education, communication medicine, defense, engineering and sports (Okebukola, 2008). Information plays a key role in the formation and structure of societies, no matter how small. Therefore with the introduction of computers and communications with their managements to yield information Technology, result in their being bound to be profound in societal impacts, Information Technology has the world's largest broad band which embraces all networks which has changed the face of the world we live in. (FGN 2001) Information Technology has hold more impact on administrative service and the private sector as they are used for admission, registration, fee payment, purchasing than on the fundamentals of classroom teaching and learning.

In view of this fact, the Information Communication and Technology is yet to revolutionize the classroom. According to Gambari and Okoli (2007), it is changing the learning experiences of students by relaxing time and space constraints as well as providing easier access to information on line, journals and E-book. Tertiary institutions refers to third in order rank or importance, the tertiary sector is, the area of industry that deals with services rather than materials or goods, Tertiary education refers to university or college level. Information is needed in virtually every field of human thought and action. Information is needed to plan meals. Make purchases while organizations need information to make decisions. Data are raw facts or events or activities, which no meaning had been attached to (Okiki, 2011), its education is today regarded as a commodity. There is the need for teachers and students to be competent in the use of ICT in the tertiary institutions. The researcher is inspired by the sophisticated level of globalization by the innovation of ICT in the world today. Also by the speed with which

the future that seemed unknown is known today. Today, there is teaching and learning at almost everyone doorpost, even the most remote rural areas because of the introduction of (ICT) Life is somehow becoming easier than the old times in human endeavour. The term telecommunication is a combination of two words “Tele” which means from far, while communication implies transfer of message, code or knowledge. Telecommunication therefore implies communication over far distance using modern media such as computer, internet, handset or cell phones, television radio and so on. The timing of the communication revolution though belated, was apt as Nigeria had been transited to a democratic dispensation, headed by President Olusegun Obasanjo (1998). The use of ICT is inevitable as large volumes of data known as information gloat, complexity of information need ways of easy processing, in banking, examination offices. All other sectors of Nigerians economy are in dire need of technological (ICT) innovation if Nigeria is to meet up the global technological advancement. For Information and Communication Technology (ICT) to meeting the needs of the 21st Century, teachers and students require technology driven environments. ICT has brought into the system new and emerging technologies that have come to replace or challenge the traditional methods involved in the teaching and learning process. There is need therefore for proper integration of ICT in instructional delivery for purposeful and experimental learning to take place. In this era of ICT, the focus in the use of computer the teacher to be able to utilize ICT he/she needs a personal computer desktop or laptop, central processing unit. Monitor, keyboard, uninterrupted power supply and printer the knowledge acquired will serve as a foundation for further advanced knowledge like internet, e-mail and more.

The researcher observed that it is necessary to take up these study based on the observation that the challenges for teachers and students in tertiary institutions is no longer in covering the course contents or adopting appropriate teaching pedagogy, but it is in having access to Information and Communication Technology and using it to embrace teaching and learning Olaofe (2005) argued that such a grasp of Information and Communication Technology should be within the capabilities of most people, regardless of age, area of discipline, gender, or educational experience. Competence is defined as the ability to combine and apply relevant attributes to particular tasks in particular contexts. Houghton (2008) points, to increasing use and power of computer technology in tertiary institutions, and advised that educators most know the capabilities of educational software. This is important because when the teacher is able to understand the role of software in the classroom and has positive attitude towards its usage in teaching and learning in tertiary institutions becomes easier.

1.2 Statement of the Problem

The world is fast becoming a global village, as a result of the development in Information and Communication Technology (ICT). The challenges of integrating Information and Communication Technology (ICT) into tertiary institution is a very big task many teachers and students still lack adequate training in used and competence in using computer (ICT) as a tool for effective teaching and learning in tertiary institutions. On the relevance of ICT for teaching and learning, the Federal Government of Nigeria (2004) observed that government should provide facilities necessary. Infrastructure for promotion of Information and Communication Technology (ICT) at all levels of the education system (FGN, 2004). The level of sophistication of (ICT) innovation came in

with an intention to improve and impact knowledge to teachers and students in tertiary institutions but its absence or insufficiency in the existing tertiary institutions in Kaduna State has made teaching and learning difficult. Therefore, it is against this backdrop that the researcher assessed the use and competence of teachers and students in (ICT) in tertiary institutions in Kaduna State, Nigeria. (ICT) is an important source of information in all fields of endeavour being a new in technology to teaching and learning and its nature of sophistication the researcher is of the view that many teachers and students still lack adequate training and competence in using computer as a tool for effective teaching and learning.

In recent times, the integration of information and communication technologies (ICTs) in teacher training programmes has been the topic of much debate, in the tertiary institutions educational systems around the world are under increased pressure to use the information and communication technologies (ICTS) to teach student's knowledge and skills they need in the 21st Century. Teachers in education institutions are faced with the challenge of preparing a new generation of teachers to effectively use the new learning tools in their teaching of practical (UNESCO, 2002). Thus, teachers have been affected by the penetrating influence of Information and Communication Technology (ICT). The fact that ICT has impacted on the quality and quantity of teaching, learning and research in traditional and distance education around the world cannot be over emphasized, ICT literacy, in concrete terms has enhanced teaching and learning. Through its dynamic, interactive and engaging content and has provided real opportunities for individualized instruction (New house, 2002).

The challenge in Nigeria today is not only shortage in the availability of teachers who are ICT – competent, but the need to moving from learning to using ICT to learn. There is a need for capacity building to improve and update the quality of the existing teaching force, and also to ensure that teachers education programmes integrate content, pedagogy technology. (Hughes, 2005, Koehler, Mishra, & Yahaya 2007).

The challenges in the use and competence of ICT in the tertiary institutions in Kaduna State Nigeria it is obvious there is little or no use of ICT at this level of our educational system, most institutions does not have the necessary (ICT) facilities for teaching and learning neither do the teachers possess skills in (ICT) for effective classroom interaction. The level of competence and skill acquisition is still low among the teachers and students to perform their professional practice and contextual task in their various discipline and the use of ICT facilities and equipment is worrisome ICT has been widely embraced by teachers and students in Nigeria Institutions. However, there are many whose use and competence of ICT is questionable what could be the underlying reasons for the slow attitudinal change in fully embracing ICT are teachers and students really competent in the use ICT and how frequently do they use ICT. These are questions that need to be answered to ensure that ICT is fully targeted in teaching and learning in Nigerian Institution. The researcher is of the view that there is under usage of ICT, by teachers and students, bureaucracy, unavailability and inaccessibility of ICT resources, has been discovered to be another problem that hinders teachers and students competence in the use of ICT in existing institutions. In Nigeria, others problems include scare of opportunity to use computer which is the reason why teachers and students were slow in the ICT update. There is the issue of lack of experience and training at in usage, lack of

ICT teachers, teachers trainers or encouragement, and lack of confidence on the part of the teachers and students and their trainers in computing skill especially in computer assisted instruction teaching content, or course content which accounts, for the low ICT. The researcher observed that traditional method of lesson delivery with "Chalk and talk" system of teaching and learning is more of a teacher-centered approach than learners-centered as practiced in some tertiary institutions today. The use of ICT in the Nigerian tertiary institution is comparatively low looking as its position on the continent the mode of teaching and learning process today is expected to shift from the conventional method to a more dynamic and flexible one, which is the learner. Centered or students-centered (Ezekoka & Okoli, 2012). The government should make effort to provide the necessary facilities, supply of constant powers, trained teachers on the use of ICT in the tertiary institutions. The study therefore assessed the use and competence of teachers and students in ICT in tertiary institutions in Kaduna State Nigeria.

1.3 Objectives of the Study

The main objectives of the study are the assessment of the use and competence, of Teachers and students in tertiary institution in Information and Communication Technology in teaching and learning in Kaduna State of Nigeria. The specific objectives are to:

(1) determine the extent of use of Information and Communication Technology by teachers in teaching in tertiary institutions in Kaduna State Nigeria;

(2) find out how often Information and Communication Technology is used by students for learning in tertiary institutions in Kaduna State Nigeria;

(3) identify the level of skills competence in training, operation, and manipulation among teachers in the use of Information and Communication Technology for teaching in tertiary Institutions in Kaduna State of Nigeria;

(4) examine the degree of skills competence in training, operation, and manipulation among students in incurring Information and Communication Technology for learning with Information and Communication Technology in tertiary institutions in Kaduna State Nigeria;

(5) identify the challenges the teachers face in the process of changing to embrace the innovation in the use of Information and Communication Technology to enhance teaching in their professional practices in tertiary institution in Kaduna state Nigeria; and

(6) identify the challenges the students face in the process of changing to embrace the innovation in the use of Information and Communication Technology to enhance learning in their contextual task in tertiary institution in Kaduna state Nigeria.

1.4 Research Questions

The research was guided by the following research questions:

(1) What extent do teachers use Information and Communication Technology in teaching in tertiary institutions in Kaduna State of Nigeria?

(2) How often information and communication technology is used by students for learning in tertiary institutions in Kaduna State of Nigeria?

(3) What are the level of skills competence in training, operation, and manipulation among teachers in teaching in tertiary institutions in Kaduna State of Nigeria?

(4) What are the level of skills competence in training, operation, and manipulation among students in learning in tertiary institutions in Kaduna State of Nigeria?

(5) What are the challenges the teachers face in the process of changing to embrace the innovation in the use of Information and Communication Technology in teaching in their professional practices in tertiary institutions in Kaduna State?

(6) What are the challenges the students face in the process of changing to embrace the innovation in the use of Information and Communication Technology in learning in their contextual task in tertiary institutions in Kaduna State?

1.5 Hypotheses

The following hypotheses were formulated in the study:

Ho_1: There is no significant difference in the opinions of teachers of polytechnics, universities, colleges of education on the extent of use of Information and Communication Technology in teaching tertiary institutions in Kaduna State of Nigeria.

Ho_2: There is no significant difference in the opinions of students of polytechnics, universities, and colleges of education on the how often

Information Communication Technology is used by students in learning in tertiary Institutions in Kaduna State of Nigeria.

H_{O3}: There is no significant difference in the opinions of teachers of polytechnics, universities, colleges of education on the level of skills competence in training, operation, and manipulation among teachers in information and communication technology in teaching in tertiary institutions in Kaduna State of Nigeria.

H_{O4}: There is no significant difference in the opinions of students of polytechnics, universities, colleges of education on the level of skills competence in training, operation and manipulation among students in information and communication technology learning in tertiary institutions Kaduna State of Nigeria.

H_{O5}: There is no significant difference in the opinions of teachers of polytechnics, universities, colleges of education on the challenges the teachers face in the process of changing to embrace the Innovation in their professional practices in teaching in tertiary institutions in Kaduna State of Nigeria.

H_{O6}: There is no significant difference in the opinions of students of polytechnics, universities, colleges of education on challenges students face in the process of changing to embrace the innovation in learning in their contextual task in tertiary institutions in Kaduna State of Nigeria.

1.6 Basic Assumptions

The study is based on the following assumptions

(1) That tertiary institution lack adequate Information and Communication Technology software for instructional materials for teaching and learning in Kaduna State, Nigeria.

(2) That where ICT is applied effectively, it can impact positively on the understanding of teaching and learning.

(3) That teachers and student have competence of manipulating the ICT for teaching and learning.

(4) That concept of ICT and its effective utilization for teaching and learning will provide a significant shift from the old traditional method of teaching which is teacher centered to the student centered method, which enables more interaction, actively and exploration in the teaching/learning process.

(5) That with seminars, workshops, conferences, course on ICT in the tertiary institution will enhance teaching and learning if carried out periodically.

1.7 Significance of the Study

The result of this research will be of significance and greatly beneficial in the following ways. It will be useful to teachers, students, teacher educators Teachers and students of Tertiary Institutions, policy makers, researchers, and the society at large. In that it will help them appreciate the need to make necessary adjustment from the traditional methods of teaching and learning to a modern system of teaching and learning which is the Information and Communication Technology (ICT). The study will help the National Information Technology Department Agency (NIIDA) to measure the level of success of its organization.

Its hoped that the findings would help view possible factors hindering the effective implementation of ICT policy in education especially in tertiary institutions with the aim of solving them and improving students academic performance. The study may draw the attention of NIIDA to see possible areas that will demand review in the ICT policy to meet the current trend in the global market of information technology Study will reveal to policy makers the need to provide equipment and facilities to the teaching and learning of ICT in the tertiary institution, to encourage competency and fast usage of ICT and to remove the negative feeling of anxiety, lack of confidence in the attitude of teachers and students towards ICT usage in the tertiary institution. It will evolve trained personnels that could handle ICT equipments and infrastructure to competency level, will assist the tertiary institution in data processing. It will serve as a guide for student in their study and it will enable the teachers to do advance work in their researchers.

This finding of this study shall help, federal, states, an Education authority to know the extent to which ICT facilities are available in the tertiary institutions for teaching and learning process as well as know the level of usage utilization of these facilities by teachers and students for effective teaching – learning process.

The findings shall help make tertiary institution administrations to see the need for continuous training of their teachers who are ICT literate and train those who are not for better services delivery. Teachers will find this study helpful in so many ways. Specifically, some teachers who are reluctant to embrace this innovation or illiterate in the use and knowledge of ICT will see the need for it, if they want to remain relevant in the teaching profession and also ensure the success of their students. In addition, teachers who are faced with the problem of overcrowded classrooms can be supported with ICT to

carry out their teaching effectively without much Ado. Infact, this study will be an eye opener and image booster if they adopt this strategy lessons can be planned and be taught without the teacher being necessarily present all through in the classroom. More so, it has an added advantage of reducing the burden of teachers to more or less a facilitator in the classroom.

The NGOS and philanthropic organization who are interested in educational advancement of the nation will see possible areas that require ICT facilities in tertiary institutions and the need for their support and donations.

By the findings teachers will be encouraged by the study to identify suitable areas that needed application of ICT and detect their deficiencies and strengths in order to enhance the teaching of students in various tertiary institutions. Teacher, planners of the various learning processes, can identify most suitable ICT to apply in the classroom for maximum benefits to students which will also motivate the presence of ICT in their classes to enhance their understanding of the teachers. Tertiary educational institutions authorities can also benefit by ensuring availability and maintenance of the available ICT facilities. “The teacher who are responsible for choosing appropriate means of dissemination of information to students, may find the study useful so as to enhance the teaching and learning in tertiary institution in the classroom.

1.8 Scope of the Study

The study is on the Assessment of the Use and Competence of Teachers and Students in Information and Communication Technology in Tertiary Institutions in Kaduna State in skills application of word processing, power-point, e-mail, internet, data base, file

navigation and S/S curriculum. The study is limited to the assessment of use and competence of teachers and student in the tertiary institutions that offer ICT as a course for teaching and learning in the Federal Tertiary Institutions as well as in state institutions in Kaduna State namely Nuhu Bamalli Polytechnic Zaria, Kaduna Polytechnic Kaduna, State College of Education Gidan Waya, Federal College of Education Zaria, Kaduna University Kaduna, Ahmadu Bello University Zaria, The researcher hopes to carry out a study on the use and competence of teachers and students in ICT in tertiary institutions in Kaduna State in Nigeria.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The review of related literature was carried out by the researcher to find out the similarities and the differences between the current research and the reviewed works and how they are related to the researchers work on the assessment of the use and competence of teachers and students in ICT in tertiary institutions in Kaduna state, Nigeria.

The views of learning process have been shifted to student (Learners) centered based on cognitive learning research (Denies, 2000). The convergence of several theories has informed the understanding of the nature of and context of learning Sub themes includes: Theoretical framework, Socio- cultural theory based on Vygotsky' inter subjectiveness and zone of proximal development (ZDP), Social learning theory and, Innovation in Teaching, Concept of ICT, Concept of a teacher, Concept of learner, Constructivism and Behaviourism in the teaching and learning, Innovation in teaching, Relationship between, Learning and teaching, Nature and importance of skills types of skills, Concepts of use competence, Competence in teaching and learning of ICT in the tertiary institution, Competence among teachers and student in the use of ICT, Law of readiness, Building readiness.

The meaning of ICT as cognitive tools, Learning with ICT constructivist perspective, learning with ICT behaviorist perspective, Types of ICT, Historical

Background of ICT in Teaching, Competence of Nigerian teachers in ICT skills, competency based education Use of ICT in higher education, Sources of ICT resources and effective application, Effects of information technology on effective teaching, the concept of information and its uses, Features and benefits of internet, internet services, Benefits of internet, Information technology for teaching and learning of information, Technology utilization, Need to information, Technology skills utilization, ICT and teaching/learning environment, provision of tools to increase students productivity, Engagement of students through motivation and challenges, Investigating Reality and Building Knowledge, Active Learning and Authentic Assessment, Increasing Learner Independence, Collaborative and Cooperative Learning, Tailoring learning to the learner, Provides platform to support Higher level thinking, learning with Technology Constructive perspective, learning with technology behaviourist perspective, Use of information and communication for teaching and learning. Empirical studies and summary.

2.2 Theoretical Framework

The theories below are used for this study because they are relevant to the study of information and communication technology (ICT). The use of ICT can help to involve the learners in active participation, working on their own pace, become self-regulated, self-medicated and thus facilitate teaching and learning of the subjects or courses in the various contractual tasks.

a. **Vygotsky's Theory and the Zone of Proximal Development (ZPD)**

Vygotsky's (1978) Sociacultural Theory

The zone of Proximal Development is Vygotsky's term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more-skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone. The upper limit is the level of additional responsibility the students can accept with the assistance of an able instructor. Thus, the ZPD involves the students' cognitive skills that are in the process of maturing and their performance level with the assistance of a more skilled person. He called these the "buds" or "flower" of development to distinguish them from the "fruits" of development, which the students already can accomplish indecently. Each of these theories is based on the same underlying assumptions that learners are active agents, purposefully seeking and constructing knowledge within a meaningful context. The view of this learning process is based on the research that has emerged from theoretical framework related to human learning. Many reflected a constructivism view of the learning process. In this view, learners are active agents who engage in their own knowledge constructions by integrating new information into their mental structure. The learning process is seen as a process of meaning making in socially, culturally. Historically and politically situates context. In a construct their own knowledge by testing ideas and approaches based on their previous these to new tasks, context and situation, and integrating the new knowledge gained with pre – existing intellectual constructs. Vygotsky's theory is constructivist, emphasizing

that students actively construct knowledge and understanding rather than ebbing passive receptacles.

However, Vygotsky's theory is a social constructivist approach which emphasizes the social contexts of learning and that knowledge is mutually built and constructed. This theory proffers that knowledge is situated and collaborative. That is, knowledge is distributed among people and environments, which include objects, artifacts, tools, books and communities in which people live. Situated Cognitive Learning: Is one of the learning theories that emphasize the use of apprenticeship, coaching, collaboration, authentic contexts, tasks, activities and cognitive tools.

It occurs when students work on authentic tasks that take place in real world settings. Here, learning is viewed as a function of the activity, context and culture in which it occurs, which contrasts with most classrooms learning which is abstract and out of context Emphasizes providing an authentic context for the learner and encouraging social interaction and collaboration in the learning environment. Through collaborative problem solving, dialogue and discussion students are able to develop deeper levels of understanding of a problem this is quite relevant in this study because it emphasis is on learning beyond classroom situation which is what the use of ICT tools enable learners to do through coaching, tasks and activities that are student centered.

Cognitive Apprenticeship: This is another theory for instructional process in which the teacher or more experienced person provides in Scaffold to support learners cognitive growth and development. Cognitive apprenticeship enables

student to learn through interaction constructs knowledge and share knowledge thereby building experience with the other member of the learning community. This theory is relevant to this study because it emphasizes support which ICT does to learning through its tools by enabling groups to share online workspace to collaborate and develop intellectual products in the tertiary institutions.

a. Social Learning Theory

Bandura Albert: 1977 Social Learning Theory

Social learning theory commonly referred to as observational or imitation theory is primarily based on what a student's learns in his environment as he interacts and observes others. Observational theory is that opportunity to watch and observed educator teach with computers it a transfer of skills and behaviour and that expect pre-service teachers have computer role models it will be impossible for them to integrate same into learning. This assist students socialization process which is congruent with his society's expectations in ICT teaching and learning.

The chief proponent of social learning theory was Albert Bandura, a social psychologist of Canadian descent working in America. Albert Bandura social learning theory focuses on the learning on the learning that occurs within a social context. It considers that people learn from one another, including such concepts as observational learning, imitation, and modeling. Among others Albert Bandura is considered the leading proponent of this theory.

General principles of social learning theory follow;

People can learn by observing the behavior is of others and the outcomes of those behaviors. Leaning can occur within a change in behavior. Behaviorists say that learning has to be represented by a permanent change in behavior, in contrast social learning theorists say that because people can learn through observation alone, their learning may not necessarily be shown in their performance. Learning may or may not result in a behavior change. Cognition plays a role in learning. Over the last 30 years social learning theory has become increasingly cognitive in its interpretation of human learning. Awareness and expectations of future reinforcements or punishments can have a major effect on the behaviors that people exhibit which is what ICT entails.

Educational implications of social learning theory

Social learning theory has numerous implications which has relevance to the teaching and learning of ICT due to its classroom use. Students often learn a great deal simply by observing other people. Describing the consequences of behavior can effectively increase the appropriate behaviors and decrease the inappropriate ones. This can involve discussing with learning about the rewards and consequences of various behaviors. Modeling provides an alternative to shaping for teaching new behaviors. Instead of using shaping, which is operant conditioning, modeling can provide a faster, more efficient means for teaching new behavior. To promote effective modeling a teacher must take sure that the four essential conditions exist; attention, retention, motor reproduction, and motivation. Teachers and parents must model appropriate behaviors and take care that they do not model inappropriate behaviors. Teachers should expose students to a variety

of other models. This technique is especially important to break down traditional stereotypes. Students must believe that they are capable of accomplishing school tasks. Thus it is very important to develop a sense of self-efficacy for students. Teachers can promote such self-efficacy by having students receive confidence-building messages, watch others be successful, and experience success on their own. Teachers should help students set realistic expectations for their academic accomplishments. Self-regulation techniques provide an effective method for improving student behavior. This observer will imitate the model's behavior if the model possesses characteristics – things such as talent, intelligence, power, good looks, or popularity – that the observer finds attractive or desirable. Human development reflects the complex interaction of the person, the person's behavior, and the environment. The relationship between these elements is called reciprocal determinism. A person's cognitive abilities, physical characteristics, personality, and beliefs influence both his or her behavior and environment. These influences are reciprocal, however. Likewise, much of what a person knows comes from environmental resources such as television, parents, and books. Environment also affects behavior: what a person observes can powerfully influence what he does. But a person's behavior also contributes to his environment. This emphasis is relevant to the teaching and learning of ICT for the teachers in their professional practices and the students in their contextual task. In relation to social learning theory on ICT teaching and learning in the tertiary institutions, teachers, students, peer group serve as models that their fellow teachers and students and peers could observe and imitate in the teaching and learning of ICT so that they can learn how to incorporate the knowledge of ICT in their professional

practices and contextual task. The emphasis was on breaking down traditional stereotype, self-efficacy, confidence building messages, self regulations. This is what ICT entails.

2.3 Concept OF (ICT) Information Communication and Technology

These are diverse meanings of ICT to different people.

Communication Technology: It is the sending and receiving of information through the use of computer. GSM Radio Tele-Conferencing, Internet etc. Information and Communication Information and Communication Technology is a generic term referred to technologies that use to collecting, storing, editing, and passing information in various ways. A personal computer is the best known example of what comes to mind the time is mentioned.

a. **Information**: This is data that are processed to be useful to provide answers to who, what where and when.
b. **Communication**: Is the activity of conveying meaningful information which requires a sender, a message and an intended recipient and which must solicit a response.
c. **Information Technology**: Refers to the gathering, processing and dissemination of processed data using a combination of computer and Tele-communications.
d. **Technology**: It is an umbrella term that includes any communication device to handle information and which aids communication. ICT is used as its acronym, and it covers any product that will store, retrieve, manipulate, transmit or receive information electronically the digital form.

The use of Information and Communication Technology (ICT) brings about a powerful learning environment and its transforms the learning and teaching process in which students deal with knowledge in an active, self directed and constructive way (Volman and Eck, 2001) ICT is not only considered a tool, which can be added for existing teaching methods but also nowadays ICT is seen as a important instrument to support new ways of Information and Communication Technology (IC) encompasses the effective use of equipment and programs to access, retrieve, convert, store and organize, manipulate and present data and information (Gay and Blades, 2005).

Information and Communication Technology (ICT) combines three comparative complementary concepts - which describe its desired meaning and area of coverage. Information is a message that is transmitted and received in the process of communication and these messages, ideas or feelings are shared by both the receiver and sender at the same time. Communication refers to any process in which people share the same information, ideas and feelings. It involves spoken and written words, body language, personal mannerism and style (Okerie, 2010). Technology refers to the systematic application of the tools and art, in practice, communication cannot be effective if information is not accurately received by the target audience, the passage of information cannot be complete without the instruments of communication and feedback. Technology makes communication easier, faster and more effective. Today, Information and communication technology uses a combination of computer, telecommunication, and information systems services and products. Hence, communication serves as a connection-

link between and the learners for effective pedagogy to take place in the classroom.

There are diverse meanings of ICT to different people depending on the context of its usage; Definition of ICT by some scholars differs. According to Uzoigwe (2001), ICT involves all technologies employed in order to facilitate the collection, storage, retrieval and communication of information by the fastest means. Anderson and Glen (2003) defined ICT as generally related to those technologies that are used for accessing, gathering, manipulating, and presenting or communicating information. The technologies could include hardware (e.g. computers and other devices); software applications; and connectivity (e.g. access to the internet, local networking infrastructure, video – conferencing).

Information and Communication Technology, according to Oloruntegbe (2006), can be viewed in the following perspectives:

As an object, what is learnt is dependent on the type of education and the level of learners. Objects include computer and accessories, internet access, satellite, on line-self learning packages, etc.

As an assisting tool: ICT here can be used to support teaching in content and methodology. It can equally be used to conduct research, collect data and communicate.

As a medium of teaching and learning: teachers can teach and equally learners can learn drills, simulations and educational networks.

As tool for organization and management. This relates to ICT being used to handle school records like time tabling, attendance register, fees collection, and examination registration and examination results.

According to Onuagha (2006), computer is an electronic technology device that accepts data and information (input), processes data according to instruction given by the user, search information use for teaching in the classroom, display the result in the way the user will understand and store the information.

World Bank (2002) cited in Adokiye (2008) defined the concept of ICT as consisting of hardware, software, networks and media for collection, storage, processing, transmission and presentation of information (voice, data, text and images) for use by means of electronic devices. According to Alazliner and Kamaruzman (2009) ICT is the application of science in information handling. It is assumed that the use of conceptualized information technology in instructional delivery will enhance effective teaching-learning process to take place.

Bakac and Akbay (2011) describe information and communication technology as all types of technology that facilitate communication and the processing and transmission of information by electronic means (radio, television, telephone, computers, CD-Roms and the internet). Hence, information communication technology can be defined in this study as a world of electronic and communication device that accepts data and information, creates, processes, stores, retrieves and disseminates them through internal and external networks technology. From the various definitions of authors above, it is clear that ICT is

an indispensable tool that needs to be integrated by every classroom teacher into the teaching and learning process for efficient and effective service delivery and attaining best global practices.

Learning is a fundamental process, which enables an organism to service. Learning enables the organism to acquire the fundamental skills with which it can adopt and even change its environment. Learning is one of the key concepts in education. Hence, learning has been identified as one of the focal areas of educational psychology.

E-Learning which is described as the use of ICT to enhance or support learning and teaching in education has become increasingly important in tertiary education (OECD 2005) ICT skills are currently of great interest to governments, businesses, and individual like. Through the use of automation. The Oxford Advanced Learner's Dictionary of Current English defined media as "the main means of communicating with large numbers of people, especially television, radio." Thus, all the ways, channels, tools and aids through which information, instruction, and or knowledge could be conveyed to learners in typical social and business studies, can be seen as instructional media. Instructional media, therefore, are such things (materials and equipment) that can help the teacher to communicate effectively needed knowledge or ideas to the students; such that at the end of such instruction, the student can be that which the teacher predetermined in his objective statement. As Nwanna-Nzewunwa (2003) puts it, "instructional materials are those materials that are used to arouse students' learning." They are also called teaching aids, which brings life to learning.

The term electronic as defined by Chimedu, Nwanna-Nzewunwa and Michael, (2010), as something having or operating with the aid of, many small components (example microchips) that control and direct an electric current. Thus, electronic calculators, electronic keyboards, electronic dictionaries, electronic bibles, are all examples of electronic equipment. Electronics is the branch of science and technology that deals with the behaviour of electric currents in electronic equipment. Electronic media relates materials, equipment, and processes that utilize electronic technology to pass on information, knowledge and ideas to people living in society. For instance, radios, televisions, computers, e-mails, and projectors can be used by instructors to educate their students effectively. They are special types of instructional materials.

(Vikoo, 2003) Thus, educational technology has been "a systematic application of scientific or organized knowledge to identifying and analyzing educational problems, evolving and managing programs for solving these educational problems. "Literally, media that use electronics or electromechanical energy for the end user to access the content are called electronic media (Chiu, 2012). This kind of media are opposite with print media that end-user does not need to use electronics or electromechanical energy to access its content although print media were created using electronic tools. Video recording, audio recording multimedia presentation, slide presentation, CD-ROM, and online content are the primary sources of electronic media that familiar to the general public. Any equipment used in the electronic communication process for example, television, radio,

telephone, desktop computer, game console, handheld device may also be considered as electronic media (Chiu, 2012).

Meanwhile, education technically is the formal process by which society deliberately transmits its accumulated knowledge, skills customs and values from one generation to another (Kumar, 2012) in Chiu (2012). Education can be divided into two primary divisions, is teaching and learning. Teaching is imparting knowledge to or instructs someone in how to do something, especially in a school or as part of a recognized program (Smith, 2004) in Chiu (2012) Then, learning is the process of acquiring knowledge or skills in something through study or experience or by being taught (Smith, 2004). In Chiu (2012) from generation to generation, education is the main part in our life.

Information Technology has a feature which is particularly suitable for tertiary education. It combines and integrates a full range of media essential for effective learning. The Information Technology uses sounds, vision, text and numeric data which provides lecturers with new opportunities and in particular, distances learning and involvement in the real-world. There is also the opportunity to increase the interest and involvement by the one to one relationship provided by the student and computer and it provides students with opportunity within an opportunity to work and learn on their own.

When teaching and learning process is assessed critically in tertiary institutions in Nigeria, it could be observed that the challenge for lecturers in tertiary institutions is in not having access to Information Technology and using it to enhance quality

of teaching and learning (Igbinoba, 2008). Milken Exchange on Education Technology (1999) as cited by Onasanya, Shehu, Oduwaiye, and Shehu (2010) identified three major ways of using Information Technology for teaching and learning. These are Information Technology (IT) assisted learning, technology as a tool and computer for information. Teaching and learning are persistent process. Because of this persistent process, people are competing with each other to become the best among others. So, they generated many techniques to enhance their study performance. One of their techniques is using electronic media to enhance their study performance. In addition, the researcher main field for this study is assessment of the use and competence of teachers and students of in tertiary institutions to ICT in Kaduna State, Nigeria.

Teaching is defined by many scholars as "the promotion of learning". The teacher must provide appropriate conditions for learning. Others define teaching as helping other people to learn. Teaching is an art of impacting knowledge, skills and attitudes, in the most effective way possible. It is guiding someone to behave in a given or certain manner beneficial to himself and the society. It is essentially a system of interactions involving the teachers, the students and the learning materials, thus forming a triangular interaction as shown below.

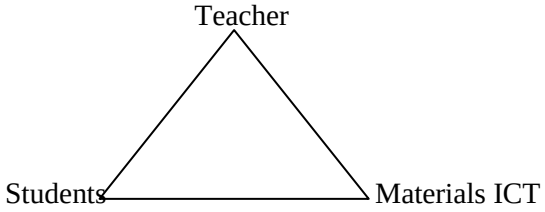


Figure 1: Teacher/Student

The triangle represent a connector the source computer and the society MTH 262 (NTI)

Here it is possible for the teacher to interact with the student learner and the ICT materials and at the same time while the students too can interact with both the teacher and the ICT materials. Teaching is an old craft with the need to formalize education. It has become a job open to all that have some expertise to share with others.

The basic fact about the computer

- Imput – processing – and output

Preparation of Lesson Notes in ICT Computer

ICT Computer: As a teacher, you are normally expected to prepare Lesson Note on a particular topic; you first of all, gather all the available materials on the topic. These may include books, articles in newspapers and journals and possibly some other related lecture notes. These materials constitute the input. The processing involves reading through all the materials gathered, jetting down the main there from and writing a final version of what you want to teach and how you want it.

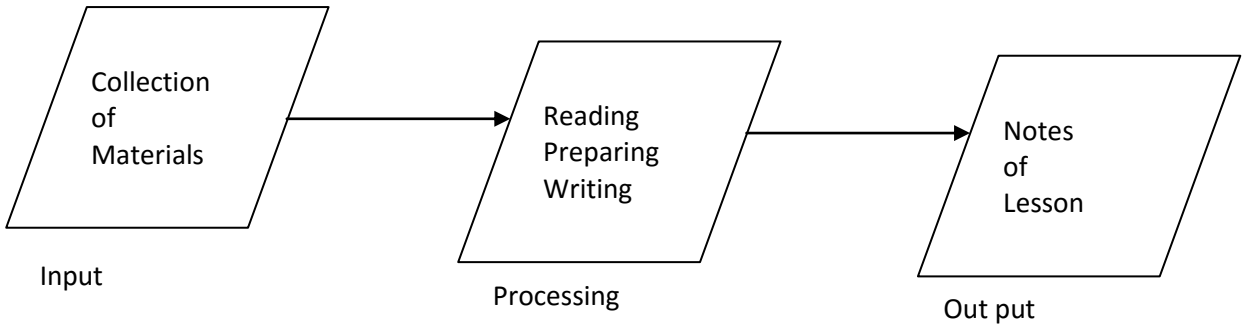


Figure 2: Flow Chart

This kind of diagram which displayed the basic procedures is called a flow chart.

