COMPETENCY NEED OF TECHNOLOGY TEACHERS IN USING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR TEACHING ELECTRICAL AND ELECTRONIC COURSES IN TECHNICAL COLLEGES IN NIGER STATE, NIGERIA.

BY

FRANCIS SAMUEL ADAMU

2015/1/54487TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA.

APRIL, 2023.

COMPETENCY NEED OF TECHNOLOGY TEACHERS IN USING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR TEACHING ELECTRICAL AND ELECTRONIC COURSES IN TECHNICAL COLLEGES IN NIGER STATE, NIGERIA.

BY

FRANCIS SAMUEL ADAMU

2015/1/54487TI

A RESEARCH WORK SUBMITED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF TECHNOLOGY DEGREE (B. TECH) IN INDUSTRIAL AND TECHNOLOGY EDUCATION

APRIL, 2023.

DECLARATION

I, FRANCIS SAMUEL ADAMU with matriculation number 2015/1/54487TI, an undergraduate student of the department of industrial and technology certify that the work embodied in this project is original and not been submitted in part or full for any for any diploma or degree or any other university.

FRANCIS SAMUEL ADAMU /2015/1/54487TI _____

Name and Matric No Sign and Date

CERTIFICATION

This project has been read and approved as meeting the requirements for the award of B.TECH Degree in Industrial and Technology Education, School of science and Technology Education, Federal University of Technology , Minna.

Dr. KALAT ISTIFANUS

Project Supervisor
Signature and Date

Dr. SABA. T

Head of Department Signature and Date

External Examiner Signature and Date

DEDICATION

This project work is first and foremost dedicated to God Almighty for his grace, mercy and strength bestowed on me throughout this work.

The work is also dedicated to my parents, Mr and Mrs Francis Adamu and my siblings, Jennifer, Miracle, Joy, Helen, Jethro and Rejoice, Mr and Mrs James Awodo.

Am also dedicating the project work to my project supervisor for his words of encouragement, advice, correction and time towards making this research project a success, I say may God bless you sir.

I also dedicate the work to my aunties, cousins whose name cannot be mentioned because of time. I say thank you for your kind support morally, financially and other wise towards the completion of this work I say God bless you all and your families Amen.

ACKNOWLEDGEMENT

My profound gratitude goes to the Almighty God for his infinite mercy, guidance, protection and grace to complete this programme.

I gratefully acknowledge the important and significant parts which many individuals have played from the beginning of this research work to its completion.

I earnestly acknowledge the tremendous encouragement given to me by my project supervisor in the person of Dr Kalat Istifanus for his valuable help, suggestion, patience and guidance throughout the period of this research work may God in his infinite mercy bless him and his family.

My immeasurable appreciation goes to my fellow students for their kindness, care and moral support throughout my course of study, the Almighty God protect of all.

This acknowledgement is not complete without my acknowledgement of the following lecturers of Electrical and Electronic Technology department, Dr. Hon. G.A Usman, Dr.E. Raymond, Dr. A.S Owodunni and other lecturers of Industrial and Technology Education; your contribution is highly appreciated.

ABSTRACT

This research was designed and carried out to study the competence need of technology teacher in using information and communication technology (ICT) to teach electrical and electronic courses. Three (3) research questions and three (3) hypotheses were formulated to guide the study. Twenty two (22) items questionnaire was used to collect data for the study. The target for the population consists of technology teachers in state and federal science technical colleges in Niger State. Data obtained were analyzed using frequency count, mean, standard deviation and t-test statistics. The null hypotheses were tested at .05 level of significance. The findings of the study show that the technical colleges of Niger State should be accorded the same statues as obtained and their curriculum should be organized to meet the standard of information and communication technology worldwide. Based on the finding, it was recommended that the faculty board should organize seminars with training sections to educate technology teachers on the use of Information and communication technology to facilitate teaching and learning process.

TABLE OF CONTENTS

Contents **Page**

CHAPTER ONE

INTRODUCTION

Background of the Study

The development in technology has made tremendous changes in the way we live, as well as the demand of the society. Recognizing the impact of new technologies on education, Teacher education institutions try to restructure their educational programmed and classroom facilities, in order to enhance the teaching and learning of technology courses. This restructuring process requires effective integration of technologies into existing context in order to provide teacher with knowledge of specific subjects' areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005). Education has been a veritable tool to nation development (FRN, 2004) not only in Nigeria but across the globe, thus the introduction of information and communication technology (ICT) as facilitator at all level of the educational system. It is, therefore, necessary for student and teacher to have a firm knowledge of information and communication technology and its impact on the society at large.

Information and communication technology as defined by Khan(2016) is the use of electronic computer and software to convert, store, process, transmit and retrieve information. It is a generic term that covers the acquisition, processing, storage and dissemination of information. It involves the application of computer and communication technology in the task of information handling. The American National council of educational technology ANCET (1995) defined ICT as the handling and promoting information through the use of electronic devices.

The teacher and student communicate through the use of electronic devices like the internet, computer, projectors, printed material etc. Tan et al (2009) defined information technology as application of information and communication technologies tools including computer network, software and hardware required for internet connection. It encompasses the computer hardware and software, the network and several other devices (video, audio, audio-visual, camera, projector etc that convert information (text), images, sound motion and so on into common digital form. The strength of a society is measured by its technological strength. The change that occurs in a society is due to this "power tool" called technology. The change can be socially, economically, educationally, religious, culturally etc information and communication technology does not only bring about change in our communication (information) but also changes the way we think and how we view our world. The development of a nation or a society is measured by the country's technologically development, for if a nation is not technologically developed, such nation will always rely on foreigners. There is no doubt that Nigeria has not had its own share of technological development in every system in the nation most especially the educational system. It must be noted that the ICT is only a means to amend not something that is profoundly changing education but it impact is our major concern. On information and communication technology and the school system, ICT have become an indispensable part of the contemporary world. The school system has been affected in a number of ways.

The technology teachers are the teachers that make good use ofICT so as to prepare themselves for the future. This will not only transform the school system but bring about tremendously effect in our teaching and learning system and this will help them to define it professionally.In Nigeria the need for well qualified teachers has gained pre-eminence because it is considered that teacher education is a means of not only providing teachers with the necessary skills and knowledge needed to adequately carry out their teaching jobs as well

as for professional growth. Teacher education is the process of training that deals with the art of acquiring professional competencies and professional growth. It is an essential exercise that enhances the skills of learning and teaching. Teacher education is designed to produce highly motivated, sensitive, conscientious and successful classroom teachers who will handle students effectively and professionally for better educational achievement. According to Selinger and Austin (2005), inadequate teacher preparation programs results in majority of teachers' inability to demonstrate adequate knowledge and understanding of the structure, function and the development of their disciplines. Therefore, an effective teacher education program is a prerequisite for a reliant education which leads to a good level of confidence to both the teachers and their students as a result of which learning is coordinated effectively, professionally and problems inherent in the teacher education rectified and solved.

Technology education is the process by which society deliberately transmits its cultural heritage through schools, colleges, universities and other institutions (Albhar, 2008). In order to achieve the above-mentioned purposes in education, information and communication technology (ICT) one could agree is an essential ingredient that could help bring these gains and benefits to technical colleges. Realistically, several researchers admitted that problems abound in educational systems that ICT could help to improve (Bork, 2008). In the same vein, similar problems would be expected in the educational sector of many developing countries (USDLEA, 2002).Some teachers in Nigerian Technical colleges find it very difficult to effectively use ICT instructional materials such as computers, audio visual aids, slides, video clip, electronic white boards, and electronic conferencing materials and so on to train electrical/electronic students. The teachers' appropriate selective preparation and use of relevant ICT instructional material, as well as their effectiveness in the operation of projected equipment to aid teaching and learning of electrical\electronics is very important.

However, the competence needs of ICT for the technology teachers starts from the society they find themselves, then to the school, their instructors and their self-confidence. In a society like ours, most people still see ICT as what they can do without. Also most parents see it as office equipment and considering the cost do not educate their children with it. The school is another part that forms the perception of the technology teachers. Most school does not have this equipment available for use, even if they have; they lack technical personnel to manage them and the student on how to use them. Some schools have these materials but lock them up in the centre and deprive the students of their use.

Statement of the Problem

Information and communication technology have become an indispensable part of the contemporary world. The school system globally has been equally being affected in a number of ways. The use of information and communication technology as presentation tools through overhead projectors, television, electronic whiteboards, guided web-tours where students can simultaneously view the resources on computer screen, (Bork, 2008). The information and communication technology gadgets promote classes understanding and discussion about difficult concepts especially through the display of simulation.

Unfortunately, it is sad to note that most technology teachers seem not to have the understanding in the use of ICT during teaching and learning process, some schools seem not to have these facilities at all and some that has these facilities seem not to be putting them into use. What is responsible for this is not quite certain.Hence this is what prompted the researcher to carry out this study.

