

TRAINING NEEDS OF ELECTRICAL INSTALLATION AND MAINTENANCE WORK  
TEACHERS ON INFORMATION AND COMMUNICATION TECHNOLOGY IN  
TECHNICAL COLLEGES OF NIGER STATE

BY

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## CERTIFICATION

I Omoniyi Folashade Abosede with Matric Number 2007/1/28542BT an undergraduate student of the department of Industrial and Technology Education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this university or any other.

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Name

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Signature

**APROVED PAGE**

This project has been read and approved as meeting the requirement for the award of B.Tech Degree in Electrical and Electronic Technology in the department of Industrial and Technology Education. School of Science and Science Education, Federal University of Technology, Minna.

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## **DEDICATION**

This project is dedicated to the Almighty God who made it possible for me to complete project successfully. I also want to dedicate this project to my parent Mr. and Mrs. Omoniyi and also my siblings, Buky, love, Samuel, Emanuel, Scott.

## **ACKNOWLEDGEMENT**

Glory, honour and adoration be unto Almighty God for his benevolence, mercy and sustenance which has made this level of achievement a reality, May your name be exalted O' Lord (Amen). Special thanks go to my supervisor Mr James Maigida for his contribution and support in the course of this work despite his tight schedule. Your guidance and patience to the success of this work will remain in my evergreen memory. I also show appreciation to Malam Usman for immense contribution and meaningful correction which has led to the success of this work.

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## **ABSTRACT**

The study was design to identify various Training needs of Electrical Installation and Maintenance Work Teachers on Information and Communication Technology in Technical Colleges of Niger State. In other to examine the various ICT trainings required for teachers to improve in their delivery of duties, Five research questions and three null hypothesis were formulated. A descriptive survey designed was used for the study. A structured questionnaire containing 49 items developed by the researcher and validated by three expert from the Department of Industrial and Technology Education was used for data collection. The population of the study comprises of all fourth year and final year student and teachers of Department of Electrical Installation and Maintenance Work in Government Technical College New-Bussa. The data was collected and analysis using measure of central tendency while t-test was used to test the three null hypotheses at 0.05 level of significance. The findings of the study identify word processing trainings, database management training, programming trainings, content delivery training and internet skills trainings needed by Electrical Installation and Maintenance Work Teachers to improve their delivery of duties. It was recommended among others that the various training mentions in the course of this study should be implemented in the department curriculum in other to provide teachers of Electrical Installation and Maintenance Work Department with the opportunities to undergo this training.

## CHAPTER I

### INTRODUCTION

#### **Background of the study**

In recent time, the world has witness a rapid increase in technological innovations. This era ushered in the advent of electronic computer system among other modern technologies. At present the computer technology has permeated nearly all aspect of human organization roles and education. Computers encompass almost all facets of human endeavours. So much has been written on it and its relatedness to all areas of human discipline, which include computer and information technology, engineering, agriculture among others.

Today, computer technology in school is one of the most far-reaching and fast growing developments in education. In schools, computers are widely used and the need for computer technology and literacy in the educational system has become more relevant. Computers can be used to diversify, developed and improve the pedagogical relation of teaching and learning. Computers according to McCormick (1999), have been found to be an effective device for presenting an instructional programme which is majorly done by using Information and communication technology,

If Information and communication technology are to be effectively used in the classroom instruction, each teacher will have to be trained on how to use computer and will have to accept a different role as “learning facilities” (March, 1993). Perhaps the greatest contribution of the present day technology to education is been intense in the area of Information and communication technology, which has impact on our everyday life.

Information and communication technology has prove an efficient and effective media in education, but in Nigeria Information and communication technology have been introduced to such limited areas of data's processing and decision making only.

According to Wikipedia (2012) Information and communication technology, is often used as an extended synonym for information technology, but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers, middleware as well as necessary software, storage- and audio-visual systems, which enable users to create, access, store, transmit, and manipulate information.