The teaching/ learning process is inevitably involved in information passage from the teacher (sender) to the learner (receiver) and vice versa on a regular basis. This has been

done over the years in communication and to the most recent electronic communication. Torruan and Abur (2013) in his view states the following points on the need why teachers must employ (ICT) in classroom

a. ICT helps to Concretize abstracts issues and topics
b. They motivate students interest on the topics being discussed
c. They develop continuity of reasoning and coherence of thought which acquires wells with the inter disciplinary nature of other subjects
d. ICT saves times and as things presented are almost self explanatory
e. Energy is saved from too much talking and writing
f. They help to appeal to students interest and this is because they tend to appeal to students difficulties as well as take care of students individual differences.

Implications for Teachers using ICT in Classroom Teaching

Potentials	**Implications for Teachers**
Dynamic learning	Students may learn outside the teacher's area of expertise. more difficult to direct and manage student learning.
Student motivation	Students are easier to manage and direct towards the tasks. students may be distracted by the computer from the tasks the teacher has intended.
Removing tedious task	More satisfying for teachers to direct less tedious task. Some teachers may prefer students to complete tedious routine tasks as "busy" work.
Instruction to fit the learner	Relieves the teacher for needing to spend a lot of time with student who need extra practice, catch – up or extension work.
Independent learning	Learning may not direct itself towards the teacher's objectives. additional coordinator of the classroom, students and materials required.
Extending student Thinking	Students thinking may go beyond teacher's experience or capabilities which may reduce the confidence of the teacher.

2.4 Concepts of Use

Use: The manner in which the teachers employ the available ICT classroom instructions using their skills knowledge and availability to organize, store, retrieve and disseminate of information this means the ability of both teachers and students to use technologies to enhance teaching and learning process.

Aduwa – Ogiebean and Iyamu (2005) enumerated four ways of utilizing Information and Communication Technology. These includes using Information and Communication Technology to enhance education efficiency through the use of careful programmes to ensures learners are accurately and systematically instructed; Information and Communication Technology can be utilized to enhance problem solving skills of the learners by focusing on thinking skills of the learners especially in subjects such as mathematics. Information and Communication Technology can be utilized for individualized learning and it can be used for administrative functions. This means that if information and communication are effectively utilized in tertiary institutions, it will enhance individual learning. Students will be systematically instructed and most of administrative problems can be solved through it. The extent of its utilization however will determine whether positive results can be yielded. There was therefore the need for this is tertiary institution in Kaduna state of Nigeria.

2.5 Concept of Competence

Competence is defined as the ability to combine and apply relevant attributes to particular tasks in particular contexts. These attributes includes high levels of

knowledge, values, skills, personal disposition, sensitivities and capabilities and the ability to put those combination into practice in an appropriate way. An ICT competence describes what a teacher should know to be able to use technology in his/her professional practice. A cluster of related abilities, commitments, knowledge, and skills that enable a person (or an organization) to act effectively in a job or situation.

Competence indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career.

The capacity of a person to understand a situation and to act reasonably. Disputes regarding the competence of an individual are settled by a judge and not by a professional (such as a doctor or a psychiatrist) although the judge may seek expert opinion before delivering at a judgment. Also called legal capacity.

Competence is the ability of to do something successfully or efficiently.

1. **Elements of Competence:** The following are elements of a competency – based system.

(a) Intellectual mission that focuses on resources and behaviours on preletive habits of mind and preparation for participation in college, career, and civic life.

(b) Standards that express in some detail what students should know and be able to do.

(c) Progress monitoring historically through grading and achievement recognition on systems, thought of as class rank.

(d) **Grouping and Scheduling Systems** – when, why and how groups are used when learning not age charts in the dominant organizing principle.

(e) Reputing to the outside world that still thinks in courses credits and grades.

(f) Content that supports self – directed and customized learning.

(g) Tools that facilitate standards – based challenges, collaboration and scheduling.

(h) Teacher support, preparation and developing for a dynamic environment with differentiated (i.e. different levels) and distributed (i.e. different locatives staffing.

(i) Evaluation having and how experiences and adults are contributing.

(j) Community connection and supports for student success.

2. The Importance of Competence

Competence alone can't make a Teacher, but it can undo one. While inaction is a prime problem facing many organizations (and individuals for that matter) there's the very real possibility that one is doing the wrong thing. An incompetent teacher has almost unlimited opportunities to be ineffective. Knowing what to do professional competence is vital. Being competence doesn't mean that a teacher knows how to do everything, but rather that they know what to do and how to get it done. Even the most brilliant teacher who tries to go it on their own is setting themselves up for failure. Teacher will

know where their strengths and weakness lie and thus know what kind of expertise they will need to surround themselves with.

While many “teachers” are often selected for their competence alone, competence is something different from character or leadership competence, and should not be confused. We have placed too much emphasis on professional competence and not enough on character and this has gotten us into trouble. Traditional business schools have excelled at teaching professional competence, but have mostly failed to impress on individuals the need to develop a moral compass to use those skills appropriately.

Yet, competence is a critical part of the whole leadership picture. Socrates believed that the “one who clearly knows best what ought to be done will most easily gain the obedience of the others.” Competence engenders confidence in a teacher. Competence, trust and loyalty are “inextricably interwoven” says in Extremis Leadership author Thomas Kolditz. “Teachers competence is usually at the root of loyalty and trust problems. “ He writes: Most teachers have gotten to their profession in life through their own competence, but that becomes lost on followers unless the leader’s competence is occasionally revealed by action. Some teachers try to build trust and loyalty through social events such as golf or team building activities, but loyalty and trust problems can’t be fixed with a trip to a rock-climbing school. Teachers need to take the time and effort to show students what they’re good at and why students should be confident in the teachers ability. Use care, however, never to upstage or embarrass someone else have you

demonstrated competence. In the end, competence is about the success of your people, not about you.

According to Debesaki (2005), the problem of competency in computer skills in relation to teaching and learning range from understanding what this new dimension is all about inability to cope with the facilities associated with it. The degree of uncertainty as regards to the level of use of ICT facilities confirms, as many of the teachers do not know how much of the basic computer skills, not to talk of the complex ones that will aid their teaching.

The worse situation is that quite a good number of staff in these institutions are not bothered about learning the skills of computer usage as they believe there are experts in that field whose services can be employed to serve their purpose. Furthermore, lack of confidence on the part of the teachers to learn the computer could explain why a good number of lecturers are uncertain about the skills involved to facilitate learning using computer assisted instruction integrated learning systems, and collaborative, network technologies for instance, information and messages can be effectively presented to the students interactively by drill, practices tutorials, dialogue, hands – on experience, simulation and software based on high level thinking. Computers present materials or problems situations to students, guide their thinking responds to their question and manage their performance. In essence, computer is used to instruct so as to achieve the desired level of proficiency. The researcher observed that according to Ololube (2006) that the teacher training programme provided by

Nigerian Institution of Higher Education are rendered by the lack of effective use and provision ICT in structural.

Uche (2006) observes that Information and Communication Technology helps in effective delivery of teaching and learning in the most efficient and reliable way which often leads to quick and better comprehension of knowledge for effective outcome, the point however, is that if teachers who are the instructors are not competent in ICT usage, the students will be handicapped. The infrastructure would have to be properly put in place to achieve the desired objectives, and gain the competencies for effective use though the fact that some institution have some of the ICT facilities being used by teachers and students for teaching and learning is still remote.

2.6 Competency-Based Education (CBE): History and Overview

CBE is an institutional process that moves education from focusing on what academics believe graduates need to know (teacher-focused) to what students need to know and be able to do in varying and complex situations (student and/or workplace focused).

CBE is focused on outcomes (competencies) that are linked to workforce needs, as defined by employers and the profession. CBE's outcomes are increasingly complex in nature, rather than deriving from the addition of multiple low-level objectives. CBE often necessitates more complex assessment, involving portfolios, experiential learning assessment in field experience, demonstration in varying contests, role play, use of standardized patients or clients, etc. Large skill

sets are broken down into competencies, which may have sequential levels of mastery. Competencies reinforce one another from basic to advance as learning progresses; the impact of increasing competencies is synergistic, and the whole is greater than the sum of the parts.

Competencies within different contexts may require different bundles of skills, knowledge and attitudes. The challenge is to determine which competencies can be bundled together to prove the optimal grouping for performing tasks. Another challenge is designing learning experiences that support students as they practice using and applying these competencies in different contexts. Continual refinement of defined competences is necessary so that enhanced performance in a variety of contexts can be assessed. In essence, CBE is a process, not a product.

CBE is more than an effort to describe or list educational and behavioral objectives the early emphasis on behavioral learning objectives was on reliable observation and judgment. To this end, writers of behavioral were encouraged to state outcomes in operational terms, which can be observed using consistent observational processes allowing for no interpretation (Bloom, 1971). In an attempt to achieve this reliability, a behavioral verb from a list of behavioral verbs (eg, state, list, name, recognize, describe, calculate, describe, explain, synthesize, analyze) was required to begin the objective. It is this narrowness that led to the criticism of these approaches then and now; attainment of the multiple behavioral objectives did not equal students' workforce functionality.

Competence of Nigerian Teachers in ICT Skills

Since availability and accessibility of ICT posed major problems. The acquisition of skills in ICT usage will be a problem. According to Agbo-Ola (2005), research pending suggest that information and communication technology is significantly under-used by students and teachers. The problem is world-wild and many explanations were offered for it among them being the unavailability and/or inaccessibility of resources in schools. The scarcity of opportunity to use computer has been cited as reason why students and teachers were slow in the ICT update (at Lubbe, 2006) and the lack of experience and training of the pre-service level in using (Idowu and Adogunodo, Emmanuel and Popoola, Bayode 2003).

In addition, the lack of teacher or teacher or teacher trainer's encouragement to students on using ICT in schools and the lack of confidence on the part of students and teachers and their trainers in computing skills were cited as reasons for the low ICT use. Own study Abubakar (2006) in his study on the availability of ICT facilities in Ofe Federal Polytechnic found out that lecturers in this polytechnic were competent in all the six areas of ICT skills presented namely word processing, spreadsheets, database, internet, E-mail and power point. These findings disagreed with the view Yusuf (200% that over 60% of male and female lecturers in Nigeria higher institutions of learning do not have minimum experience in the use of ICT. The founding of this study may therefore not be unconnected from those of previous researchers.

Regardless of the quantity and quality of technology available in classrooms the key to how ICTs are used is the teacher; therefore, teachers must have the competence and the right attitude towards technology (Kadel, 2005). Competence is defined as the ability to combine and apply relevant attributes to particular tasks in particular contexts. These attributes include high levels of knowledge, values, skill, personal dispositions, sensitivities and capabilities, and the ability to put those combinations into practice in an appropriate way (Commonwealth Department of Education, Science and Training, 2002). An ICT competency describes what a teacher should know to be able to use technology in his/her professional practice.

Kirschner and Woperies (2003) highlighted some major ICT competencies teachers require. These include competency in:

a. Making personal use of ICT;
b. Mastery of a range of educational paradigms that make use of ICT;
c. Making use of ICT as minds tools;
d. Using ICT as tool for teaching,
e. Mastering a range of assessment paradigms which involves use of ICT; and
f. Understanding the policy dimensions of the use of lCT for teaching and learning.

Similarly, Marija and Palmira (2007) classified ICT competencies into two: basic and educational ICT competence. In Nigeria, higher education institutions still have a long way to make optimal use of ICT in the learning process as the ICT

competencies of the majority of teachers at this level is at the basic level, if they have any at all.

Traditional Versus ICT Resources Based Learning

Traditional Learning	ICT Resources – Based Learning
Textbook as primary source	Variety of sources/media
Facts as primary	Questions as Primary
Information is packaged	Information is discovered
Emphasis on product	Emphasis on process
Assessment is quantitative	Assessment is qualitative/quantitative

Emergence of Instructional Machine

Computer based instruction borrowed its antecedent from programmed learning. The original concept of programme, learning was an educational technique characterized by self-paced, self-administered instruction presented in logical sequences and with much repetition of concepts. Adballa, (2006) noted that the proponents of programme learning, B.F. skinner and J.A. Mc-Geoch maintained that pre-occupation with theory was misguided. For them, the approach simply was to discover the condition that produce and control learned behaviour.

Beyond this, their interest diverged. Skinner studied instrumental conditioning (operant conditioning as he called it among rats) and McGeoch specialized in human rate learning. Despite the divergence of their opinions they still stuck to

their empirical guns, giving a variety of programmes for the practical control of behaviour. Teaching machines, computer-aided instruction, behaviour modification and planned utopian society all found scientific origins in skinner's rejection theory in favour of direct efforts to provide results.

The original teaching machines are mechanical devices used for presenting a programme of instructional materials. Abdulla, (2006). All teaching machines defined on a programme, that is, a series of question presented that provide a student with a certain amount of challenges as well as a chance to learn. These machines are particularly useful in subject that require drill, such as mathematics. In a classroom situation, the machine, relieve teachers of some of the time-consuming aspect of drilling students, hence allowing them to give more attention to individuals with specific problems or to concentrate or particularly difficult areas of instruction.

According to Adballa, (2006) it is from these roots, that a more sophisticated concept of information and communication technology came to being used in teaching and learning. The use of computers in education started in 1960. With the advent of convenient personal computer in the seventies, computers became a household item.

Adballa, (2006) observed that instructional computers are basically used in one of the following two ways: either they provide a straightforward presentation of data or they fill a tutorial role in which the student is tested on comprehension. Accordingly, if the computer has a tutorial program, the student is asked a

question by the computer, the student types in an answer and then gets an immediate response for the answer. if the answer is correct, the student is routed to more challenging problems, if the answer is in-correct various messages will indicate the flaw in procedure and the program will bypass more complicated questions until the student show mastery in that area.

Computers can be programmed to process information and to develop classification rules. They are programmed to mimic the process of problem solving required of subjects in laboratory experiments on concept learning. It is evident now that human concept formation based on any mode of handling information can be built in a machine, in fact, Adballa, (2006) remarked further that, it is almost an article of faith among many investigators that human thinking can be explained mechanistically in physiological terms. Some of the educational principles and guidelines underlying programmed instruction and learning theories which make information and communication technology valuable techniques as enumerated by Modun (2005) are: Goal oriented learning: the programme instruction aims at specific knowledge or skills, all trivial, irrelevant and superfluous materials are excluded. Logical sequence: in programme instruction the steps are organized in an ‘optimum’ order. The programmer spends many hours analyzing the task and the concept to be learned As, a result of this extensive analysis, each frame is related to those which preceded it.

Optimum Step Size: Rather than requesting the learner to digest large amount of materials, programmed instruction breaks the materials into smaller, more digestible pieces. Most programme have held the opinion that the optimum step

size depends upon the nature of the content as well as upon the students for whom it is designed.

Active Participation: Most programmers agreed that students are more likely to learn what they experience firsthand, that is learning results from active involvement. A teacher can expose student to textbooks, lectures and films, to which the student may not respond. But in programmed instruction the student responds to the materials in every frame. Consequently, he becomes actively involved throughout the learning process. This opinion is found to be very relevant to the study as ICT has been found to make students respond to it in form of processing, sending and retrieval of information.

2.7 History and Development of Information and Communication Technology

As early as 1986, Nigeria had expressed keen interest in becoming part of the emerging global trend and was searching for appropriate ways and means to actualize her ICT and computer policy.

Historically as at 1994 there were more than 200 registered companies in Nigeria offering a broad range of computer related services. Most of them were set up between 1977 and 1982 to take advantage of the indigenization decree act in the then prevailing boom. A partial survey conducted in 1986, involving 47 computer companies showed that 88 percent of these were vendors, 79 percent were consultants, 70 percent offered training services, 105 percent had maintenance facilities while 45 percent offered Bureau Services In line with the realization of its objectives, the Federal Government of Nigeria during the 32nd Ministerial

Council Meeting of the National Council of Education in 1987, decided to introduce computer education into her school system and this was followed by the inauguration of the National Committee on Computer Education the same year. The functions of the committee included planning for a dynamic policy on computer education and literacy in Nigeria as well as devising clear strategies and terminologies to be used by the Federal and State Governments in introducing school computer education (Nigeria Tribune, April 11, 1988). The general objectives of the policy include:

1) To bring about computer literate society in Nigeria by the mid 1990s.
2) To enable present school children to appreciate and use the computer in various aspects of life and future employment.

The modalities and the strategies for achieving the stated objectives include:

1) Training the teachers and associated personnel
2) Procurement of hardware facilities
3) Curriculum development
4) Software development and evaluation
5) Maintenance of hardware and peripherals.

The policy recommended a continuous evaluation of progress. The starting point of the evaluation is to compare existing school practice with policy stipulation. This will provide a framework for policy revision. Furthermore, the Federal Government in the year 2001 made some efforts to improve ICT trend in Nigeria with the publication of National Policy on Telecommunications and other policies

through her agencies such as the Nigeria Telecommunication Limited (NITEL) which published a National Policy on Telecommunication. According to Arzinka (2000) this policy provided more telecommunication services, mobile phone services, audio visual services and internet services.

With regards to computer education there are categories of institutions identified as providing computer education in Nigeria. These include:

1) Tertiary institutions set-up by status examples Universities, Polytechnics, College of Technology, College of Education, etcetera
2) Institutions that run professional computer education courses and training for public exams and international certificates example CPN, BCS, IDPM, international certificates developed by Microsoft, CISCO, Hewlett Packard, Oracle, sun, micro systems, etcetera
3) Institutions that run computer literacy programmes including computer awareness, appreciation, computer utilization and use of computer packages,

   For (1) and (2) of such educational programs the aim is to produce professionals with expertise in high demand areas such as programming, Technical support, engineering, database, information warehousing, networking, web development,

Research, internet and e-commerce. Since ICT is the infrastructure of the knowledge economy, such skilled professionals are needed to create, operate, design, maintain, programme and deploy information and communication technology solutions. In addition to (1), computer science and engineering

graduates produced can be involved in hardware and software research development. For (2), the aim is to produce, improve the level of computer literacy of students and working professionals irrespective of their course of study or profession.

However, even with the regulatory and professional role played by the National IT development Agency (NTIDA), established by the government with the responsibility of the National ICT policy and the facilitation of the use of ICT as a tool for national development, NITDA has been hampered by a lack of legislative backing which they secured only in December 2006, and which has limited its effectiveness, coupled with the lack of human and financial resources to facilitate its work.

In connection to ICT services available in educational and Research institutes, the Nigeria ICT 4D Annual Review (2007) described the following scenario:

In most of the educational and research institutes visited, the ICT infrastructure has just been put in place. There had been computer systems available for so many years but their use limited toward processing. The ICT drive in most of the educational and research institutes visited is on internet service provision. A lot of the institutes have achieved this using government allocation and private grants. All the educational and research institutes visited had computing equipment, such as computer systems, printers and scanners, while internet service in most of the institutes is a recent development. There was a wide range of computing

equipment available in the institutes most institutes had a mixture of branded and assembled computer systems.

The number of laptops in most institutes was very few. The computer-to-reseller ratio was very low, about 2:1 in most of the educational and research institutes. This may be due to lack of physical security at the educational and research institutes or a low priority of computer facilities on the institute's list of needs. It was also discovered that the computing needs of the administrative staff have priority over that of research staff.

The National Universities Commission (NUC) recently carried out training March, 2005 – an equipment audit, including computing equipment of all federal universities, access to the information was to be made available on the commission's website. However, on enquiry the information was yet to be processed. In addition, almost all the institutes have a Local Area Network (LAN) which was usually wired and may be restricted to the resource room, the library or the main building of the institute.

This scenario in ICT usage and infrastructure in some of the educational and research institutes only goes a long way to show that a lot need to be done to attain the stated national development priorities on ICT, to start with, there is a dearth of structures on the ICT sector and the effect of ICT on the sectors. Such information is critical for planning policy analysis and decision making. This research served this purpose.

2.8 Objective of Information and Communication Technology

The programme of ICT policy was anchored on the National objectives is contained in the Second National Development Plan 1970 – 74. These objectives include making Nigeria.

a. A free and democratic society
b. A just and egalitarian society
c. A United strong and self reliant nation
d. A great and dynamic economy
e. A land of bright and full opportunities as for all the citizens.

According to the National Computer Policy of National Policy on Education (2004), the objectives of information and communication technology includes:

(1) To ensure that the general populace appreciates the impact of information and computer technology on today's society, the importance of its effective use, and the technologies that process, manage, and Communicate Information.
(2) To ensure that people know how to use and programme computer and their history and to appreciate the economic, social and psychological impact of the computer.

In line with the objectives it is important that all and Sundry should posses literacy among other competencies so that they can be adequately guided in the use of Information and Communication Technology. From the above objectives, information and communication technology in Nigeria is gradually becoming a skill everyone must possess. Most importantly in the tertiary institution since

Nigeria as a nation depends on them for technological advancement, growth and survival.

2.8.1 Objectives of ICT in Education

The Federal Ministry of Education (2010) states the objectives in the long term vision of ensuring equal access to quality basic education for all citizens and to integrate Nigeria into the knowledge based economy. The objectives amongst others include to:

1. Provide access to ICT for all teachers and learners.
2. Promote education for all through usage of all types of electronic media.
3. Emphasize the role of ICT as a tool for teaching and learning.
4. Use ICT to increase efficiency and effectiveness of the tertiary institutions system.

According to Manjulika and Reddy (2002), access to ICT varies enormously from country to country. This is particularly evident when comparing developed and developing countries showing a stark digital difference. In view of actualizing these objectives, there is need for adequate funding and provision of material resources required in every school system for effective teaching and learning process by the government, private donors and Non-Governmental Organizations (NGO's) due to the capital intensive implications involved. Furthermore, Onwumere (2012) stated the need for teachers to become more effective and competent in service delivery in the following areas:

1. Critical thinking
2. Broad competencies

3. ICT competencies to enable expert work
4. Decision making
5. Handling of dynamic situations
6. Working as a member of team
7. Communication efficiency

By possessing these qualities, teachers will be functional and they will be kept abreast with information regarding their subject matter.

2.8.2 ICT and Teacher Education in Nigeria

Teacher Education in Nigeria has undergone many changes ranging from its earliest time of predominant use of chalk and talk to the integration of the new ICT facilities. As of now ICT has been integrated into the planning and classroom teaching in the country. The reasons for the integration of ICT in teacher Education Programme are not far-fetched.

Hjay; (2001) Opines that the new ICT facilities could allow teachers and lectures, to move into the roles of guides and facilitators assisting students to gain skills required to acquire and utilize knowledge available in various forms all over the world.

Programme in Nigeria includes the followings:

(1) Facilitating an increase in teacher turnover especially in disciplines where there is lack. e.g. mathematics, sciences, English Language, etc.

(2) Enhancing the quality of teacher education by exposing pre-service and in service teacher to resources and information beyond their immediate horizon.

(3) Limiting or eliminating the requirement for building large classrooms, laboratories and libraries.

(4) Easy adoption by bodies responsible for teacher education like the National teachers institute (NTI), Colleges of Education, Faculties or Institutes of Education in Universities and school of Education in National Open of Nigeria.

(5) Enhancing easy handling of large student population and accessibility to information by learners of open and distance Education Programmes from their Headquarters, Facilitators and Elsewhere.

(6) Simplifying the task of the teacher, lecturer or facilitator while the scope of interaction with materials and men by students is broadened.

2.9 Types of ICT Instructional Media

Instructional media can be the defined as a systematic way of planning, designing. Implementing and evaluating the total process of teaching and learning based on specific instructional objectives, using available human and non-human elements to improve the quality of instruction. The various instructional media in teaching and learning process cannot be underestimated. The under listed are what Karima (2008) considered as the advantages of media utilization in instruction.

(1) Increase the rate of learning and at the same time allow the teacher to use more time on other gainful activities.

(2) Reinforce verbal and visual messages. Pupils would generally find it difficult to understand abstract ideas discussed by their teachers. However, if the

abstract ideas are put inform of models, pictures etc students understand them with ease and they remain permanent in their memories.

(3) Through the use of media, emphasis is placed on realistic learning rather than rote learning.

(4) Instructional media have a way of motivating and arresting pupils attention, environment for realistic and enjoyable teaching and learning atmosphere.

(5) Terms and concepts that are abstract are best illustrated through the use of instructional media.

The major task of a teacher is done in the classroom where he/she is with the learners, with the purpose of effecting learning. In order for him/her to accomplish this role, he/she needs to comprehend and put into practice the principles of instructional technology. Even as teacher manager, the knowledge of instructional media is considered vital.

a. Audio Media:

Audio media offer a wide range of opportunities for group or individual use. They can be used to deliver instruction involving verbal information, and also for guiding the learning of intellectual and motor skills. With the availability of small compact cassette recorders, audio medium can be produced by teachers. It can also be used to supplement to other media like filmstrips and slides. They are also relevant for learning objectives related to the affective domain of learning. Audio recording can provide response drill in mathematics, and language. Furthermore, several copies of the media can be produced easily. Audio medium is equally

good for all types of instruction, from the precision of speech to the mental formed by music and sound effect.

b. Overhead Projectors:

Using the overhead projector, transparent materials are projected so that a group can see. It is simple to operate, and it is a versatile media for teachers to use. Transparency can face the audience from the front of the room and maintain eye-to-eye contact with students while projecting transparencies in a lighted room.

c. Slide Projectors and Filmstrip Projector:

Slide projectors are used to project slides-small format photographic transparency in colour or black and white, individually mounted and used to transmit instructional content. On the other hand, filmstrip projectors project images container in filmstrips, which are series of small slides photographed in permanent sequence on a 35mm or 16mm film either in colour, or black and white. Some filmstrip projectors can also be used to project slides. Teachers can use filmstrips and slides to enrich their instruction. They are less expensive, easily handled and stored for future use. They are adaptable for use in every subject area, and the rate of presentation for classroom use/can be controlled by teachers using remote, reverse, and advance mechanisms. Their presentations can be accompanied with print or audio recording.

d. Film Projector and Video Player/Projector:

Film projectors and videotape projectors are used to project motion pictures, when motion is a significant factor of a subject. Educational films are in black and white, and colour. There are also sound and silent motion pictures. Videotape availability has further widened the possibilities for the use of motion pictures, as they can be shown through monitor, that is, cathode ray tube, or projected using video projector or through the digital projector, for group use.

Motion pictures are relevant for all subject disciplines, in sciences, art, social sciences, and physical education. Motion pictures when accompanied by sound, may constitute a very effective way of emphasizing distinctive features for the tasks, which needs distinguishing the visual aspects of simulation. Motion pictures are also very good for ensuring student's positive attitude toward the subject of instruction. They can also be used to modify students' attitude in such areas like ecology, good work habit, hygiene in health education, and so on.

e. Multi-Media Presentation:

This involves combinations of visual materials. It is a learning resource package, which can be effective when several media are used concurrently for specific instructional purposes.

When two or more pictures are projected simultaneously, on one or more screens for group viewing, the compound concept multi-image is used. However, when two or more different types of media are used, sequentially in a single instruction or for self-paced learning package, the term multi-media is used. Using multi-

media or multi-image, a large amount of information can be passed across to students, and high interest can be created in students.



OVER HEAD PROJECTOR



PROJECTOR



PROJECTOR



FILM PROJECTOR AND VIDER PLAYER



AUDIO MEDIA



FILM SIGNATURE



Storage with Computers



SPEAKER



Computer set



Electronic Mail



Video Conferencing Room



Projected Conferencing Room









Search Engine



Music Studio



Projector



Audio Player



Video Prayer/ Burner on recorder



Desktop Computer



DSLR Camera

Figure 3: TYPES OF INSTRUCTIONAL MD

2.10 Factors Influencing the Use of Electronic Media in Teaching

Several authors (Ethmke et al., 2004, Cuban et al., 2001) have pointed out that cooperation and communication between teachers, such as the exchange of ICT experience and mutual encouragement to use electronic media, has a positive effect on the willingness to utilize electronic media in the classroom.

Another variable, which influences classroom use of electronic media positively, is teaching style. For instance, "Computer-using teachers (…) are distinctively more constructivists than non-computer-using teachers". Constructivism claims that skills and knowledge cannot be directly transmitted from teacher to students. The theory suggests getting students to articulate their understanding, and defending them against contrary points of view, claiming that understanding comes from individuals expending effort to integrate newly communicated claims and ideas with their own prior beliefs and understanding. Further states that using computers should fit into existing skills of teachers and should not demand for too much effort to change. The literature on factors which impact the use of electronic media in classrooms positively has identified the teachers' openness to change as a key issue.

In addition to variables which have a positive influence on classroom media use, a number of variables have been identified, which have a negative influence.

It is common knowledge that teachers are not able to make full use of electronic media because they lack the time needed to prepare teaching material using electronic media. Additionally, time is also needed for teachers to learn electronic hardware and software computer skills. An important additional determinant of

teachers' engagement in the use of electronic media in classroom is their confidence in using technology. Teachers with little confidence in using ICT in their work will try to avoid them. Reported that many teachers who were not using computers were doing so because they lacked confidence with, or felt frightened by computers.

Thus, lack of ICT-competence is clearly a barrier to teachers' use of electronic media in classrooms. "Teachers who have a reasonable amount of technical skill and who use computers to address their own professional needs use computers in broader and more sophisticated ways with students than teachers who have limited technical skills and no personal investment in using computers themselves." Similar results have also been found by others.

Based on the above literature, an exploratory model that incorporates factors that have both positive and negative impact on use of media in a classroom by teachers can be provided (See Figure 2).

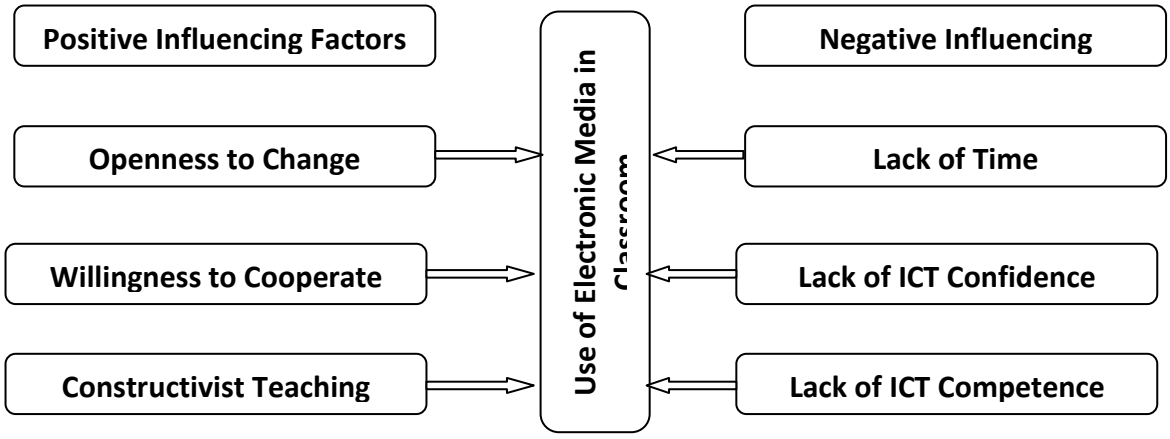


Fig. 3: Teachers' Characteristics influencing the use of Electronic Media in Classrooms

2.11 The Role of ICT in Teaching and Learning

ICT in the form of Electronic Media in Teaching has provided a new perspective and opportunity to motivate and engage teachers in professional development programmes. ICT can contribute significantly to all the three components of professional development: (Anderson & Glen (2003).

a. Firstly, it can bring world experiences into professional training by providing good teaching and learning materials, facilitating simulations and capturing and analyzing best practices of teaching.
b. Secondly, ICT can open a world of flexible lifelong professional development programme by offering training anytime and anywhere.
c. Finally, ICT can break the professional isolation of teachers by connecting them in a virtual network and with valuable resources of teaching and learning materials.

Until teachers are given due recognition for the key role that they can play and encourage them towards innovation, the transformation level of ICT integration becomes a harder target to reach, in order to create successful programme for capacity building and for teacher to become pioneers, inventors and shapes of the new culture of learning, professional development programmes should consider the following elements:

e. Inspire teachers to invent
f. Focus on experimental learning
g. Conduct need assessments

h. Provide greater opportunities for feedback and reflections

i. Improved teacher competence in ICT integration, (Anderson & Glen (2003)

Professional development refers to a variety of activities, both formal and informal, designed for the personal and professional growth of teachers with respect to pedagogy-technology integration. Professional development includes individual development, containing education, in-service education or staff development, as well as, various professional developmental activities. It involves a wide variety of curricular to ensure that the teachers acquire and maintain the required competencies to face the diverse challenges of pedagogy-technology integration. It is concerned with the development of new insights into pedagogy and stimulates an on-going reflection into one's own practices.