Purpose of the Study.

The main purpose of this study is to identify the competent needs of technology teachers in using Information and communication technology (ICT) for teaching electrical/electronic courses in technical colleges inNiger State. Specificallythis study seeks to;

(1) Identify the level of literacy of technology teachers in using ICT gadgets as instructional aids.

(2) Identify strategies that will be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronics.

(3) Determine the availability of ICT facilities in technical colleges inNiger State for teaching electrical/electronic courses?

(4) Determine ways to improve the usage of the ICT facilities technical colleges in Niger state.

Significance of the Study.

The study when completed will be useful to the teachers in technical colleges, National Teacher Institute (NTI), Nigerian Association of Teachers of Technology (NATT), and the students of technical colleges.

This study will enable the technology teachers to make use of ICT in teaching the students so as to increase their skills and knowledge of learning. The study will be significant to education technologist in developing teachers' competence at every level of education system. National Teacher Institute (NTI) and other professional bodies and associations such as Nigerian Association of Teachers of Technology (NATT) and so on may benefit from the study in the sense that it will provide the information and communication technology needs

that will enhance technical college teachers' performance on the job. It will promote computer literacy among technical college teachers and also enable student to take full advantage of information and communication technology which is necessary for effective learning and facilitate teaching.

Scope of the study.

This study is limited to literacy level of technology teachers in technical colleges in Niger State in using ICT gadgets as instructional aids, the availability of resources needed to carryout demonstration and the strategies that will be adopted in the use of ICT gadgets in teaching and learning process.

While skill is perceived as the ability to carry out a task effectively, Mbah and Umurhurhu (2016) defined skill as the ability to make purposeful movements that are necessary to complete or master a particular task. Digital skill is therefore defined in this context as ability to utilize trending technological devices in carrying out a specific task.This ability is prerequisite in the utilization of mobile learning applications

Digital skills are broadly defined according to Asli (2022) as the skills needed to use digital devices, communication applications, and networks to access and manage information from basic online searching and emailing to specialist programming and development.

According to United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018), digital skills are defined as a range of abilities to use digital devices, communication applications, and networks to access and manage information. They enable people to create and share digital content.

Research Questions:

The following questions were raised to assist in carrying out the study;

What is the literacy level of the technology teacher in using ICT gadgets as an instructional aid?

What are the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses?

What are the availability of ICT facilities in teaching electrical/electronic courses?

Hypotheses:

The following hypotheses were formulated and tested at.05 level of significance.

(Ho1): There is no significance difference between the mean responses of state science and technical college teachers and federal science and technical college teachers with regard to the literacy level of using ICT gadgets as an instructional aid.

(Ho2): There is no significant difference between the mean responses of statescience and technical college teachers and federal science and technical college teacherswith regard to the strategies to be adopted for enhancing the use of ICT gadgets in teaching and learning electrical/electronic courses.

(Ho3): There is no significant difference between the mean responses of statescience and technical college teachers and Federal scienceand technical college teachers with regard to the availability of ICT facilities in technical colleges in Niger State.

CHAPTER(TWO)

REVIEW OF RELATED LITERATURE

This chapter embodies the review of literature pertinent to the research under the following sub-headings.

Theoretical Framework

1. Meaning of information and communication technology.
2. Information and communication technology and the Nigerian school system.
3. Information and communication technology resources for teaching in technical colleges.
4. Strategies adopted for teaching technical subject using ICT.
5. Competency needs of technology teachers in using information and communication.
6. Summary of literature reviewed.

Theoretical Framework

Theoretical frame, work for the study is based on management theories and vocational education theories. In management theories, scientific management theory will be used for the study, while in vocational education theories , The Process Habit Theory will be used for the study.

Theory is a general explanation of natural events which will better explain as a set of tested common sense values or principles which help managers to understand, interprete or predict real action (Ogbonna 2003). In school management, theories are used to back up management actions in educational practices. It influences the educational practices when properly applied.

The Scientific theory of management

The scientific theory of management states that the overall output of a worker can be increased and improve upon through a scientific management process. The theory was propounded Fredrick Winslow Taylor (2012).

According to his philosophy of man as machine the regular job of an employee should be clearly defined the employer of optimal untility. However , materials, tools and equipment that that are required for successful execution of the defined tasks must be made available to the workers to enable them accomplish set standards of performance. Thus workers should be exposed to training relevant to their work.

The Process Habit Theory

(Prosser C.2011) ,propounded the process habit theory which states that effective vocational training can be given where the training jobs are carried on in the same way with the operations, the same tools and the same machines as in the occupation itself. This implies that for the learner to effectively prepared , he/she must be trained to posses the habit of doing each task or job in the way in the way with the same tools, machines and operation as in the occupation itself. The functionality of these tools and machines in order to be used in preparing students is hinged on the proper management maintenance.

The theory to the present study in the sense that it talk about competent need of technology teachers in using ICT for teaching electrical and electronic courses.

Meaning of information and communication technology

Information and communication technology as defined by Khan (2016) is the use of electronic computer and software to convert, store, process, transmit and retrieve information.Also, in defining the concept of information and communication technology, the

American National Council for Educational Technology (ANCET, 2002) defined ICT as the handling and promoting of information in area of electronic devices. This has resulted in wide spread of computers all over the world as well as Nigeria. This ICT is now found in private sector, public sector, industries, education, government, commerce, entertainment and homes. In fact, information and communication technology is a part of modern society. It is a field of human knowledge that is made up of three technologies; computing micro-electronics and telecommunication and how these technologies are used to collect, store, process and distribute any form of information by electronics means. Learning through ICTs is more effective as they provide opportunities for using multiple technologies (video, computer and telecommunication).

Information and communication technology is a tool of communication for obtaining and getting in touch with any part of the world by mere touch of a combination of keyboard button (Akinnoyewa, 2003). It can be deduced that computer is the aggregate of the potential inherent in computing, electronic-learning, audio-visual, video cameras, and digital cameras and so on to manage information or to communicate in digital form.

Yusuf (2005) also made a theoretical analysis of the Nigerian National Policy for Information Technology (FRN, 2001). The study on one hand pointed out that the national policy on the IT is inadequate to impact positively on the Nigerian education system, as the philosophical framework of reference is market driven. On the other hand, he provided some suggestions to ensure maximum exploitation of ICT potential in Nigerian school system.

The role of ICT in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. We are now in the era of information technology, Nigeria needs ICT to aid teaching and learning and educational management. In recognition of the prominent role of ICT in advancing knowledge and skills

necessary for effective functioning in the modern world, there is urgent need to integrate ICT into education in Nigeria (FRN, 2004).

ICT offers great potential in enhancing students learning by offering to them constructive approach to learning (Collis and Moonen, 2001).

Gattiker (1992) stated that access to computer (among the learners) is known to be associated with higher level of computer literacy. It has been found that amount of time spent working with the computer is significantly related to learners' competence in working with the computer (Open et, al. 1999). Faculty also use computer on a regular basis to work from home, conduct scholarly writing, create presentations, conduct research using internet resources and conduct data analysis (Sax, 2000). For example computers are used in education (i.e. teaching and learning), science and technology, engineering, informal training and problem solving that is why it is made to be part of the National Education System (FRN, 1998).

Information and Communication Technology and the Nigerian School System

Every country in the world including Nigeria has plan for educational reform to provide developing countries schools and ministries of education with sustainable solution for mobilizing the necessary technologies, skill and educational resources to prepare students and teachers for the use of ICT. Information and communication technology need to be more readily available to larger number of students and teachers.

Clark (1994) observed that the school curriculum should reflect the perceived value and importance of development of ICT literacy among students and teachers nationwide. In Nigerian school system today, the national policy on computer education has made computer education part and parcel of Nigerian educational system (FRN, 1998). Government will

provide necessary infrastructure and training for the integration of ICT in the school system in recognition of the role of ICT in advancing knowledge and skills in the modern world (FRN, 2004). The role of ICT in teaching and learning is rapidly becoming one of the most important and widely discussed issues in developing countries.

Yusuf (2004) noted that in order to embrace the potentials of ICTs most nations of the world, including Nigeria, have evolved national information and communication technology policy to serve as a framework for ICT integration in all facets of the society. Nigerian National Policy on information technology (FRN, 2001) mission statement recognized the need "To use IT" for "education". The policy stressed that information and communication technology must be used:

- To empower the youth with IT skills and prepare them for global competitiveness.
- To integrate IT into the mainstream of education and training.
- To establish new multifaceted IT institutions or centre of excellence to ensure Nigeria's or centre of excellence to ensure Nigeria's compositeness in international markets.