According to "Milken Exchange on Education Technology, (1999)", Information and communication technology is defined as computer based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network and several other devices (video, audio, camera among others) that convert information (text), into common digital form. Information and communication technology, encompass a broad range of computer technologies that supplements the classroom teaching and learning environment and can dramatically increase a student achievement. Student also benefits from immediate feedback provided by Information and communication technology and most of them appreciate the self-paced learning environment. At its best, Information and communication technology, engaged student interest, motivates them to learn, and increase their personal responsibility for learning.

The major aim of this Information and communication technology is to improve the educational standard in other to meet the needs of individual learners. Information and

communication technology continues to increase, eventually offering several advantages. Some of the benefit of using Information and communication technology include; emphasize on active learning, enrichment of collaborative learning, encouragement of greater student, independence and task-base teaching, support conventional class room work (Worthinton, 1996; Spinelli 2001; Prvan, 2002). Worthinton (1996) typified that, Information and communication technology can impact and improve student overall level of skill mastery, they also emphasize that testing may be improved if student complete test are receive immediate feedback about their performance mostly by using computer assisted instruction.

Information and communication technology increases motivation by providing a context for the learning that is challenging and stimulated curiosity (Malone 1982). Activities that are intrinsically motivating also carry other significant advantage such as personal satisfaction, challenge, relevance, and promotion of positive perspective on lifelong learning (keller and Suzuki 1988). A fantasy context increases learning by facilitating engagement “Malone 1982”. Fein 1981 and signer 1987 have also found, apart from using ICT that involved in fantasy, is often highly intrinsically motivating. Providing student with choice over their own learning provides learner-controlled instruction, which contribute to motivation. Increase motivation in turn increase student learning (Kinzie, Sullivan and Berdel, 1988).

Knowing all this effect of computer instruction on education makes it so unpleased to hear that Information and communication technology is not effectively utilized, especially in developing countries in which Nigeria is one of them. Nigeria is still regarded as one of the developing nations, because it is still advancing in the field of scientific and technological

know-how. According to Bojuwoye (1985), a nation is rated developed or otherwise depending on the education and technological advancement. Ozoro (1982) also remarks that “science and technology has advance very far and the space of growth is so fast that any nation that wishes to catch up, must make a very systematic and determined effort to set the space at which to proceed” in which Nigeria is one of the country that wish to catch-up majorly with the aspect of Information and communication technology. In the process of actualizing this objective lot of work have been done with the aid of national board for technical education and government intervention.

According to national board for technical education, electrical installation and maintenance work has an aim to give training and impacts the necessary skills leading to the production of craftsmen, technician and other skilled personnel who will be enterprising and self reliance (NBTE 2001). This programme has an objective to provide student in the technical colleges with the practical skills in work pertaining to the general metal work, basic electricity, domestic installation, industrial installation and electric motors, cable jointing, battery charging and repair, winding of electrical machines, solid state devices and circuits, electrical/electronic drawing, advance courses, industrial installation, advanced winding electronic device, circuit services, among others.

In respect to this national board for technical education help to; train teachers on how to use Information and communication technology in teaching, provision of Information and communication technology aids, among others. and the outcome of all this work doesn't justified the objective. This in-turn lead to lot of research and the result being gotten from this research is geared toward the “teacher”. This means that the researcher find out that teachers are not well train on how to use Information and communication

technology to facilitate effective learning which its effect is telling on their performance. In finding solution to this problem, it was posited that there must be provision to ensure that all the teachers are train and retrained in other to have all the skill and knowledge, and also to succeed in the future as professionals. And in doing this the training needs of teachers on how to use Information and communication technology in all area of electrical installation and maintenance work must be optimally focussed on.

The training needs of electrical installation and maintenance work teachers for competent instructional delivery using Information and communication technology deals with effective training on how to design and use the following, computer and networking, communicating device, computer assisted instruction among others and if this training is effectively utilized it will tends to increase student performance in electrical installation and maintenance work.