Various professional development strategies exist for the successful implementation of pedagogy-technology integration. The strategies recognize the diversity within the region in terms of culture, languages and ethnicity. They encourage innovative practices. The strategies also focus on incorporating ICT development, education reforms and professional development of teachers in national policies and plans. National plans and programmes require taking into account teachers' needs and concerns, particularly those related to their professional development. Commitment and support at various levels (facilitators, policy makers, communities and other stakeholders) are crucial in facilitating successful implementation of any national policy. Teachers may find it impossible to incorporate ICT into their work without support from peers, parents, leaders and other stakeholders. To bring this about, these community members may also

need professional development along with the teachers. Countries that have initiated efforts to infuse ICT into teacher education have found the following professional development strategies to be helpful in successful technology integration: (Anderson & Glen (2003).

a) Professional development programme on ICT integration places pedagogy over technology. The focus lies in teaching and learning rather than hardware and software alone. In other words, it is not only about mastering ICT skills but also utilizing ICT to improve teaching and learning.
b) Professional development of teachers requires adequate access to ICT resources in the classroom. The better the access to ICT, the more likely it will be used for instructional purposes. This is a big challenge across the Asia-Pacific Region because of the diversity of institutions and the difference in resources Anderson & Glen (2003).
c) A 'Just in Time' (JIT) approach to professional development is a model that works well. In this approach, professional development is provided to teachers on a as-and-when-required basis.
d) Capacity building is a sustained, continuing and lifelong process. It is not a one-time activity. Teachers need to update their knowledge and skills as the school curriculum and technology changes Individual develop in stages and mature over time. Developing Capacity for Continuing Teacher Development.
e) Professional development is a building process. Preferably it starts with what teachers do well in the classroom. Teachers can then gradually build their

skills and knowledge in successive steps, towards pedagogy-technology integration.

f) Capacity building should be based on learning needs and skills of individuals. A detailed needs assessment is essential in order to identify gaps between the present status and the target to be achieved.

g) ICT has the potential to break the professional isolation from which many teachers suffer. ICT provides a suitable means of connectivity with universities, peers, mentors, centers of excellence and the sources of teaching and learning materials.

While developing professional development strategies, one requires taking into account the following guiding principles to promote pedagogy-ICT integration in its proper context.

a. Infuse ICT into the entire teacher education programme: pre-service, in-service, and both formal and informal teacher education.
b. Integrate ICT in all activities of education: teaching, learning and administration.
c. Empower teachers to develop knowledge, skills and positive attitudes actively towards integrating ICT in teaching and learning.
d. Integrate ICT in all aspects of learning and in all phases of the learning process.
e. Integrate ICT for lifelong learning.
f. Innovating ICT to embody and model the forms of pedagogy that teachers can use themselves in their classrooms.

g. Apply hands-on, learner-centered principles in designing professional development programme.

h. Use ICT for empowering teachers to use a variety of learning strategies.

i. Apply ICT to promote higher order thinking skills.

j. Emphasize the professional development of teachers to reduce the digital divide within and among the member/participating countries.

k. Use ICT to remove barriers between learners and facilitators.

l. Provide an authentic learning environment for ICT integration.

m. Encourage teachers to be mentors, tutors, guides and facilitators.

n. Encourage self-directed learning independent of space and time. Anderson and Glen (2003).

2.12 The Usefulness of ICT in Education

The indispensability of ICT in the teaching and learning of Education cannot be over emphasize, Abolade and Yusuf (2005) describe ICT as a powerful tool in the teaching and learning process. Information and Communication Technology (ICT) have the viable potentials to accelerate the acquisition of basic skills and knowledge required in motivating the students to learn. ICT offers the teachers of Education new role that is preparing learners to manipulate information for solving social, political and economic problems. ICT encompasses different technologies that are used for processing, transmitting and communicating data. Olalere (2005) maintains that ICT has been found very useful in space exploration, engineering, banking and other fields but its greatest influence has been found in the field of education where it has helped tremendously to

revolutionize teaching and learning. According to Jonkins and Springar (2002), ICT is a willing instructional tool which the teacher can use to present information and manager class activities in order to help students achieve their educational goals.

In other words Education Courses can benefit immensely from the potentials of information and communication technology. Orungbemi (2008:162), opines that "Education is expected in the long term to affect the social values of young learners through exposure to realities about life". Therefore, ICT is of tremendous importance in engaging all the senses of learners in examining social issues through seeing, feeling hearing, even smelling and thinking through social situation presented to them, as well as helping to develop information and communication technology knowledge and skills for individuals society at large, ICT also offers to the education process one of the most potentially powerful learning tools available (Beebe, 2004).

Teachers and Students in tertiary institutions require ICT knowledge, skills and awareness if they are to be successful in future. The nation will also depend on a high level of ICT capability from its people to develop technologically and to compete internationally (Boezerooy, 2003). However, not only can ICT support teaching and learning of Education across the educational curriculum, but communication networks also provide the learner with fast and searchable access to vast amounts of information. Thus, Olibie (2008) in line with the above view, maintains that ICT support a wide range of broader educational objectives,

including independent learning, collaboration with others, and communication skills.

For a healthy application of information and communication technology in the teaching and learning and of Education Orungbeni (2008) suggests that there is need to have an insight into its knowledge structure which should serve as the focus of the programme. He further stated the ICT can play vital roles in the teaching process of both the practical and theoretical capacity of broad areas of study.

Information and communication technology can, therefore, be applied to present teaching tasks more vividly, or presenting concepts more clearly, for the purpose of enhancing learning outcomes as learners will learn and retain more of what is taught, involving more senses for perception than hearing alone. Orungbemi (2008) is of the view that since ICT is practical based and ICT is all about disseminating information that has been tested to be factual, current and having social implication, ICT can be applied in assisting the students to store learning tasks and will give the students extra access to the lesson more than the volume they had in the normal classroom situation. It is, therefore, indispensable to all ICT teachers and students to have adequate access to information and communication technology so as to acquire the necessary skills, knowledge, and taking full benefit of the learning capabilities that ICT provides, numerous aspect of information and communication technology is of great significance to ICT teachers and students. One of these aspects is programmed instruction of ICT.

Information and Communication technology could be used to provide varieties of programmed instruction to Education classroom interaction. Akudolu in Olibie (2008) states that programmed instruction is a self-instructional technique which presents experience sequentially and logically such that a learner interacts with them in a predetermined order. Akinyemi (1998) opines that with the programmed lessons in the ICT, slow learners can go through the lesson several times and this enhances and facilities understanding.

Roiniszowskil (1994) explains that using ICT for programmed instruction involves arraigning materials to be learnt in computer software through a series of small steps designed to lead the learner through self-instruction from what is known to the unknown, new and more complex knowledge and principle, with a view to realizing specific operationally defined objectives. In utilization of ICT in teaching and learning of Education, the programmed instruction from ICT could permit ICT students to play active roles in the instructional process. In line with the above, Ike (1995) states that programmed-instruction from ICT could be used to emphasized the importance of immediate feedback in education and to propose a system of individualized instruction.

ICT has to be taught to the learners in an active, interactive and effective way through the utilization of ICT. Orungbemi (2008) maintains that the oldest presentation too used in classrooms in undoubtedly the chalkboard. It is an essential tool and will remain so in many places and circumstances. This has been replaced or complemented by “flip charts” and overhead projectors (Maiwada, 2004). ICT is a powerful information technology with various uses in education.

Taylor (1980) categorizes the educational application of ICT into three broad categories, namely ICT as teacher, ICT as learner and ICT as assistant. ICT material/principles can be used to present instruction directly to the learners. In this mode, the ICT engages in activities radically associated with teachers. Information and communication technology presents instruction, provides instructional activities or situations, quizzes of otherwise receives instruction from learners, evaluate learners' responses, provide feedback and determines appropriate follow activities. As teaching device, information and communication technology can be highly interactive, individualized and infinitely patient.

Notwithstanding, when ICT functions as learner, the traditional obligations of ICT and learners are reversed. The information and communication technology devices become the learners and students become the teachers. Students have to "teach" the ICT, to perform some task or to teach others some contents, through computer-based materials. To achieve this goal, Aremu and Okuntade (2010) suggest that students should learn how to perform the task and direct the ICT device to perform the task or present that content to others. This requires logical thinking to perform problem-solving tasks.

ICT as an assistant: ICT assists the teacher or learner in the performance of routine work task. ICT place the role of the teacher as guidance and facilitator of learning, not instructor. The teacher in Education classroom will provide all the necessary materials and information and then allow the learners to work on their own individually or in groups, while the teacher with help of ICT device guides

the process by motivating, providing example, discussing, facilitating, supporting and challenging, but not to act as knowledge conduit.

Aremu and Okuntade (2010) maintain that the use of ICT in Education studies classroom does not write off the roles of the teacher in the classroom. The use of ICT reduces the function of the classroom teacher to knowledge and meaning construction. The use information and Communication technology in Education classroom provides both the teacher and the students with the several tracks from which to retrieve knowledge and the ability to develop more complex schemes relevant to the learning experience. The teacher and students of Education will be experiencing multiple perspectives of a particular event and students will be provided with raw materials necessary to develop multiple representations. Oyibe (2011) opines that when instructional contents is presented to the students from multiple perspectives and experiences along with concrete examples, it increases the students understanding and adaptability as they will be able to examine any experience from multiple perspectives.

Utilization of information and communication technology (ICT) in the teaching and learning of Education would, therefore, make the students to realize that in almost all settings, there is more than one solution to any problem, more than one way to accomplish any tasks; since a fundamental assumption of inquiry-base instruction is that multiple solutions to any problem are possible.

2.13 Quality of ICT Usages

Not only are different media able to accommodate different sets of symbol systems, they can also accommodate them differently. For instance, the print medium can accommodate static word and still pictures. The computer can accommodate static words and pictures moving picture and sound, and has the ability to accommodate them in a different format (the words can be linked though hypertext for web pages). The quality of the learning interaction could be very strongly linked to each medium's capability of accommodating symbol systems. According to (Hawkridge 1999), "Symbol systems shape knowledge acquisition and organization through a particular medium". Depending on the way these symbol systems are organized, each medium has the ability to influence the learner interactions differently. This will also affect each leaner's ability to get involved in the learning process.

Media have characteristics which can change the nature of leaner interactions. In general these relate to issue such as:

a. Accessibility to students (the skills required to access the learning content)
b. Ease with which the student can manipulate (re-play, re-organize, add, remove, search text)
c. Portability (removal from restriction to place)
d. Familiarity with the media on the part of the learner
e. Sense of immediacy they bring to the learning interaction
f. Cost of reproduction and distribution.

Contend that “the quality of interaction depends on the depth of processing. Perhaps the processing depth can be linked to the four learning activities which seems to be able to accommodate notions of desirable learning. These are:

1. Acting on (learning by doing) or experiential learning, which suggests that the learner must leave his or her on the learning text.
2. Interpreting or making meaning, reformulating the content.
3. Reflection is a central learning activity involving forming individual points of view and critically considering issues raised; self-reflection is a major component of adult learning.
4. Collaboration is a learning interaction which allows the learning processes to become not only democratic but also cognitively stimulating and challenging particularly for adult learners. Some of the outcomes of this form of learning include high mastery and retention levels, improved quality of reasoning strategies and positive effects on social, motivational and attitudinal outcomes in addition to academic outcomes.

The other issues which tended to affect learning on media were related to how the tutor used the learning activities, coupled with the tutor’s awareness of each medium’s capability to support different learning activities and learner needs.

2.13.1 Uses of Computer (ICT)

The uses of various activities in computer (ICT)

a. Referencing

(a) Computer can be used to store information that may need retrieval from time to time. In a school system, information in respect of school staff, student's particulars and yearly list of graduands, school Time Table, school officers and vital documents may be stored in a computer. From time to time, the school may have cause to recall any of the information either for use or for upgrading. For example if a teacher retires or leaves the services of the school for one reason or the other you may wish to delete his name from the staff list.

Also when a new officer resumes duty you may need to add to the data. The use of a computer as an information is quite useful though not of much significance in the use of a computer.

b. Computation

A computer basically derives it name from its high potentiality in carrying out computations at a very high speed. The computer makes us of the electronic arithmetic and logic unit, and processors to perform the basic operations, comparison, ordering, other numerical operations and derivation of relationship between two or more variables.

The computer has a high capacity to cope with a large number of data within a limited time. For computation to be effectively carried out, the computer must be

fed with a good program that shows what process is to be carried out, the process to use and contains the correct data.

c. Decision-Making

The computer may be used to carry out some computation that will assist in decision making.

The computer may be used to determine whether or not a student is to be awarded the Nigerian Certificate in Education at the end of the 3 year course. This decision will require

(i) Knowledge of course taken by the students with their units, status of courses and scores obtained in each course.

(ii) Minimum number of units accepted to be passed at each level for certification.

(iii) Other conditions to be fulfilled for certification.

The computer must be supplied with a program that provides definite instructions on what is to be done and the necessary data to be use in the computation. Having done this, the program is run, and the computer printout provides the result that is to be used in decision taking.

(d) Recreation and Commerce

Computer can be used in playing some games through application programs. Computer may be used for commercial transactions. Used in this manner, information is transferred from one computer to another

through a network. This process is much easier and neater than the physical transfer of data.

(e) Research and Education

The degree of accuracy and speed of computation renders the computer to invaluable use in research work. Fed with data it is possible to use the computer in decision making provided all necessary information for the decision have been contained in the program or can be deduced from the result of computation to be carried out by the computer.

In research work, hypotheses are often set up for testing. Data collected for testing each hypothesis are often so enormous that calculations using paper and pencil may

f. Computers and the Society

Take a terribly long time with the exercise so boring that the researcher may give up somewhere along the line. The computer will carry out the computation accurately and at very high speed.

Data analysis may be too tedious when many variables are involved. The use of computer will make the analysis very quick and accurate.

(f) Simulation Studies

In school administration there are times one needs to introduce new ideas or policies. It could be dangerous executing them without trying to find out whether they will work well or not. The search for a solution before executing the policy

calls for simulation. Simulation calls for a buildup of a mathematical model which needs to be tested. With some data fed in the computer will assist in computational work necessary for decision making.

(g) Computer – Aided Instruction (CAI)

Instructional materials are often developed in form of computer programs for learners. The piece of information necessary for a particular learning may be presented in bits. Each bit may appear on the Visual Display Unit (VDU) of the computer for the learners to study. The bit is then followed by questions to be answered by the learners to test his mastery of the subject matter. The degree of accuracy with which the learner responds will determine whether the learner is to proceed to the next bit, review the bit or go back to study some other bit earlier presented.

The computer Aided Instruction permits a learner to study at his own pace. It however has its limitations. Some instructions require diagrams showing different colours or a display of concrete objects for learners to handle. Colour separation and provision of physical objects are not possible with the computer. In a bid to make up for these deficiencies. Computer Aided instructions (CAI) are usually very bulky and may require a lot of time to accomplish.

(h) Meeting Various Demands of Several Professions

In modern times, almost all professionals make use of computers either for needed computational works, data storage or retrieval, design works or diagnostic work.

Accountants, engineers and architects use the computer for computational works in their disciplines. The architect and engineers may further use the computer to make designs of buildings and various structures. The Surveyor may through feeding data collected from field work into a computer obtain the desired coordinates and map. News media men and lawyers can store information into the computer. Such information may be retrieved anytime they are needed for reporting or references in similar cases.

Medical practitioners store in data in the computer which enable them to study the history of the illnesses of their patients and the type of treatments they have been receiving. Such stored data when retrieved proved the medical practitioner adequate information as to what line of action to take next in treating each patient. The medical world has developed to such a stage that the computer information alone is not only used but the computer heart beats and blood pressures, where there is an outrageous departure from the normal, the computer attacked to a patient gives a signal either in terms of some red colour light or an alarm to draw the attention of the nurse to the particular patient in trouble.

Office Automation

In offices, a lot of printed work is carried out. There is a great demand for typing documents and letters. No matter how fast a typist is, he cannot produce work at the same rate as the computer. Modern offices make use of word processors, a facility offered by the computer, in carrying out their secretarial duties.

Word processors can be used in presenting documents in any format that may be desire, the word processor and the computer act as good storage facilities for documents

and other information. Modern office administration no longer makes use of heavy files that move from office to office. The word processor can be used to reproduce as many copies of a document as may be required at anytime. Copies of a modified form of a document may also be produced using the word processor within a short time.

(j) Business

The main purpose of any business organization is to make money. The success of any business depends on its management information system. (MIS). The management information system is responsible for feeding the management with all data or information necessary for decision making.

Computer firms have computer programs that use useful for management, accounting, personnel record keeping, pay roll service, sales ledger and general ledger. On purchase, the company is expected to modify the program to suit his company.

Computers can be used for quality control, computers obtain measurements of materials produced by a company and will raise an alarm whenever a measurement fails outside the standard measure.

(k) Government

The government will find the computer very useful in the areas of population census, planning for developments and provision of facilities for people. Data required for such work are much beyond what any individual can cope with manually hence the need for the computer.

The government may use computer in the area of tax administration. Data obtained from companies in relation to their workers and production are stored in the computer and used in computing amount of tax expected from the company. Information relating to individual's income, property owned and other sources of income when computed will be used in determining the individual's tax.

The Police used computer to keep records of crime and criminals. Information regarding convicted people can be easily retrieved and supplied to a law court whenever so demanded. Computer can be useful in posting junior staff to duty posts.

Stages of Teaching and Learning Using ICT Tools

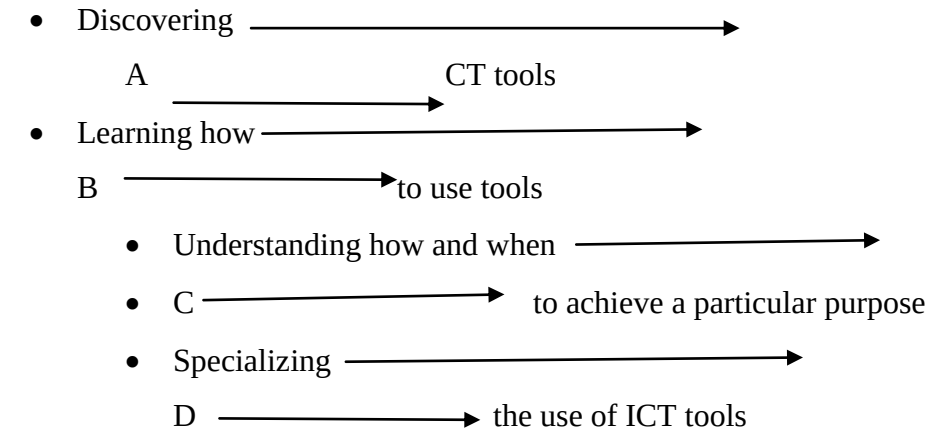
Teachers and learning processes are interrelated and inter-connected to each other; as such it becomes necessary to understand the process of effective integration of ICT tools into teaching –learning situation. Onwumere (2012), reveals that studies carried out on teaching and learning have shown that there are four (4) major stages in which teachers and students teach and learn about as well as gain confidence in the use of ICT tools. These include; discovering, learning how, understanding how and when and specializing in the use of ICT tools.

Discovering ICT Tools: Teachers and learners need to discover tools necessary for ICT, and learn how those tools can be used effectively in the classroom. At this stage, emphasis made on ICT literacy and basic skill considering the emerging approach in ICT development.

Learning How to Use ICT Tools: When the ICT tools are discovered, the users will learn how to use them with the general or particular approach.

Understanding How and When to Use ICT Tools: Having learnt how to use the tools, it is important to know the best way to use them in order to achieve a particular purpose, such as in completing a given project. This implies the ability to recognize situation where ICT facilities will be helpful, choosing the appropriate tools for a particular task and using these tools in combination to solve real problems.

Specializing in the Use of ICT Tools: This occurs, when the teachers and learners enter more deeply into the science of discovering those things that are used to create and support ICT, The students at this point learn ICT as a subject to become specialists. These are obtainable at vocational or professional education rather than general education and are quite different from other stages as involving the use of ICT tools. The above points can be illustrated using the diagram below.



(Model of stages of teaching and learning with and through ICT, UNESCO, 2002).

Teachers ICT usage

Teachers integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subjects areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnership with ICT as a tool.

Teachers' attitudes are major predictors of the use of new technologies in instructional settings. Teachers' attitudes toward ICT shape not only their own ICT experiences, but also the experiences of the students they teach. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology, Demetriadis et al (2003) reached similar conclusions in their research study: "Training efforts are generally welcomed by teachers but consistent support and extensive training is necessary in order for them to consider themselves able to integrate ICT in their teaching methodologies" According to Rogers (1995) one of the major factors affecting people's attitudes toward a new technology is related to the features of the technology itself. Rogers pointed out five basic features of technology that affect its acceptance and subsequent adoption: relative advantage, compatibility, can be observed, and ability to be

tried. Thus, a new technology will be increasingly diffused if potential adopters perceive that the innovation:

(1) Has an advantage over previous innovations;

(2) Is compatible with existing practices,

(3) Is not complex to understand and use,

(4) Shows observable results, and

(5) Can be experimented with on a limited basis adoption

Preparing students for real life in our technological and diverse world requires that teachers embed ICT in significant learning experiences (Braun & Kragy, 1995). However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained" when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT" As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheels, 2001).

2.14 Challenges Associated with the Use of Information Communication and Technology

Observation revealed that employing Information Communication and Technology to facilitate teaching and learning process in respective course is not always the issue but how to use it and its availability to use. Information Communication Technology are available in large quantity and are producing a slit from the traditional audio-visual aids approach to the more comprehensive and efficient learning resources concepts.

Unfortunately, in spite of the bright prospect of ICT to the teaching and learning process, the ICT-facilities are still inadequate in Nigeria, let alone its circulation to the secondary schools the nation. A lot of problems are confronting the use of Information Communication Technology in Nigeria tertiary institutions which include:

a) Teachers' Professional Knowledge and Technical Know (–) how:

Information communication and technology (ICT) is a fairly new era of importance in education especially in developing countries like Nigeria. Due to the technicalities involved, there is the need for teachers to understand how it can affect the teaching and learning situation. The first aspect to understand is the operational functionality of the materials. As much as materials differ in terms of technical components, design and set-up, they also differ in terms of functionality. Some are multi-dimensional; capable of various functions such as giving logical outcomes, manipulating information, etc. Without the teacher

being knowledgeable enough in the use of ICT he cannot create change and make meaningful impact in his learners. Teachers' knowledge has a great impact on the effective application of ICT because the teacher needs to understand the sequential presentation of the instructional gadgets that will suit the interests of the learners and it appropriateness with the instructional tasks. For instance, a teacher who is not computer literate would find it difficult to operate the system and manipulate it to achieve his instructional objectives or even with partial knowledge of the operational function of the computer system, they might be wrongly used thereby creating a wrong impression to the students. Okojie (2010) supported this view that old brigade teachers are unwilling to change to the ICT way of instruction but rather prefer the long age old method of instruction.

b) Lack of Computers: Computers are still expensive in Nigeria:

In Nigeria, a country with high rate inflation, majority of the individuals and institutions cannot afford to buy computer while some consider it as a luxury item, more expensive than a T.V. set. Even some fairly used computer systems cost as much as N45,000, while branded new ones are being sold between N98,000 and above. Computers are still relatively expensive and despite spirited efforts by the government agencies, NGO's, corporate organizations and individual donations to some schools, there still remain a large percentage of the schools unable to purchase computers for use by their students due to the cost.

c) Lack of Constant Power Supply: According to Urenyere (2012), there are still some schools not yet connected to electricity; Nigeria being a developing country, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools that fall under such places especially in some rural areas which cannot afford to purchase a power generating set are left handicapped and may not be able to offer computer studies. It is quite embarrassing that even the urban centres are faced with the challenges of epileptic power supply.

d) Broken down computers: While some tertiary institutions have benefited from used computers donated to them, some have not been adequately equipped with the same on maintenance and repair, hence its very common to see a school's computer laboratory full of broken down computers; some repairable and some beyond repairs. This has actually been a major problem because the government has not put strict measures on any persons, NGO or corporate bodies willing to donate computers to avoid donating the fairly used ones thereby making the institutions to be seen as a dumping ground.

e) Burglary: The fact that computers are still very expensive in Nigeria, this makes them a target for thieves who usually have ready markets to sell them. This has made many institutions to incur extra expenses trying to secure the computer laboratories with burglar proof to prevent theft. These extra expenses therefore make some institutions shy away from purchasing computers for their students.

f) Lack of interest or slow connectivity: Most tertiary institutions are not able to connect to the World Wide Web (www), due to the high costs involved in the connectivity.

On average, it may cost approximately $150 per month to connect to about 15 computers on a bandwidth of 128/64 kbps. This is considered as very expensive in addition to the running cost of the institutions

g) Increased moral degradation: Internet pornography, chatting, cyber-crimes and other anti-social behaviours is a worrying emerging problem amongst youths today. These have led to increased in moral decadence among youths who spend much of their good time both during the day and at night on the internet.

h) Environmental factors: Part of the application of ICT in the teaching – learning process is the target population for whom the materials are top be used and the setting or vicinity where the learning should take place. The degree of satisfaction derived by students in respect to comfort of the learning environment in a great deal will determine the effectiveness and efficiency of the instructional process in the classroom.

i) Time Constraints: Time is also a serious problem or factor that impedes the effective use of ICT because the time that is allotted for a particular lesson like economics on the timetables might not be enough for the teachers to present his contents alongside with judicious use of the materials provided will affect the wholesome delivery of the content.

j) Poor Maintenance Culture: Materials available for the teaching sometimes are poorly mal-handled by both the teachers and institutions authority. Non-availability of well spacious resource room for the proper keep of both the locally manufactured and the commercially purchased instructional facilities limits the durability and life span of those materials. Very many of the teachers use materials occasionally without the proper servicing of those materials after used for the future use. (Adapted from Torruam and Abur, 2013)

k) Inadequate Funding: Nzewi (2009) pointed out that the cost of obtaining a good computer is still expensive to purchase number for schools, most schools cannot even afford to maintain internet connections. Despite the fact that Nigeria is blessed with resources that make it rich, the problem of corruption and fraudulent practices has bedeviled the nations resulting to poor development of the education sector.

2.15 Services Available in ICT

These are the services available in the use of ICT

1. **Pager:** This is a small electronic device operated by radio signals used for receiving messages. ICT teachers and their learners can use this device to cross fertilize ideas and issues as it relates to the contents of their subject.

2. **Web Quests:** According to Oyebola (2006) Web Quests are enquiry oriented activities in which most or all the information used by learners are drawn from the World Wide Web. Learners are guided and assisted to obtain information from the internet in order to carry out assignments. Findings of a research project reported by

Tancook (2002) in which twenty five, nine and ten year old in fourth-grade children in an Elementary ICT in USA were asked to obtain information from the internet through Web Quests as part of their ICT class activities, the result shows that the use of the Internet enabled these pupils to acquire better knowledge of the content covered.

3. Internet: Ochim and Agbo (2006) define internet as any collection of networks into larger Wide Area Network (WAN). It is often called the NET, the information super Highway or Cyberspace is the largest computer network in the world. Network, is a group of connected computer that allows learners to share information and equipment. ICT learners of today are better equipped to access their lecture notes with ease. The Internet is also relevant for training and research. The ICT teachers and students could upgrade their knowledge by browsing through the internet on topical issues across the globe. Information on the Net could help the researcher on social issues to have a better understanding of the problem under study and also to make meaningful comparative assessment of the problem. Text materials on different areas in ICT are also available on the Net and could be downloaded both for class activities and for research processes.

3. **World Wide Web (www):**This is the greatest service on the Internet. It connotes hypertext based information that links multimedia database in different parts of the world. Ochim and Agbo (2006) agree that High amounts of information such as international journals, technical standards, books, films, newspaper and software are available on the Web. The relevance materials on ICT are available digitally on this device and could be downloaded and printed as a book. The students can also be connected to www to search for the relevant information. They can post information to the search in www.goggle.com for more materials on any relevant ICT contents.

4. **Internet Chat:** It is the service that allows communication and instance response between two persons. It could be by typing the message or by speaking over the net. Chatting can take place between the ICT teacher and the students through voice message. This is possible through computers that have microphone. Students can as well ask questions and get quick response from the teacher.

5. **Video Conferencing/Teleconference:** It is a method of holding conference whereby the participant sits in a room equipped with video cameras, microphones and television monitors. This would be of immense benefit to ICT specialists and the students during seminars and conferences to cross fertilize ideas on current issues.

6. **E-mail:** Electronic Mail is a process whereby instant communications are sent and received among the subscribers in a twinkling of an eye. In ICT especially in distance learning programme, lecture note, tutorials and assignments can be posted to the students via e-mail. The student read his/her lecture notes, do the given task and turn in their work and possibly send questions. For this to be useful, teacher and student need to have their own electronic mail box on the computer.

7. **Computer:** This is an electronic device that can store, organize and find information, do calculation and control other machines. ICT teachers can use it to assemble a comprehensive data on test and non test instruments on individual students. It can also be used to store information on cognitive, affective and psycho-motor domains of student such as academic results, personal background,

health data, educational plans, attitudes and emotion. There are packages in computer that can help ICT teachers and students collate their research data in a simple, easy and convenient manner. An example of such packages is the Statistical Package for ICT.

8. **Microphone/Laud Speaker and Amplifier:**ICT teachers can use it during conferences seminar, and workshops and to lecture large classes especially in tertiary institutions.

9. **Telephones/Mobile Phone:** This device is very relevant to ICT educators. According to Etim (2001), most of the handsets have memory devices where information is stored and on the appointed date, the device would raise alarm to serve as a reminder. It can be used by ICT teachers to fix appointment as regards meeting and conferences. The teacher can also have short discussion with his/her distant learning students.

10. **Video:** ICT class teaching, microteaching and diverse cultural heritage, seminars, conference proceeding can be videotaped. This can be replayed over and over again until the required knowledge is acquired. Students learn fast here than through other media. Distance learning students and those who are studying by correspondence, can get the video tapes of each lesson and reply it at their leisure.

11. **Tape Recorders:** This is relevant to both ICT teachers and students. It can be used in inquiry approach as in interview by students who are investigating certain issues. The result would be taped and replayed later or submitted to the teacher. Class teaching can also be audio taped and replayed back later.

12. **Database:** This is a set of files organized to enable easy access to students and teachers files. This will make the work of ICT teachers easier.

13. **Camera:** Camera is relevant to ICT especially during the excursion, it can be used to snap the people in their different cultural background. It can later be used to make photo album which can serve as teaching aids to students.

14. **Television/Radio:** This will help both the ICT teachers and students to be current about what is going-on in different part of the world. Cultures of people can also be learnt and appreciated through these audiovisual and audio aids.

15. **CD ROM/Flash Drive/Diskette:** These are storage devices that can be of immense benefits to ICT teachers and students. Important journals and information of researchers can be scored and transferred from one place to another. Instead of carrying volumes of text, a flash drive will have a lot of information which can be carried without stress.

16. **Uploading in ICT:** Uploading is the transmission of a file from one computer system to another, usually larger computer system. From a network user's point-of-view, to upload a file is to send it to another computer that is set up to receive it. People who share images with others on bulletin board services (BBS) upload files to the BBS.

17. **Downloading in ICT:** Transmission in the other direction is downloading from one, usually larger computer to another, usually smaller computer. From an

Internet user's point-of-view, downloading is receiving a file from another computer.

The File Transfer Protocol (FTP) is the Internet facility for downloading and uploading files. (If you are uploading a file to another site, you must usually have permission in advance to access the site and the directory where the file is to be placed).

When you send receive an attached file with an e-mail note, this is just an attachment, not a download or an upload. However, in practice, many people use "upload" to mean "send" and "download" to mean receive. The term is used loosely in practice and if someone says to you "Download (or upload) such-and-such a file to me" via e-mail, they simply mean "Send it to me".

In short, from the ordinary workstation or small computer user's point-of-view, to upload is to send a file and to download is to receive a file.

18. To Manipulate in ICT

1. To move, arrange, operate, or control by the hands or another body part or by mechanical means, especially in a skillful manner: She manipulated the lights to get just the effect she wanted. See Synonyms at handle.
2. To influence or manager shrewdly or deviously: He manipulated public opinion in his favor.
3. To tamper with or falsify for personal gain: tried to manipulate stock prices.

4. Medicine To handle and move in an examination or for therapeutic purposes: manipulate a joint; manipulate the position of a fetus during delivery.

19. To Operate in ICT

Job or tasks consisting of one or more elements, or subtask, performed typically in one location. Operations transform resource or data inputs into desired goods, services, or results and create and deliver value to the customers. Two or more connected operation constitutes a process, and are generally divided into four basic categories: (1) processing (2) inspection (3) transport and (4) storage.

Sources of ICT Resources and Effective Application

Alan, et al; (1999) suggested in their work, for the moment, at least, textbooks and monographs have little to fear from on-line competition. Few students or faculty will submit to reading long passages of text on a computer screen. But many classrooms can benefit from electronic resources in at least two areas: supplementary readings and primary sources. Even the best published readers or photocopied packets tend to dampen the thrill of discovery because they have been preselected and packaged for a particular purpose (seldom your own). Electronic sources, whether on CD-ROM or the Web, can significantly open up the range of materials accessible to your students.

There are varieties of electronic resources that can be useful for the classroom. Among the most popular have been CD-ROM document collections such as Chaucer: Life & Times; Pennsylvania Gazette, 1728-1783; and Presidential Papers: Washington-Clinton, Textbook publisher are increasingly providing

electronic study guides, map exercises, sample presentation slides, and computerized test banks on CD-ROM, floppy disks, or even on the Web. Some schools are producing, or arranging access to, large collections of digital materials.

The most extensive, if still not fully developed, source for electronic resources is the World Wide Web. Many web sites can deliver primary documents, secondary literature, sound, and images from a wide variety of sources. Students who explore web sites related to a course can bring compelling evidence and arguments back to the class. Publishers are building companion web sites around their textbooks, and large international projects have been launched to provide on-line sources for standard humanities and social science survey.