Furthermore, the National Policy on Education (FRN, 2004) stated that ICT should be integrated into education in Nigeria. For the role it plays in advancing knowledge and skills necessary for effective functioning in the modern world. Nigeria as developing country should use computer within the school system, for it has become an important medium in instructional delivery and instructional management (Yusuf,2008). Students in technology rich environment have more positive learning behavior and increased learning rate, and their attitudes towards learning is encouraging. Technology rich environment implies the adequacy of computers and computer hardware and software (Schacter,2006).

Prices of computer hardware are now coming down and more teachers are getting to be computer literate, teachers and administrators with computer education are required these days, it is not surprising that people see rational connection between computers and education because education is associated with information and computers are associated with information in the two scenes to make a perfect marriage (Resnick, 2004).

Information and communication technology if employed in Nigeria school system can enhance teachers' professional development, facilitate administrative duties and make teaching easy (Lopez, 2003). In more and advanced industrialized nations, there has been a staggering amount of research and publications related to ICT use for educational purpose (Iyamu Ogiegbaen 2005).

Similarly, Poole (1996) noted that most expert, in the field of education agreed that, when information and communication technology hold great promise to improve teaching and learning and also provides workforce opportunities. Students' attitudes toward learning and their self -concept improved consistently when computers were used for instruction.

Information and Communication Technology Resources for Teaching in Technical Colleges

Improving the quality of education and learning is a critical issue, particularly at a time of educational expression. ICT can enhance the quality of education in several ways; by increasing learners' motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICT is also a transformational tool which when used appropriately, can promote the shift to a learner-centered environment. Motivating to learn ICT such as Videos, Television and multi-media computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the students in the learning process. Interactive radio makes use of sound effects,

songs, dramatizations, cosmic skits and performance conventions to compel the students to listen and become involved in the lessons being delivered. More so than any other type of ICT, networked computers with internet connectivity can increase learner motivation as it combined the media richness and interactivity of other ICT with the opportunity to connect with real people and to participate in real world events.

Facilitating the acquisition of basic skills, the transmission of basic skills and creativity can be facilitated by ICT through drill and practice. Educational television program such as Sesame Street use repetition and reinforcement to teach the alphabet, number, colors, shapes and basic concept. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition reinforcement, enhancing teachers' training. ICT has been used to improve the quality of teacher training. For example, Insinuations like the cyber teachers training centre(CTTC) in south Korea are taking the advantage of the internet to provide teacher professional opportunities to in-service teachers. The government-funded CTTC established in 1997, offers self-directed, self-paced web-based courses for primary and secondary school teachers. Courses include "computers in the information society, Education Reform and Future Society and Education." Online tutorials are also offered with some courses requiring occasional face-to-face meetings. In China, large-scale radio and television-based teacher education has for many years been conducted by the China central radio and Television University, the Shanghai radio and TV University and many other Radio and Television University in the country. At India Gandhi National Open University, satellite-based one-way video-and two-way audio-conferencing was held in 1996, supplemented by print-training institute by Kamataka state. The teachers interacted with remote lectures by telephone and fax.

The importance of ICT is quite evidence from the educational perspective. Though, the chalkboard, textbooks, radio/television and film have been used for educational purposes over the years, none has quite impacted on the educational process like the computer. While television and film impact on the audiovisual facilities of the users, the computer is capable of activating the senses of sight, hearing and touch. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability are the main purpose of ICT it is involve in the development of human mental resources which allow people to both successfully apply the existing knowledge and produce new knowledge" (Shavinina, 2001).

Strategies adopted for teaching technical subjects using ICT

Many different types of technology can be used to support and enhance learning. Starting from video content and digital movies to laptop computing and handheld technologies has been used in classrooms. Similarly, new uses of technology such as pod-casting are constantly emerging. Various technologies delivered different kinds of content and serve different purposes in the classroom. Word processing and e-mailing promotes communication skills; database and spread sheet programs promote organizational skills; and modeling software promote the understanding of science and mathematics concept (Marshall, 2002). It is important to consider how this electronic technology differs and what characteristics make them important as vehicle for education.

Technologies available inclassroom today range from simple tool-based application (such as word processors), to online repositories of scientific data. Others are primary historical document, handheld computers, closed-circuit television channels, and two-way distance learning classrooms. Prensky (2005) asserted that even the cell phones that many now carry with them can be used to learn. According to Lei and Zhao (2006) each technology is likely

to play a different role in student learning, rather than trying to describe the impact of all technologies as if they were the same. Researchers need to think about what type of technology are been used in the classroom and for what purpose. Two general distinctions could then be observed from the literature. Students can learn from computer where technologies are used essentially as tutor and serve to increase student's basic skill and knowledge. Moreover, they can learn with computer where technology is used as tool that can be applied to a varieties of goals in the learning process and can serve as a resource to help develop higher order thinking, creativity and research skills (Ringstaff and Kelley, 2002).

According to Murphy, et al., (2001), the primary form of students learning from computer is described as Discrete Educational Software (DES), Integrated Learning System (ILS), Computer-assisted Instruction (CAI), and Computer-based Instruction (CBI). These software applications are also the most widely available application of Educational technology in schools today, along with word-processing software, and have assisted in classroom for more than 20years (Becker, Ravity and Wong, 2005). Murphy et al., (2001) explained that teacher use does not only supplement instruction as in the past but to introduce topic, provide means for self- study and offer opportunities to learn concept otherwise inaccessible to students. The software also manifests two key assumptions about how computer can assist learning. First, the users' ability to interact with the software is narrowly defined in ways specifically to promote learning with the tools. Secondly, computers are viewed as a medium for learning rather than as tools that could support further learning.

As this is recognized as the commonly used approach to computers used in student learning, in more recent years, use of computer in schools has grown more diversified as educators recognized the potential of learning with technology as a means for enhancing student reasoning and problem solving abilities. Zhang (2005) noted that "this shift which has been

driven by the plethora of new information and communication devices now increasingly available to students in school and at home, each of which offers new affordance to teachers and students alike for improving students' achievements and meeting the demand for 21st century skills." It should be noted at this juncture that there appear to be three main approaches to ICT by teachers according to (UNESCO, 2004). These are:

Integrated approaches: Planning the use of ICT within the subject to enhance particular concept and skills and improving students' attainment. This involves a careful and considered review of the curriculum area, selecting the appropriate ICT resources which will contribute to the aim and objectives of the curriculum and scheme of work and then integrating that use in relevant lessons.

Enhancement approach: Planning the use of ICT resources which will enhance the existing topic through some aspect of lessons and tasks. For example, using an electronic whiteboard for presenting theory about a topic in this approach, the teacher plans to complement the lessons with an innovative presentation method to promote class discussion and the visualization of problems.

Complementary approach: Using an ICT resources to empower the pupils' learning, for example by enabling them to improve their class work by taking notes on the computer, or by sending homework through e-mail to the teacher from home, or through work processing of their homework. All these three approaches can enhance attainment but the effect may be different. In the integrated approach, students' learning is enhanced because they are confronted with the challenges to their existing knowledge and giving deeper insight into the subject been studied. The enhancement approach could improve students' learning through presenting knowledge in new ways, promoting debate among students and encouraging them to formulate their own explanations. The complimentary approach draws on the approach that

suggests that learning can be enhanced by reducing the mundane and repetitive aspect of tasks such as writing essay and homework by hand, freeing the learner to focus on more challenging and subject-focused tasks (Kemmis et al., 1977 in UNESCO, 2004). These different types of use require the teacher to have an extensive knowledge of ICT and to be able to fit its use either into their existing pedagogy or to extend their pedagogically knowledge so they can accommodate ICT effectively in their teaching.

Competency needs of technology teachers in using information and communication technology for teaching electrical/electronic courses in technical colleges.

There are three major ways of using ICT for teaching and learning. These are Information Technology (IT), Computer Assisted Learning and Computer and Information Science. Computer assisted learning is the interaction between a students and a computer system designed to help the students to learn. The technology teachers should be competent in using interactive whiteboards to present lessons, for video projection and to access Internet sites. More than a few also used the added tools provided with the whiteboard. For example, a teacher of physics used the supplied library of symbols for creating electrical circuit diagrams to construct such diagrams on the interactive whiteboard. This is more effective than he could have done with a traditional whiteboard or overhead projector

In some technical colleges in Niger State, technology teachers use technology toys effectively to teach. Examples included:

- use by teacher of the interactive whiteboard, in conjunction with its notebook application, to deliver an effective lesson on electrical/electronic skills and stimulation

- learners and teaching staff use the drill and practice to investigate concepts of position and movement of bus in circuit design.
- Use of the Internet by many teachers to research and present information sources to learners in relation to project works in electrical designs. This encouraged learners to use the Internet purposefully and effectively for independent and personal learning.