However, it has been discovered that the persistently poor performance of student of electrical installation and maintenance work emanates from the incompetent teacher (which is course by inability of teachers to know there training needs which make them to do any training that might not leads to mastery of their duties). With ongoing technological developments and growing important of research and development, there is an increasing need for effective performance of electrical installation and maintenance work teachers. This course the researcher to investigate the possible training needs of electrical installation and maintenance work teachers on the usage of Information and communication technology in other to achieve save instructional delivery of electrical installation and maintenance work

### ***Statement of the problem***

Student graduating from technical colleges are expected to have acquired knowledge and skills necessary for effective performance in the workplace. It is however apparent that there is a huge decline in student academic achievement in trades subjects including electrical installation and maintenance work. The major reason or factor that has been found to have contributed to student poor achievement as opine by (Yalam and Fatokun, 2007) include; student study habit, teaching method use by teachers in the teaching learning process, administrators, among others.

Information and communication technology has been found to be effective in improving student achievement when used in addition to regular instruction. The effectiveness of ICT according to Crawl (1997), Lepper and Gurter (1989), makes the Technical Educational Board to implement it in the curriculum of electrical installation and maintenance work. However the benefits of its induction seem for fetched. This calls for investigation on possible cause of lack of improvement.

The greatest problem of electrical installation and maintenance work teachers for competent instructional delivery using Information and communication technology (existed because most teachers do not seem to know the actual training needed to give effective judgement to a particular aspect of a course. For instance, if a teacher want to use Information and communication technology to teach student on how to do parallel electrical installation of a house, it is appropriate for him to use computer assisted instruction, like stimulation or AutoCAD instead of television. Becker (2001). But to do this the teacher has to be train on how to use this information and communication technology which is discover that the training is not effective or not in place.

### ***Purpose of the study***

The purpose of this study is to identify training needs of electrical installation and maintenance work teachers on information and communication technology in technical colleges in Niger state. Specifically the study intend to identify trainings such as

1. Computer appreciation and word processing
2. Use of internet for research and communication
3. Programme language needed for effective operation of machine
4. Various training needed for the effective use and management of database
5. Packaging course content for digital delivery.

### ***Research question***

1. What are the word processing trainings needed by the teachers of electrical installation and maintenance work to improve learning?
2. What are the various internet training required by teacher of electrical installation and maintenance work?
3. What are the programming trainings needed for effective management industrial machine needed by electrical installation and maintenance work programme?
4. What are the various training needed for the use and management of electrical installation and maintenance work database?
5. What are the requirements for digital content delivery by electrical installation and maintenance work teachers?

### ***Significance of the study***

It's hoped that the finding if this study will be significant to teachers, student, administrators, and government and society at large.

The result of the study will be of immense benefit to electrical installation and maintenance work teachers because this study will gear up the effective use of computer and information technology by teachers, which is majorly known as the most educational improving techniques, it will help them to identify their weak point and to know the precise area they needed to be trained which will enhance the effective delivery of their work.

Secondly it will helps the student to boost their knowledge and make them competent in their area of specialization by acquiring technical skill, technical know-how and preparing them fully for employment.

Thirdly it easen the work of the administration because the rate of learning can be optimally monitored with less stress e.g with the use of computer, telephone, e.t.c.

Its significant to government because the outcome of this training will result to effective teaching which will aid the production of quality student/personnel which will help in the economic.

### ***Scope of the study***

The study is designed to investigate the training needs of electrical installation and maintenance work teachers on information and communication technology (ICT) in technical colleges in Niger state. The study is further delimited to identify ICT trainings related to computer appreciation and word processing training, internet and e-mailing training, computer programming trainings,, database management training, presentation training as well as use of software's needed to improve the performance of teachers in Electrical Installation and Maintenance Work Department

### ***Assumption of the study***

In carrying out this study, the following assumption were made; that teachers will embrace the knowledge of ICT if provided to them, that teachers will deliver their duties better when all gadget are on ground, that those that will respond to the questionnaire items are competent enough to provide the correct response.

### ***Hypothesis***

The following null hypothesis were formulated and tested at 0.05 level of significance;

1.  $H_{01}$  There is no significant different in the mean response of teachers and students on the word processing training needed by the teachers of electrical installation and maintenance work to improve learning.
2.  $H_{02}$  There is no significant different between the mean response of teachers and student on the various internet trainings required by teachers of electrical installation and maintenance work.