2.15.2 Essentials of Information and Communication Technology

The determinant of an efficient Information and Communication Technology as observed by Radicella (2006) are:

a. A good loop access network technology using a mixture of traditional copper and optic fibre system and conversion into digital network.
b. There should also be a good urban infrastructure and digital subscriber line;

   An efficient long distance communication infrastructure using:-
c. Synchronous digital hierarchy (SDH) which allows the use of equipment from different manufacturer;
d. Wavelength division multiplexer (WDM) which enables full utilization of band width;

e. Asynchronous transfer mode (ATM) which is characterized by a high bandwidth and low delay;
f. A good wireless infrastructure and a quick migrate from analogue to digital;
g. An efficient internet infrastructure;
h. Intelligent networks for easy integration of new facilities with the old and the necessary manpower to maintain the facilities. These infrastructure listed above are acceptable.

2.15.3 Lat Legal Maxim and Benefit of Transfer of Learning in ICT

Asmau (2015) Nemo quod non that habeat Latin you cannot give what you don't have, you cannot give that which you don't have when the stimulus pairs are different but the responses are the same, the transfer effect is positive. The greater the similarity between the stimuli in the two situations, the more the positive transfer.

a. Learning in the classroom should be such that it results in a thorough mastery of whatever is to be learned in ICT.
b. The student should have experience with a wide range of problems that differ somewhat from one another, this may function as training for flexibility to the student in ICT learning.
c. The teacher should emphasize principles and their application. Pupils must have the opportunity of participating in the use of the principles with a variety of problem situations.
d. Develop positive attitude and transfer consciousness in students.
e. Make curriculum and teaching relevant to past and expected student experiences.

f. Pay special attention to aspects that will facilitate positive transfer in your teaching.

1. Motivating Students for Better ICT Learning:

a. Make your teaching interesting and appealing

b. Develop a state of need in the students by exposing them to the objectives of the lesson.

c. Structure your learning situation and material in a way that allows success in earlier steps, reinforce later steps.

d. Provide adequate feed back to students on a continuous basis.

e. Make judicious use of incentives. Evolve a token economy system. Develop an atmosphere for healthy competition among students.

f. Make all learning meaningful and relevant to the experiences of the students.

2. Innovations in Teaching

Teachers have not just persisted in the traditional way of doing things. Like those in every other human activity, they have tried to evolve new more helpful ways of educating the young. An obvious benefit to the classroom is that new methods are time and energy saving both to the teacher and the students.

a. Programmed Learning: This is also known as programmed Instruction. Credit for this approach to learning goes to a famous psychologist known as Skinner, who was one of the Instruction arranges learning in such a way that small units of subject-matter are organized in a logical sequence, thus enabling each individual to proceed at his own pace. The idea is to ensure that a high degree of success

goes with the activity of learning. Each small unit is followed by an activity which the learner is expected to perform.

The activity may take the form of a question. The learner is required to perform the activity satisfactorily. Programmed learning provides correct answers to questions in each unit which the learner can easily refer to in order to ascertain the correctness of his efforts. In so doing, the learner receives immediate reinforcement for what he does right.

b. **Teaching Machines:** The teaching machine operates along the lines of programmed learning. However, it is not yet widely used in this country. Basically, the teaching machine presents ideas in bits. The student is supposed to work on one of these ideas at a time.

The learner is supposed to print an answer to a question at a point that is shown on the machine. Another device indicates whether or not the response is correct. If the proper response has been given, the student is advised to go on to another bit of work.

On the other hand, he can be instructed to return to what he had done before in order to ensure correctness. With a teaching machine, information that a response is right encourages the student's to make further effort.

c. **Independent Study:** This method of teaching involves the preparation of assignments for an individual or a small group of individuals. Usually, the student receives no instructions from the teacher. He uses his initiative and spirit of inquiry and creativity to approach the problem that has been presented to him. So

much joy comes out of being able to provide a solution to a problem without receiving any cues from the teacher.

d. **Multi-Media Teaching:** In recent times, the organs or mass communication – the newspaper, radio, and television – have begun to serve a new function, which is that of providing education at costs that many can afford. Because these organs have large audiences, they can be used to reach people who ordinarily cannot be effectively served by the conventional school. With the mass media, the concept of the school as a building in which learning activities are arranged in the presence of a teacher has now changed to include the kind of learning which a teacher organizes for people that he may never see. The mass media have revolutionized education and raised the hope that learning experiences can be organized for those who require them at any time and in every place. A significant benefit of mass media education is that one teacher can reach many more Students than he would otherwise do if he were operating in a conventional classroom. You are fortunate to be among the beneficiaries of this new method of delivering educational experiences to several people across the nation.

2.15.4 Relationship between Learning and Teaching

There is a strong relationship between teaching and learning. One of the activities cannot be effectively carried out without the other. We can safely say that both are bound together in the same way that the egg bound to a hen. In this kind of situation, it is always difficult to suggest which one comes before the other. In order to organize learning activities effectively, a teacher has to understand ‘how’ and ‘why’ people

learn. It is not enough gathering students in an enclosure in the name of teaching them.

There must be a conscious effort to learn about the conditions that favour the teaching of individuals. In the world of today, the teacher has to in one way or the other, be guided by scientific findings regarding the nature of students, their development and capabilities for learning and how they can be guided into becoming very useful citizens. Ideas that perform these functions are generally referred to as theories of learning.

2.15.5 The Nature and Importance of Skills

Skills are acts which are performed at a high level of proficiency. The problem with this statement is that of determining the level or extent of the "act". Strictly speaking, the act may contain many smaller acts. for example, the act of a ball consists of many minor acts such as holding the ball with hand, raising the hand, swinging the arm from back to front, excreta but, what makes throwing the ball a skill is that all these small actions are linked together and performed in a swift, smooth sequence without being conscious of the many minutes actions that go to make it up. What is more, there is a certain consistent way in which skills are performed. People will differ in the way or style of performance but the act of writing, throwing or typing are usually consistently done.

Sometimes one talks of cognitive skills, ICT skills, etc. and although these are important, our major concern will be on psychomotor skills. An example of cognitive skills in the computational skills addition, multiplication and division in Mathematic.

ICT which involve movement –psychomotor skills are overt and observable. Although we are emphasizing the overt aspects of cognitive and effective elements they enter into performance of most skills.

In considering skilled actions, the level of performance is important. Our definition talks about "a high level of proficiency". For an act to be really a skill, it has to be performed well, smoothly and in a expert-like way. So, a teacher has to encourage students to learn and perform the acts so expertly that they do not bother to spend much time thinking of the component parts.

2.15.6 Types of Skills

Motor skills can be classified into three –Locomotor, Manipulative and Non-Locomotor skills, sometimes, some writers distinguish between gross and fine motor skills. Gross motor skills involve movement of large muscles and fine motor skills involve movement of small muscles. Both classifications are valid. However we will use the classification with which you are familiar.

(ii) **Locomotor skills** are those skilled actions which are related to movement from one place to another. These include skills important in Physical Education, Creative and Cultural arts, in role play and Dramatization in other school subjects, Marching, running, swinging, walking are some of these

(iii) **Manipulative skills** involve the receiving, giving and handling of objects in the performance of tasks. There are very, very important in all subjects. They include writing holding books, and drawing, sweeping, measuring, lifting and arranging objects, even wiping the board.

(iv) Non-locomotor skills are classified as acts which involve neither movement from one place nor manipulation of objects. The skills which are of interest to the teacher are standing, looking, raising the hand, reading (perceptual-motor skill), singing, speaking. Most school subjects require skills in this category too.

Why are skills important in the tertiary institutions

(i) Skills are important because they involve movement and all schools work and movement. Various types of skills play a part in learning and teaching or in this organization of the class, in the cleanliness of the classroom environment maintaining order and in independent studies.

(ii) Certain skills are important because 2they improve the health of students and therefore their ability to learn. As you know Physical Education is a core subject. Apart from helping to develop the talent of students, Cultural and creative Arts have therapeutic to express themselves in arts forms and to let off steam in case of frustration.

(iii) General and specialized skills are valuable in preparing vocations and professions. Specialized skills of typing, playing musical instruments, skills in arts, sports and games etc. enable people earn money. Our young famous Nigerians are those who have developed these specialized skills. `General skills enter into preparation for future professions. The future engineer must start from school to learn how to measure precisely and skillfully.

2.16 Information and Communication Technology in Education

The education system today has found the place of integrating ICT into every stage of pedagogy in the school system. ICT when applied to education, enhances the delivery and access to knowledge, improves the breadth and scope of the curriculum, increases learning rates, encourages critical thinking and offers unlimited means of achieving educational goals (lloanusi & Osagwu, 2009). The Federal Ministry of Education (2010) states the place of ICT in achieving the national educational goals as:

"The policy provides the needed guidance on what is expected in the entire process of ICT integration in education to all stakeholders in education. Its' implementation therefore should lead to a speedy transformation of the teaching, learning and administration of education. This in turn will foster the production of graduates in the education system that can survive in the contemporary society, sustain national development and can compete globally (p.3).

The above policy statement poses challenge to the nations' education system and her stakeholders if ICT-driven instructional mode of learning will be successfully integrated into the school system for quality service delivery. This will help in producing the crop of graduates that will meet up the technological advancement needed globally for national development. Education is seen as the bedrock for any sustainable national development, therefore, it behooves that ICT is the horse that education must ride on to meet up global transformation, especially for the developing nations like Nigeria.

The increase in the trend of use of ICT in classroom work across the globe has been necessitated by three major factors and they are:

(7) Electronic technological devices are being used to prepare the present generation of young people for a future work place that will undoubtedly be characterized by information technology (IT). Preparing students in economics for future economic and national development of the country that can be done through the use of ICT tools, electronic conferencing programmes, the web, spread sheets, database etc. which when adopted will enhance students' critical thinking.

(8) ICT tools make schools more efficient in the teaching-learning enterprise, classroom teachers' personal professional development and academic productivity will be greatly enhanced.

(9) ICT tools are being used to improve reform or renovate teaching and learning. Learners are stimulated to learn actively either on an independent basis or working closely with others (Olorundare, 2007).

2.17 Integrating ICT into the Education System

In order to gain access into the school system, Tinio (2002) observed that ICTs can expand access to education in the following ways:

a. **Anytime, Anywhere:** One defining feature of ICTs is the ability to transcend time and space. ICTs make possible and asynchronous learning or learning characterized by a time lag between the delivery of instruction and reception by learners. Online course materials, for example, may be accessed 24hours a day, 7day a week. ICT-based educational delivery (examples educational programming broadcast over radio or television) also dispenses with the need

for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such a teleconferencing technologies enable instruction to be received simultaneously by multiple geographically dispersed learners (i.e. synchronous learning).

b. **Access to remote learning resources:** Teachers and learners no longer rely solely on printed books and other materials in physical media housed in libraries and available in limited quantities for their educational needs, due to the internet and the world wide web, a wealth of learning materials in almost every subject and in variety of media can now be accessed from anywhere or at any time of the day with unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries that have limited and out dated library resources. ICTs also facilitate access to resources persons, mentors, experts, researchers, professionals, business leaders, and peer all over the world.

c. **Improving the quality of education and training:** This is a critical issue, particularly at a set time of educational expansion. ICTs can enhance the quality of education in several ways: By increasing learners' motivation and engagement; by facilitating acquisition of basic skills, and by enhancing teachers training (Haddad & Jurich, 2002). ICTs are also transformational tools which when used appropriately can promote the shift to a learner-centred environment.

d. **Motivating to learn:** ICTs such as videos, television and multimedia computer software that combined text, sound and colourful, moving images

can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effect, songs, dramatization, comic skits, and other performance convention to compel the student to listen and become involved in the lessons delivered. More so that any type of ICT networked computers with internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world event.

e. **Enhancing teacher training:** ICTs have also been used to improve access to and quality of teacher training. For example in China, large scale radio and television based teacher education for many years have been conducted by the China Central Radio and Television University, the Shanghai radio and TV University in the country (Carnoy, 2002 in Tinio, 2002).

With the above advantages, it could be said that the place of ICT becomes imperative to current trends in the teaching-learning process in the school system because it offers divers ways for people to access quality education conveniently towards achieving national educational objectives.

2.18 Technology as Cognitive Tools

Technology is a scientific knowledge used in practical ways in industry for example in designed new machines or to make use of modern technology such as machinery or equipment.

Cognitive tools have been around for thousands of years, ever since primitive humans used piles of stones, marks on trees, and knots in vines to calculate sums

or record events. In the broadest sense, cognitive tools refer to technologies, tangible or intangible, that enhance the cognitive powers of human beings during thinking, problem-solving, and learning. Something as complex as a mathematical formula or as simple as a grocery list can be regarded as a cognitive tool in the sense that each allows humans to "off-load" memorization or other mental tasks onto an external resource. Computer as cognitive tools represent quits a different approach from media and technology as vehicles for educational communications. Computer-based cognitive tools have been intentionally adapted or developed to function as intellectual partners to enable and facilitate critical thinking and higher order learning. Examples of cognitive tools include:

a. Databases,
b. Spreadsheets
c. Semantic networks,
d. Expert systems,
e. communications software such as teleconferencing programs,
f. On-line collaborative knowledge construction environments,
g. Multimedia/hypermedia construction software, and
h. Computer programming languages.

In the cognitive tools approach, information is not encoded in predefined education communications which are then used to transmit knowledge to students. Indeed, with cognitive tools, the needs for formal instructional system design processes are reduced. Instead of specialists such as instructional designers shaping students' learning via prescribed communications and interactions, media and technology are

given directly to learners to use for representing and expressing what they know. Learners themselves function as designers using media and technology as tools for analyzing the world accessing and interpreting information, organizing their personal knowledge, and representing what they know to others.

Learning with Technology: Constructivist Perspective

In educational uses of technology, a distinction between learning from computers and learning with computers. Much of the early research and development with technologies considered the enhanced learning that could be achieved when computers played an important and key role in delivering content and creating learning opportunities to help students make meaning and develop and understanding. In such settings, there was a distinctly diminished role for the teacher. Jonassen (1991) suggest that the more opportunistic and effective uses of technologies in classroom are those where the technology supports and scaffolds the learning rather than being the object or derivative of the learning. McClintock (1992) also states that in a constructivist-learning environment, technology plays an acknowledged and purposeful role in the day-today activities, but does not become the object of instruction.

When used in a constructivist manner, students utilize technologies to;

a) Manipulate data,
b) Explore relationships,
c) Intentionally and actively process information,
d) Construct personal and socially shared meaning, an
e) Reflect on the learning process. Cognitive tools describe such applications as;

a) Calculators,

b) Databases,

c) Spreadsheets,

d) Communications software,

e) Semantic network tools, and

f) Knowledge construction tools.

The critical attribute of cognitive tools is not in the information and knowledge that they carry, but the forms of learner activity and engagement that they support and encourage. Cognitive tools still need the informed teacher to design and supervise the learning activity, but they act to amplify and distribute the cognitive tasks through their design and application. Jonassen (2000) also developed the idea of, computer based tools and learning environments that have been "adapted or developed to function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher-order learning". According to him, the role of Electronic Media is to extend the learner's cognitive functioning during the learning process, and to engage the learner in operations while constructing knowledge that they would not have been able to accomplish otherwise.

"Media tools enable learners to become critical thinkers. When using cognitive tools, learners engage in knowledge construction rather than knowledge reproduction (Jonassen, 2000). By using commonly available software, learners employ technology to both construct and represent knowledge. Computers can successfully enhance the problem solving abilities of the students by using project-based learning (PBL) activities; because they are used, most often, in an environment where people are drawn to

collaborate naturally as a result of their cultural expectations. The informants reported that PBL had a variety of positive benefits for students, such as, attitudes towards learning, work habits, problem-solving capabilities and self esteem.

According to a three-year study of mathematical instruction, A study by Ryba and Brown (2000), conducted in two classrooms in an elementary school in New Zealand, found that teachers' beliefs about themselves and their roles in the classroom, as well as their philosophy of education had a central place in shaping the nature of their computer use. Those teachers who saw learner centered classrooms and authentic learning tasks as central to the success of their students were more likely to use the technology on a continuing basis. Means and Olson (1997) found that technology increased the complexity with which students could deal successfully and created a multiplicity of roles, leading to student specialization. It allowed in-depth exploration of a smaller number of ideas and related facts around authentic, challenging tasks. They further state:

I. When students are using technology as a tool or a support for communicating with others, they are in an active role rather than the passive role of recipient of information transmitted by a teacher, textbook, or broadcast.

II. The students are actively making choices about how to generate, obtain manipulate, or display information. Media allows users to enter virtual environments that include text, sound, visual images animation and video.

Ayersman (1996) found that the use of media applications promoted deep comprehension and enhanced listening comprehension, story production and decoding skills and improved ability to discover links among people, places, events and issues within

historical contexts. Riddle (1995) investigated that students using hypermedia demonstrated increased ability to convey insight and individuality, greater descriptive detail, and unique perspectives. In the USA, The Challenge 2000 Multimedia Project supported by multimedia gives students opportunities to use technology effectively in the planning, development and presentation of their projects (Thomas, 2000). Students who took part in this project had better results than comparison students on content mastery, audience sensitivity and coherent design.

In addition to media applications, the Internet may provide a rich source of outside information resources that allow students to address complex problems. The Internet connects teachers and students to people outside the school environment, providing access to expertise not available locally. Irving (1991) conducted a two-year study in six schools in which students were given access to on-line information services.

The project was designed to stimulate students' use of a variety of information resources and the study of contemporary topics. Conclusions of the study were that "on-line services provided immediate, on-demand and up to date material not available in or near the schools, and access to specific information on topics for which school books either did not exist or were not in the school resource collection". Constructivist learning works well with web-based activities. Students entering this environment bring with them their prior knowledge. They engage in a web-based activity such as searching the Internet, gathering information, organizing their thoughts, or communicating with peers via email thus adding to their cognitive infrastructure.

Miken Exchange on Education Technology (1999) cited by Yusuf and Onasanya (2004) identified three major ways of using ICT for teaching and learning. These are Information Technology (IT) assisted learning; technology as a tool and computer and information science.

Information Technology (IT) Assisted Learning

This is divided into (1) Computer Assisted Learning (CAL), which is the interaction between a student and computer system designed to help the students learn (drill and practice, tutorials simulations and virtual realities). (2) Computer assisted research implies where ICT is used as an aid to doing library and empirical research. This is enhanced through the growth of World Wide Web which has created virtual library that can only be accessed by the technologically literate. (3) Distance learning, which is the use of telecommunications, designed to facilitate students learning through e-mail, interactive web sites and two-way audio/video teleconferencing.

Technology as a Tool

This involves the use of a large array of hardware and software: word processors, graphic packages; digital camera, presentation applications database and spreadsheet, among others. These hardware and software do not have limited educational purpose, buy they are designed to help people extend their abilities to do work. Digital science probes, for instance are more specialized.

Computer and Information Science

These deal with specialty in computer as an area of study for students with particular interests in technology. The ICT should be used as a pedagogically powerful tool for the construction and modeling of knowledge.

Association of African Universities (2000) and Yusuf (2005) identified the following application of ICT in teaching and learning:

a. To provide basic computer literacy skills
b. To provide basic computer literacy skills relevant to respective academic disciplines.
c. To improve students motivation
d. To improve access to remote resources
e. To improve communication skills
f. To improve higher order thinking skills
g. To provide content (examples., CD-ROM, www, etc.)
h. To support teaching methodology (example group work tools for group assignments on the internet).
i. To improve course management (both in the regular curriculum and in distance education)
j. To collaborate in online teaching and learning with others faculty and students from around the world.

Learning from Technology Behaviorist Perspective

Use of technology from the behaviorist perspective mirrors traditional classroom practice, users are relatively passive, the content and interaction between the user and the

software are predetermined, and there is a limited repertoire of acceptable responses (Jonassen, 2000). The acquisition of facts through repeated practice and rote memory, or learning from the technology, is the goal of instruction (Jonassen & Reeves, 1996). Computer assisted instruction (CAI), integrated learning systems, drill-practice programs, computer-based tutoring systems, and assessment software are some of the technologies designed based on the behaviorist learning theory (Jonassen, 2000). CAI and integrated learning systems have been readily adopted in many schools in the USA as they closely match the traditional routine of classroom life. Jonassen argues that CAI can increase achievement because it leader to automaticity of lower-level skills through extended practice. A computer that is endlessly patient with the learner monitors this practice. In the tutorial form of computer-assisted instruction, the computer provides additional information to the learner if an incorrect answer in supplied. This continues until the learner is successful. Skinner's views of immediate positive reinforcement following a correct answer are directly applicable to drill-and-practice and tutorial forms of CAI (Yaakub, 1998).

Technology integration from this perspective is commonly used to increase student motivation. In a study exploring differences in teachers' uses of technology and their perceptions of the value or role of technology, Ertmer, Addison, Lane, Ross, and Woods (1999) found that majority of the teachers in elementary schools in the USA perceived technology as an incentive or behavioural reward in order to motivate students to complete their assignments and make lessons more interesting to students. At the time of the study, the teachers in this study were using technology for drill-and-practice activities and as a presentation tool to support their lessons. Almost all uses observed by the

researchers, as well as those described by the teachers, involved the application of some type of instructional game or informational CD-ROMs. The study revealed that their integration of technology was mainly related to its usage to employ computers as presentation tools providing additional resources and engaging visuals to enhance lessons, to motivate students and to promote the belief that students need to use technology to be prepared for the future.

2.19 Uses of Computer in Information Technology

Looking at the whole of National and International communities, modern societies now depend heavily on automation of information processing. Computers are at centre and are playing an increasing role in many forms of automation in Communication Technology. The rapid rate of computerization and technical innovation has led people to talk of a micro-electronics revolution. With computer connected to a modem, messages (voice, data and graphics), are exchanged via satellite all over the world. Information and Communication Technologies, ICT is generally taken to mean technologies that support Communication via computers. This implies the internet or Local networks, e-mail, and World Wide Web technologies. A computer network is an interconnection of computer systems. A computer network has the ability to grow and change its character. Computers are networked for resources sharing with common resources being information, computer systems (software and hardware) and people.

2.20 Effects of Information Technology on Effective Teaching

World population exceeds six billion of which more than 4.7 billion reside in the developed world (UNDP, 2000; US Census Bureau, 2010). As the population is

increasing there is a need to find ways of improving efficiency and quality of teaching and learning in all school systems in developing countries. Information Technology (IT) has been identified as a vehicle with the potential to improve the quality of good service delivery as well as the efficiency of the teachers both in the developed and developing countries. Information Technologies have changed the face of the world we live in. Information Technology enables people to communicate with family, friends and colleagues around the world instantaneously, gain access to global libraries, information resources, and numerous other Opportunities, hence, Information Technology might also have brought an improvement in the educational sector (Olakulehin, 2007). Globalization is a word used to describe the whole world as a simple community served by electronic media and information technology. It entails greater international movement of commodities, money, information, ideas and people. Globalization is described as the process that promotes the integration of a whole system of interrelationships across sovereign states. The above definitions suggest that globalization is a process through which the people of the world are incorporated into a single global society. This process creates a global market which allows all nations to complete enable active participants. The process of globalization is not new for several entries before now, from the developed world have extended their production and handling activates to various territories of the globe example colonialism, imperialism, Europeanization, Westernization, Americanization.

Knowledge of using internet or let is to make the world a global village, acting as resources for education and to sacred for information using any or all of the devices. Formation Technology can be defined as one of the driving forces of globalization.

With Communication Technology integrated into it gave it a broad spectrum of technologies that includes the use of radio, film, television, press, and telephone along with more participatory forms such as theatre, video or storytelling. It also focuses on the electronic end of the spectrum such as e-mail, the internet, mobile phones and digital video (Adeshina, 2006). Information and Communication Technology came into existence in most of the African countries through research institutions, educational institutions, or international organizations like the World Bank, UNDP, USAID, UNICEF, etc. The first Information Technology initiative in Nigeria started in the 1950s with focus on print and electronic media. No major policy or other outcome was achieved because of strict government control (Olakelehin, 2007).

The full awareness of the importance of Information Technology was absent, only the private sector demonstrated Information Technology initiatives. The Obasanjo Administration in 2001 established the National Information Technology Development Agency (NITDA) to serve as a bureau for the implementation of National Policy on Information Technology. NITDA is trying to increase the internet penetration levels in Nigeria but much is yet demanded in the educational sector delivery systems Nigeria started implementing its Information Technology policy in April 2001 after the Federal Executive Council approved it by establishing the National Information Technology Development Agency (NITDA), as the implementing body. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realize the specifics of the country's vision of, "making Nigeria an IT capable country in Africa and a key player in the information society by the year 2005, using IT as an engine for sustainable development and global competitiveness".

(Emadoye, 2002). This vision though is yet to be fulfilled, because not many teachers particularly the tertiary institution have come to accept the need to use IT for teaching.

The Objectives of NITDA was to pursue Council approved it by establishing the national information. Technology Development Agency (NITDA), as the implanting body. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realize the specifies of the country's vision of, "making Nigerian an IT capable country in Africa and a key player in the information society by the year 2005r, using IT as an engine for sustainable development and global competitiveness". (Emadoye, 2002). This vision though is yet to be fulfilled, because not many teachers particularly the tertiary institution IT capable country in Africa and a key player in the information society by the year 2005, using IT as an engine for sustainable development and global competitiveness". (Emadoye, 2002). This vision though is yet to be fulfilled, because not many teachers particularly the tertiary institution teachers have come to accept the need to use IT for teaching.

The objectives NITDA was to pursue were as follows: ensure that information technology resources are readily available to promote efficient national development, guarantee that the country benefits maximally, and contributes meaningfully, by providing the global solutions to the challenges of the information Age, empower Nigerians to participate in software and information technology developments in a competitive manner, establish and develop information technology skills and prepare them for global competiveness, and integrate information technology into the mainstream of education and training Nigeria.

The telephone system in Nigeria has been for years. A breakthrough in telephone infrastructure emerged in January 2001 when the sector was totally liberalized with the licensing of MTN and ECONET (Mobile Phone Companies). They injected over a million lines into Nigeria within a year. Also Globacom came into existence late that year. The Global System of Mobile Communication (GSM) is spreading in a highly competitive manner from state to state and city-to-city. The advent of GSM has greatly enhanced the exchange of information especially in Nigeria tertiary institutions (Daniels, 2002). Telephone calls are now made at chapter rates both locally and internationally within real time. Text messages using the handsets have also contributed in no small measure to information exchange both locally and internationally. Before the advent of IT, it was not possible.

There is a number of factors affecting access to the internet in Nigeria with cost being the leading factor. The average charges by Internet Service Providers (ISPs) to connect to the internet are prohibitive for most tertiary institution. Informal observation revealed that there have been considerable (though uncoordinated) information and communication technology training efforts of late both at personal and institutional level among teachers in the tertiary institution. The purpose of these trainings was to make teachers information technology skilled both in personal activities and day-to-day professional practices. The problem has been that these trainings do not seem to have any impact in the teachers' classroom teaching delivery. At best, teachers use the internet, and in few cases, use computers for word processing (Adeshina, 2006).

Thus teaching with information Technology in Primary and Secondary Schools still becomes impossible to achieve. This is because serving teachers did not experience

information technology immersed curriculum in their professional preparations and they pass on what they received. The products of the tertiary institution that will use computers and Information Technology in later teaching practice must have observed their teachers using computers (Jegede & Adelodun, 2003). The most critical factor in the successful integration of information technology into education is the extent to which teacher educators are able to prepare teachers with the required knowledge and skills to utilize Information Technology effectively (Information and Communication Technology in Education, 2004). Oliver (2002) in Oluwalola (2006) identified the needs for student teachers to experience models of information technology use in their own learning before they can go head to implement same in their later profession.

Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change (UNESCO, 2002). This is because the teacher is an agent of change, therefore cannot separate for the development of information and Communication Technology is a global resolution and has been a subject of great significance to all mankind (Idih & Njoka, 2008). These technologies have become central to contemporary societies. Whether one is talking on phone, sending an e-mail going to the bank, using a library, listening to sports coverage on the radio, watching news on television working in an office or in field, going to the doctor, driving a car or catching a plane, one is using information technology.

Information technology is a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyze, create, exchange and use data, information and knowledge in ways that were almost imaginable (Association of African Universities, 2000). The prevalence and rapid development of information and

communication technology has transformed human society from the “information age” to the “knowledge age” (Okebukola, 2008). Most Nigerian tertiary institutions are already having computer study as part for their academic programs, most of them are still theoretical in nature to impact meaningfully on the society. The Nigeria University Commission identify established a virtual learning website but its impact is yet to be seen and it is too early to be assessed (Adeshina, 2006).

Information technology has had more impact on administrative services such as admissions, registration, fee payment and purchasing than on the fundamentals of classroom teaching and learning. Even if information technology has not revolutionized the classroom yet, it is changing the learning experience of students by relaxing time and space constraints as well as providing easier access to information online journals and e-books; students portals; etc, an achievement that should not be downplayed (Gambari & Okoli, 2007).

Igbinoba (2008) identified the following competencies required by teachers information technology application in education. These include: competence to make personal use of information technology, competence to master range of educational paradigms which make use of information technology for teaching and learning. Lecturers in tertiary institutions are involved basically in two things: teaching and research, with auxiliary administrative assignments.

The information technology have the potentials of not only ensuring effectiveness and efficiency in these two areas of teaching and learning; they have the potentials of easing the administrative duties. According to organization for Economic Co-operation and

Development (OECD, 2005) information technology can be used in the following ways: to help in school administration, to train students in skills which they will need in further education and as an ongoing learning process throughout the rest of their lives and for their future jobs, example. word processing, email communications: to provide access to information outside the classroom example. Via the internet, to support teacher development via external networks, and to support and potentially transform the learning and teaching process. Transfer of learning is said to occur whenever a previous learning has some effects on the learning of new responses. “The influence that learning one task may have on the subsequent learning of another is called transfer of learning”.

Research is another core business of the university. Distance research collaboration has been made possible using Information Technology, virtual lab technology making it possible for researchers located in different geographical regions to participate in joint projects. Onasanya, et. al. (2010) identified three specific areas of relevance of Information Technology to teachers in the area of research as follows: that, it provides opportunities for scholars to communicate with one another through e-mail, mailing lists and new groups and chat rooms. These Information Technology resources enable communication between scholars as they can post research, assignments, books or journal lists references to on-line materials. Problems and solution can be discussed between researchers and scholars spread throughout the world, thus, national and international dimensions or research issues can be studied as they can allow for communication with peers and experts around the world. Through collaborative knowledge building, studies can spotlight trans-national trend analysis through human and instrumentation collaboration.

Information Technology can facilitate research in any discipline as they provide quicker and easier access to more extensive and current information through digital libraries that provide digitized full-text resources to learners and researchers. Others are the electronics list-a directory of scholarly and professional e-conferences containing relevant topics and articles relevant to researchers and electronic reference desks or virtual libraries. Others include electronic journal and catalogues and image database. Others are Internet resources; gopher and CD-ROM can provide a researcher with current, in depth, firsthand information.

Information Technology can be used to do complex mathematical and statistical calculations which are important in research. They can be used for data manipulation and analysis. The Information Technology will facilitate the compilation of data on time, performance of statistical analysis. In fact, complex statistical analyses are not only performed instantaneously but also more accurately than possible manually.

Information Technology has become a necessary tool for every day activity and the utilization of emerging Information Technology (IT) in the institutions of learning (School) as a means of teaching has become incumbent on teachers and students for the purpose for which they are established. The application of Information Technology skills is responsible for the effectiveness and efficiency of Information management in schools today and every Tertiary Institution Teachers is expected to be able to maximize the full potential of this technology (Igbinoba, 2000). It is important to note that Information Technology has been considered as one of the greatest forces bringing changes in the world of work and any teacher who wants to remain relevant, competitive and effectively

productive, must, therefore, embrace and put to use the Information Technology skills to access vital and up-to-date information on the internet for the purpose of teaching.

Ikelegbe (2007) opined that Information Technology (IT), has all the modern systems for processing information in data, text, image and voice. It embraces all the technologies that support activities involving the creation of data, storage, manipulation and communication of information, including other methods, procedures, management and application. Butcher (2003) described Information Technology as electronic technologies for collecting, storing, processing and communicating information. Since the Tertiary Institution Teachers play prominent roles in preparing ICT students, they are expected to utilize the Information Technology skills they have so far acquired, to access relevant, vital and up-to-date information from the internet, in order to make the content of their subject matter to be imparted to the students relevant to the world of work of the current dispensation.

Agbamu (2005) opined that business educators might find it difficult to deliver the appropriate education and training to their students. This is because, the more a teacher knows, the more the teacher will be able to impart to his students. Thus the need to shift from the traditional instructional materials to more modern materials in imparting the right type of knowledge, skills attitudes and values to enable students move on the fast lane of Information Technology. Arunachalam (2005) said, “The electronic or digital revolution is affecting the nature of learning and the production of knowledge and transforming the world in unexpected ways”. Rai and Bhattacharya (2005) agreed that, Information Technology (IT) is one of the key technologies of our age and has had a profound effect on every aspect of modern society including education

The use of Information Technology in acquiring knowledge and skill has become an essential in education (training) and these Information Technology elements in the educational process have magical effects. Higher education without the support of Information Technology makes the lives of learners and teachers equally difficult.