Abolade and Yusuf (2004) stated that in other aspects of the school curriculum, there were examples where technology teacher made effective use of ICT in provision for pupils with additional support needs, research for suitable learning and teaching materials on the Internet for lesson planning purposes, science through use of digital microscopes, religious and moral education for background research and physical education for data logging in monitoring children's fitness. A few teaching staff had the confidence and competence to extend their use of ICT for enhancing teaching into more experimental areas, such as the use of mind mapping software to document and organize class discussions, and the use of an interactive whiteboard for the teaching of electrical circuit component such as Capacitors, Resistors and diodes. Technology teachers in technical colleges of Niger State made less use of presentation software for whole-class delivery of the curriculum than in tertiary institutions. The technology teachers reported benefits from the use of ICT in their teaching. These benefits included: enhanced support for pupils with additional support needs, a more interactive approach to teaching and learning, the promotion of structured play, increased learner engagement through use of images and sound and use of still and video cameras to document learner progress in project activities. Generally, teaching and other staff in technical colleges did not exploit the opportunities available to them and their classes to enrich learning and teaching through the use of available ICT in teaching electrical/electronic courses in technical colleges

FRN (2004),stated that there were varying degrees of sophistication in the use by teaching staff of interactive whiteboards. In vocational classes, teaching staff generally engaged learners well in interacting with this equipment, thus involving them more effectively in the learning and teaching process. Some teachers in technical college incorporated a wide range of resources, including the built-in text processing applications, handwriting recognition, timers and clocks, symbol libraries, sound and animations and commercial software designed for teaching. Others did no more than use the whiteboard to present teaching resources for which they had previously used an overhead projector. Their approach was often didactic with relatively passive learners. Imaginative uses of interactive whiteboards across a wide range of subject areas included: electrical circuit, design in physics, vocabulary exercises in modern foreign languages, demonstrations of application software in computing studies, simulation and animation in artificial intelligence and in electronic systems, video clips used by school chaplain at assembly, video in teaching of map bearings in mathematics and the use of electrical teaching materials and lists of useful websites from the Scottish Association of technology Teachers (SAGT).Ogiegbaen and Iyamu (2005) stated that few technology teachers with reasonable confidence in their ICT skills in using interactive whiteboards effectively, where security arrangements allowed it, to present interesting and appropriate websites to their classes. These resources added immediacy and currency to lessons, and pupils reported that their use of enlivened lessons enhance their engagement with the subject. Many teachers continue to make good use of recorded video material.

Teachers should be able to embrace the potential of ICT in their teaching tasks. It makes the tasks easy for them and their students. Yusuf (2004) noted that information and communication technology increase administrators and teacher productivity. Distance learning, which is the use of telecommunication is made easy through the ICT, thereby, facilitating students learning through e-mail interactive web sites and two-way

teleconferencing (Selinger& Austin, 2003). Federal Government intends to provide necessary infrastructure and training for the integration of ICT in the school system in recognition of its role in advancing knowledge (FRN, 2004).

This indicates that information and communication technology is a new field of study and that to achieve optimum use of ICT in various ways and for various reasons, the three technologies should be put together to be able to collect, store, process and distributes information. Information and communication technology is a form of technology over a distance and the world "tele" in Greek words means "far off" and this refers importantly to electronic materials such as radio, television, telephones, fax and computer communication (Akinyemi, 2000). The area under information and communication technology involves computer literacy, photograph, video conferencing, distance learning, audio – conferencing and competency to mention few. The country is now depending in the use of information technology (IT) in every area of human endeavors' especially education sector. Lopez, (2003) states that information and communication technologies (ICTs) have had significant impact on the traditional school system. They have provided innovative opportunities for teaching and learning and they engendered advances in research about how people learn there by bringing about rethinking to structure education. The federal government on realizing the significant role information technology can play in education and decided to introduce and make it a part and parcel of school system and make it an area of study at all level of the educational system. Information and communication technologies are essential in any education system. They have the potentials of being used to meet the learning needs of individual teachers, promote equal educational opportunities, offer high quality learning materials, increase self-efficiency and independence of learning among students and improve teachers professional development (Abolade and yusuf, 2004).

The traditional system of education 7-5-2-3 inherited at independence in 1960 is now replaced with modern method of teaching and learning through information technology due to review of the curriculum. Abolade and Yusuf (2004) noted that, information and communication technologies help to relate academics to practice of today's work at the influence of ICTs.

Ogiegbaen and Iyamu (2005) made theoretical studies on using information and communication technology in technical colleges in Nigeria. The study revealed that Nigeria still did not integrate ICT into technical schools. Therefore, administrative and instructional work is still carried out manually; they also identified some major obstacles militating against the use of ICT in technical colleges in the country. These obstacles include high cost of computer hardware and software, weak infrastructure, inadequate of human skills and knowledge in ICT etc.

Summary of literature reviewed

ICTs (information and communication technologies) are information handling tools that are used to produce, store, process, distributeand exchange information. These different tools are now able to work together and combine to form networked world which reaches into every corner of the globe (UNDP Evaluation office,2001). It is an increasingly powerful tool for participating in global markets, promoting education, improving the delivery of basic services, and enhancing development opportunities (UNDP, 2006). Ogunsola (2005) defined ICT "as an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we lived". It can be used to access global knowledge and communication with other people.

Information and Communication Technology can make the school more efficient and productive, thereby engendering a variety of tools to enhance and facilitate teachers' professional activities (Kirschner and Worperies, 2003). Teachers are expected to be competent and effective in utilizing these tools. The role of information and communication technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy (Thierer, 2000). Most experts in the field of education agreed that, when properly ICT is used, it holds great promise to improve teaching and learning in addition to shaping workforce opportunity. Poole (1996) indicated that computer illiteracy is now regarded as the new illiteracy. This has actually gingered a new and strong desire to equip school with computer facilities and qualified personnel necessary to produce technologically proficient and efficient student in technical colleges across the state. There is no doubt that computer can aid the instructional process and facilitate students learning.Many studies have found positive effect associated with technology aided instruction.

CHAPTER III

METHODOLOGY

This chapter describes the research procedures used in carrying out the study. It focuses on research design, area of the study, population of the study, instrument for data collection, validation of the instrument, administration of the instrument for data collection, and method of data analysis.

Research Design

The design of this research is a survey research. It involves the use of a questionnaire to determine the opinion and response of respondents. It gives room to the researchers to elicit information from respondents in technical colleges in Niger State.

Area of Study

This study was carried out in Niger State particularly in five (5) technical colleges which includes:

Federal Science and Technical College Shiroro

Government Technical College Kontagora.

Government Technical College Minna

Government Technical College Bida

Government Technical College New Bussa

Population of the Study

The target population for this study comprises of electrical/electronic technology teachers in technical colleges in Niger State, it consists of ten (10) electrical/electronic technology teachers from five (5) technical colleges in Niger State Science and Technical school management Board. The entire population was used for the study hence; there is no need for sampling.

Instrument for Data Collection

A structured questionnaire was used by the researcher for data collection. It contains four (4) sections; Section A contains personal data, Section B contains (8) items under the research question: What is the literacy level of the technology teacher in using ICT gadgets as an instructional aid, Section C contains (5) items under the research question: what are the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses, Section D contains (9) items under the research question: The availability of ICT facilities in technical colleges in Niger State. The questionnaire was made of twenty- four (22) items divided in to four (4) sections. Each section sought for data to answer related research questions.

Validation of the Instrument

The instrument for data collection was validated by three lecturers in the Department of Industrial and Technology Education, Federal University of Technology, Minna. Their suggestion and correction were used to produce the final draft of the instrument that was used for data collection.

Administration of the Instrument

The researcher personally visited the selected schools where he solicited and obtain permission from the principal. The instrument were personally administered to the respondents, Fifty (50) questionnaire were administered and collected immediately after completion.

Method of Data Analysis

The data collected by the researcher was analyzed using mean score, standard deviation and t-test as statistical tools. A four- point rating scale was employed as follows;

Strong Agree	(S.A)	4 point
Agree	(A)	3 point
Disagree	(D)	2 point
Strongly disagree	(S.D)	1 point

Decision Rule

To determine the acceptance level, a mean score of 2.50 is computed in line with four -point rating scale. Any items that attracts up to 2.50 and above was considered agreed and any item below 2.50 was regarded as disagreed.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter deals with the presentation and analysis of data with respect to the research questions and hypotheses formulated for this study, the result of data analysis for the research questions were presented first, followed by those of the hypotheses tested for the study.

Research Question 1

What is the literacy level of the technology teacher in using ICT gadgets as an instructional aid?