3. HO<sub>3</sub> There is no significant different between the mean response of teachers and student on the various training needed for database management.

## Chapter II

### Review of related literature

Literature related to the study is reviewed under the following subheadings:

- Technical College in Nigeria
- Concept of information and communication technology in Nigeria.
- Information and communication technology and computer assisted instruction
- Factors affecting teachers use of information and communication technologies
- Information and Communication Technology in teacher's training in Nigeria
- training needs of technical teacher's on the usage of ICTs in teaching
- the summary of related literature

#### *Technical college's in Nigeria*

The national policies on education (1981) define technical education as that aspect of education, which leads to acquisition of practical and applied skills as well as basic scientific knowledge. The establishment of technical college's education therefore, is to address and bridge the gap of the declining manpower needs by producing artisans who are skilled workers in their various vocations for self-reliance and socio-economic development. Dambe (1998) believed that the national policies in education (1981) employed technical education as an instrument for technical advancement of any developing nations of which Nigeria is one.

However, before the advent of the proper and organized technical education programmes establishing the technical colleges in Nigeria, technical education, Okori (2001) observed was mainly non-formal through the apprenticeship system in the colonial system of education. The unwillingness of the colonial government towards developing technical education in Nigeria in general, is a reflection of their late acceptance and improper-attitudes to Technical education as an economic development strategies by the British government even back home in England. As pointed out by Salami (2003), "England was an example of the country that is pre-eminent in science, has a cult of genuine but is nonetheless backward in technology". Also Okori observed that in 1887 the education ordinance provide increase government grant-in-aid for the agricultural and industrial technical education activities. This development prompted the inclusion of some vocational technical subject such as carpentry, typing, tailoring, gardening, electrician, among others. in such schools as; Bonny boys high school in 1990, Hope waddle training institute Calabar as well as Nasarrawa school in 1909, with the purpose of educating few of his citizen to perform essential functions for the colonial masters own welfare and not necessarily for the welfare of the country in general. Thus, this unhealthy attitude of colonial government towards technical education in Nigeria was a mere reflection of their homeland prejudice (Salawu 2003).

After some years the needs to harness, coordinate and regulate the development of adequate technical manpower needs through skilled workers and technicians as a strategies for economic development and social growth by Nigerians for Nigeria was set up the then federal government through the Ashby commission of 1960 which according to Fafunwa (1974) was the first committee to take a bold step to recognize the important of technical

education and also addressing the needs of this technical draught. This saw to the establishment of technical college's education thereafter in Nigeria. This is according to salawu (2003) was a point of realism experience in the Nigeria education system

technical colleges education as an aspect of education, which deals with the acquisition of practical skills, has many roles to play in many developing nations, Mbonu (2000) contended that technical education in Nigeria should be geared towards the acquisition of appreciable skills, abilities and confident to equip individual to live in and contribute to the development. On the other hand Field man (1968) as cited in Tukura and Rufai (2003) view technical education as that aspect of education experience which helps a person discover, define and refine his talent and used them in working towards a career. Although other national resources can be contributed to the economical advancement of the nation but the immense contribution of technical colleges' education for economic development cannot be overemphasized. This according to momoh (1998) declares that if economic development in Nigeria is to be achieved and sustained, technology education and training must be pursued vigorously. Apart from the economic roles of technical education to any country, it also imposed values of technological progress of the nation. This view was supported by salami (2003), that a nation without significant national resources but with skills technical power, could achieve technological progress.

Therefore, all this attribute of technical education points to the fact that technical education has tripartite function, that is as a process, product and as a discipline. As a process, technical colleges education is used as a means of achieving manpower needs for economic development and sustenance, as a product, technical education functions to equip individual to be self reliance whit which hw can be recognized and finally as a

discipline, technical college education constitute a basic course of study for technology and engineering based education to be undertaken in the higher institution of learning.

Conclusively, the aim of technical education according to nation's policy (1981) includes:

1. To enable our young men and women to have intelligent understanding and increasing complexity of technology
2. To give an introduction to professional studies in engineering and others technologies
3. To provide technical knowledge and vocational skill necessary for agriculture, industrial, commercial for economic development.
4. To provide the trained man-power in applied science, technology and commerce at sub professional grades.
5. To provide people who can apply scientific knowledge to the improvement and solutions of environmental problems of the use and convenience of man.
6. To give training and impart necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliance.