Ezenwafor and Ndinechi (2003) opined that ICT teachers need a thorough knowledge of the standard instructional methods in the field and should use a variety of them according to the situation, subject matter being taught, and instructional objectives so as to enhance teaching/learning effectiveness. Standard instructional methods for ICT as outlined by Osuala (1989) and Aliyu (2000) included lecture, discussion, role play/dramatization, questioning, problem solving, project and assignment, demonstration, drill/practice, simulation and field trip.

Information Technology provides a powerful instructional delivery media for employing any or a combination of these identified instructional methods in ICT of which ICT is an integral part. However, the UNESCO 2000 World Education report identified the following conditions as essential for improving learning: that, Students and teachers must have sufficient access to digital technologies and the internet in their classrooms, schools, and teacher education institutions, high quality, meaningful, and culturally responsive digital content must be available for teachers and learners, and teachers must have the knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards.' The opportunity exists to harness this force and use it positively, consciously and with design in order to contribute to meeting, defined learning needs.

Based on the stated facts it ‘could be inferred that, Information Technology provides opportunities for teachers and students to collaborate with others across the country and across the globe. They also provide new tools to support this collaborative learning in the classroom and on-line. Bruer, (2000) in Nwanewezi and Okpokwu (2008) noted that Information Technology is quite adept at "breaking knowledge and skills into thousands of little standardized, de-contextualized pieces, which could be taught and tested one at a time". Information Technology can provide powerful tools to help teachers access vast knowledge resources, collaborate with others, consult experts, share knowledge, and solve complex problems using cognitive tools. It can also provide teachers with powerful new tools to represent their knowledge with text, images, graphics, and video.

ICT educators use computers and interactive multimedia to make their teaching more efficient, effective, powerful, and flexible. Internet is one of the computer and multimedia tools that have revolutionized the social world and classroom in recent times. By using the internet, a teacher can get virtually any type of information. The internet brings teachers instructive information that they could not find in any other way, especially through the World Wide Web (www). ICT teachers can register on line to read journals, magazines, book reviews, statistics, etc on the internet, and they can also download useful information into their own computers for subsequent impartation to the students.

It is true that not all the ICT who claim to have the Information Technology skills have the time to access the internet, talk less of browsing to update on the content of their subject matter, thereby making it very current. Ngurukwem (2005) rightly discovered that if an audit of ICT teachers with Information Technology skills is conducted today, the

result will reveal that only very few teachers who possess the skills and utilize them to support them in their teaching. If a business teacher is not capable of utilizing the Information Technology skills to enhance what he/she teaches, he/she should be charged with professional obsolescence. Based on this reason, Ngurukwem (2005) remarked that it is necessary that 'teachers of ICT utilize Information Technology skills to enable them grow professionally and remain relevant.

Computer literacy is crucial in accessing and using information on the Internet, and modern teaching methods should incorporate Information Technology as part of teaching learning strategies. The implication is that, Internet revolution will impact on Nigerian Education, as it would reposition it for effective classroom delivery and global competitiveness (Okoji, 2008). This could explain the reason for which Government is pursuing the implementation of IT and ensuring it becomes a necessary tool for everyday activity.

ICT programme is in the frontline of information management, letter writing, receiving and giving information, and word processing, therefore, Information Technology literacy and ability to the utilize IT to access quality Information is therefore very crucial (Igbinoba, 2008). There has been a gradual and steady increase in Information Technology skills acquisition by teachers teaching ICT there is still a gap in terms of adequacy of training and availability of Information for effective teaching delivery. Therefore, there is still the need for ICT teachers to acquire and use Information Technology skills for teaching and training of ICT teachers, particularly at the tertiary level. The missing link between IT skill acquisition and effective teaching would have

been filled, which is the use of Internet to improve the quality of teaching in the classroom.

The Federal Government of Nigeria (2001) introduced Information Technology from two perspectives: for a supportive service and to be integrated to enhance sustainable development and global competitiveness. Information obtained from this Technology would be managed to give support and the IT itself would be used to fast-track the national goal. Information Technology is hereby seen as a very important resource in the country's search for economical, social, technological and educational development. Obviagele (2006) shared this opinion as he stated that, everywhere in the world, information technology is essential for efficient running of offices, industry and institution. Information Technology (IT)· sparked off the information revolution and this is noticeable as the most powerful tool of change in management practice, as it stands in the center of the economic and technological development of any nation in this information age.

Information Technology has great implications for the ICT students in the tertiary institution. The existing curriculum for the programme produced by NUC (2002) has incorporated some elements of ICT. Therefore, acquisitions of Information Technology competencies and ability to utilize such competencies have now become imperative, if the teachers are to graduate students that would be relevant to their world of work. Osuwa (2002) concludes that, no organization can survive without information and the advent of IT has made information very easily available for people. For Nigeria to be able to compete favourably globally, through accessing latest information in all educational fields, he advocated, that efforts must be made to link up all universities, Colleges of

Education, Polytechnics, Libraries, Research centres, Teaching Hospitals and Government Department with internet. He without doubt said, this would be expensive but the country stand to gain more than what should be the cost.

Ekruyota (2005) outlined the following as the benefits of Information Technology (IT) as it enables employees to cope with a variety of manufacturing systems, can improve the standard of employee's productivity, can create job satisfaction and improve job mobility, helps to keep contact with friends, families and business associates via the internet and using e-mail, provides facilities for managing personal finances with the use of spreadsheet packages and online, real time banking and it is helpful in pursuant of hobbies with specialized software packages. Other benefits are: it enables hand on activities, real time data collection on the internet, provides a medium to develop and exercise critical thinking ability, enable the student to known many new types of educational opportunities available elsewhere, and can be a conduit of powerful ideas and the seed of cultural changes, helping people form new relationships with knowledge that cut across the traditional lines separating humanities from science and knowledge of the self. These benefits gave IT stronger and powerful reasons for the usage to teach in the Nigerian Tertiary Institution.

2.21 Trends in Information and Communication Technology (ICT)

Information and Communication Technology can be defined as all forms of technology applied to processing, storing and transmitting information in electronic form. The National Policy of Information Technology (2001) sees ICT as the bedrock for national survival and development in a rapidly changing global

environment and defines it in two ways. In the first definition, the term ICT means computer auxiliary equipment, software and hardware, similar procedures, services (including support services) and related resources. In the second definition, the term ICT includes any equipment or interconnected system or sub-system of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, inter changing, transmission or reception of data or information.

Adeweyin (1991) in Adamu (2009) stated that the use of information technology evolved gradually from the use of visual aids dates back to ancient time of introduction of mechanical gadgets like projector, radio, films, television, computer, teaching machine, satellite, internet and e-mail. Adamu (2009) observed that the year 1450 AD marked a significant turning point in the revolution of information technology. John Guttenbergy inverted a printing press which revolutionized the communication process; the invention gave rise to the age of books with the production of the Holy Bible in 1456. These increased awareness of IT during the colonial era; they encouraged the use of visual aids materials such as slides, charts, maps, firms, audio tapes, models and mock – ups. Adamu further stated that in 1943, the first radio receiving stations began in Lagos; this increased the pace of information dissemination in the country particularly in the area of educational broadcasts.

Adamu (2009) stated that in 1947, an instructional materials production centre was opened in Lagos. Nigeria started focusing attention on the new age in Late 1994. The first attempt of introducing the internet to Nigeria was made through

UNESCO sponsored regional Information Network for Africa (RINA) project. An electronic network workshop was held at the Obafemi Awolowo University (OAU) Ile-Ife, this gave birth to the Nigeria internet Gray (NIG) as non-governmental organization to carry out the campaign for connection to the internet using 64 k6ps dedicated circuit was announced in February 1998 by the ISP Nigeria on line. Another ISP micro computer system emerged in March 1998, this time using 128 KB dedicated satellite based circuit. It was observed that conscious of information age, Nigeria quickly became a member of African Information Society Institute (AISI) formed in 1996 essentially to bring African ICT age.

Today, communication technology has brought about the evolution of information technology which is rapidly growing and seriously affecting every aspect of human endeavours, be it educational, economic, political, social and religious. Kiesler (2002) stated that individual consumers may use the telephone to increase business or household efficiency or to enrich their social networks and reduce isolation. Raymond (2006) opined that the development and the influence of ICT in education should be expected since educational sector normally set the pace for any form of innovation and change. The ICT revolution is particularly more visible in the university system, this is because National University Commission (NCC) as a matter of deliberate policy initiated the move to get Nigeria university to embrace ICT through its Nigerian University Management Information System (NUMIS) project.

The opportunity to set link to the formation super highway, thereby enjoying what may be referred to as academic cyber freedom which poses a new challenges to the long views by conservative teacher education theorists teaching and learning. Information technology also known as (ICT) is playing a crucial role in contemporary society. It has transformed the whole world into a global village with global economy which is increasingly dependent on the creative management and distribution of information. globalization of world economies has greatly enhanced the values of information to business organization and has offered new business opportunities. Today, ICT provided the communication and analytical power that organizations need for conducting trade and managing business at global level with much ease.

UNESCO defines ICT as 'scientific technological and engineering disciplines and the management techniques used in information handling and processing information, their interaction with men and machine and associated social, economic and cultural matters". Librarian's glossary defines ICT as, "a development of information sources handled by computers and communication by electronic channels, database can this be accessed, telephone links and computer output can be transmitted in an electronic format directly to remote receiver", while glossary of Academic San Diego State University (2007) stated that: Information Technology (IT) includes matters concerned with the furtherance of Computer Science and Technology, design, development, installation and implementation of information system and applications".

Today, we are all in agreement that the world is becoming increasingly dependent upon technology as evidenced by the big role it is playing. All developing nations can derive tremendous advantages from this technology for updating the knowledge of its researchers and scientists.

2.22 ICT and Teaching/Learning Environment

It has been argued earlier that ICT is a mediator of learning. As a component of the learning environment, it is difficult to measure and directly demonstrate the influence of ICT in schools of learning. It is possible to suggest possible influence by connecting ICT as a mediator with well researched theories of learning and strategies for providing learning opportunities.

Oyeniyi (2007) stated that internet is a collection of computer networks that operate in common standards to enable the computers and programmes that they run to communicate directly. The internet is beginning to play an important role in education. The internet provides an invaluable and rich source of information to students. Some of the benefits of using internet in education as identified by Coulter, Feldman and Konold (2000) include the following:

a. Provision of in-depth content for learning in most subject areas.
b. It allows the user to engage in inquiry by exploring nearly unlimited resources available on the internet.
c. Textbooks are often outdated, but most websites resources are often current and updated frequently.
d. Instruction is less teacher centered as students curiously drives their learning.

e. It allows students to learn at their own pace and time as the internet can be accessed anytime of the day.

It is important for students in Nigeria to take advantage of these and to prepare for a globally competitive society. Teachers must provide opportunities for students to use ICT while working together to access information, applying information in problem solving and sharing their solutions. The Committee on Development in the science of learning completed research work and stated that: “several groups have reviewed the literature on ICT and learning and concluded that it has great potential to enhance students achievement and teacher learning, but only if it is used appropriately” (CDS 2000).

20. Provision of Tools to Increase Students Productivity

In the past, students have spent a lot of time doing repletion of low level tasks, particularly involving writing, drawing and computation. While it may be necessary for students to develop these skills at some time; on most occasions, they are pre-requisites to some high level task. Unnecessary repetition of low-level task is inefficient, non-motivational and may obscure the real purpose of the learning activity. Many computer applications provide the tools to support students in quickly completing these lower-level tasks so that they can focus on the main purpose of the activity. Word processors, graphics, packages, database spreadsheet and other soft ware support the performance of students.

21. Engagement of Students through Motivation and Challenges

Information and Communication Technology helps to motivate learners and pose challenges that will make them to be inquisitive, and develop positive mind towards

learning. Many studies have found that students like to use computers and are likely to develop more positive attitude towards their learning when they use computers. In a related development, Cradler and Birdgforth (2002) stated that "Computer systems do provide the opportunity to create a wide range of interesting learning experiences. This is likely to help to maintain students interest".

22. Investigating Reality and Building Knowledge

ICT allows students to investigate thoroughly the real world. Reginald (1996) said that students can more readily access information sources outside the classroom and can use tools to analyze and interpret such information. Information may be accessed through online system or through data logging systems. Reil (1998) stated that technologies allow students to receive feedback, refine their understanding, build new knowledge and transfer from school to non-school settings.

23. Active Learning and Authentic Assessment

In many classroom situations, it is difficult to allow students to be sufficiently active as participants. Typically, students are often passive; spending a lot of time listening or reading. It is well-known that students are more likely to be interested and attentive and will achieve a wider range of learning outcomes if they can be active. Riel (1998) in his own contribution concluded that computer software can be used to provide students with learning experiences when they are interacting with the computer system. Learning by doing committee on development in the science of learning (2000) in support, stated that students engagement with the curriculum will increase as they are afforded opportunities is create their own information and represent their own ideas.

24. Increasing Learner Independence

Computer systems are increasingly being use to provide learning experiences when and where they are needed. This provides student with greater independence not only in terms of when and where they learn, but also what they teach. Cradler and Bridgforth (2002) stated that it is not necessary for all students to do the same thing at the same time. Teachers may provide students with access to software allowing students to select different learning experiences. The class does not have to be treated as a group. Individuals or groups of students may consider learning topics independently of the teacher.

25. Collaborative and Cooperative Learning

Researchers have found that typically, the use of ICT leads to more cooperation among learners within and beyond schools and a more interactive relationship between students and teachers. Reginald (1996) defines collaborative as a philosophy of interaction and personal life style where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers. Cooperation is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through people working together in groups. Studies have found that ICT provides good support for team-based project work. National Foundation for the Improvement of Education (2001) in support said that the use of ICT to collaborative and cooperative learning is extrapolated to the support of learning community.

26. Tailoring Learning to the Learner

In most traditional learning situations, it is not possible to provide each student with an instructor and for that instructor to specially design learning experiences for that student. The programmability and interacting possible with computer systems provides the opportunity to develop software which stimulate the role of an instructor, intelligent tutoring software may use information about the student to recommend appropriate sequences or sections of a tutorial for the student. Schacter (1999) stated that many studies have found that using computer – based instruction can increase achievement scores by at least, one standard deviation, although this is neither uniform nor consistent across all areas of study. The idea is that software allows the student and/or teacher to tailor the learning experiences to suit the individual student.

Eadie (2000) in agreement stated that: the use of online technologies is used to provide more individualized programmes. He went further to buttress his claim by saying that computer software can also be used to support children who require individual learning programmes (example. gifted, distance education or remedial).

This is agreed with Patrick (2000) in his study on computer and its impact on teaching and learning came out with the finding that computer technology will and is changing the traditional pattern of teaching and learning in our schools. He stressed that administrative and paper work which a teacher is usually engaged in will be drastically reduced to its barest minimum. Again, with proper application of computer technology, teachers role in the class will just be to assist the students solve the difficulty in interacting with computers.

27. Provides Platform to Support Higher Level Thinking

There is an increasing range of software tools which can be used to support the development of higher level thinking skills such as application, analysis and synthesis. National Foundation for the Improvement of Education (2001) stated that: Computer can be used to analyze data, present data, link data, or information, present information in different formals, stimulate environments and conditions, and support interactive communications. This allows teachers to consider providing a range of activities to assist students to become critical thinkers, designers and problem solvers. Committee on Development is the Science of Learning (2000) stated that: Computer systems provide a wider range of motivating situations in which students can develop and apply these higher level thinking skills and provide opportunities to develop deep knowledge. The researcher will review literature on assessment of competence, use and attitude of teachers and students of some tertiary institution to ICT in Kaduna State, Nigeria.

2.23 The Concept of Information and Its Uses

Various attempts have been made to define information; as such no simple definition is universally acceptable. This is because to understand the nature of information exactly, there is a need to understand another term called data. Onajaife (2006) defined data as raw facts or observations that describe a particular phenomenon, while information is data that has a particular meaning within a specific context processed from data. Curtis, Folley, and Morin (1998) established the difference that exists between Data and Information that, data are raw and could include numbers, sounds, video or photographs, when they are processed;

they become information in the form of letters, charts or multi-media. Sometimes, some information could become data depending on the circumstance or context in which it is used; but when they are processed they transform again into information.

Ibrahim (2005) opined that information is data that have been processed into a meaningful and usable context. It involves the transmission and reception of intelligence or knowledge. Eyitayo, Eyitayo and Akeju (1999) defined information as data which has been processed in such a way as to be meaningful and useful to the person who receives it. The definitions have some things in common: such as data referred to as facts events, activities and transactions which have been recorded, which when processed would give rise to information. In view of the aforementioned submissions it is important to state here that there are volumes of data that had already being processed which are available on the internet that secretarial business education teachers can access, which will help them in their teaching of the course. These data had gone through series or rigorous reviews and they have been up-dated to reflect views that are current hence up-to-date meaningful and useful information which are capable of making one, well informed in the global village and remain relevant in the world of work.

Information can be written, oral, visual or sensory. Written information is information that is made up of numbers and words which are in written form and transmitted from one person to another. Oral is the face to face exchange of information, through talking, while the visual information refers to information

that is transmitted graphically or pictorially (Adeshina, 2007). For an item to be information, Afedia (2006) maintains that it has to pass from one person to another (communicated) and from one place to the other. Many ways have been devised in the past for passing information especially in the traditional setting. These included: oral discussion, beating of drums to call out people, and town criers going round a village to pass some messages to people. In the traditional office, the most common means of passing information was the messenger service who delivers messages through passing circulars, notices, and memos to authorized persons.

With the advent of Information Technology, today's business environment revolves around navigating computer file system. Whereas recording of information was done manually in the past, modern Information and Communication Technology equipment has been invented to satisfy all human efforts and ease human labour. Modern Information Technology has changed that cost of information acquisition processing and communication and if effectively applied could reduce the problems arising in the dissemination of information in the public and private sectors of developing countries. This is done through computers, internet, Global System for Mobile (GSM), Communications to mention but a few. A teacher who wishes to be relevant in the education industries, producing graduates that are relevant to the modern world of work must not be Information Technology ignorant, he/she must possess the skill and utilize it for teaching

The computer as an electronic device, according to Oduguwa (2002) in Omolorhe (2006) is capable of receiving data as input, and processing the data into meaningful information (output) in printed or visual form. In order to be able to communicate with the computer, knowledge of the system operation is essential. Information Technology through the use of internet has come of age to enhance productivity by improving the ability to store and retrieve information accurately. When such information are obtained they will serve the purpose of bringing currency into the classroom. He stated further that, it includes ability to download files of interest, exchange files through file transfer and participate in professional discussions on different subjects, sending and receiving e-mail on required information for institutions and students and the use of the world wide library services by researchers. The usage of Internet by the Secretarial Teachers affords them ability to compete globally.

2.24 Features and Benefits of (ICT)

The internet has been described as a global collection of many different types of computer networks linked together. The National Teachers Institute (2000) describes the internet as consisting of computers permanently joined together for high speed interaction in the information super highway. The word "internet" is derived from inter-Net-work. Obviagele (2006) stated that, for a business office or any other person for that matter to be permanently connected to the internet, you simply connect your computer to any of the computers on the network through internet service (Access) providers. Once you are connected to the internet, you

can communicate with any other computer that is linked to the network anywhere in the wide world.

The use of internet is of great benefits to the secretarial workers especially in this information age, where knowledge is power. Yerirna and Mohammed (1998), in Chukwumczie (2002), describes internet as a major breakthrough in technology and the most flexible mediums currently available in the technological world. Adebayo (2006) points out that the network quickly grew to include scientists and researchers across the countries and virtually schools, business, libraries and individuals around the world. Each, organization that subscribes to the net is responsible for maintaining its own network. It is therefore important to note that most of the information on the internet is free. Government; universities, colleges, companies and individuals provide free information to educate and entertain the public.

Osuwa (2002) posits that the internet provides services that have educational value and which serve useful purposes, stressing that using the internet is like travelling to a new country with many things to see and hear. It is possible for any educator to have global sharing of course materials of any other informational between educators in different countries. In view of the way internet has been described, it is sufficient to state that it is a new technology based on the principle that every piece of data held electrically anywhere is potentially accessible to any persons with appropriate computer technology. A word processed, document, picture, sound or video can be produced and shared among unlimited persons, no matter where they are located in the world, as long as it has been digitalized and

recorded on disk somewhere. It is important to consider the following in relation to internet: Internet features, Internet services, and Internet benefits.

Internet Features: Chukwumezefe (2002) gave the following to inform Internet features:

i. **Real Time Information**: Retrieval and Transfer is one of the most remarkable features of the internet as it enables communication in real time xample. E-mail can be sent and received from any location in no time.

ii. **Global Assess**: the internet is global and it can be accessed from anywhere in the world as long as a connection to a local provider can be established.

Interactively user friendly: the internet presents information to its assessors in user friendly modes for example world-wide-web (www) pages are formatted with brilliant graphics and text providing a very good enabling environment for information dissemination.

Dynamic: internet content is constantly being updated providing users with current state of the art technologies and information.

Internet Services: A list of internet services were recommended by Mmeruwa (2001) that are supposed to inform the necessary skills required for use by secretaries in order to make them effective in information management: these includes the following: E-mail, Newsgroup/Usenet, Telecommuting or teleworking, Computer Aided Telephony, World Wide Web (www), Surfing the net, Internet relay chat, Corporate lease access, File sharing and topic sharing,

Video conferencing, Public voice messaging, Topic searching, Radio paging, Mobile telephone system and Internet address and host address.

Benefits of Internet: Internet has a great benefit to everyone that has to do with information. Obviagele (2006) opined that the use of internet therefore helps in three basic ways, which are, to get information, to provide information and to compile information. Through the internet, the end users of information, researchers, educationists and executives get information about people, products, organizations, research data and results. The internet also offer one of the best media which enables people to know who you are, what you are doing, or that you have done and how. This is what is called global "advertising". The easiest way for business organizations or institutions is to set up a website to let the world know what their products and services are. Adebayo (2006) also maintained that, the most recent and very successful attempt at presenting information over the Internet is the worldwide-web (www).

The much that have written about Internet, the features, services it offers and the benefits stopped short at accessing the Internet. To use Internet by the ICT teachers in Nigerian tertiary institution for effective classroom delivery, there must be ability to access.

Dangana and Sabitu (2009) stated that, the emergence of the internet and its resources has helped in no small measures to effective dissemination of information, record management and improvement in commerce and the global economy politics and life in its ramifications. The products of ICT being a part of

the ever changing and dynamic world of work, must move in the same pace with information technology in order to be relevant in today's world of work. The ability of the teacher of the ICT to harness the internet resources and apply them in the classroom will go a long way to improving the students effectiveness and productivity. The speed of the e-mail for instance, and the ease with which it can be sent, even to multiple recipients all over the world has made it very useful to most organizations that can afford it.

Information Technology for Teaching and Learning

The present educational delivery system in ICT places emphasis on teacher-centered approach in which case the teacher is the focus. The main characteristics of teacher—centered approach according to the Federal Republic of Nigeria (2003) were:

Teachers select what the learners learn, the methods by which they learn and the pace at which they learn; and teachers see their role as communicating knowledge to their learners as effective as possible. In view of the observed phenomena, the teacher as a link between the learner of ICT and vital information must possess the skill of sorting, analyzing and disseminating vital information to students. This is where the Information Technology comes in with the attendant information sorting through the internet. Where the teacher is also saddled with the responsibility of selecting what the learners learns, he must be able to provide assorted kinds of information from where the students cannot make a selection as

well. The information Technology through the use of the internet enables a teacher to access numerous information.

In order to also communicate up-to-date information which would help the students of ICT, which is very dynamic, then the teacher must rely on the use of internet where such up-to-date information can be obtained (Solomon, Nweze and Eze, 2008). These assertions supported ahead to suggest that for a good delivery system in ICT (with which is ICT), the teacher must understand the different models of computer used in education, among which are: Computer Aided Instruction (CAI), Computer Managed Instruction (CMI) and Computer Based Education (CBE). The combination of these models, according to Akudolu (2004), would help the teacher to use the computer not only for instruction and recording purposes but also for the production of instructional materials and the development of instructional systems.

Solomon, Nweze and Eze (2008) conclude that the effective implementation of Information Technology driven instructional approach using the aforementioned computer models are avertable tools for reforming the delivery system of ICT. This would also serve as catalyst for re-engineering education in general and making it technology - based and learner - centered. Therefore, every teacher needs adequate knowledge of how best to use computers to achieve educational objectives in his/her subject area.

Adebayo (2006) defines Information Technology as computer based tools which are utilized for the information needs of a particular organization, institution or

individual. The particular individual, who should use Information Technology in his/her teaching methodology, is the teacher of ICT in the tertiary institution. Olorundare (2006) posited that, Information Technology comprises different types of technologies which are utilized for processing, transmitting or communicating data and information. The implication of this position to ICT programme is that, processed information awaits the secretarial teacher if they can be accessed on the web using the internet.

According to Ogbaekirigwe and Uloh (2008), Information Technology tools are indispensable in this modern age and its use in teaching and learning business (ICT) studies in Nigerian schools will go a long way in producing skilled graduates that will effectively deliver afterwards in their respective places of employment. Akpotohwo and Ugeh (2008) observed that, the internet has become especially popular among educators because of its ubiquitous, global platform independent nature that support education through the creation, sharing and distribution of on-line course materials. This observation supported the researcher's suggestion that ICT studies, teachers in tertiary institution should enlist in the usage of internet, which has been termed popular and would give support to their efforts, as they would be accessing available up-to-date information from the Internet.

Alavi (1998) and Hilderbrand (1999) observed that, ICT Schools have been under constant pressure to provide students the skill and experience needed to effectively use emerging technologies. Also, Ladner and Jarvenpaa (2003) in Akpotowho (2008) observed that the technologies are being used by business to

gain competitive advantage. For graduates in the tertiary institution to have a competitive advantage in the global market, they must be equipped with global information not found in textbooks that were written in the medieval centuries or in the past years, but on the internet where current research studies are daily reported.

Research findings supported that development of education in any nation will always have its root in classroom instructions; therefore, the classroom should be made conducive both for the students and the instructors (Ezeabii and Obayi, 2008). The conduciveness of such environment could be explained also in the light of whether it is using the current universally accepted instruction, that is, the usage of Information Technology for teaching and learning. When the same instructional materials a teacher has been using for the past two or three years are still very handy for the next succeeding class without any update, there is no way that such class would not become monotonous and subsequently not interesting. This is because the students have a way of passing their lecture notes to the next class succeeding them. As soon as the students discover that nothing has really changed in the lecture notes, the environment now becomes too boring and it may begin to make students to stay back from attending lectures, Contrary to this disadvantage of using the Internet, when the students discover that the teacher is inclined to the dynamism that Information Technology could give to his subject matter content, through accessing vital up-to-date information from the internet, students curiosity would be aroused and they would be eager to attend to their lectures. It is important to note that man loves to hear things that are new, modem

and current. Nwosu (2009) observed that, today ICT functions and training have been greatly improved due to improvement in the dynamic training methodology. This dynamism has posed a challenge for secretarial profession more than any single profession because it is saddled with the responsibility to process information needed by every sphere of human endeavour. Nwosu (2009) said these challenges have come in the area of curriculum content, instructional facilities, teaching methods, domination, and nomenclature.

In order to solve specifically the challenges of instruction in ICT teaching and learning Nwosu (1987) argued that, the teaching learning of skills had long shifted from subject centeredness in which the teacher dominates the learning scene to learner centeredness in which the learner dominates by actively participating in the learning himself. This is very relevant to secretarial subjects such as shorthand, typewriting, secretarial duties, office practice, and key boarding among others. According to Nwosu (2009), the best way to keep students active as possible throughout the period of instruction is to inspire and guide them on activities specially designed to present as near as possible the work situation they will come in contact with when they become employed. The resource material for instruction, which are developed based on the societal needs, are ever changing since they can be accessed on the internet for the use of students.

Onyejem (2005) in Nwosu (2009) stated that the use of resource materials do not achieve' any of the attributed value on their own. Their usefulness depended on what the teacher makes out of them. The reason why some of these facilities are

not used by teachers, as observed by Nwosu (2009) was because, the teachers lacked the necessary skills to operate them. It is in recognition of the vital importance of the instructional facilities that National Commission for Colleges of Education (NCCE) provided that for accreditation of NCE ICT (embodying ICT studies) programme, one of the requirements is having a model office. Model office according to Oxford Dictionary (2006) is "something to be copied", "a pattern" "thing closely resembling another". From these definitions it can be said that, a model office is a teaching learning facility which should closely resemble the real life office. The purpose is to create an office-like environment in the classroom and to enable the students not only to see office and office related facilities but also to manipulate such facilities under real life situations.

The model office in the IT era is called e-office, an office that is being electronically manipulated. The model office cannot be anything short of what obtains from the real life office and if it must be so, then the teacher must be up to the task to deliver using the Information Technology and all the vital up-to-date. Information it affords. Ndinechi (2001) saw the strength and power of Vocational education (the umbrella under which ICT is offered) as being a veritable means of meeting manpower needs of the society. Whereas these instructional facilities are either lacking or inadequate, the training institutions will continue to graduate half-baked individuals, those who are unable to either secure paid employment or be self-employed. The implication is that the graduates are jobless which may lead some into other vices like robbery, cult, prostitution or production of those who roam about the streets hawking recharge cards.

The teacher will give only what he has “lat legal maxim” you cannot that which you do not have. The possession of IT skill by the ICT teacher for teaching will impact upon their products who will in turn utilize it effectively and efficiently in the real world of work. One of the objectives of teacher education as contained in the National Policy of Education (2004) was to provide teachers with the intellectual and professional background required for their assignment and to make them adaptable to any organizing situation not only in the life of their country but also in the wide world. Nwaiwu (2009) remarked that, ICT teachers should adapt to the changing environment in the social world by equipping themselves with knowledge of Information Technology.

The possession of IT skills by the ICT teachers will equip them with the knowledge of the components Information Technology and how it works; such as the computers, mobile telephones, fax machines, electronic mails, and internet so as to bring about desired effectiveness and efficiency required teaching in the classroom. Information Technology especially the use of computer has gradually become a rule than an exception, owing to its capacity to improve the quality of life through the advancement it has given to education. Information Technology is of great importance in teaching and learning ICT education in the tertiary institution as it will produce skilled IT B.ed graduates that will effectively deliver afterwards in their respective classrooms.

The Impact of ICT on Students, Teachers and Teacher Educators

Education is a process of human enlightment and empowerment for the achievement of a better and higher quality of life. While teaching is an ever changing profession. The field of education is expanding each year as advancement is made in technology and brain based research. To keep pace with the changing world, teachers must have current knowledge and skills of educational technology.

Just as technology is influencing and supporting what is being learned in schools and universities, so too is it supporting changes to the way students are learning. Moves from content centered curricula to competency – based curricula are associated with moves away from teacher centered forms of delivery to student centered forms. Through technology facilitated approaches, contemporary learning settings now encourage students to take responsibility for their own learning. The growing use of ICT as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in the learning process.

a. Student Centered Learning

Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centered models. Evidence of this today is manifested in:

1. The proliferation of capability, competency and outcomes focused curricula
2. Moves towards problem based learning.
3. Increased use of the Web as an information source.

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools, the influence of the technology on supporting how students learn will continue to increase.

b. Supporting Knowledge

The emergence of ICTs as learning technologies has conceded with a growing awareness and recognition of alternative theories for learning. In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge transmission. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource based, student centered settings and by enabling learning to be related to context and to practice. As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs their learning processes, the more pronounced the impact of this will become.

The Impact of ICT on when and where Students Learn

In the past educational institutions have provided little choice for students in terms of the method and manner in which programs have been delivered. Students have typically been forced to accept what has been delivered and institutions have tended to be quite staid and traditional in terms of the delivery of their programs. ICT applications provide many options and choices and many institutions are now creating competitive edges for themselves through the choices they are offering students. These choices extend from when students can choose to learn to where they learn.

a. Any Place Learning

There is a concept of flexibility in the delivery place of educational programs. Educational institutions have been offering programs at a distance and there has been a vast amount of research and development associated with establishing effective practices and procedures in off – campus teaching and learning. Use of the technology has extended the scope of this activity and students are able to make this choice through technology-facilitated learning settings.

b. Anytime Learning

In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs. Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments.

ICT in Education: Policy and Initiatives

It is against this backdrop that we need to view the role of information and communication technologies (ICT) in education in Nigerian.

a. Alternative instructional delivery systems such as radio, educational TV, and audio-visual communication.
b. Computers and computer-based systems for instructional delivery and management, such as CAI (Computer Assisted Instruction), use of multi-media and internet/web based education (Rai & Bhattacharya).

   Since the 1950s, policy has consistently favoured the use of ICT in education (Reddi & Sinha (2004). "From the use of radio to spearhead the green revolution, to satellite-based, one-way and interactive television for rural development in some of the most backward districts, to today's thrust for the use of open and distance learning models to serve the larger populations, India has tried it all, with varying degrees of success… Radio has a penetration of 100 per cent in the country while satellite and terrestrial television cover nearly 80 percent of the country".

   Gyan Darshan was launched in January, 2000, with three completely digital and round-the-clock TV channels dedicated to education. in November 2001, am FM radio channel, Gyan Vani was launched through different FM stations in the country. (GOI Ministry of HRD Press Release, October 21, 2003).

Use of ICT in Higher Education

Based on recommendations made by different state open universities and distance education institutions (DEIs), the Indira Gandhi National Open University's (IGNOU)

board of management has approved the National Open and Distance Learners Library and Information Network (NODLINET) initiative. The expert committee set up by the ministry for human resource development (MHRD) has endorsed the initiative, which will now be implanted in a phased manner within a period of five years. (Times News Network, April 22, 2007).