Table 1

Mean responses of State technology teachers and Federal science technology teachers with regard to the literacy level of using ICT gadgets as an instructional aid

` N_1= 40, N_2=10

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	$\overline{X}_t$	Remarks
1	Technology teachers attended workshop(s) on the use of ICTs for teaching electrical/electronic curses	1.90	1.90	1.90	Disagree
2	Technology teachers have certificate(s) on computer course(s)	2.00	2.10	2.05	Disagree
3	Technology teachers can use Microsoft word to type, edit, copy, and print.	1.85	1.80	1.83	Disagree
4	Technology teachers can use Microsoft power point for teaching electrical/electronic courses	1.93	1.90	1.92	Disagree
5	Technology teachers can use Microsoft excel to draw graphics, calculate some simple arithematics	1.88	1.90	1.89	Disagree
6	Technology teachers can select printer and print work from the computer	2.75	2.70	2.73	Agree
7	Technology teachers can browse the internet and download some useful materials.	3.03	2.90	2.97	Agree
8	Technology teachers can receive and send mail through computer.	2.98	2.90	2.94	Agree

Key

N_1 = Number of statescience and technical college teacher, $\overline{X}_1$ = Mean of state science and technical college teachers

N_2 = Number of Federalscience and technical college teachers, $\overline{X}_2$= Mean of Federal science and technical college teachers, $\overline{X}_1$= Average mean of state science and technical college teachers and Federal science and technical college teachers

The data presented in table 1 show that the respondents agreed with items 6,7 and 8 with mean score ranging between 2.73 -2.97, and disagreed with items 1, 2,3,4, and 5 with mean score ranging between 1.83-2.05 respectively. This means

1. Technology teachers did not attended workshop(s) on the use of ICTs for teaching electrical/electronic curses
2. Technology teachers did not have certificate(s) on computer course(s)
3. Technology teachers cannot use Microsoft word to type, edit, copy, and print.
4. Technology teachers cannot use Microsoft power point for teaching electrical/electronic courses
5. Technology teachers cannot use Microsoft excel to draw graphics, calculate some simple arithmetic

Research Question 2

What are the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses?

Table 2

Mean responses of state technology teachers and Federal science technology teachers with regard to the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses?

N_1= 40, N_2=10

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	$\overline{X}_t$	Remarks
9	Train technology teachers on how to use computer in education	3.32	3.00	3.16	Agree
10	Technology teachers use of interactive white board for teaching electrical/electronic technologies courses	2.70	2.70	2.70	Agree
11	Technology teachers use of power point projector for teaching electrical/electronic technologies courses	2.65	2.70	2.68	Agree
12	Technology teachers use of computer assisted instructional package	2.65	2.60	2.63	Agree
13	Provision of ICT facilities for teaching electrical/electronic courses	3.30	3.40	3.35	Agree

Key

N_1 = Number of statescience and technical college teachers, $\overline{X}_1$ = Mean of statescience and technical college teachers

N_2 = Number of Federalscience and technical college teachers,X_2 = Mean of Federalscienceand technical college teachers

$\overline{X}_1$= Average mean of state science and technical collegeteachers and Federal scienceand technical college teachers

The data presented in table 2 show that the respondents agreed with all the items provided in the table with mean score ranging between 2.63-3.35. This means

1. Train technology teachers on how to use computer in education

2. Technology teachers use of interactive white board for teaching electrical/electronic

technologies courses

3. Technology teachers use of power point projector for teaching electrical/electronic technologies courses

4. Technology teachers use of computer assisted instructional package

5. Provision of ICT facilities for teaching electrical/electronic courses

Research Question 3

The availability of ICT facilities in technical colleges in Niger State?

Table 3

Mean responses of state technology teachers and Federal science technology teachers with regard to the availability of ICT facilities in technical colleges in Niger State

N_1= 40, N_2=10

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	$\overline{X}_t$	Remarks
14	Desktop computers for teaching and browsing	3.13	3.70	3.42	Agree
15	Computer LAB equipped with laptop and internet facilities	3.08	3.00	3.04	Agree
16	Computer Printer	3.15	3.20	3.18	Agree
17	Digital Camera	3.15	3.30	3.23	Agree
18	Standby generator for powering computer LAB in case of power failure	2.95	3.00	2.98	Agree
19	Projector for power point presentation.	3.20	3.10	3.15	Agree
20	Scanners for scanning images for teaching and learning.	3.25	3.22	3.24	Agree
21	Projector screen.	3.43	3.40	3.42	Agree
22	Interactive white board	3.05	3.00	3.03	Agree

Key

N_1 = Number of state science and technical collegeteachers, $\overline{X}_1$ = Mean of statescience and technical college teachers

N_2 = Number of Federalscience and technical college teachers, $\overline{X}_2$ = Mean of Federal scienceand technical college teachers

X_1= Average mean of statescience and technical college teachers and Federalscienceand technical college teachers

The data presented in table 3 shows that the respondents agreed with all the items, 14,15,16,17,18,19,20,21 and 22 with mean score ranging between 2.98-3.42. This means

1. Projector for power point presentation
2. Computer LAB equipped with Laptop and internet facilities.
3. Computer printer.
4. Standby generator for powering computer LAB in case of power failure.
5. Interactive white board

Hypothesis One

There is no significance difference between the mean responses of state science and technical college teachers and Federal science and technical college teachers with regard to the literacy level of technology teachers in using ICT gadgets as an instructional aid.

Table 4

t – test Analysis of the respondent regarding the literacy level of technology teacher in using ICT gadgets as an instructional aid

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	SD_1	SD_2	T-cal	Remarks
1	Technology teachers attended workshop(s) on the use of ICTs for teaching electrical/electronic curses	1.90	1.90	0.89	1.04	0.00	NS
2	Technology teachers have certificate(s) on computer course(s)	2.00	2.10	0.81	0.83	-0.34	NS
3	Technology teachers can use Microsoft word to type, edit, copy, and print.	1.85	1.80	0.65	0.40	0.31	NS
4	Technology teachers can use Microsoft power point for teaching electrical/electronic courses	1.93	1.90	0.96	0.94	0.09	NS
5	Technology teachers can use Microsoft excel to draw graphics, calculate some simple arithematics	1.88	1.90	0.68	1.04	-0.06	NS
6	Technology teachers can select printer and print work from the computer	2.75	2.70	0.49	0.64	0.23	NS
7	Technology teachers can browse the internet and download some useful materials.	3.03	2.90	0.27	0.54	0.74	NS
8	Technology teachers can receive and send mail through computer.	2.98	2.90	0.35	0.83	0.30	NS

Keys

$\overline{X}_1$ = Mean of statescience and technical collegeteachers, SD_1 = Standard Deviation of statescience and technical college teachers

$\overline{X}_2$ = Mean of Federal science and technical college teachers, SD_2 = Standard Deviation of Federal scienceand technical college teachers

T = t-test calculated, NS = Not Significant, S = Significant

Table 4 reveals that items 1,2,3,4,5,6,7 and 8 were accepted indicating that there is no significant difference between the respondents of state science and technical college teachers and Federal science and technical college teachers. The t-calculated is less than t-critical value of ±1.98 at .05 level of significance;hence null hypothesis stated is accepted.

Hypothesis Two

There is no significant difference between the mean responses of statescience and technical college teachers and federal science and technical college teacherswith regard to the strategies to be adopted for enhancing the use of ICT gadgets in teaching and learning electrical/electronic courses.

Table 5

t – test Analysis of the respondent regarding the strategies to be adopted for enhancing the use of ICT gadgets in teaching and learning electrical/electronic courses.

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	SD_1	SD_2	T-cal	Remarks
9	Train technology teachers on how to use computer in education	3.32	3.00	0.47	0.45	1.99	S
10	Technology teachers use of interactive white board for teaching electrical/electronic technologies courses	2.70	2.70	0.78	0.78	0.00	NS
11	Technology teachers use of power point projector for teaching electrical/electronic technologies courses	2.65	2.70	0.82	0.64	-0.21	NS
12	Technology teachers use of computer assisted instructional package	2.65	2.60	0.82	0.80	0.18	NS
13	Provision of ICT facilities for teaching electrical/electronic courses	3.30	3.40	0.64	0.66	-0.43	NS

Keys

$\overline{X}_1$ = Mean of state science and technical college teachers, SD_1 = Standard Deviation of state science and technical college teachers

$\overline{X}_2$= Mean of Federal science and technical college teachers, SD_2 = Standard Deviation of Federal science and technical college teachers

T= t-test calculated, NS = Not Significant, S = Significant

Table 5 reveal that item9 were rejected indicating that there is a significant difference between the responses of state and Federal science technical college teachers. The t-calculated are greater than t-critical value of ±1.98 at .05 level of significance. While items 10,11,12, and 13 were accepted indicating that there is no significant difference between the respondents hence null hypothesis stated is accepted.