### ***ICTs in Nigeria***

Technology involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. In other words, technology can change or alter how people access, gather, analyze, present, transmit, and simulate information (See, 1994). The impact of technology is one of the most critical issues in education

(Webber, 2003). The use of ICTs creates a powerful learning environment and it transforms the learning and teaching process in which students deal with knowledge in an active, self directed and constructive way (Volman & Van Eck, 2001). ICTs are not just regarded as a tool, which can be added to or used as a replacement of existing teaching methods. ICTs are seen as an important instrument to support new ways of teaching and learning. It should be used to develop student's skills for cooperation, communication, problem solving and lifelong learning (Plomp et al., 1996; Voogt, 2003).

*Integrating ICT into curricula* with the intent of positively influencing teaching and learning has been in a state of evolution over the past 20 years (Dias & Atkinson, 2001; Dockstader, 1999). Driven primarily by hardware and software evolution, accessibility to computers in educational settings, and popular instructional technology trends, technology integration has covered the continuum from instruction on programming skills, self-directed drill and practice, interactive learning software, online training, testing, instructional delivery augmentation, and Internet-based accessibility to information, communication, and publication (Dias & Atkinson, 2001). According to Flanagan and Jacobsen (2003), ICT integration is meant to be cross curricular rather than become a separate course or topic in itself. Technology should be used as a tool to support the educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving which are important for the preparation of children for the knowledge society (Drent & Meelissen 2007). In fact, innovative use of ICT can facilitate student centred learning (Drent, 2005). Hence, every classroom teacher should use learning technologies to enhance their student learning in every subject because it can engage the thinking, decision making, problem solving and reasoning behaviours of students (Grabe & Grabe, 2001). These are cognitive Behaviours that children need to learn in an information age.

Despite successful efforts to acquire computer hardware and to raise the student to computer ratio to 5:1 (World Almanac, 2002), there has been less success identifying, which computer skills should be taught in school and how computers can be used for teaching and learning (Dooling, 2000). Thus, current attention has turned to what is actually happening in the classroom with computer technology. Although ICT may facilitate independent self-paced learning, the potential of ICT may not be optimized if there is no shift in the learning and teaching paradigm (Bangkok, 2004). In fact, teachers play an important role in the teaching/learning paradigm shift. They must understand the potential role of technology in education. Also, they should become effective agents to be able to make use of technology in the classroom. In fact, understanding the pedagogical, psychological and cognitive barriers to the successful use of information and communication technology is a vital precondition for improving the utilization of computers and other technological aids in the educational process (Benzie, 1995). Also, the detection of these barriers provides information that is helpful in supplementing existing in-service training programs

Focusing on the success stories of Nigerian Teacher Education Institutions in ICT application, integration and use for and in the teacher training programmes, on issues and challenges associated with use of ICT in enhancing teacher quality and enabling/enhancing the ICT use in the associated schools, have so much to do with the efforts put in by Government of Nigeria.

As Nigeria industry moves towards more professionally managed culture, the education sector too is taking strides. With the diversity in our educational set up and to meet the diverse needs of our rural populations scattered over a large geographical area in many villages most of which are very small and remote we need to adopt curricula that suits the needs of different socio-cultural groups, and to maintain the national and social

cohesion of the country. This can be achieved when we build the capacity to train large number of teachers and use Technology as a lever to generate this change and cater to the training requirements of teachers. ICT enabled education and training would not only be cost effective but also make education effective and efficient while offering mass customization of learning, and continuous support.