At the international level, the United Nations has generated the "Global school and Communities Initiative" (Gesci), a special campaign to promote the use of technology in education (UNESCO Website (d)). From their Bangalore base, Gesci will work with the Nigerian ministries of Information Technology and Educational facilitating policy support, technical assistance and global resource for the initiative.

Today, a great number of experiences with educational technology in higher education exist worldwide, especially in the developed world. This has resulted in new opportunities in the integration of pedagogical and technological resources, which has enlarged flexibility across the learning process. It has equally improved the communication between lecturers and students and the interaction between different educational resources. Oliver (2002) asserts that the use of ICT in higher education enhances student-centered learning.

Within higher education, one of the major teaching challenges has always been helping students to bridge the gap between knowledge and real life practice. This is especially important in applied academic disciplines such as education where professional knowledge is constantly being renewed and recreated through real practice (Cheetham & Chivers, 2001). The National Policy on ICT in Education and Framework launched in

2010 presents a holistic and broad vision for ICT integration in the education sector in Nigeria. This policy moves beyond a basic technology literacy approach. Rather, if focuses on leveraging technology to transform the roles of the teacher and the learner in the classroom. It has been widely acclaimed that for Nigeria's vision 20:2020 (the economic blueprint aimed at placing Nigeria among the biggest 20 economies in the world by 2020) to be achieved, education, especially teacher development, will play a key role and ICT equally so. by 2020) to be achieved, education, especially teacher development, will play a key role and ICT equally so.

Teacher development is clearly required to prepare teachers with lCT skills to equip students with the kinds of critical skills needed if they, as members of the society, are to contribute meaningfully in the country's future development. All teachers need to be familiar with TCT applications and competent in the use of ICT applications. White (2003) recommends that teachers need to experience online learning as part of their professional development. The National Universities Commission (NUC) has worked assiduously to lay the foundation for lCT integration in higher institutions through investment in ICT infrastructure, management information systems, e-mail access, and library information services. There have been essentially three kinds of ICT infrastructural provisions in Nigerian tertiary institutions. These are:

a. Local initiatives; conceived and developed using local resources
b. Corporate initiatives; corporate organizations such as Cisco and Microsoft
c. International partnership initiatives; for instance the NetTel@Africa telecommunications management post graduate programme project sponsored by the

Nigerian Communications Commission in partnership with regional stakeholders united in their desire to increase the capacity of African ICT sector.

In line with the National Information Technology Development Agency's (NlTDA) mandate of Private Public Partnership (PPP) arrangement, the University of Benin, in 2002, went into partnership with Broadband Technology, and IT firm based in Lagos. This led to the establishment of U. B. Technologies, which was specifically to provide;

1. Internet services for students and staff,
2. Training on ICT use for students and staff, and
3. Computer services at a reduced rate.

However, although, the University of Benin has adopted and customized the Uniben.waeup.org portal (This is the Student Registration Portal [SRP] of the University of Benin, which is part of the West African e-University Project (WAeUP) to improve productivity and promote efficient record-keeping to enhance administrative services.), the use of ICT applications in the teaching and learning process has not really taken-off in the university.

2.25 Importance and Relationship of ICT in Teaching and Learning in Education

ICT in education is the foundation upon which a country develops. It is a dynamic force in the life of every individual influencing his physical, mental, emotional, social and ethical developments. It is a complete development of the individuality of a child enabling him to make original contribution to human life. There is a strong relationship between teaching and learning. One of the activities cannot be effectively carried out

without the other. We can safely say that both are bound together in the same way that the egg bound to a hen. In this kind of situation, it is always difficult to suggest which one comes before the other. In order to organize learning activities effectively, a teacher has to understand 'how' and 'why' people learn. It is not enough gathering children in an enclosure in the name of teaching them. There must be a conscious effort to learn about the conditions that favour the teaching of individuals. In the world of today, the teacher has to in one way or the other, be guided by scientific findings regarding the nature of children, their development and capabilities for learning and how they can be guided into becoming very useful citizens. Ideas that perform these functions are generally referred to as theories of learning. In order to achieve clarity we shall briefly consider what a theory is and what its role in learning and teaching is.

2.26 Integrating Information Technology in Teaching

It is the contention of this study that the concept of integration as expressed in the white paper on e-education (DOE, 2003) needs to be unpacked or problematical. In practice, the adoption and integration of Information Technology Skills to access Information from the internet to teach is a challenging and complex process for schools, particularly where there is limited precious experience in the use of its to support teaching and learning.

Furthermore at many schools that have had access to IT, the focus has tended to be on leaning about IT rather than learning with or through the use of IT (Jonassen, Peck & Wilson 1999).

Historically, the concept of it integration as an approach evolved as a reaction to early computer in schools programmes where the emphasis lay on developing computer

literacy or technical knowledge of computer and the use of various computer application. More recently IT integration has been recognized an using computers for teaching and learning rather than learning to use computers" (Urrescol Col., 2004). Thus the focus is on adding value to the curriculum in numerous ways. What is important is that it skills are not taught as a district activity.

(Just-in-Case) but are acquired just-in-time" in the context of activity that is meaningful to learners" (UNESCO/COL, 2004). Indeed "the integrated approach places information technology in a pivotal role in the already transforming learning process. Its success as an approach lies with the ability of teachers to set tasks that require students use these information skills. This is appropriate and necessary at this time when South African teachers are being encouraged to adopt new teaching strategies that are outcomes based and learner centered" (Roos 2005).

In addition to describing stages of integration, His thought valuable to differentiate between types of integration.

Here, it is useful to distinguish between "representational" and "generative" use of IT, as explained by Hokanson and Hooper (2000). The term "representational use" is used to described how IT is used to merely represent information in another medium, Here the IT is incorporated within a task, but its purpose is to "re-present" information, not to generate or construct new information. It is suggested here that the underlying epistemological assumption of Hokanson and Hooper's (2000) "representational use" is that knowledge is absolute, definable and. Re-presentation This thesis suggest that if teachers epistemological assumptions are defined by objectivist beliefs of knowledge and

their pedagogical practices are informed by behaviourist theories of learning, than they are likely to limit the use of IT skills to representational uses, This might account for teachers belief that merely typing an essay or making a pretty front cover using every conceivable font and page border can be termed “Integration” it is hereby maintain that using IT as a “representational” tool is only partly integrative.

2.27 Empirical Studies

A number of empirical studies related to this research work were reviewed, with a view to making clear the gaps that exist in related studies that will provide insight for this study. These include:

Ajayi and Fadekemi (2007) conducted a research titled “the use of management information system” (MIS) in decision making in the South-West Nigerian Universities. Having gone through the work the following were observed, survey design was used questionnaires were used for data collection, simple percentage was used to analyzed the data, that management information system helps to standardize the system of obtaining reports and statistical information from the various universities on students, staff, financial matters and library, the MIS was not adequately put into use to make long term planning in the universities, that MIS was not adequately used for administrative decision on short term planning.

Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to

improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theories. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which is a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphases apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

Further, the present study used expost-facto design as the research method, that is a situation whereby a researchers get to the scene after an event has taken place (after the event) that was the data was already in existence of the use of ICT for teaching and learning. The target populations of the study were computed of 2234 teachers and 58101 students. The instrument the present study used was a self designed questionnaires, (T/S ICT fus) with a reliability index of 0.970 using sample table a total of respondents were sampled made up of 327 teachers and 384 students.

The present study analysed the data using frequencies and percentages to analysed bio data variables and research questions were answered using frequencies, mean and standard deviation. While the hypotheses were tested using chi square at 0.05 level of significance. The findings of the present study showed that teachers and students use of ICT frequency of usage in teaching and learning was high especially as majority could shut down and start up computer on their own safely and used for typing of examination and tests also teachers and students use of ICT level of skills competence in teaching and learning was high as majority of them could operate and use computer system with software packages and they also acquired skills to operate word processing. Again, teachers and students challenges in charging to embrace the new innovation of ICT in teaching and learning in tertiary institution is high as majority said that in effectiveness in erratic power supplying area was a major obstacle and the lack of interest of teachers and students in technology usages.

Moreover, the current research was on assessment of the use and Competence of teachers and students in ICT in tertiary institutions in Kaduna State. The similarities between the two works was that they all delve with the use of ICT in tertiary institutions. Emphasis was on the use of information and communication technology in enhancing teaching and learning the previous research reviewed the role of ICT in creating egalitarian society and

respect for the dignity **of** labour.

In addition, Ilomaki (2008) conducted a comparative study on the effect of ICT's on schools teachers and students perspectives the purpose of the study was to find out how the various elements influence the school; elements such as students and teachers, ICT

skill and usage. ICT in teaching and learning practices ICT adoption within a teacher community and an overall change process in the school two questions were constructed as instrument. In general, the results showed that students are capable and motivated users of new technology. The technical resources for using ICT both at home and at school are very good. The study above conducted has relevance to the present study because it seeks to assess the use and competence of teachers and students in information and communication technology in tertiary institutions in Kaduna state Nigeria.

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in erratic power supplying area was a major obstacle and the lack of interest of teachers and students in technology usages.

The objective of the present study was to determine the extent of use, skill competences and challenges in information and communication technology by teachers and students in teaching and learning in tertiary institutions in Kaduna state, Nigeria. The point of derivation of the past study was comparative study between the teachers perspectives and students perspectives and also if seeks to find out the changes the competence and the use of ICT will bring to the tertiary institutions while the present study was done in Kaduna State. The past study was carried out in Finland.

Another study was conducted by Ezekoka and Okoli (2012) on the of computer in teaching and learning in secondary schools in Imo state. The purpose of the study was to examine if the modern philosophy of computer aided instruction (CAI) to investigate the effect of the use of computer on the academic performance of secondary school students. An experimental research design was used and the instruments for data collection were multiple-choice questions designed by the researcher, and an oral interview held after the experiment with some students. The result of the t-computed was 25,33 which is greater than critical of 2,064. The result shows that students taught with computer performed better than those taught without computer. The above study conducted is very much related to this research because it was based on finding out the effect of the use of computer – aided instruction on academic performance of secondary school students.

Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in

training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

While the current study seeks to assess the use and competence of teachers and students in ICT in tertiary institutions in Kaduna state, Nigeria. The only point of departure from the conducted study from this present one was that it was carried out on the use of computer in teaching and learning in secondary schools in Imo state.

The objective of the present study was to determine the extent of the use skills, competence and challenge, the teachers and student in the use of ICT in the tertiary institutions in Kaduna state, Nigeria.

Theoretical framework of the present study was on vygosky and its zone of proximal development this theory is relevant in the use of ICT because it emphases collaboration, co-operation programme instruction, logical sequence, activity, task self reflection which assist the students to have deeper level of understanding and learning beyond classroom situations occurs, that what ICT entails.

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The present study adapted two theories. They are vygosky was theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which is a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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Duru and Ozoji (2011) investigated the utilization of ICT and its application in teaching computer studies in secondary schools in Owerri educational zone. The objective of the study was to investigate the extent of utilization of (ICT) electronic media devices, in teaching computer studies specially to find out, the extent to which teachers utilize internet in teaching computer studies, the problems associated with utilizing information and communication technology in teaching and to proffer solutions to these problems. The past study adopted survey design present study methodology was expost-facto design they both also used questionnaires for gathering relevant information population consisted of all the secondary schools in Owerri municipal, sampling 150 students and go teachers, used to while in the past study mean score and standard deviation statistical method was used to compute the data. The objective of the present study was to

determine the extent of use, skills competence and challenges in ICT in tertiary institutions part of the findings revealed that, computers teachers lack the required skills to operate these resources, secondary schools lack the necessary infrastructure required for utilization of the resource and application. The study was similar to the current study.

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Muideen (2010) undertook a research titled, an assessment of student's usage and availability of ICT facilities in colleges of education: problems and prospects. The study assessed the student's usage and availability of ICT facilities in colleges of education, the population of the study comprised of students. The research methodology was a descriptive survey, and the instrument for gathering data used was a questionnaire. The study found that, students made use of the available facilities of the college. ICT facilities are widely used in instruction and that Students had access to ICT facilities. There were also problems encountered by the students in terms of electricity supply.

The reviewed study was similar to the present study by focusing on trainee teachers from colleges of education system. The objectives, methodology and instruments are also similar. The difference between Muideen's study and the present study was that while his study focused on the student's usage of electronic media, the present study was on the assessment of the use and competence of teachers and students to ICT in tertiary institutions in Kaduna State in Nigeria.

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Hennessy, Harrison and Wamakote (2010), studied teacher's use of information and Communication Technology (ICT) in primary and secondary schools in sub-Saharan Africa, with a particular emphasis on improving the quality of subject teaching and learning. The research focused on the internal factors of influence on teachers' use, or lack of use, of technology in the classroom. The study tried to determine the perceptions and benefits about ICT and their motivating effects, technological literacy and confidence levels, pedagogical expertise related to technology use, and the role of teacher education. Factors are discussed in light of significant infrastructure and other external issues. The method adopted in conducting the research was descriptive design. Research findings showed that new digital technologies have the potential to revolutionize the quality of subject teaching and learning when carefully integrated into the classroom yet a primary barrier to teachers readiness and learning confidence in using ICT, despite general enthusiasm and belief in benefits for learners, was their lack of relevant preparation, either initially or in-service. Research indicates that, until recently, training opportunities

have remained limited in availability and inconsistent in quality. The research applied a synthesis of literature on the area of concern, primary schools were used as population of the study, and it covers sub Saharan Africa. The present study adapted two theoretical framework. They are vygosky is theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which is a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme institution, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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to focus on use and the skills competence level of the teachers and students on the training, manipulation and operation of ICT in their professional practices and contextual tasks. The subject the researcher used was the teachers and student of tertiary institutions the instrument was a structured questionnaire. The difference was that the present research was conducted in Kaduna while current research under review was carried out in Subsaharan Africa.

Beyerbach, Walsh, and Vannatta (2001) conducted a research study to investigate teachers' use of technology infusion and its role in student learning in the USA. This was a two-year evaluation study of a pre-service teacher technology infusion project in which teams of teacher educators and K-12 teachers collaborated to infuse technology in their respective teaching contexts, and to create links between these contexts. The results suggest that technology infusion to enhance teaching is a multifaceted process that takes time, support, and collaboration. A team approach, with practitioners from the K-12 and arts, sciences and education faculty, and undergraduate and graduate students offered a fruitful model for infusing technology both into teacher education and the schools where the students learn by doing. After participating in the project, "pre-service teachers changed their views of technology infusion from thinking that they would teach and learn about technology to thinking they would use technology to support student learning" (Beyerbach et al, 2001).

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What the results of these studies all point to was a need to shift funding and research priorities from simply providing access to technology in schools to make sure that teachers are adequately trained and supported in both the technology skills and the pedagogical strategies to integrate technology into their teaching. The findings demonstrate a need for teachers, and teacher trainers, to assume new roles, acquire new skills and adopt new teaching approaches as they integrate technology into their teaching.

Aisha (2012) carried a research on Assessment of the Availability and use of Information and Communication Technology for teaching and learning in Polytechnics in the Northern Geo-Political Zone of Nigeria. The objective of the study was to determine the use of information and communication technology (ICT) for teaching and learning in the

Polytechnics in the Northern Geo-Political Zone of Nigeria, Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

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the use of (ICT) for teaching and learning in tertiary institutions in Kaduna State of Nigeria and identify the challenges the teachers and students face in the process of changing to embrace the new innovation so as to improve their competency level in the use of (ICT) to enhance teaching and learning in their professional practices and contextual task in Tertiary Institutions, Kaduna State, Nigeria. The population of the study are teachers and students, teachers population 2234 while that of the students are 58101, the instruments used was structured questionnaires the study under review used questionnaires too that was similar and also difference was the study under review was conducted in Northern Geo-political Zone while the present study was carried out in Tertiary Institutions Kaduna State, Nigeria.

Fabunmi,; (2012) conducted a Research on Undergraduate student's perception of the effectiveness of ICT use in improving teaching and learning in Ekiti State University, Ado-Ekiti, Nigeria The paper evaluated undergraduate students' perception of the effectiveness of ICT use in improving teaching and learning in Ekiti State University, Nigeria. Four research questions guided the study and the instrument used was the questionnaire, the research method used was survey. The study came out with the results that there is a preference for ICT use in improving teaching and learning, though centres as places of accessibility to get information through ICT teaching and learning. It concludes by affirming the need for the development of ICT use in Nigeria universities for the improvement of teaching and learning for the students. This becomes imperative because ICT culture has come to stay globally in all higher institutions. Information and Communication Technology was now the modern means of improving teaching and learning especially in the University system. The study was the same with present study

in that emphasis was on using ICT to teach and learn. Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

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Danner and Pessu (2013) Carried out A Survey of ICT Competencies among Students in Teachers Preparation Programmes at the University of Benin, Benin City, Nigeria The purpose of this study was to examine the ICT usage habits and the self-assessed ICT competencies possessed by undergraduate students in teacher preparation programmes in

the University of Benin. A second important issue that was addressed was whether there were significant differences in the perceived ICT competency among students according to demographic and study related factors. Thus, the paper's central research objectives are:

To examine the ICT usage habits of students in teacher preparation programmes.

To examine the self-assessed ICT skills' competencies possessed by students in teacher preparation programmes.

To determine whether there were significant differences in perceived ICT competencies among students in teacher preparation programmes according to demographic and study related factors (gender, and type of computer training).

A descriptive survey was adopted 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 questionnaire adapted from Bassey, Akuegwu, Udida, Ntukidem, and Ekabua (2007).

The results show 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 was 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. Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

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teachers and students challenges in charging to embrace the new innovation of ICT in teaching and learning in tertiary institution is high as majority said that in effectiveness in erratic power supplying area was a major obstacle and the lack of interest of teachers and students in technology usages. The similarities in the two works, they all talk about the use and competences of the students in the perception of ICT in the tertiary institutions the study under review adopted descriptive survey while the current research used expost facto design for the study. The current research was on the assessment of the use and competence of teachers and students in ICT, the instrument used was the same structured questionnaire. The current study perceived that both teachers and students have high ICT usage, competence and challenges in the use of ICT. The differences in both works was that one was conducted at the university of Benin while the other was conducted in Kaduna State, Nigeria.

Philip, Odusola, and Matthew (2007) conducted a Research on Relationship between ICT competence and attitude among some Nigerian tertiary institution lectures. The study investigates the relationship between ICT competence and attitudes as well as attitudinal construct of teachers. Four hundred and sixty seven teachers randomly selected from 10 institutions (5 universities and 5 colleges of education) participated in the study. Information bordering on ICT competence and attitude of the teachers were collected employing two research instruments. The resulting data were analyzed using multiple regressions, Findings revealed that attitude bears significant relationship with and also predicts competence. It was further obtained that two of the five attitude constructs predict competence, it was observed that as teachers perceived computers to be useful in

their pedagogical enterprise, the interests become aroused which in turn help their computer skills.

The present study adapted two theories. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which was a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

Further, the present study used expost-facto design as the research method, that is a situation whereby a researchers get to the scene after an event has taken place (after the event) that is what the study entails in the use of the use of ICT for teaching and learning. The target population of the study were computed of 2234 teachers and 58101 students. The instrument the present study used was a self designed questionnaires, (T/S ICT fus) with a reliability index of 0.970 using sample table a total of respondent were sampled made up of 327 teachers and 384 students.

The present study analysed the data using frequencies and percentages to analysed bio data variables and research questions were answered using frequencies, mean and standard deviation. While the hypotheses were tested using chi square at 0.05 level of significance. The findings of the present study showed that teachers and students use of ICT frequency of usage in teaching and learning was high especially as majority could shut down and start up computer on their own safely and used for typing of examination and tests also teachers and students use of ICT level of skills competence in teaching and learning is high as majority of them could operate and use computer system with software packages and they also acquired skills to operate word processing. Again, teachers and students challenges in charging to embrace the new innovation of ICT in teaching and learning in tertiary institution was high as majority said that in effectiveness in erratic power supplying area was a major obstacle and the lack of interest of teachers and students in technology usages. The current study was on the Assessment of the use and competence of teachers and students in ICT in tertiary Institutions in Kaduna State, Nigeria. The study has 2234 for the teachers while the student 5801 from the sample size, 3 tertiary Institutions were selected for the study. The research instrument used was the questionnaire the data was analyzed using chi-square test statistics. The findings revealed that teachers and students can use, start up and shut down a computer and for them to type text and examination also operate electronic messages and they lack problem of in effectiveness in power supply and lack of interest on the part of the students in the use of ICT. The difference between the two studies was that the study under review was done at Obafemi Awolowo University while the current study was done in Kaduna state of

Nigeria. The similarities in two of the works was that they deal with pedagogy to enhance teachers and students to be competent in the use of ICT.

Glenda, Sonia, Dwayne, Philmore, and Peter, (2006) conducted a Research on the Perceptions of information and communication technology among undergraduate management studies in Barbados This exploratory study examined attitudes and usage of ICT among undergraduate management students in Barbados. Of the sample of 166 students, the majority indicated they had access to a computer and had access and regularly used the internet. In addition, more females than males has access to a computer off campus. Over 90% used the course-based WebCT, whereas only 30% used the Campus Pipeline. The study showed that students were generally favourable towards ICT, males were more inclined to incorporate ICT in web-based instruction compared to other teaching activities. Older students were more interested in using ICT only as a supplement to teaching activities. The findings suggest high usage of and positive attitudes toward ICT among tertiary level students. University administrators need to address the gender and age differences regarding ICT usage as well as develop strategies to maintain positive student attitudes and high usage of ICT. The current research was on the assessment of the use and competence of teaches and student in ICT in tertiary Institutions in Kaduna state. Teachers and students have high use of ICT as they could start up a and shut down computer and that teachers and students can now operate and use computer system with soft ware packages, again teachers and students can do word processing, also teachers and students complained of ineffectiveness in erratic power supply area was a major obstacle and the lack of interest of teachers and student. The sample size of 327 of teachers and 384 of students, the majority of the teachers and the

students had access to the use of ICT. The differences between the research under review and the current research the teachers and students have high usage of ICT and they are only interested in using ICT as a supplement to teaching activities Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theories. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which was a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD was the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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The similarities in the two works were that they all delved on the use of ICT for teaching and learning in the tertiary Institutions.

Termit (2014) Investigated a Research on Teachers Readiness on ICT Integration in Teaching – Learning: A Malaysian Case Study. The purpose of this study was to investigate the knowledge level, attitude towards the use of ICT in teaching-learning and obstacles faced by the in-service teachers in secondary schools. A survey was conducted involving all 50 teachers in a secondary school in the state of Penang. The study informed the researchers that teachers were comfortable with the use of certain applications such as spreadsheet, presentation software, internet and e-mail. The respondents demonstrated a positive attitude towards using ICT as majority of them used ICT for teaching and learning and felt that the connected classrooms can change the way students learn in classrooms. The study also proved that a connected classrooms can be effective for students' learning to happen. It was also found that the attitudes of teachers on the use of ICT vary with their years of experience and level of knowledge on ICT. This study was one of very few studies which have investigated secondary teachers' knowledge and attitude towards ICT use in classrooms. The paper's primary contribution was finding that teachers' attitudes on ICT use in classrooms vary with their years of experience and level of ICT knowledge. Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theories. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and

zone of proximal development because of its relevance to the study of information and communication technology which was a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

Further, the present study used expost-facto design as the research method, that is a situation whereby a researchers get to the scene after an event has taken place (after the event) that was data was already in existence of the use ICT for teaching and learning. The target population of the study were computed of 2234 teachers and 58101 students. The instrument the present study used was a self designed questionnaires, (T/S ICT fus) with a reliability index of 0.970 using sample table a total of respondent were sampled made up of 327 teachers and 384 students.

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The challenges encountered by the works that was reviewed was on the uncomfortable feelings of the teachers on the use of ICT application. While on the current study was on the challenges of the teachers and students on the ineffectiveness of power supply and lack of interest on the part of teachers and students on the use of ICT. Difference in the work was that the study under review was done in Malaysia while the current study was done in Kaduna State, Nigeria.

Onasanya, Shehu, Oduwaiye and Shehu, (2010) carried out a research on higher institutions Lecturers' Attitude Towards Integration of ICT into Teaching and Research in Nigeria The study surveyed the attitude of lecturers towards integration of information

and communication Technologies (ICTs) in tertiary institutions in Kwara State, Nigeria. To elicit responses for the study, four research hypotheses were formulated. One hundred and fifty lectures, 90 males and 60 females from three tertiary institutions in Kwara State participated in the study. Data were collected for the study through the administration of 29-item questionnaire.

A test re-test method was used to determine the reliability of the instrument, the result was appropriately scored. The data obtained were analyzed using t-test and ANOVA in testing the hypotheses. The findings showed that gender has no effects on the attitudes of lecturers towards integration of ICT into teaching and research in tertiary institutions. Science oriented lectures attitudes towards integration of ICT in tertiary institution was higher than other non science oriented lecturers. Less experienced lectures are more exposed to the use of ICT than moderately and highly experienced lectures. University lecturers have more ICT skills than their counterparts in polytechnics and colleges of education. Many lecturers lacked adequate training and competence in using computer as a tool for effective teaching and research purposes. It was recommended among other things, that higher institutions should encourage their lecturers to be computer literate by organizing conferences, seminars and workshops. Old lecturers should be encouraged to develop good attitudes toward the use of ICT for teaching and research work. Recommendations were made toward effective integration of ICTs in tertiary institutions in Nigeria. ICT has really imparted students' lives in Ekiti State University, Ado – Ekiti, Nigeria. This was so because the world is moving at an unimaginable speed in the areas of information dissemination (Okiki, 2011). Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills

competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theories. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which was a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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Reginald Nnazor, (2009) carried out a research on a conception frame work for understanding use of Information and Communication Technology in teaching in University. The research reviewed the internal and external factors affecting the universities in Nigeria in terms of the advert of information and communication technology, he discovered about technology in education, higher education research, distance education, frame work and teaching and learning of ICT in universities. The reviewed research was for understanding the use of Information and communication technology. Objectives of the present study on the extent of use of ICT by teachers in

teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theoretical frame work. They are vygosky theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which is a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction, authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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framework and teaching and learning of ICT in the universities while the current research was on the assessment of the use and competence of teachers and students on how to use ICT in teaching and learning in tertiary Institutions in Kaduna state Nigeria. The similarities in the two works was that they talked about the use of ICT in the tertiary Institutions.

Adedeji (2011), investigated the level of availability and use of ICT in some South - western Nigeria Colleges of Education. The study revealed low level of usage of ICT gadgets and non-availability of some ICT equipments. The data for the study were gathered through questionnaire administered to 200 respondents who were accessible in the School of Education in all the Colleges of Education in the South-Western part of Nigeria. The research looked at the following issues as a basis:

(i) Nigeria as a nation came late and slowly into the use of ICT in all sectors of the nation's existence more especially in teacher education.

(ii) A majority of male and female teachers in Federal Government Colleges do not have needed competence in basic computer operations.

(iii) Most of the teachers in Federal Government Colleges do not have needed skills and knowledge in the use of common computer software.

(iv) There is no significant difference between male and female teachers in their experience in using computers, their levels of proficiency in computer operations, and in their use of common software.

This is as a result of chronic limitations brought about by economic disadvantages and government policies. These factors have direct consequences on the nation's educational development. The results of the survey on College of Education staff on the level of availability use of and perception of the impact of ICT on teacher education in Nigeria revealed and suggested a low level of usage of ICT gadgets; non availability of ICT equipment and that the respondents were disgruntled with the sluggish use and integration of ICT. Objectives of the present study on the extent of use of ICT by teachers in teaching and students in learning, to find out the skills competence of teachers and students in training, operation, and manipulation in the use of ICT by teachers and students. Also to identify the challenges the teachers and students faces in the process of using ICT to improve their competency level for the teachers in their professional practices and the students in their contextual task.

The present study adapted two theoretical frameworks. They are vygosky was theory and zone of proximal development and social learning theory. The present study hinged on vygosky theory and zone of proximal development because of its relevance to the study of information and communication technology which is a term for the range of tasks that are too difficult for students to master alone but that can be learned with guidance and assistance from adults or more skilled students. The lower limit of the ZPD is the level of problem solving by the students working independently alone the upper limit is the level of additional responsibility the student can accept with the assistance of an able instructor. Thus, the ZPD emphasis apprenticeship, problems based learning active on learning, individualize learning, collaborative learning, self reflection learning, social interaction, activities, logical sequences, dialogue, discussion, programme instruction,

authentic tasks with all these students are able to develop deeps levels of understanding of a problem. This is quite relevant to the study of ICT because it emphasis is on learning beyond classroom situation.

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with the present research, in areas of Instruments problems and similar area as in teacher education, however the point of divergence was while the reviewed research was conducted in the south west, the current research was carried out in Kaduna state, Nigeria. This research intends to fill the gap, that amongst the authors reviews most did not dwell on the training of teachers and students on the general use of how to operate and manipulate ICT in the professional practices and contextual tasks. Therefore the researcher was of the view that teachers and students needs to be trained on the general use of ICT in all disciplines in as much as the classroom was becoming extremely congested like a traffic Jams there was need for expansion and a more flexible way of teaching and learning which can enhance learning and reduced a lots potholes and bring in a more relaxing moments in teaching and learning in the tertiary institutions in Kaduna State Nigeria.

2.28 Summary of work

The chapter reviewed different literature related to the area of study. It started with a theoretical framework and reviews on empirical studies conducted by scholars that have bearing on the study. While most researchers were interested in finding either the relation or effect of electronic media in teaching, the current research was specifically on issue of assessment of the use and competence of teachers and student in tertiary institution for teaching and learning. Theoretical framework, Socio- cultural theory based on Vygotsky' inter subjectiveness and zone of proximal development (ZDP), Social learning theory and Behaviourist theory, Innovation in Teaching, Concept of ICT, Concept of a teacher, Concept of learner, Constructivism and Behaviourism in the teaching and learning, Innovation in teaching, Relationship between, Learning and teaching, Nature and

importance of skills types of skills, Concepts of competence, use, competence in teaching and learning of ICT in the tertiary institution, Competence among teachers and student in the use of ICT, The meaning of ICT as cognitive tools, Learning with ICT constructivist perspective, learning with ICT behaviorist perspective, Types of ICT, Historical Background of ICT in Teaching, Competence of Nigerian teachers in ICT skills, competency based education Use of ICT in higher education, Sources of ICT resources and effective application, Effects of information technology on effective teaching, The concept of information and its uses, Features and benefits of internet, internet services, Benefits of internet, Information technology for teaching and learning of information, Need for information teaching and learning, ICT and teaching/learning environment, Constructive perspective, learning with technology behaviourist perspective, Use of information and communication for teaching and learning.

Empirical studies all these bearing in the study. The major implication of the review of related literature for this study was that the finding of the previous studies would be used to support the findings of the study. Another positive implication of the reviewed for this study was that it has afforded the researcher the opportunity of knowledge what areas have been covered, what remains to be covered, and what techniques to employ in this research study for instance, the review of empirical work related to this study showed that majority of the studies concerning the assessment of the use and competence of teachers and students in information and communication technology in tertiary institutions Kaduna state, have predominately been carried out in secondary schools secondary schools levels and not at the tertiary institutions level. This was one of the major reasons which have informed this investigation. The review of

empirical studies has also influence this study by affording the researcher the opportunity to identify an appropriate design for this research work the use of ex-post factor design is a situation where a research gets to the scene of event after it has occur, also a situation whereby the effect of an independent variable measures against a dependent variables examples brain damage or the use of and computer in teaching and learning for investigating the problems most of the studies reviewed shared the conviction that the assessment of use and competence of teachers and students in information and communication technology for teaching and learning in tertiary institutions could be used in helping them to think and communicate creativity and also used to enhance the teaching and learning experience of both teachers and students by the virtue of the importance of information and communication technology to teaching and learning processes. It then becomes necessary to make information and communication technology available in the tertiary institution to enhance effective learning and teaching processes.

The literature reviewed in this chapter of the research study revealed different methods in use for accessing, processing and disseminating of information before the advent of information technology. The introduction of information technology brought about the paradigm shift from the traditional way of using information to a more modern way of doing it which has improved efficiency and effectiveness in teaching and learning of ICT the literature also revealed the impacts that information technology as the societal needs change, there will be need to revisit the curricula content; which would also mean that, the methodology for teaching the subject matter will change. Based on the fact that education is moving from use of chalkboard to use of internet, the teachers and students

certainly would require retraining to enable them offer a good service delivery of the subject matter, which would subsequently bring forth graduate students that are universally acceptable in the globally market in the review the role of the teacher in the classroom is now transformed from being a font of knowledge to an instructional manager helping to guide students through individualized learning opportunities pathways, identifying relevant learning resources, creating collaborative learning opportunities and providing insight and support both during formal class time and outside of the designated few minutes instruction period to play the importance of the information technology to teaching greatly emphasized shows the need to foster trusted partnerships, cooperation and safe collaboration by all stakeholders.

These stakeholders include teachers, curriculum planners, the various government agencies saddled with educating policies and implementation the studies conducted by some other researchers includes; the use of management information system, an assessment of students usage and availability of ICT facilities in colleges of education, teachers use of information and communication and use of information and communication technology for teaching and learning, a research on undergraduate students perception of the effectiveness of ICT use in improving teaching and learning, s survey of ICT competencies among students in teachers preparation programmes, research on relationship between ICT competence and attitude among some Nigerian tertiary institution lecturers, a research on the perceptions of information and communication technology among undergraduate management studies teachers readiness in ICT integration in teaching and learning, a research on higher institutions lecturers attitudes towards integration of ICT into teaching and research, implication of learning

theories for effective technology integration and pre-service teacher training, the utilization of ICT and its application in teaching computer studies, the level of availability and use of ICT in some south-western college of education there appears to be a gap between the training, operation and manipulation and the practical usage of ICT skills to access diverse information stored up the internet, which is useful for effective classroom delivery it is against this backdrop that this study finds out the assessment of use and competence of teachers and students tertiary institution and their ability to utilize the ICT for effective teaching and learning with a view to transforming the classroom from one that teaches to the middle, to one that uses the ICT to teach in other to bring effectiveness to teaching and learning the classroom thereby removing or minimizing the observed gaps.