Hypothesis Three

There is no significant difference between the mean responses of state science and technical college teachers and Federal science and technical college teachers with regard to the availability of ICT facilities in technical colleges in Niger State

Table 6

t – test Analysis of the respondent regarding to the availability of ICT facilities in technical colleges in Niger State

S/N	ITEMS	$\overline{X}_1$	$\overline{X}_2$	SD_1	SD_2	T-cal	Remarks
14	Desktop computers for teaching and browsing	3.13	3.70	0.60	0.64	-2.55	S
15	Computer LAB equipped with laptop and internet facilities	3.08	3.00	0.72	0.63	0.35	NS
16	Computer Printer	3.15	3.20	0.53	0.98	-0.16	NS
17	Digital Camera	3.15	3.30	0.61	0.64	-0.67	NS
18	Standby generator for powering computer LAB in case of power failure	2.95	3.00	0.80	0.77	-0.18	NS
19	Projector for power point presentation.	3.20	3.10	0.46	0.94	0.33	NS
20	Scanners for scanning images for teaching and learning.	3.25	3.22	0.54	0.98	0.09	NS
21	Projector screen.	3.43	3.40	0.54	0.66	0.13	NS
22	Interactive white board	3.05	3.00	0.63	0.45	0.29	NS

Keys

$\overline{X}_1$ = Mean of state science and technical college teachers, SD_1 = Standard Deviation of statescience and technical college teachers

$\overline{X}_2$ = Mean of Federal science and technical collegeteachers, SD_2 = Standard Deviation of Federal scienceand technical college teachers

T= t-test calculated, NS = Not Significant, S = Significant

Table 6 reveal that item14 were rejected indicating that there is a significant difference between the responses of state and Federal science technical college teachers. The t-calculated are greater than t-critical value of ±1.98 at .05 level of significance. While items 15, 16, 17, 18,19,20,21 and 22 were accepted indicating that there is no significant difference between the respondents hence null hypothesis stated is accepted.

Summary of the Major Findings

The following are the principle findings of this study: they are highlighted base on the research questions.

A. The literacy level of the technology teacher in using ICT gadgets as an instructional aid?

1. Technology teachers did not attended workshop(s) on the use of ICTs for teaching electrical/electronic curses

2. Technology teachers did not have certificate(s) on computer course(s)

3. Technology teachers cannot use Microsoft word to type, edit, copy, and print.

4. Technology teachers cannot use Microsoft power point for teaching electrical/electronic courses

5. Technology teachers cannot use Microsoft excel to draw graphics, calculate some simple arithmetic

B. The strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses?

1. Train technology teachers on how to use computer in education

2. Technology teachers use of interactive white board for teaching electrical/electronic technologies courses

3. Technology teachers use of power point projector for teaching electrical/electronic technologies courses

4. Technology teachers use of computer assisted instructional package

5. Provision of ICT facilities for teaching electrical/electronic courses

C. The availability of ICT facilities in technical collages in Niger State

1. Projector for power point presentation

2. Computer LAB equipped with Laptop and internet facilities.

3. Computer printer.

4. Standby generator for powering computer LAB in case of power failure.

5. Interactive white board

D. The outcome of the hypotheses tested

1. Table 4 reveals that items 1,2,3,4,5,6,7 and 8 were accepted indicating that there is no significant difference between the respondents of state science and technical college teachers and Federal science and technical college teachers. The t-calculated is less than t-critical value of ±1.98 at .05 level of significance;hence null hypothesis stated is accepted.

2. Table 5 reveal that item 9 were rejected indicating that there is a significant difference between the responses of state and Federal science technical college teachers. The t-calculated are greater than t-critical value of ±1.98 at .05 level of significance. While items 10,11,12, and 13 were accepted indicating that there is no significant difference between the respondents hence null hypothesis stated is accepted.

3.Table 6 reveal that item 14 were rejected indicating that there is a significant difference between the responses of state and Federal science technical college teachers. The t-calculated are greater than t-critical value of ±1.98 at .05 level of significance. While items 15, 16, 17, 18,19,20,21 and 22 were accepted indicating that there is no significant difference between the respondents hence null hypothesis stated is accepted.

Discussion of Findings

This is organized base on the research questions for the study.

1. **The literacy level of technology teachers in using ICT gadgets as an instructional aid**

Base on the data collected, the literacy level of technology teacher can be improved. The result of the study identified that there is no adequate facilities provided for the teachers in using ICT as instructional aid for carrying out their demonstrations. Gattiker, (1992) stated that access to computer (among the learners) is known to be associated with higher level of computer literacy. It has been found that amount of time spent working with the computer is significantly related to learners' competence to working with the computer. (FRN, 1998) stated that the existing curriculum designed for the training of pre-service teachers in Nigeria does not include the practical usage of ICT materials such as computers and their software, slides, overhead projectors etc. Example computers are used in education (i.e. teaching and learning), science and technology, engineering, informal training and problem solving therefore it's made to be part of the National Education System (FRN, 1998). Finally the study reveals that adequate training should be given to technology teacher on the use of ICT gadgets in technical colleges. By doing this the literacy level of the technology teachers will be improved. Furthermore, Computer education introduced into the Nigerian secondary school since 1988 has largely been unsuccessful as a result of teachers' incompetence because empirical studies Yusuf, (2005) have recognized that teachers' ability and willingness to use ICT and integrate it into their teaching is largely dependent on the poor quality of professional ICT development they receive. Thus they have been unable to find effective ways to use technology in their classrooms or any other aspect of their teaching and learning life Creed (2006), It is equally possible that the hardship faced by these institution and their inability to meet the demand to develop effective and proficient ICT literate teaching

cadre is as a result of corrupt practices by both the federal and state government officials, and the regulatory bodies and officials of the teacher education institutions on the other hand. According to Akinyemi (2004), the greatest problem faced by the teacher education institutions is inadequate funding or finance coupled with lack of library facilities and inadequate teaching/learning materials. This probably accounts for the limitations to the effectiveness of the institutions training programs. However, the results of the analysis of the responses obtained showed that the teacher preparation programs have slightly impacted on the level of performance of the Nigerian technology teachers Sax (1998).

2. The strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic course

Findings in table (2) revealed that there should be adequate provision of ICT gadgets. The table also revealed that latest technologies, internet access, professional courses, hardware and software, access to computers, appropriate funding, maintenance of ICT gadgets and other equipment should be put in place. According Marshall, (2002) stated that many different types of technology can be used to support and enhance learning. Starting from video content and digital movies to laptop computing and handheld technologies has been used in classrooms. Similarly, new uses of technology such as pod-casting are constantly emerging. Various technologies delivered different kinds of content and serve different purposes in the classroom. Word processing and e-mailing promotes communication skills; database and spread sheet programs promote organizational skills; and modeling software promote the understanding of science and mathematics concept. It is the teachers who need to bring about the required changes in their attitude and approach to ICT.

Prensky (2005) asserted that even the cell phones that many now carry with them can be used to learn. According to Lei and Zhao (2006) each technology is likely to play a different

role in student learning, rather than trying to describe the impact of all technologies as if they were the same.

Murphy (2001) explained that teacher use does not only supplement instruction as in the past but to introduce topic, provide means for self study and offer opportunities to learn concept otherwise inaccessible to students.

Zhang (2005) noted that "this shift which has been driven by the plethora of new information and communication devices now increasingly available to students in school and at home, each of which offers new affordance to teachers and students alike for improving students' achievements and meeting the demand for 21st century

3. The availability of ICT facilities in technical colleges in Niger State

The analysis of result in table (3) reveals that there are inadequate facilities in carrying out the demonstration; therefore, teacher himself should be responsible for realizing and implementing such factors. These factors according to Gattiker (1992) are access to own personal laptop computer, availability of high quality resources, high level of technical support, availability of good quality training, full access to hardware and software at all time, electricity supply should be made constant so as to prevent damages of ICT gadgets, availability of large capacity building and access to interactive whiteboard. These according to Gattiker, are what the teacher should have or incorporate to enable him integrates ICT in his daily routine of teaching. Thus, the school should exhaust all avenues toward making ICT a reality.

Shavinina (2001). Said that the computer is capable of activating the senses of sight, hearing and touch. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability are the main purpose of ICT it is

involve in the development of human mental resources which allow people to both successfully apply the existing knowledge and produce new knowledge.

The hypotheses tested for this research question was accepted it show that there is no significant difference between the mean responses of state science and technical college teachers and federal science and technical college teachers with regard to technology teachers to make use of Information and communication technology in teaching the students so as to increase their skills and knowledge of learning. The outcome is not new, because both the respondent,state science and technical college teachers and federal science and technical college teachers can identify things in developing teachers' competence at every level of education system in the sense that it will provide the information and communication technology needs that will enhance technical college teachers' performance on the job. It will promote computer literacy among technical college teachers and also enable student to take full advance of information and communication technology which is necessary for effective learning and facilitate teaching.