The gap or loophole to be filled is that tertiary institutions need to train the teachers and students on how to manipulate and operate ICT for their professional practice and for the students in their contextual task. This to enable the ease of congested classroom which is nowadays becoming obsolete to learn with courses like social science, art and humanities and congested for learning. There is need to used interactive white board to learn to make teaching more meaningful in the tertiary institution. Also the America ways of teaching could be introduced which is called tutoring the large classes should be divided to port or section, where the students themselves can teach and learn on their own. This is according to the truth University of Martin Luther King.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter looked at research design, population of the study, size of sample, sample and sampling technique, instrumentation, validity of the research instrument, pilot study and reliability of the instrument, procedure for data collection and procedure for data analysis.

3.2 Research Design

Ex-post facto was adopted in the study. Ex-post facto is a type of descriptive research that is undertaken after the events have taken place and the data are already in existence in research and that it is difficult to manipulate variables because data are already in existence. Since data are already in existence it is sufficient to provide adequate information. What a researcher needs to do is to look at existing data for causes of a problem. According to Razak & Ajayi (2000) it seeks to find out the factors that are associated with certain occurrences, outcomes, conditions or types of behavior, by analyzing past events or already existing conditions. It is called retrospective (It means after the event).

3.3 Population of the Study

The population of this study included all the teachers and students of tertiary institutions in Kaduna State. The entire teachers population was 7312 while the entire student population was 186,787. This is presented in table 3 below.

Table 3.1: Distribution of population of the Study of Tertiary Institutions in Kaduna State

S/No	Institutions	Population of Teachers	Population of Students	Total
1.	Nigeria Defence Academy	352	10,000	
2.	Kaduna State University	601	15,000	
3.	Kaduna Polytechnic	564	21101	
4.	College of Agriculture Mando	152	2564	
5.	Innovation College Technology, Kaduna	125	2030	
6.	College of Agriculture Samaru Kataf	135	2150	
7.	Ahmadu Bello University, Zaria	920	25000	
8.	Nigeria College of Aviation Technology	138	1052	
9.	FCE Zaria	841	22000	
10.	Nuhu Bamali Polytechnic, Zaria	833	23180	
11.	Ameer Shehu Idris College of Advanced Studies, Zaria	245	10650	
12.	Nigeria Institute of Leather & Science Technology	126	845	
13.	Nigeria Institute of Transport Technology, Zaria	122	756	
14.	Federal Cooperative College Kaduna	262	1021	
15.	Kaduna State College of Education Gidan Waya	750	12000	
16.	St. Louis Nursing College Zonkwa	105	1758	
17.	Federal Training Centre Kaduna	128	2145	
18.	Federal College Agric Samaru, Zaria	154	2862	
19.	National Teachers Institute	285	10260	
20.	Federal College of Forestry Mando, Kaduna	245	9356	
21.	National Water Resources Institute, Mando, Kaduna	102	5012	
22.	Armed Forces Command and Staff College Jaji	127	6045	
	TOTAL	**7312**	**186,787**	

Source: Kaduna State Ministry of Education Higher Education Division, 2015

3.4 Sample and Sampling Technique

In selecting sample, the researcher selected one Federal University, one Federal Polytechnic and one State College of Education. The teacher population of the three selected tertiary institutions was 2234. The total population of students in the three selected tertiary institutions was 58101. Using Krejcie and Morgan, the appropriate sample size was 384 for students and 327 for teachers. This was proportionally distributed. The teachers sample size was 135, 83, and 109 from ABU, Kadpoly and COE Kafanchan respectively. The sample size is 168, 139 and 76 for students from ABU, Kadpoly, and COE Kafanchan respectively.

Table 4: Sample of the Study

Institutions	Teachers population	Teachers Sample	Students Population	Students Sample	Total Sample Size
Ahmadu Bello University, Zaria.	920	135	25000	165	300
Kaduna Polytechnic Kaduna	564	83	21101	139	222
COE Kafanchan	750	109	12000	79	188
Total	**2234**	**327**	**58101**	**384**	**711**

Source: Kaduna State Ministry of Education Higher Education Division, 2015

3.5 Instrumentation

The instrument the researcher used for data collection was a structured questionnaire. This made the researcher to assess large number of individuals at minimum which encourages objective responses. The instrument was a structured type for responses in relation to the objective of the study. It was a close ended questionnaire and it consisted of 3 sections. Section "A" for Bio-data of the respondents, Section "B" consisted of ten structured questions on the use of ICT

in teaching and learning in tertiary institutions. The measuring scale was five (5) which were, very often, often, unsure, not often, never used carrying points 5, 4, 3, 2 and 1 respectively. Hence the decision means is 3.00 computed by using (5+4+3+2+1) 15=3.00. Section "C" consisted of ten structured questions on ICT level of skills competence in teaching and learning. The measuring scale was five (5) which were very efficient, moderate, poor and very poor. Carrying points 5,4,3,2 and 1 respectively hence the decision using (5+4+3+2+1) 15=3.00 section D consisted of ten structured questions on ICT challenges to embrace the new innovation in teaching and learning. The measuring scale was five (5) which are, most obstacle, much more obstacle, much obstacle, moderate obstacle, no obstacle carrying points 5,4,3,2 and 1 respectively. Hence the decision mean was 3.00 computed by using (5+4+3+2+1) 15=3.00

3.5.1 Validity of the Instruments

In order to make sure that the final copy of the questionnaire was valid for the study, the instrument was face and content validated by the researcher's supervisors and experts in Curriculum and Instruction Department, Mathematics and Statistics on the basis of this, structured questionnaire consisting o6f three (3) demographic and another section consisting of thirty six (36) structured 5-Likert scale questions were administered to respondents.

3.5.2 Pilot Study

A pilot study was conducted in FCE Zaria by the researcher. Thirty (30) copies of questionnaire were administered to the respondents, out of which eighteen (18) were filled and returned to the researcher. This is because the researcher wanted

to use respondents that would not participate in the actual research study. The purpose of the pilot study was to enable the researchers determine the reliability of the selected instrument. Data collected were coded and submitted for reliability and internal consistency test for the two instruments separately.

3.5.3 Reliability of the Instrument

The data collected from the pilot study was statistically analyzed for the purpose of reliability co-efficient. The Cronbachs reliability coefficient was used. Consequently, a reliability co-efficient of 0.97 alpha level was obtained according to Olayiwola A. (2010). An instrument is considered reliable if it lies between 0 and 1, and that the closer the calculated reliability coefficient is to zero, the less reliable is the instrument, and the closer the calculated reliability co-efficient is to 1, the more reliable is the instrument. Since the reliability of the instrument is 0.970 very close to 1, the instrument is adjudged to be very reliable

3.6 Procedure for Data Collection

Letter of introduction was collected from the office of the Head of Department, Educational Foundation and Curriculum, Faculty of Education, Ahmadu Bello University, Zaria to the respective sampled Institutions.

The researcher personally supervised the administration of the questionnaire to the sampled respondents in the three institutions with the help of three trained research assistants. In addition, the researcher personally administered the instrument to the lecturers through their Heads of Departments and also retrieved the instrument through the same channel for collation.

3.7 Procedure for Data Analysis

The data collected was generally analyzed using the SPSS, IBM version 23. The biodata variables of the respondents were analysed using frequencies and percentages. The research questions were answered using the item frequencies, means and standard deviation and a cumulative mean computed with the standard mean of 3.00. The first (3) three research question were answered from the (3) three sections of the teachers questionnaire. The remaining research questions would be answered from the (3) three sections of the student questionnaire. All the six null hypotheses were tested using chi-square at 0.05 level of significance. Chi-square is a non-parametric statistic for testing hypothesis. It is used to establish either or not significant difference exists between the observed frequency and expected frequency. The justification for using chi-square is because the data collected was categorical data that took discrete number of values with no inherent order to the categories.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presented the statistical analysis of the responses of respondents on assessment of use and competence of teachers and students in ICT in some tertiary institutions in Kaduna state of Nigeria. A total of 322 teachers and 380 students were used as respondents for this study. These samples represent about 98% of the total sampled respondents. The IBM version 23 SPSS (Statistical Package for Social Sciences) was used for the analysis which is presented in sections. The first section of this chapter presented the demographic characteristics of the teachers and students who were involved in the study. This section was analyzed in frequencies and percentages in separate tables, while the second section answered the six research questions using item frequencies and mean responses. The decision mean is 3.000 computed on the five Likert scale options, thus: (5+4+3+2+1)/5 = 3.000. The Aggregate/cumulative mean was compared with the decision mean to determine if level of agreement or disagreement with the research question raised in each question A mean at this level or higher would constitute agreement on the scale. The first three questions were from the teachers' questionnaire while the rest three questions were from the students' questionnaire The third section presented and interpreted the six null research hypotheses by means of chi-square x^2 statistics for teachers, in the first three hypotheses and students in the last three hypotheses, All hypotheses were tested at 0.05 alpha level of significance.

4.2 Analysis of Bio data variables of Teachers

Table 5: Name of institution

Institutions	Frequency	Percentage
Ahmadu Bello University, Zaria	132	41.0
Kaduna Polytechnic	80	24.8
College of Education Kafanchan	110	34.2
Total	322	100.0

Table 5 is on the name of the institution of the respondents, according to the table;132 of the respondents was from ABU,80 of them was from Kaduna Polytechnic, and the rest 110 of them are from COE Kafanchan. Therefore, from the table we can conclude that sampled schools reflected three types of tertiary institutions and most of the respondents were from ABU.

Table 6: Ownership

Ownership	Frequency	Percentage
Federal	212	65.8
State	110	34.2
Total	322	100.0

Table 6 is on the ownership of the sampled schools where respondents were drawn 212 of them were from owned federal government owned institutions while the rest 110 were from state government owned institutions. Meaning that most of the respondents were from the federal government owned institutions.

Table 7: Gender

Gender	Frequency	Percentage
Male	214	66.5
Female	108	33.5
Total	322	100.0

Table 7 is on the gender of the respondents, according to the table 7,214 of the respondents were males and remaining 108 were females. This was proportionate to the total population of each gender. Hence most of the respondents were males.

Table 8: Rank of Teachers

Rank	Frequency	Percentage
Grad Assist	84	26.1
Asst Lect	74	23.0
Lect II	48	14.9
Lect I	42	13.0
Snr Lect	30	9.3
Reader	36	11.2
Professor	8	2.5
Total	322	100.0

Table 8 is on the ranks of the teacher respondents, from the table, 84 of them were graduate assistants,74 were assistant lectures,48 were lecturer II, 42 of were lecturers I, 30 were senior lecturers, 36 were readers and the rest 8 of them were professors. This shows that most of the lecturers were between the rank of graduate assistance and lecturer I. Only 22.5% were in the senior lecturer to professional cadre.

Table 9: Ownerships

Ownerships	Frequency	Percentage
State	80	24.8
Federal	242	75.2
Total	322	322

Table 9, State owned institutions were 80, while the federal government owned institutions were 242 or 75.2%.

4.3 Analysis of Bio data variables of Students

Table 10:

Name of Institution	Frequency	Percentage
Ahmadu Bello University, Zaria	163	42.9
Kaduna Polytechnic	137	36.1
College of Education Kafanchan	80	21.1
Total	380	100.0

Table 10 shows the names of the institution of the students respondents and the sampled population and percentage. According to the table;163 or 42.9% of the students respondents were from ABU Zaria, while 137 or 36.1% of them were from Kaduna Poly, and the rest 80 or 21.1% of them were from COE Kafanchan From the table we can conclude that most of the respondents were from ABU, Zaria.

Table 11: Ownership

Ownership	Frequency	Percentage
Federal	300	78.9
State	80	21.1
Total	380	100.0

Table 11 is on the ownership of the institutions from the students were sampled owned institutions 300 of them were from federal government owned institutions while the rest 80 were owned by the state government. This shows that most of the respondents were from federal government owned institutions.

Table 12: Gender

Gender	Frequency	Percentage
Male	249	65.5
Female	131	34.5
Total	380	100.0

Table 12 is on the gender of the students respondents. According to the table, 249 of them were males and the rest 131 of them were females. Hence most of the respondents were males.

4.4 Research Questions

Question One: To what extent do teachers use ICT in teaching in tertiary institutions in Kaduna state, Nigeria?

Table 13: Extent do which teachers use ICT in teaching in tertiary institutions in Kaduna state

S/no	Items	Response category					Mean
		Very often	Often	Unsure	Not used	Never used	
1.	Searching for materials through internet	32	80	68	89	53	2.84
2.	Teaching through computer assisted computer software	89	16	88	113	16	3.15
3.	Make presentation using presentation software (such as power – point)	24	112	120	41	25	3.21
4.	Typing tests and exams papers	137	40	57	56	32	3.60
5.	Typing official and other documents	00	40	97	113	72	2.33
6.	Typing handouts and teaching materials	80	48	105	64	25	3.29
7.	Create a new document	64	80	72	73	33	3.21
8.	Start up and shut down a computer safely	15	25	16	78	48	1.33
9.	Copy file and directories/folders	18	00	83	97	124	2.04
10.	Delete files and directories/folders	56	35	94	102	35	2.92
Cumulative mean							**2.792**

decision mean=3.00

Table 13 revealed respondents response on information and communication technology frequency of usage for teaching. The above shared responses on the utilization of ICT by teachers in the teaching of processes. Thus, items 2,3,4,6 and 7 each has means higher than 3.00 standard mean while items 1,5,8,9 and 10 each has means lower than the 3.00 standard decision mean. The highest level of teachers use of ICT in teaching was typing test and examination papers and typing, handouts and teaching materials on the other hand, the least use of ICT by teachers is starting/shutting down computer safely and copying files and directories and folders, also typing official and other documents.

However, the general usage of ICT by teachers in teaching in tertiary institutions is below average because the cumulative mean of 2.792 is lower than the 3.00 standard mean. The level of ICT use by teachers needs serious improvement

Question Two: What is the extent of students ICT use in learning in tertiary institutions in Kaduna state, Nigeria N=380

Table 14: Extent of ICT use among students in Learning in tertiary institutions in Kaduna state

s/no	Items	Response category					Mean
		very often	often	Unsure	Not used	Never used	
1	searching for materials through internet	36	92	81	106	65	2.81
2	learning through computer assisted computer software	93	18	92	145	32	2.99
3	make presentation using presentation software (such as power –point)	28	135	142	47	28	3.23
4	writing tests and exams papers	162	47	67	66	38	3.60
5	typing official and other documents	00	48	112	134	86	2.32
6	typing handouts and teaching materials	100	56	122	74	28	3.33
7	create a new document	72	98	86	87	37	3.21
8	start up and shut down a computer safely	204	32	20	74	50	3.70
9	copy file and directories / folders	21	00	94	115	150	2.02
10	delete files and directories / folders	80	55	102	103	40	3.08
cumulative mean							***3.029***

decision mean=3.00

Table 14 revealed student respondents response on information and communication technology frequency of usage. It revealed that their overall responses on this regard is positive as the cumulative mean response of 3.029 was found to be higher than the decision/ standard mean of 3.00. Specifically, it was discovered that item 8 which state that majority can start up and shut down a computer safely obtained the highest mean of 3.70 with further details revealing that204 of the respondents said that it was very often,32 of them said it was often, 20 of the people said that it was occasionally used,74 of them said that it was rarely used and the remaining 50 of the respondents said it was never used. In the same vein item 4 which state that ICT is used in typing tests and exams attracted the second highest mean of 3.60 as details of the responses on this item revealed

that 162 of the respondents said that it was used very often, 47 of the respondents responded that it used often, 67 of them said that it was occasional, 66 said it was rarely used and 38 of them said that typing tests and examinations papers were never used. Based on the overall mean, it can be said that the frequency of ICT usage for learning was high.

Question Three: What are the ICT skills competence level in training, operation and manipulation among teachers in teaching in tertiary institution N = 322

Table 15: ICT skills Competence level in training, operation and manipulation among teachers in teaching in tertiary institutions in Kaduna state.

S/no	Items	Response category Very efficient	efficient	moderate	poor	Very poor	Mean
1.	Ability for fast and accurate key boarding for efficient composition of words	32	88	60	89	53	2.89
2.	Ability for fast and accurate key boarding for making inputs	89	16	88	113	16	3.15
3.	Ability for fast and accurate boarding`s for checking and editing data	24	112	120	41	25	3.21
4.	Ability to operate word processing	137	40	57	56	32	3.60
5.	Ability to operate data base	00	40	97	113	72	2.33
6.	Ability to operate electronic messaging	210	40	24	25	23	4.20
7.	Operate and use computer systems with hard ware packages	64	80	72	73	33	3.21
8.	Operate and use computer systems with soft ware packages	80	48	105	64	21	3.29
9.	Operate and use computer systems with both hard ware and software packages	24	00	56	97	145	1.94
10.	Operate use computer systems with electronic mails and application software	100	64	72	53	33	3.45
Cumulative mean							**3.126**

decision mean=3.00

Table 15 revealed teacher respondents response on their ICT level of skills competence in teaching. It revealed that their overall responses in this regard is positive as the cumulative mean response of 3.126 was found to be higher than the decision/ standard mean of 3.00.

Specifically, it was discovered that item 6 which state that majority of the teachers has ability to operate electronic messaging. Obtained the highest mean of 4.20 with further details revealing that 210 of them were very efficient, 40 of the respondents were efficient, 24 of them were moderate, 25 of them were poor, and the rest 23 of the respondents said it was very poor. In the same vein item 4 which state that they operate word processing, attracted the second highest mean of 3.60 as further details revealed that 137 of them responded that it was very effective, 40 of them said it was effective, 57 of them said that it was moderate, 56 of the respondents said it was poor and the rest 32 of them said it was very poor.

In essence the ICT competence level in training, operation and manipulation in teaching (TICTICS) was high especially as majority of them could operate and use computer system with soft ware packages and have acquired skills to operate word processing.

Question four: What are the ICT competence level in training, operation and manipulation among students in learning in tertiary institution in Kaduna state N = 380

Table 16: ICT competence level in training, operation and manipulation among students in learning in tertiary institution in Kaduna state

S/no	Items	Response category					Mean
		Very efficient	Efficient	moderate	Poor	Very poor	
1	ability for fast and accurate key boarding for efficient composition of words	36	92	81	106	65	2.81
2	ability for fast and accurate key boarding for making inputs.	108	20	102	130	20	3.17
3	ability for fast and accurate key boarding's for checking and editing data	28	135	142	47	28	3.23
4	ability to operate word processing	162	47	67	66	38	3.60
5	ability to operate data base	00	48	112	134	86	2.32
6	ability to operate electronic messaging	100	56	122	74	28	3.33
7	operate and use computer systems with hard ware packages	72	98	86	87	37	3.21
8	operate and use computer system with soft ware packages.	250	46	28	28	28	4.22
9	operate and use computer systems with both hard ware and software packages.	30	65	00	114	171	2.13
10	operate use computer systems with electronic mails and application software	120	75	85	62	38	3.47
cumulative mean							***3.149***

decision mean=3.00

Table 16 revealed students respondents response on their ICT level of skills competence for learning. It revealed that their overall responses in this regard is positive as the cumulative mean response of 3.149 was found to be higher than the decision/ standard mean of 3.00. Specifically, it was discovered that item 8 which state that majority can operate and use computer system with soft ware packages, obtained the highest mean of 4.22 with further details revealing that 250 of them were very efficient,46 of the respondents were efficient 28 of them were moderate,28 of them were poor ,and the rest 28 of the respondents said it was very poor . In the same vein item 4 which stated that they acquired many ICT skills, like the ability to operate word processing, attracted the second highest mean of 3.60 as further details revealed that 162 of them responded that it was very effective, 47 of them said it was effective, 67 of them said that it was moderate, 66of the respondents said it was poor and the rest 38 of them said it was very poor.

It can therefore be said that ‘ICT level of competence in training was high especially as majority of them could operate and use computer system with soft ware packages and they also acquired skills to operate word processing,

Question Five: What are the challenges teachers face in changing to embrace the new innovation of ICT in teaching in tertiary institutions in Kaduna state, Nigeria? N = 322

Table 17: Challenges teachers face in changing to embrace the new innovation of ICT in teaching in tertiary institutions in Kaduna state

S/no	Items	Response Category					Mean
		Most obst	Much more obst	Much obst	Moderate obst	No obst	
1	insufficient time to prepare electronic based materials	32	80	68	89	53	2.84
2	insufficient technical teachers, technical knowledge	89	16	89	113	16	3.16
3	problems of accessibility to existing hard ware (computer, overhead projector etc)	24	112	120	41	25	3.21
4	lack of guidance and support in electronic media usage by institutions	137	40	57	56	32	3.60
5	inadequate funding for technology integration	00	40	97	113	72	2.33
6	lack of provision for professional development opportunities in electronic media	80	48	105	64	25	3.29
7	lack of interest of teachers and student in technology usage	127	60	54	56	25	3.65
8	ineffectiveness in erratic power supply areas	124	25	16	17	140	2.93
9	high acquisition and maintenance cost of equipment	15	00	32	57	218	1.56
10	most electronic software easily becomes obsolete	67	39	38	33	145	2.53
cumulative mean							2.91

decision mean=3.00

Table 17 revealed the response of respondent's on the challenges in changing to embrace the new innovation of ICT in teaching in tertiary institutions in Kaduna state. The table shows that the problem include insufficient technical teachers, technical knowledge, problems of accessibility to existing hard ware (computer, overhead projector etc), lack of guidance and support in electronic media usage by institutions, lack of provision for professional development opportunities in electronic media, lack of interest of teachers and student in technology usage. In items 2,3,4,6,3, and 7 each has been higher than the 3.00 standard decision mean. While in items 1,5,8,9 and 10 each has mean lower than

3.00 standard/decision mean. Therefore the mean challenges are items that have means above the decision mean of 3.00. These include lack of interest of teachers/students in teaching/usage, lack of guidance and support in electronic media usage. The items that have mean lower than the decision mean of 3.00 are not classified as serious challenges. There include higher acquisition and maintenance cost of equipment and electronic software being obsolete and funding for integration. However, the cumulative mean of all the 10 items was 2.91 which is lower than the 3.00 decision mean implying that the challenges are not in-surmountable.

Question six: What are the Students response on the challenges in changing to embrace the new innovation of ICT in learning in tertiary institution in Kaduna state ?N = 380

Table 18: **Students response on the challenges in changing to embrace the new innovation of ICT in learning in tertiary institution in Kaduna state**

S/no	Items	Response Category					Mean
		most obst	much more obst	much obst	moderate obst	no obst	
1	insufficient time to prepare electronic based materials	41	90	83	106	60	2.86
2	insufficient technical teachers, technical knowledge	108	20	102	130	20	3.17
3	problems of accessibility to existing hard ware (computer, overhead projector etc)	28	135	142	47	28	3.23
4	lack of guidance and support in electronic media usage by institutions	162	47	67	66	38	3.60
5	inadequate funding for technology integration	00	48	112	134	86	2.32
6	lack of provision for professional development opportunities in electronic media	100	56	122	74	28	3.33
7	lack of interest of teachers and student in technology usage	72	98	86	87	37	3.21
8	ineffectiveness in erratic power supply areas	250	46	28	28	28	4.22
9	high acquisition and maintenance cost of equipment	30	00	65	114	171	1.96
10	most electronic software easily becomes obsolete	120	75	85	62	38	3.47
cumulative mean							***3.137***

decision mean=3.00

Table 18 revealed the response of Students respondent's on the challenges in changing to embrace the new innovation of ICT in teaching in tertiary institution in Kaduna state the table is positive because the cumulative mean of *3.137* is greater than the decision mean of 3.00 the item 8,which holds that there is ineffectiveness in erratic power supply area; attained the highest mean of 4.22 as further details revealed that a total of 250 of the students respondent's said that there was most obstacle, 46 of them said that there was much more obstacle, 28 of them said that there was much obstacle,28 of them said that there was moderate obstacle and 28 responded that there was no obstacle. In the same vein, the students second highest mean of 3.60 states that there is lack of interest of teachers and student in technology usages. With further details showing that 162 of them said that there was most obstacle, 47 of them said that there was much more obstacle, 67 of the respondents said that there was much obstacle, 66 of them commented that there was moderate obstacle and the rest 18 of them said that there was no obstacle.

In summary the students challenges in changing to embrace the new innovation of ICT in learning in tertiary institution in Kaduna state is high especially as majority said that ineffectiveness in erratic power supply area is a major obstacle and the lack of interest of teachers and student in technology usages.

4.5 Hypotheses Testing

Chi square statistics were used to test the hypothesis at 0.05 alpha level of significance since the test items were in nominal form of frequency counts among respondents from Universities, Polytechnics and Colleges of Education.

Hypothesis 1: There is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria **N= 322**

Table 19: Chi square statistics on teachers n on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria (TICTFUS)

Variable	*Institution*	*VO*	*O*	*UNS*	*NO*	*NU*	X^2 *calculated*	X^2 *critical*	*Df*	*P*
level of e extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria	ABU	728	440	691	635	278	1093.228	**55.758**	32	0.000
	Polytechnic	650	350	500	412	101	1025.20	**55.75**	32	0.012
	COE	500	301	480	301	141	1005.201	**55.75**	32	0.023

X^2 calculated> X^2 critical at df 32 , calculated p (0.000) < 0.05

Results of the chi square statistics above revealed that significant differences exist in the teachers level on the extent of the use of ICT among teachers of polytechnic, universities and colleges of education for teaching in tertiary institutions in Kaduna state of Nigeria. This is because the computed chi square value of 1093.228, 1025.111, 1005.201 were found to be higher than the chi square critical value of 55.75 at df 32. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the teachers on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria.

Therefore the null hypothesis which state that there is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigerian, is hereby rejected.

Hypothesis 2: There is no significant difference in the opinions of students of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria. **N= 380**

Table 20: Chi square statistics on students on the extent of the use of ICT in learning tertiary institutions in Kaduna state of Nigeria

Variable	*Institution*	*VO*	*O*	*UNS*	*NO*	*NU*	X^2 *calculated*	X^2 *critical*	*Df*	*P*
level of e extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria	ABU	906	662	825	848	539	1887.724	**55.758**	32	0.000
	Polytechnic	810	444	701	430	311	1111.02	**55.75**	32	0.002
	COE	654	290	501	422	401	1201.00	**55.75**	32	0.004

X^2 calculated> X^2 critical at df 32 , calculated p (0.000) < 0.05

Results of the chi square statistics above revealed that significant differences exist in the students level in on the extent of the use of ICT among teachers of polytechnic, universities and colleges of education in teaching tertiary institutions in Kaduna state of Nigeria.

This is because the computed chi square value of 1887.724, 1111.02 and 1201.00 were found to be higher than the chi square critical value of 55.75 at df 32. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the students on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria.

Therefore the null hypothesis which state that there is no significant difference in the opinions of students of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigerian, is hereby rejected.

Hypothesis 3: There is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria. **N= 322**

Table 21: Chi square statistics on level of difference in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria

Variable	*Institution*	*VE*	*E*	*M*	*P*	*VP*	X^2 *calculated*	X^2 *critical*	*Df*	*P*
level of e extent of the ICT competency in training, operation and manipulation in institutions in Kaduna state of Nigeria	ABU	500	470	802	812	442	815.022	**55.758**	36	0.022
	Polytechnic	580	471	700	799	351	870.221	**55.75**	36	0.041
	COE	490	351	654	658	390	1002.20	**55.75**	32	0.032

X^2 calculated> X^2 criticalat df 36 , calculated p < 0.05

Results of the chi square statistics above revealed that significant differences exist in the difference in the in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria. This is because the computed chi square value of815.022, 870.221 and 1002.2 were found to be higher than the chi square critical value of 55.75 at df 36. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria. Therefore the null hypothesis which state that there is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the

ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria, is hereby rejected.

Hypothesis 4: There is no significant difference in the opinions of students of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among students in learning tertiary institutions in Kaduna state of Nigeria. **N= 380**

Table 22: Chi square statistics on level of difference in the opinions of students s of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among student in learning tertiary institutions in Kaduna state of Nigeria

Variable	*Institution*	*VE*	*E*	*M*	*P*	*VP*	X^2 *calculated*	X^2 *critical*	*Df*	*P*
level of e extent of the ICT competency in training, operation and manipulation in institutions in Kaduna state of Nigeria	ABU	780	571	681	712	402	1010.02	**55.758**	36	0.001
	Polytechnic	687	480	690	700	400	1000.01	**55.75**	36	0.029
	COE	699	502	666	702	399	998.21	**55.75**	32	0.044

X^2 calculated> X^2 criticalat df 36 , calculated p < 0.05

Results of the chi square statistics above revealed that significant differences in the opinions of students s of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among student in teaching tertiary institutions in Kaduna state of Nigeria. This is because the computed chi square value of1010.02, 1000.01 and 998.21 were found to be higher than the chi square critical value of 55.75 at df 36. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the opinions of students s of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among student in teaching tertiary institutions in Kaduna state of Nigeria. Therefore the null

hypothesis which state that there is no significant difference in the opinions of students s of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among student in teaching tertiary institutions in Kaduna state of Nigeria, is hereby rejected.

Hypothesis 5: There is no significant difference in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state. **N= 322**

Table 23: Chi square statistics on level of difference in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state

Variable	***Institution***	***MO***	***MMO***	***MO***	***MO***	***NO***	***X^2 calculated***	***X^2 critical***	***Df***	***P***
level of e extent of the ICT challenges in embracing the new innovations in institutions in Kaduna state of Nigeria	ABU	699	598	544	700	396	1022.89	**55.758**	36	0.041
	Polytechnic	688	501	666	358	388	999.90	**55.75**	36	0.027
	COE	699	502	666	702	399	888.88	**55.75**	32	0.002

X^2 calculated> X^2 critical 55.758 at df 36 , calculated p (0.000) < 0.05

Results of the chi square statistics above revealed that significant differences in the opinion of teachers of polytechnic, universities and colleges of education in challenges

teachers face in in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state. This is because the computed chi square value of*1022.89, 999.90 and 888.88* were found to be higher than the chi square critical value of 55.75 at df 36. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state. Therefore the null hypothesis which state that there is no significant difference in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state is hereby rejected.

Hypothesis 6: There is no significant difference in the opinion of students of polytechnic, universities and colleges of education in challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use ICT in learning in their contextual task in tertiary institutions in Kaduna state.

Table 24: Chi square statistics on level of difference in the opinion of students of polytechnic, universities and colleges of education in challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use ICT in learning in their contextual task in tertiary institutions in Kaduna state

Variable	*Institution*	*MO*	*MMO*	*MO*	*MO*	*NO*	X^2 *calculated*	X^2 *critical*	*Df*	*P*
level of e extent of the ICT challenges in embracing the new innovations in institutions in Kaduna state of Nigeria	ABU	881	664	586	844	414	1221.01	**55.758**	36	0.033
	Polytechnic	721	501	606	344	379	890.85	**55.75**	36	0.037
	COE	790	464	599	687	387	901.55	**55.75**	32	0.042

X^2 calculated> X^2 critical 55.758 at df 36 , calculated p (0.000) < 0.05

The outcome of the chi square statistics above revealed that significant differences in the opinion of students of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state. This is because the computed chi square value of 1221.01, *890.85 and 901.55* were found to be higher than the chi square critical value of 55.75 at df 36. Moreover the calculated p values were each lower than the 0.05 alpha level of significance. This shows that significant differences exist in the opinion of students of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state.. Therefore the null hypothesis which state that there is no significant difference in the opinion of students of polytechnic, universities and colleges of education in challenges

teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state is hereby rejected.

4.6 Summary of the Major Findings

The followings are the summary of the major findings of the study

1. Teachers use of ' information and communication technology frequency of usage in teaching ICT was low especially as majority could shut down and start up computer on their own safely and used for typing of exams and tests.

2. Students use of ' information and communication technology frequency of usage in learning ICT was high especially as majority of the students could shut down and start up computer on their own safely and used for typing of exams and tests.

3. Teachers use of 'ICT level of skills competence in teaching (TICTICS) was high especially as majority of them could operate and use computer system with soft ware packages and they also acquired skills to operate word processing,

4. Students use of 'ICT level of skills competence in learning (TICTICS) was high especially as majority of them could operate and use computer system with soft ware packages and they also acquired skills to operate word processing,

5. Teachers challenges in changing to embrace the innovation of ICT in teaching in tertiary institution in Kaduna state was low especially as majority said that ineffectiveness in erratic power supply area is a major obstacle and the lack of interest of teachers and student in technology usages.

6. Students challenges in changing to embrace the innovation of ICT in learning in tertiary institution in Kaduna state was high especially as majority said that

ineffectiveness in erratic power supply area was a major obstacle and the lack of interest of teachers and student in technology usages.

4.7 Discussions of the Findings

The first set of data were meant to answer research question, each of the objectives was addressed by presenting the relevant items in frequencies and percentages and the last set of data were for testing of the null hypotheses meant to provide valid solutions to the research questions in chapter one. Based on what the researcher discovered some factors were found out that facilities were inadequate for teachers and students to use so that they can be competent in the use of ICT as a tool for effective teaching and learning in the tertiary institutions in Kaduna state Nigeria. Also it was discovered by the researcher that teachers and students still lack adequate skills competences on use of ICT the tertiary institutions more so, students cannot operate the gadgets effectively for their contextual tasks, and the same applies with the teachers in the professional practices. There was also no adequate training and retraining of staff personal or ICT special staff who can train teachers and students so that they can proficient in the use of ICT to improve teaching and learning in the tertiary institutions in Kaduna State Nigeria.

In analyzing the data, two group of respondents that was teachers and students were treated separately and the results was also separated in answering the research questions 1 - 6 and test of null hypotheses 1 – 6 this was done in order to enhance good analysis of items better judgment and valid conclusion. All computation was based on the 5 Likert Scale rating.

Answering of research questions respondents to answer the six (6) research questions of the study and analyzed. In table 4.1.4 in the cause of the analyzing opinions of both teachers and students were categorized into five (5) groups very often (5) often (4) occasional (2) rarely used (1) never used (1) to give a better understanding and interpretation of data (5) Likert Scales point was used for all the Responses. This research work was designed to assess the use and competence of teachers and students in ICT in tertiary institutions in Kaduna state, Nigeria.

The research question asked that what according to the respondents was the information and communication technology frequency of usage in teaching in ICT N = 322 (TICTFUS). It revealed that their overall responses on this regard was positive as the cumulative mean responses of 2.792 was found to be lower than the decisions standard mean of 3.00 specifically, it was discussed that item 3 which state that majority can start up and shut down a computer safely obtained the highest mean of 3.60. In the same vein item 4 which state ICT was used in typing of tests and examinations attracted the second highest mean of 3.60. it concludes that the use of information and communication technology frequency of usage in teaching ICT is high especially as majority could shut down and start up computer on their own safely and use ICT for typing and test and examinations.

The research question asked what according to the students respondents in the information and communication technology frequency of usage in learning ICT N = 380. (SICTFUS). It revealed students respondents response on information and communication technology frequency of usage in learning ICT. It revealed that their overall response on this regard was positive as the cumulative mean response of 3.029

was found to be higher than the decision stand and mean of 3.00 specifically. It was discovered that the item 8 which state that majority can start up and shut down a computer safely obtained the highest mean of 3.70 in the same vein item 4 which state that ICT was used in typing tests and examination attracted the second highest mean of 3.60. it concludes that use of information and communication technology frequency of usage in teaching ICT was high especially as majority of the students could shut down and start up computer on their own safely and used for typing of examinations and test.

The research question asked that what was the extent of teachers respondents on ICT level of skills competence in teaching N = 322. It revealed that their overall responses in this regard was positive as the cumulative mean response of 3.126 was found to be higher than the decisions/standard mean of 3.00 specifically, it was discovered that the item 6 which state that majority of the teachers has ability to operate electronic messaging obtained the highest mean of 420. In the same vein item 4 which state they operate word processing attracted the second highest mean of 3.60. it concludes that the use of ICT level of skills competence in teaching (TICTLCS) was high especially as majority of item can now operate and use computer system with software packages and they also acquired skills to operate word processing.

The research question asked that what was the extent of students respondents ICT level of skills competence in learning (SICTLCS). It revealed in this regard was positive as the cumulative mean response of 3.149 was found to be higher than the decision/standard mean of 3.00 specially, it was discovered that the item 8 which state that majority can operate and use computer system with software packages. Obtained the highest mean of 4.22. in the same vein item 4 which state that they acquired many ICT

skills, like the ability to operate word processing, attracted the second highest mean of 3.60. it concludes that the use of ICT level of skills competence in learning (SICTLCS) was high especially as majority of them can now operate and use computer system with software packages and they also acquired skills to operate word processing.

The research question asked that what are the teachers challenges in changing to embraces the new innovation of ICT in teaching in tertiary institutions in Kaduna state N = 322. (TCNIICT) revealed that the response of respondents on the challenges in changing to embraces the new innovation of ICT in teaching in tertiary institutions in Kaduna state that the table was positive because the cumulative mean of 2.91 was lower than the decision mean of 3.00. The item 8 which holds that there was ineffectiveness in erratic power supply area attained the highest mean 2.93 in the same vein, the item 4 with the second highest mean 3.60 states there was lack of interest of teachers in technology usages. It concludes that the challenges to embrace the new innovation of ICT in teaching in tertiary institutions in Kaduna state was high especially as majority said that ineffectiveness in erratic power supply area was a major obstacle and the lack of interest of teachers in technology usage.

The research question asked that what are the students response on the challenges in changing to embrace the new innovation of ICT in learning (SICTLCS) in tertiary institutions in Kaduna state, the table was positive because the cumulative mean of 3.137 was greater than the decision mean of 3.00 the item 8 which holds that there was ineffectiveness in erratic power supply area, attained the highest mean of 4.22 in the same vein, the students second highest mean of 3.60 states that there was lack of interest of teachers and students in technology usages. It concludes the students challenges in

changing to embrace the new innovation of ICT in learning tertiary institutions in Kaduna state was high especially as majority said that ineffectiveness in erratic power supply area was a major obstacle and the lack of interest of teachers and students in technology usages.

The research hypothesis one (1) assumed that there was no significant difference in the opinions of teachers of polytechnic, universities, and colleges of education on the frequency of the use of ICT in teaching in tertiary =N= 322 institutions in Kaduna state of Nigeria. This is because the computed chi-square of 1093.228 was found to be higher than the chi-square critical value of 4377.228 at df 32. This implies that calculated p-value of 0.000was found to be lower than the 0.05 alpha level of significance. The study found out that in line with the finding of Adamu (2009) who find out that ICTs have the potentials to contribute to different facets of educational development and effective learning promoting efficiency and enhancing the quality of teaching. In addition, welle-strand (1991) in Adamu (2009) observed that the major rationale for having ICT in tertiary institutions was more concerned with the need to use ICT to improve teaching and learning. The first objectives of the study was to determine the extent of use of information and communication Technology by teachers in teaching in tertiary institutions in Kaduna state. It was revealed that ICT offers real opportunities to make lasting improvement to teaching and learning of courses in tertiary institutions using chi-square test statistic.

The study found out that significant difference exist in the teachers on the extent of the use of that in teaching in tertiary institutions in Kaduna state using chi-square test

statistics meaning that teachers ICT extent of use of ICT was high. Adamu well-stranded others – the null hypothesis was rejected.

The research hypothesis two (2) assumed that there was no significant difference in the opinions of students of polytechnic, universities, and colleges of education on the extent of the use of ICT in learning in tertiary institutions in Kaduna state of Nigeria. N=380.

The study found out that significant differences exist in the students on the extent of the use of ICT in learning in tertiary institutions in Kaduna state using chi-square test statistics meaning that students on the extent of the use ICT was high in that the calculated p-value of 0.000 was found to be lower than 0.05 alpha level of significance.

This finding was in line with Orakawe (2007) who stated that internet provides dept and content for learning in most subject area internet allows the user to engage in ongoing by exploring meanly unlimited information and it makes the instrument less teacher centered as students curiously derive their learning. The second objectives of the study was to find out how often ICT was used by students by learning in tertiary institutions in Kaduna State. The study revealed that ICT knowledge assist to develop the ability to acquire information about that society. This finding incline with Tancook, (2002) who stated that a wide variety of information was available to students through the face book and that the leadings of variety of materials are made possible and that ICT provides successful strategies to solving wide range of problems and promoted activities participation in problem solving. It was discovered that the introduction of ICT was creating new scientific communication in tertiary institutions. This finding coincides with Oyeniyi (2007) who stated that internet was beginning to play an important role in education. The

internet provides an invaluable and rich source of information to students, this finding also agreed with John (2005) who stated that ICT provides students with data and information necessary for research. School enrolment, examinations and the rules and regulations of the institutions. The research work also find out that the knowledge of ICT promotes creativity among students by encouraging them to use their imaginations. This findings also agreed that with the view of Paul and Aliunnat (2002) who suggested that students need sustained access to appropriate ICT system which will enable them to access number of work stations and a quality software which was flexible enough to allow them test out their ideas. This finding also agreed with Adamu (2009) who opined that ICT encourages students to use their imaginations and promotes creativity.

The hypothesis three (3) assumed that there was no significant differences in the opinions of teachers of polytechnic, universities, and colleges of education on the ICT skills competence level in training, operation and manipulation among teachers in teaching in tertiary institutions in Kaduna State of Nigeria. Third objective of the study was to identify the level of skills competence among teachers in the use of information and communication technology for teaching in tertiary institutions in Kaduna State that significant difference exist in the difference in the opinions of teachers of polytechnics, universities and colleges of education on the ICT skills competence level in training, operation and manipulation among teachers in teaching in tertiary institutions in Kaduna State of Nigeria N 322 the calculated P-value 0.000 was found to be lower than the 0.05 alpha level of significance. This implies that significant differences exist in difference with regards to the ICT skill competence level in line with third objective of the study revealed that inadequate ICT gadgets here hampers the use of ICT for its recipients to

acquire computer skills competence in the tertiary institutions. This finding agreed with Oyebola (2007) who asserted that the national policy on educations states that government shall provide necessary infrastructure and training for integration of ICT in tertiary system. He however, discovered that there was inadequate supply of ICT facilities. It was revealed that ICT offers real opportunities to make lasting improvement to teaching.

It was revealed that ICT curriculum content has not been adequately integrated into computer institutions that will make the recipients to acquire computer skills. The research hypothesis four (4) assumed that there was no significant difference in the opinions of students of polytechnics, universities and colleges of education on the skills competence level in training, operations and manipulation among students in earning in tertiary institutions in Kaduna State the fourth objectives was to examine the degree of skills competence in training operation and manipulation among students in incurring ICT for learning with information and communication technology in tertiary institutions in Kaduna State that significant differences exist in different with regards to the ICT skills competence level in training, operation and manipulation amongst students in learning in tertiary institutions in Kaduna state in tertiary institutions in Kaduna State in that the calculated P-value of 0.000 was found to be lower than the 0.05 alpha level of significance. It was revealed that ICT offers real opportunities to make lasting improvement to learning. This finding agreed with Adamu (2009) who opined that the use of ICT selectively and appropriately in teaching and learning process motivates students to achieve positive attitudes to learning the time allocated to computer courses in the department in the tertiary institutions was grossly inadequate and equally. It was also

revealed that there was no computer courses in the time table in some of the tertiary institutions, coupled with inadequate computers and ill prepared curriculum, these findings agreed with Oyebola (2007) who opined that the integration of ICT in to tertiary institutions shall help students acquire and develop needed skills attitudes for integration by aligning curriculum with computer skills.

The research hypothesis five (5) assumed that there was no significant difference in the opinions of teachers of polytechnics, universities and colleges of education on challenges teachers face in the process of changing to embrace the new innovation to improve their competence level in their professional practices in teaching in tertiary institutions in Kaduna state the fifth (5th) objective was to identify the challenges the teachers face in the process of changing to embrace the new innovation so as to improve their competency level in the use of ICT to enhance teaching in their professional practices that significant difference exist in the opinions of teachers of polytechnics, universities and colleges of education in challenges teachers face in professional practices in teaching in tertiary institutions in that the calculated p-value of 0.000 was found to be lower than the 0.05 alpha level of state significance. Using chi-square test statistics the study revealed that inadequate computers, erratic power supply lack of technical know-how, lack of interest on the part of the teachers here hampered the use of ICT in the tertiary institutions. This finding according to Oyobola (2007) who asserted the national policy on education states that government shall provide necessary infrastructure and training for integration of ICT in the tertiary education system.

The research hypothesis six (6) assumed that there was no significant difference in the opinions of students of polytechnics, universities and colleges of education in

challenges students face in the process of changing to embrace the new innovation to improve their competence level in the use of ICT in learning in their contextual task in tertiary institutions in Kaduna state. The six (6) objectives was to identify the challenges the students faces in the process of changing to embrace the new innovation so as to improve their competency level in the use of ICT to enhance learning in their contextual task in tertiary institutions in Kaduna state. That significant difference exist in the opinions of students of polytechnics, universities and colleges of education in challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use of ICT in learning in their contextual task in tertiary institutions in Kaduna State using chi-square test statistics. The study revealed in effectiveness in power supply by students and lack of interest on the part of the students.

In conclusion of the discussions of the findings, the researcher discovered the following items were not available and were take note of as inadequate of facilities, lack of competence in the use of ICT by teachers and students, students cannot operate the computer gadget properly no training and e-training of staffs and teachers, government presence was lacking too.

CHAPTER FIVE

SUMMARY, CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

5.1 Introduction

In this closing chapter, the researcher presented the summary of the major findings, the conclusions, and recommendations that are deducted from the analysis as well as putting forward some suggestions for further studies.

5.2 Conclusion

1. Results of the chi square statistics above revealed that significant differences exist in the teachers level in on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria. ***X^2 calculated 1093.228) > X^2 critical* 55.758 *) at df 32 , calculated p (0.000) < 0.05*** This is because the computed chi square value of 1093.228 was found to be higher than the chi-square critical value of 55.758 at df 32. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant differences exist in the teachers on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria. Therefore the null hypothesis which state that there is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria, is hereby rejected.
2. Significant differences exist in the students level in on the extent of the use of ICT in learning tertiary institutions in Kaduna state of Nigeria. ***X^2 calculated 1887.72)> X^2 critical* 55.758 *) at df 32 , calculated p (0.000) < 0.05.*** This is

because the computed chi square value of 1887.724 was found to be higher than the chi square critical value of 55.758 at df 32. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant differences exist in the students' n on the extent of the use of ICT in learning tertiary institutions in Kaduna state of Nigeria. Therefore the null hypothesis which state that there is no significant difference in the opinions of students of polytechnic, universities and colleges of education on the extent of the use of ICT in teaching tertiary institutions in Kaduna state of Nigeria, is hereby rejected.

3. Significant differences exist in the difference in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria. ***X^2 calculated 897.446) > X^2 critical (55.758) at df 32, calculated p(0.000) < 0.05.*** This is because the computed chi square value of 816.087 was found to be higher than the chi square critical value of 55.758 at df 32. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant differences exist in difference with regards to the information and communication technology in ICT skills competence in teaching. Therefore the null hypothesis which state that there is no significant difference in the opinions of teachers of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and

manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria is hereby rejected.

4. Significant differences exist in the difference in the opinions of Students of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in teaching tertiary institutions in Kaduna state of Nigeria ***X^2 calculated*** 1151.013***) > X^2 critical (*****55.758***) at df 32 , calculated p (0.000) < 0.05*** This is because the computed chi square value of 1151.013was found to be higher than the chi square critical value of 55.758 at df 32. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant differences exist in difference with regards to their ICT skills competence level in training operation and manipulation among student in learning tertiary institutions in Kaduna state of Nigeria. Therefore the null hypothesis which states that there is no significant difference in the opinions of students of polytechnic, universities and colleges of education on the ICT skills competence level in training operation and manipulation among teachers in learning tertiary institutions in Kaduna state of Nigeria is hereby rejected.

5. Significant difference differences exist in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state . ***X^2 calculated1400.452) > X^2 critical 55.758) at***

df 36 , calculated p (0.000) < 0.05. This is because the computed chi square value of 1400.452 was found to be higher than the chi-square critical value of 55.758 at df 36. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant difference exist in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state. Therefore the null hypothesis which state that there is no significant difference in the opinion of teachers of polytechnic, universities and colleges of education in challenges teachers face in the process of changing to embrace the new innovation to improve their competency level in their professional practice in teaching in tertiary institutions in Kaduna state is hereby rejected.

6. Significant difference exist in the opinion of students of polytechnic, universities and colleges of education in challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use ICT in learning in their contextual task in tertiary institutions in Kaduna state. ***X^2 calculated***1369.989***) > X^2 critical 55.758) at df 36, calculated p (0.000) < 0.05.*** This is because the computed chi square value of1369.989 was found to be higher than the chi square critical value of 55.758 at df 36. Moreover the calculated p value of 0.000 was found to be lower than the 0.05 alpha level of significance. This shows that significant difference exist in the opinion of teachers of polytechnic, universities and colleges of education in

challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use ICT in learning in their contextual task in tertiary institutions in Kaduna state. Therefore the null hypothesis which state that there is no significant difference in the opinion of students of polytechnic, universities and colleges of education in challenges students face in the process of changing to embrace the new innovation to improve their competency level in the use ICT in learning in their contextual task in tertiary institutions in Kaduna state is hereby rejected.

5.3 Recommendations

On the basis of the outcome of the study, the following recommendations are hereby put forward. Based on the findings of the study the following recommendations were made:

1. Exposure of the various ICT devices will enhance teachers to use ICT in their professional practice and students in their contextual task.
2. Using relevant educational software packages that meet the need of teachers and students will evoke positive use and competence from the teachers and students as they use technology.
3. Federal Government, State Government and private sector should help in the provision of computers and other equipment that should facilitate the use and skills competence of ICT in tertiary institutions. This will help the students to acquire necessary and relevant skills. Private sectors should do more by partnering with the government in providing ICT centres in tertiary institutions.

4. Tertiary institutions management should ensure that the few available ICT facilities are well maintained and they should service and install and update antivirus to avoid crash or damage within short period.
5. Teachers should be provided with opportunity to update their knowledge in computer appreciation through in service training workshops and seminars. This can be done by the Federal State Government by devoting more funds to human development.
6. Teachers should make personal efforts and enroll with private computers centres to increase their knowledge in computer and to deliver effectively. Self development is a personal assess that no one can take away from any individual. Teachers/students should go out of their ways to train themselves in private computer centres so that can be competent in the use of ICT.
7. Parents and all the stake holders should be informed on the cost and benefits of using ICT in tertiary institutions and educate them on the need to be financially committed to sustain ICT use.
8. Government should practically work out a sustainable power supply in institutions of learning for effective implementation of ICT programme.
9. The curriculum should be reviewed in tertiary institutions to have a general curriculum in the teaching and learning of ICT to enhance use and competence in training, operation and manipulation of ICT. The study revealed that the use of ICT enhances teaching and learning ICT in various disciplines based on this finding, there is urgent need by the Federal State

Government and Private owners of tertiary institutions to install ICT in various departments in all the tertiary institutions.

10. Tertiary institutions management should seek for assistance from ICT coordinating agency, private individuals to support and facilitate installing of ICT in various department and programmatic harmonization as well as promoting the staring of knowledge and resources.
11. Teachers should focus on improving students learning by shifting teachers hands on instructional practice to competency based learning which is focused on students understanding problem solving and creative thinking in operation and manipulation of computers.
12. There should be courses on how to operate and use computer systems with both hard ware and software packages.

5.4 Implication of the Findings for Education and Practice

1. Students in the tertiary Institutions were not taught ICT skills, and therefore they may graduate without ICT skills and as such cannot complete with their global counterparts.
2. ICT facilities were not used by teachers and students for teaching and learning. This implied that the advantages that ICT provides in using computer assisted instruction, integrated learning systems and collaborative networked technologies is deluded in these tertiary Institutions.
3. ICT facilities were not available and were not easily assessable to both teachers and students for teaching and learning and so there was need for both the state and

federal government and other stakeholders to address this anomaly in order to keep up with the pace of development the world over.

4. This new approach to teaching and learning demand a shift from the traditional teaching method which seek to transmit fixed well structured knowledge, with a firm external control of content sequence and pace of learning, to a teaching method which requires the teachers and students to work in different ways which include not only the use of various teaching and learning resources in the pursuit of learning, but also require the student to construct their own knowledge, learn more independently, and in the process acquire the habit of self reliance.
5. To keep pace with development in e-learning and improve conditions for teachers and students, it is important to review the curriculum from time. It can be delivered with significant added synchronized elements allowing students to work on the same learning tasks at different times and opening up for institutions the possibility of escaping the confines of the inflexible timetable and fixed period of learning activities. In addition the curriculum can be extended, as access to information, curriculum package and experts opinion allow almost any topic of interest of import to be explored at an appreciate depth within the classroom.
6. The document serves as a point of reference to prospective future researchers in similar theses and study area for the development of education.
7. The study depicts that a lot of findings require further study in the area of this topic which can help stimulate prospective researchers to action. This will enable the provision of a more comprehensive data on ICT and its effective utilization for teaching and learning in all institutions of learning in Nigeria.

5.5 Suggestions for Further Studies

Due to time constrain, funds and materials available to the researcher, other possible areas that could have been investigated were left, hence the researcher suggests the following areas for further studies.

1. This study was restricted to Kaduna State of Nigeria which is one of the Northern State in the country. It is therefore suggested that similar studies be carried out in other parts of the country.
2. Research should be carried out to investigate the Assessment of the use and competence of teachers and students in ICT in the tertiary institutions and varies ways to improve on it.
3. Research should be made on the forms of instructional media that will be involved in the National Curricula of ICT to enhance ICT Education in the Nation.
4. This study concentrated on the Assessment of use and competence of teachers and students in ICT in tertiary institution in Kaduna State, improving the use and skills competence of teachers and students in the training, operation, manipulation in ICT tertiary in Kaduna is recommended.
5. The present research dwells on the assessment of use and competence of teachers and students in Information and Communication Technology (ICT) in tertiary Institutions in Kaduna State Nigeria. It will be exciting to find out the degree of use of Information and Communication Technology (ICT) and the level of competence in training, operation and manipulation in (ICT) and the

challenges the teachers and students face in changing to embrace the new innovation (ICT) tertiary Institutions in Kaduna State.

6. This study is by no means exhaustive, further studies should be undertaken regarding the effect if ICT in the job performances of teachers and Academic performance of students.
7. More researchers are required at the institutional and department levels in Nigeria on the impact of ICT on tertiary education in Nigeria.
8. Student's perception, in the use and competence patterns of behaviour need to be explored in respect to utilization of ICT for learning in Nigeria.
9. It is imperative to understand how issues of ICT impact on societies, other sectors of Nigeria and the world as a whole.
10. There is need for further research on the using ICT and ICT packages by teachers in the classrooms. The knowledge and skills needed and the approach need to be extensively explored in order for ICT to have impact for teaching and learning.

5.6 Contributions to Knowledge

1. Teachers have higher knowledge than student this implies, that teachers have potential of improving the teaching skills that enhance better outcome in teaching and learning tertiary Institutions.
2. The study of ICT in the tertiary institutions shall foster the protection of graduates in the education systems that can survive in the contemporary society, sustain National development and compete globally.

3. The study of ICT shall lead to human progress, lifelong, education, and provide future careers to teachers and students through skills acquisition when they are competent in the use of ICT.
4. The student of Nigerians Tertiary Institutions shall be like Asian children who are functional in practical aspect of Education. Whereby at the age of 10 years a kid can repairs electrical wires, repair handset.
5. The study of ICT shall move students from the theoretical aspect of education to more a functional and practical study of education be it in sciences, Arts Vocational and humanities, therefore each students should be able to possess a set of laptop to enable him or her to practice to be competent in the use of ICT in their contextual tasks.
6. With ICT teachers shall have the potentials to improve teaching and learning to enhance knowledge that shall be gained by the students
7. The use of ICT shall assist teachers in doing their professional practices and research work.
8. The use of ICT shall make it easier for tertiary Institutions in their administrative work, registration and office work

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Department of Educational Foundations and Curriculum

Ahmadu Bello University, Zaria

APPENDIX I

Dear Respondent,

REQUEST TO COMPLETE QUESTIONNAIRE

The researcher is a post-graduate student of the above Department, undergoing a PhD Programme in Curriculum and Instruction.

As part of the requirements for the award of the degree, the researcher is undertaking a research study titled: "Assessment of the use and competence of teachers and students in ICT in tertiary institutions in Kaduna State, Nigeria".

Your are pleased requested to help complete the attached questionnaire which is meant to elicit information on the above research topic. Your response shall be kept strictly confidential and used for academic purpose only.

Thanks for your co-operation.

Yours faithfully,

Oluchi Marry Ikoh
PhD/EDUC/44000/2012-2013
08033554516

Topic: Assessment of the use and Competence of Teachers and Students in ICT in Tertiary Institutions in Kaduna State, Nigeria.

Questionnaire for Teachers

APPENDIX II

Section (A)

There are two sections A seeks background information of the respondent while section B contain items on the variables of the study.

ICT for teachers (ICTTS)

Section A: Demographic Data

Instruction Fill/Tick the appropriate information/box

(1) Name of Institution _____

(2) Ownership Federal ☐ State ☐ Private ☐

(3) Status Teachers ☐ Students ☐

(4) Level of study (If student) ND, NCE, B.ED HND. ☐

(5) Rank (If teacher) A.: Graduate Assistant ☐

B.: Assistant Lecturer ☐

C.: Lecturer II ☐

D.: Lecturer I

E.: Senior Lecturer ☐

F.: Reader ☐

G.: Professor ☐

(6) **Gender:** Male ☐ Female ☐

SECTION B

Please read each of the sentences below and indicate by ticking (V) how well you have used the information technology appliances and internet packages for some years.

Please tick the most appropriate to rate frequency of use in the use of Information Communication and Technology (ICT).

Teachers Information and Communication Technology Frequency of Usage in Teaching ICT (TICTFUS)

KEY Used often =UO (5) Often =O (4) Unsure =US (3) Not Used=NU(2) Never Used =NU (1)

S/N	ITEMS	U0	0	US	NU	NU
7	Searching for materials through internet					
8	Teaching through computer assisted computer software					
9	Make presentation using presentation software (such as power –point)					
10	Typing tests and exams papers					
11	Typing official and other documents					
12	Typing handouts and teaching materials					
13	Create a new document					
14	Start up and shut down a computer safely					
15	Copy file and directories / folders					
16	Delete files and directories / folders					

SECTION C

Please tick the most appropriate to rate level of competence in the use of Information Communication and Technology (ICT).

Teacher ICT Level of Skills Competence in Teaching (TICTLCS)

Very Efficient=VE (5) Efficient=E (4) Moderate =M(3) Poor =P(2) very poor=VP (1)

S/N	ITEMS	VE	E	M	P	VP
17	Ability for fast and accurate key boarding for efficient composition of words					
18	Ability for fast and accurate key boarding for making inputs.					
19	Ability for fast and accurate key boarding's for checking and editing data					
20	Ability to operate word processing					
21	Ability to operate data base					
22	Ability to operate electronic messaging					
23	Operate and use computer systems with hard ware packages					
24	Operate and use computer system with soft ware packages.					
25	Operate and use computer systems with both hard ware and software packages.					
26	Operate use computer systems with electronic mails and application software.					

SECTION D

Teachers challenges in changing to embrace the new innovation of ICT in teaching in some tertiary institutions in Kaduna state (TCNIICT)

Please tick the most appropriate to rate the challenges the teachers face in changing to embrace the new innovation of ICT in teaching

Most Obstacle =MO (5) Much more Obstacle =MMO (4) Much Obstacle=MO (3) Moderate Obstacle =MO (2) No Obstacle =NO (1)

S/N	ITEMS	MO	MMO	MO	MO	NO
27	Insufficient time to prepare electronic based materials					
28	Insufficient technical teachers, technical knowledge					
29	Problems of accessibility to existing hard ware (computer, overhead projector etc)					
30	Lack of guidance and support in electronic media usage by institutions					
31	Inadequate funding for technology integration					
32	Lack of provision for professional development opportunities in electronic media					
33	Lack of interest of teachers and student in technology usage					
34	Ineffectiveness in erratic power supply areas					
35	High acquisition and maintenance cost of equipments					
36	Most electronic software easily becomes obsolete					

Topic: Assessment of the use and Competence of students in ICT in Tertiary Institutions in Kaduna State, Nigeria.

Questionnaire for Students in ICT

APPENDIX III

There are two sections A seeks background information of the respondent while section B contain items on the variables of the study.

ICT for students (ICTTS)

Section A: Demographic Data

Instruction Fill/Tick the appropriate information/box

(1) Name of Institution _____

(2) Ownership Federal ☐ State ☐ Private ☐

(3) Status teachers ☐ Students ☐

(4) Level of study (If student) ND, NCE, B.ED HND. ☐

(5) Rank (If teacher) A.: Graduate Assistant ☐

B.: Assistant Lecturer ☐

C.: Lecturer II ☐

D.: Lecturer I ☐

E.: Senior Lecturer ☐

F.: Reader ☐

G.: Professor ☐

(6) Gender**:** Male ☐ Female ☐

SECTION E

Please read each of the sentences below and indicate by ticking (V) how well you have used the information technology appliances and internet packages for some years.

Please tick the most appropriate to rate frequency of use in the use of Information Communication and Technology (ICT).

Students Information and Communication Technology Frequency of Usage in Learning ICT (SICTFUS)

KEY Used often =UO (5) Often =O(4) Unsure =US(3) Not used=NU(2) Never Used =NU (1)

S/N	ITEMS	U0	0	US	NU	NU
7.	Searching for materials through internet					
8.	Learning through computer assisted computer software					
9.	Make presentation using presentation software (such as power –point)					
10.	Word processing					
11.	Files navigation					
12.	Internet browsing					
13.	Email					
14.	Projector multimedia					
15.	Printers					
16.	Digital Cameras					

SECTION F

Please tick the most appropriate to rate level of competence in the use of Information Communication and Technology (ICT).

Students ICT Level of skills Competence in learning (SICTLCS)

Very Efficient=VE (5) Efficient=E (4) Moderate =M(3) Poor =P(2) very poor=VP (1)

S/N	ITEMS	VE	E	M	P	VP
17.	Ability for fast and accurate key boarding for efficient composition of words					
18.	Ability for fast and accurate key boarding for making inputs.					
19.	Ability for fast and accurate key boarding's for checking and editing data					
20.	Ability to operate word processing					
21.	Ability to operate data base					
22.	Ability to operate electronic messaging					
23.	Operate and use computer systems with hard ware packages					
24.	Operate and use computer system with soft ware packages.					
25.	Operate and use computer systems with both hard ware and software packages.					
26.	Operate use computer systems with electronic mails and application software.					

SECTION G

Students challenges in changing to embrace the new innovation of ICT in learning in some tertiary institution in Kaduna state (SICNIICT)

Please tick the most appropriate to rate the challenges the teacher's faces in changing to embrace the new innovation of ICT in learning

Most Obstacle =MO (5) Much more Obstacle =MMO (4) Much Obstacle=MO (3) Moderate Obstacle =MO (2) No Obstacle =NO (1)

S/N	ITEMS	MO	MMO	MO	MO	NO
27.	Insufficient time to prepare electronic based materials					
28.	Insufficient technical teachers, technical knowledge					
29.	Problems of accessibility to existing hard ware (computer, overhead projector etc)					
30.	Lack of guidance and support in electronic media usage by institutions					
31.	Inadequate funding for technology integration					
32.	Lack of provision for professional development opportunities in electronic media					
33.	Lack of interest of teachers and student in technology usage					
34.	Ineffectiveness in erratic power supply areas					
35.	High acquisition and maintenance cost of equipments					
36.	Most electronic software easily becomes obsolete					

Thank you for completing the Questionnaire.

Chi square critical table

	α =0.995	0.99	0.975	0.95	0.9	0.1	0.05	0.025	0.01	0.005
df =1	---	---	0.001	0.004	0.016	2.706	**3.841**	5.024	6.635	7.879
2	0.01	0.02	0.051	0.103	0.211	4.605	**5.991**	7.378	9.21	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	**7.815**	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	**9.488**	11.143	13.277	14.86
5	0.412	0.554	0.831	1.145	1.61	9.236	**11.07**	12.833	15.086	16.75
6	0.676	0.872	1.237	1.635	2.204	10.645	**12.592**	14.449	16.812	18.548
7	0.989	1.239	1.69	2.167	2.833	12.017	**14.067**	16.013	18.475	20.278
8	1.344	1.646	2.18	2.733	3.49	13.362	**15.507**	17.535	20.09	21.955
9	1.735	2.088	2.7	3.325	4.168	14.684	**16.919**	19.023	21.666	23.589
10	2.156	2.558	3.247	3.94	4.865	15.987	**18.307**	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	**19.675**	21.92	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	**21.026**	23.337	26.217	28.3
13	3.565	4.107	5.009	5.892	7.042	19.812	**22.362**	24.736	27.688	29.819
14	4.075	4.66	5.629	6.571	7.79	21.064	**23.685**	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	**24.996**	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	**26.296**	28.845	32	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	**27.587**	30.191	33.409	35.718
18	6.265	7.015	8.231	9.39	10.865	25.989	**28.869**	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	**30.144**	32.852	36.191	38.582
20	7.434	8.26	9.591	10.851	12.443	28.412	**31.41**	34.17	37.566	39.997
21	8.034	8.897	10.283	11.591	13.24	29.615	**32.671**	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	**33.924**	36.781	40.289	42.796
23	9.26	10.196	11.689	13.091	14.848	32.007	**35.172**	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	**36.415**	39.364	42.98	45.559
25	10.52	11.524	13.12	14.611	16.473	34.382	**37.652**	40.646	44.314	46.928
26	11.16	12.198	13.844	15.379	17.292	35.563	**38.885**	41.923	45.642	48.29
27	11.808	12.879	14.573	16.151	18.114	36.741	**40.113**	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	**41.337**	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	**42.557**	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	**43.773**	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	**55.758**	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	**67.505**	71.42	76.154	79.49
60	35.534	37.485	40.482	43.188	46.459	74.397	**79.082**	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	**90.531**	95.023	100.425	104.215
80	51.172	53.54	57.153	60.391	64.278	96.578	**101.879**	106.629	112.329	116.321

90	59.196	61.754	65.647	69.126	73.291	107.565	**113.145**	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	**124.342**	129.561	135.807	140.169