Finally, they need to be given support and guidance to help them bring about these changes

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMEDATIONS

Summary of the Study

The main purpose of this study is to determine the competence need of technology teacher in using ICT to teach electronics courses, the literacy level of technology teachers in using ICT gadgets as an instructional aid, the availability of ICT facilities in technical colleges, The study also find out the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic course. Related literatures were reviewed in the study under the following sub-headings: Meaning and nature of information and communication technology, Information and communication technology a tool for instruction, Information and communication technology and the Nigerian school system, Information and communication technology resources for teaching in technical colleges, Strategies adopted for teaching technical subject using ICT, Competence needs of technology teachers in using information and communication technology for teaching electrical/electronics courses in technical colleges, Summary of literature review. Appropriate statistical tools such as mean, standard deviation were used to analyze the data using fourty (40) technology teachers in Niger State technical colleges andten (10) federal science technology teachers in technical colleges in Niger State with a total of eighty (50) respondents.

Questionnaire was used as instrument for data collection and was analyzed according to each research questions, a descriptive survey research was the research design adopted. three research questions were formulated and tested at .05 level of significance.

Base on the findings of this study as highlighted it was observed that technology teachers should be properly trained on how to use ICT gadgets to enhance teaching and learning. The technical colleges should be accorded the same statues as obtained and their curriculum should be organized to meet the standard of information and communication technology worldwide.

Implications of the Study

The findings of this study have implication on the competence need of technology teachers in using ICT for teaching electrical/electronics course in Niger State technical colleges. The computer is the major tool of ICT which has some of the other tools imbedded in it e.g. camera, and also support other tools to function effectively e.g. computer and the projector e.t.c. This led to the finding on the computer literacy of the technical school teachers.

With reference to availability of ICT facilities in technical colleges in Niger State. It has been observed that they are insufficient tools for carrying these demonstrations. This does not encourage the technology teacher and the lecturer to explore and build up a better confidence of ICT use in instruction. When ICT is used for teaching electrical/electronics, students understand the lesson better, ICT equipment can be used for learning in the absence of the teacher which improves the students knowledge and skills in his area of study.

Conclusion

Information and communication technology is a tool necessary to bring about a positive outlook in our educational system. The future of the education defends solely on the technology teachers. There are two major needs of the technology teacher; Availability and accessibility of ICT gadgets to technology teacher and Training on how to use the ICT

gadgets. If technology teachers can be provided with the necessary materials and duely trained, it facilitate the future teaching and learning process of our society.

Recommendation

With important roles information and communication technology play in effective teaching and learning process, it is necessary for everyone in the field of education not to see ICT use, literacy, accessibility and availability, training and integration in curriculum as an optional skill but must be a necessary tool for development

To be able to attain this goal, the following recommendations are offered:

1. The government should provide more ICT gadgets in every department in science and technical colleges of Niger State
2. The curriculum planners should integrate ICT curriculum and enforce its use in instruction in science and technical colleges of Niger State
3. The technical board of Niger State should organize seminars with training section to educate State science and technical college teacher on ICT and how to use it.
4. There should be an alternative source of power supply such as standby generator
5. The ICT gadgets used by the technology teachers should be adequately maintained by skilled personnel

Suggestion for Further Research

The following suggestions were made based on the study.

1. Strategies for effective management and maintenance of ICT gadgets in technical colleges of Niger State.
2. Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy.
3. The effect of ICT in teaching in technical college in Niger State.

REFERENCES

Amercan National Council for Educational Technology.(1995) Factors affecting the implementation of ICT in Jigawa State Schools. An M. Ed. Thesis University of Ilorin.

Retrieved from proQuest Digital Dissertations. (AAT 3295214)

Abimbola I. O. (2006).The role of computers in Education, Nigeria Journal of Technical Education.6, 12 - 15.

Abolade, A. O. & Yusuf (2004). Information Communication Technology and the Nigeria Teachers Education Programme. Department of Science Education University of Ilorin.

Retrieved fromproQuest Digital Dissertations. (AAT 3295214)

Abolade, A. O. & Yusuf M. O. (2000): Information and Communication Technologies (ICTs) and the Nigeria Teachers Education Programme. African Journal of Educational Studies .3, 1 – 19.

Akinnoyewa M. (2003). Benchmarking the Motivational Competencies of Academically Qualified Teachers and Professionally Qualified Teachers in Nigerian Secondary Schools. The African Symposium, 5(3), 17-37.

Akinyemi,S.A. (2000). Information and Communication Technology in Nigeria: Revolution or Evolution.J. Bristol. Soc. Sci., 11(1): 7-14.

Alfred Bork, L.N (2008) what is the need or effective learning on the internet. Educational Technology and Society 4 (3), 1436 – 4522.

Anoa, N.L. (2003). In-service Teacher Education in Nigeria: A Case Study. Journal of Education for Teaching, 17(2), 189-99.

Awolowa A. (2004). Professionalism: An Institutional Approach to Teachers' Job Effectiveness in Nigerian Schools. Paper Presented at the Seventh International LLinE Conference. held at Mahwah, NJ: Erlbaum. On the 23 to 25th September

Beckerz H.J. (2007). Internet use by Teachers. Available at http://www.crio.uci.edu/TLC/findings/Internet-use/startpage.html.

Burnett, G. (2005). Technology as a Tool or Urban Classrooms. ERIC/CUE Digest, 95, New York: Eric Clearing House on Urban Education Retrieved from http://www.ericdigests.org/1994/tool.htm.

Collis, H. & Moonen Y, (2001). Nigeria. In Nigerian Communications Commission: www.ncc.gov.ng 57, 153-155

Creed, Y. (2006). Essay inthe Effective Classroom (Doctoral dissertation, Boston College,S). Dissertation Abstracts International, 62, 7741A.

Ekireghwo, P. O. (2008) An overiew of Information Technology for Instructional Resources Management, NSCL, 2(1), 13 – 20.

Federal Republic of Nigeria (2004). National Policy on Education (3rd Edition) Lagos. NERDC Press.

Federal Republic of Nigeria (2004). National Policy on Education (4 edition) Laos NERDC press.

Fredrickson, K.I. (2006). How Teachers Taught: Constancy and Change in American Classrooms 1890-1990.New York, NY: Teachers College Press.

Gatiker, E. (2007). Computers and the Collaborative Experience of Learning. Current Direction in Psychological Science, 11, 7-10.

Gaynor, O. (2003). International Handbook on the Continuing Professional Development of Teachers, 3-32. Berkshire: Open University Press.

Iyamu, A. & Ogiegbaen, E.(2005). School Effectiveness and Quality Improvement: Quality Teaching in Nigerian Secondary Schools. The Affrican Symposium,5(4), 17-31.

Kirschner, P. & Woperies, I.G, J, H. (2003). Mind Tools for Teacher communities: A European perspective. Technology, pedagogy, and Education, 12(1), 127-149 Retrieved from http://www.triangle.co.uk/jit/.

Lei, J. & Zhao. (2006). Technology uses and Student Achievement: A Longitudinal Study. Computers and Education. Available at: http://www.sciencedirect.com

Lopez, V. (2003). An exploration of the use of information Technologies in Colleges classroom. CollegeQuarterly, 6(1).Retrievedfrom

http///www.College, quarterly.ca2003. 6(1) fall/lopez html.

Marshall, J.M. (2002). Learning with Technology: Evidence that Technology can, and does Support Learning. San Diego: State University.

Marshall, S., Elgort, I., & Mitchell, G. (2003). Raising the valleys: An Approach to Developing Staff Capability in e-learning.2(1) Available at: http://surveys.canterburg.ac.nz/herdsa03/pdsnon/N1123.pdf

Murphy, D. & Greenwood, C. (2002). How Do Teachers Help Children to Learn: An Analysis of Teachers' Interventions in Computer-Based Activities. In D. Faulkner, K. Littleton & M. Woodhead, (Eds.), Learning Relationships in the Classroom.(pp.1-21) New York,NY:Springer.

Murphy, R., Penuel, W., Means, B., Korbak, C., & Whaley, A. (2001). E-DESK: A Review of Recent Evidence on the Effectiveness of Discrete Educational Software. Menlo Park, CA: SRI International.

Ogunsola, L.A. (2005). Information Communication Technologies and the Effects of Globalization: Twenty-first century “digital slavery” for Developing Countries- Myth or Reality? Electronic Journal o Academic and Special Librarianship 6(1- 2), 120-125.

Pensky, M. (2005). What can you learn a Cell Phone? Almost anything! Innovative: Journal of Online Education, 1(5), 341-392.

Poole, M. (2005 April 9). Creating Virtual Learning Communities in Africa. Challenges and Prospects, pp 1A, 2A.

Poole, G.A. (2007,January 29). A new gulf in America education (Review of the book Digital Divide). The New York Times. Retrieved from http///www.nytimes.com/1996/01/29/books/review/Poole-t.html 163-173

Reeves, T.C. (2004). The impact of Media and Technology in Schools: a Research Report Prepared for The Bertelsmann Foundation.

Resnick, F.(2004). Collaboration in Administrative Computing: The Issues. Association of Commonwealth Universities (ACU), ABCD, 134, 18-21.

Rosen, A. & Well, B. (2005). Teachers and Machines: The Classroom Use of Technology. Psychological Review, 100,589-608.

Rosen, L.& Michelle, W. (2004). Computer Availability, Computer Experience and Technophobia among Public School Teachers: Computer in Human Behavior. Journal of personality and social Psychology, 65, 1190-1204

Sax, E.O. (2000) Information and Communication Technology in Education. A Curriculum for Schools and Programme for Teacher. London, UK: Europe Psychological Association.

Schacter, S. (2006). Teachers must engage is active capacity building. Unesdoc-rewrite: URL Rewritng Engine. In Apache HTTP Server Version 1.3 Documentation (Apache unesdoc .) Retrieved from http://httpd.apache.org/docs/1.3/ unesco-rewrite.html.

Shavinina, L.V. (2001). A New Generation of Educational Multimedia: High Intellectual and Creative Educational Multimedia Technologies. In L. R Vandervert, L.V Shavinina & R.A. Cornell (Eds.), The future of Distance Learning (pp.107-123). New York, NY: Mary Ann Liebert, Inc.

Thierer, A. (2000). Divided over the Digital Divide, Washington, DC: Heritage Forundation.

Tomei, D. (2005a). The Teacher's Role when Pupils Use ICT as a Mediating Artifact in Project Work. Developmental Psychology, 17, 408-416

Tomei, D. (2005b). Web Based Teaching and Learning. Child Development, 52, 636-643

United Nation Development Program me. (2001). Information Communication Technology for Development (DHHS Publication No. ADM 90-1679). Washington, DC: U.S. Government Printing Office.

United Nation Development Program me. (2006). Information Communication Technologies and Development.(DHHS Publication No. ADM 90-1679). Washington, DC: U.S. Government Printing Office.

United Nation Education Scientific and Cultural Organization. (2004). ICT Pedagogy. UNESCO Press.

United Nation Education Scientific and Cultural Organization. (2009). Guide to Measuring Information and Communication Technologies (ICT) in Education. UNESCO Institute for Statictics.

United States distance learning association. (2002). Impact of the Internet on learning and teaching. A Referred Journal of USDLA, 166. No. 3 ISSN 1537 – 5080.

Yusuf P.I. (1998). Quantitative Data Analysis with SPSS Release 10 for Windows: A Guide for Social Scientists. Philadelphia, Routledge: Taylor and Francis Group.

Yusuf, M.O. (2005). Information and Communication Technology and Education: Analyzing the Nigerian National policy for Information Technology. International Education Journal, 6(3), 163-173. Available from project MUSE Wed site: http://muse.jhu.edu/journals/modern-fiction-studies/toc/mfs52.1.html

Zhang, Y. (2005). Development and Validation of an Internet use Attitude Scale. Computers and Education. Available at: http://www.sciencedirect.com/science

Appendix 1

QUESTIONNAIRE:

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION.

PART I

SECTION A

QUESTIONNAIRE FOR ASSESSING THE USE OF ICT FOR TEACHING ELECTRICAL AND ELECTRONIC COURSES IN TECHNICAL COLLEGES OF NIGER STATE.

INTRODUCTION: Please complete these questionnaire as objectivelyas possible by checking the column that best represent your view about the above topic. The questionnaire is just for research purpose and your view will be treated confidentially.

PERSONAL DATA.

NAME OF SCHOOL:

……...

Years of Experience: 1- 5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21 and above ☐

Sex: Male ☐ Female ☐

INTRODUCTION: A [four] 4–point rating scale is used to indicate your opinion, tick appropriately:

STRONGLY AGREE	= S.A
AGREE	= A
DISAGREE	= D
STRONGLY DISAGREE	= S.D

PART II

SECTION B

What is the literacy level of the technology teacher in using ICT gadgets as an instructional aid?

S/N	ITEMS	S.A	A	D	S.D
1.	Technology teachers attended workshop(s) on the use of ICTs for teaching electrical/electronic curses				
2.	Technology teachers have certificate(s) on computer course(s)				
3.	Technology teachers can use Microsoft word to type, edit, copy, and print.				
4.	Technology teachers can use Microsoft power point for teaching electrical/electronic courses.				
5.	Technology teachers can use Microsoft excel to draw graphics, calculate some simple arithematics.				
6.	Technology teachers can select printer and print work from the computer.				
7.	Technology teachers can browse the internet and download some useful materials.				
8.	Technology teachers can receive and send mail through computer.				

PART III

SECTION C

What are the strategies to be adopted for enhancing the use of ICT gadget in teaching and learning electrical/electronic courses?

S/N	ITEMS	S.A	A	D	S.D
9.	Train technology teachers on how to use computer in education.				
10.	Technology teachers use of interactive white board for teaching electrical/electronic technologies courses.				
11.	Technology teachers use of power point projector for teaching electrical/electronic technologies courses.				
12.	Technology teachers use of computer assisted instructional package.				
13.	Provision of ICT facilities for the teaching of electrical/electronic courses.				

PART IV

SECTION D

The availability of ICT facilities in technical collages in Niger State.

	ITEMS	**Highly Available**	**Moderately Available**	**Available**	**Not Available**
14.	Desktop computers for teaching and browsing				
15.	Computers room equipped with laptop and internet facilities				
16.	Computer printer				
17.	Digital Camera				
18.	Standby generator for powering computer room in case of power failure				
19.	Projector for power point presentation				
20.	Scanners for scanning images for teaching and learning				
21.	Projector screen				
22.	Interactive white board				

Appendix 2

Formula

$$\text{Mean } X = \frac{\Sigma fx}{\Sigma f}$$

$\bar{X}$ = Mean

Σ = The sum of

X = The Score

F = The Frequency of each point in the scale

Standard Deviation

$$SD = \sqrt{\frac{\Sigma f(x - \bar{x})}{\Sigma f}}$$

$\bar{X}$ = Mean

Σ = The Sum of

X = The Score

F = The Frequency

t – test formula

$$t - test = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_1^2}{N_2}}}$$

$\bar{X}_1$ = Mean Score of State science and technical college teachers

$\bar{X}_2$= Mean Score of Federal science and technical college teachers

S_1^2 = Variance of Statescience and technical college teachers

S_2^2 = Variance of Federal science and technical college teachers

N_2= Number of State science and technical college teachers

N_2 = Number of Federal science and technical college teachers

Hypothesis 1, item 1, Standard deviation for State technology teachers

X	F	FX	$x - \bar{x}$	$(x - \bar{x})^2$	$F(x - \bar{x})^2$
4	3	12	2.10	4.41	13.230
3	5	15	1.10	1.21	6.050
2	17	34	0.10	0.01	0.170
1	15	15	-0.90	0.81	12.150
	$\Sigma f = 40$	$\Sigma fx = 76$			$\Sigma f(x - \bar{x})^2 = 31.600$

$X_1 = \frac{\Sigma fx}{\Sigma f} = \frac{76}{40} = 1.90$

$S_1^2 = \frac{\Sigma f(x - \bar{x})}{\Sigma f} = \frac{31.600}{40} = 0.79$

$SD_1 = \sqrt{\frac{\Sigma f(x - \bar{x})2}{\Sigma f}} = \sqrt{\frac{31.600}{40}} = \sqrt{0.79} = 0.89$

Hypothesis 1, item 1, Standard Deviation for Federal science technology teachers

X	F	FX	$x - \bar{x}$	$(x - \bar{x})^2$	$F(x - \bar{x})^2$
4	1	4	2.10	4.410	4.410

3	2	6	0.10	1.210	2.420
2	2	4	0.10	0.010	0.0200
1	5	5	-0.90	0.810	4.05000
	$\Sigma f = 10$	$\Sigma fx = 19$			$\Sigma f(x - \bar{x})2 = 10.900$

$X_2 = \frac{\Sigma fx}{\Sigma f} = \frac{19}{10} = 2.42$

$S_2^2 = \frac{\Sigma f(x - \bar{x})}{\Sigma f} = \frac{10.900}{10} = 1.09$

$SD_2 = \sqrt{\frac{\Sigma f(x - \bar{x})2}{\Sigma f}} = \sqrt{\frac{10.900}{10}} = \sqrt{1.524} = 1.04$

t – Calculated =

$$\frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_1^2}{N_2}}}$$

$$= \frac{1.09 - 1.09}{\sqrt{\frac{0.89}{40} + \frac{1.04}{10}}}$$

$$\frac{0.00}{\sqrt{00198 + 0.1082}} = \frac{0.00}{\sqrt{0.1280}} = \frac{0.00}{0.1280} = 0.00$$