***Information and communication technology and computer assisted instruction.***

In an era where the world of education and learning are changing rapidly, bringing new realities and challenges to Teacher Education Institutions ( TEI's), through innovations in the use of ICTs has important implications. Today Teacher Education in Nigeria is being overhauled and redesigned to include the changes taking place across the world. New opportunities and possibilities especially those in electronic and other related applications for skill development outside formal learning arrangements stimulate the reform of the existing educational provisions. The past decade has seen efforts made at different levels not merely to spread the use of computer and related technologies but also to integrate the same in the core functioning of institutions i.e. teaching- learning. In this direction, the ministry of education has initiated several programmes starting with the Computer Assisted Learning and Teaching (CALT) in late 1980's

The growing use of ICT in education instruction makes the training for teachers and teacher's educators to be considered as a prime objective for the advancement of education technology (Aubineen 1989). The use of CAI in school may conveniently be divided into learning about computer and learning with, from or through computers.

Most of the form of computer assisted instruction being used are drill and Practice, tutorial, stimulation and game, animation. Knowledge of CAI may be thought of as continuum, ranging from skill and awareness of computer as learning and educational tools at one end of the continuum, thought programming in higher and lower level languages, and to solid-state physic at other end of the continuum.

The terminology concerning CAI as a learning medium varies widely. and there are no universally agreed upon definitions. Among those frequently encountered are:

- a. Computer assisted instruction; where computer act as a tutor teaching new skills or concepts or providing practise for learners. Software in this mode refers to as drill and practise and tutorials.
- b. Computer-base learning (CBL) which include various categories such as stimulation and modelling, instructional games, problem-solving, information handling and demonstrations (Anderson 1986).

According to Fourie (1999), CAI is an instructional technique whereby a computer is used present the instructional material and monitor the learning that takes place, it is also known computer-assisted learning (CAL), computer base instruction (CBE), computer base training (CBT), CBT allows the student to direct their own progress.

CAI learning uses a combine of text, graphics, sound and videos in the learning process. It is especially useful in distance learning situations. The explosion of the internet as well as the demand for distance learning has generated great interest and expansion of computer assisted instruction. The first university formed to provide degrees entirely through internet courses was jones international university in 1993. It received full

accreditation by the north central association and schools (NCA) on March 5, 1999. Currently there are more colleges and universities offering web-based courses and programmes (Helfer, 1999).

The CAI has many purposes in the classroom, and it can be utilized to help the student in all areas of the curriculum. CAI refers to the use of computers as a tool to facilitate and improve instruction. CAI programs use tutorial, drill and practise simulation, and problem solving approaches to present topics, and they help to improve the students understanding. These programmes let student progress at their own pace, assisting them in earning the material. The subject's matters through CAI can range from basic math facts to more complex concepts in math, history science, social studies and language arts (Sharp 1999). Many education software programmes follow the same design as programmed instruction. student received some instructional material, followed by a "probe" (a small test);if they respond correctly, they move on to the next lesson covering the same material. this approach is called computer assisted instruction.

Lepper and Gurther (1989) observed that CAI suffers from some of the same problem as programmed instruction. It is often repetitive, and it reduced learning to discrete unit that sometimes obscures the relation ideas. CAI is better suited for drill and practise than for building concepts and promoting comprehension. Research has shown that when used in addition to regular instruction, CAI improves student attitudes, motivation and academic achievement".

The use of CAI in educations is still in its infancy. However, the CAI is bringing some exciting innovation to education. The following are the areas in which CAI are help in education

1. Flexibility for student so that they can work at their own speed at the time that is best for them
2. It saves time in learning
3. It provides direction between students and the subject matter to be learned
4. It maintains progress cards and preserves their confidentiality, among others.

### ***ICTs in Nigeria***

ICTs in Nigeria may be viewed in different ways. Rodriguez and Wilson (2000) defined ICTs in Nigeria as a set of activities which facilitate by electronic means the processing, transmission and display of information. ESCAP (2000) in its own definition sees it as techniques people use to share, distribute, and gather information and to communicate through computers and computer networks. Marcelle (2000) described it as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media. Ogunsola and Aboyade (2005) viewed ICT as a cluster of associated technologies defined by their functional usage in information access and communication of which one embodiment is the internet. Information and Communication Technology are computer based tools used by people to work with information and communication processing needs of an organization. Its purview covers computer hardware, software, the network and other digital devices like video, audio, camera and so on which convert information (text, sound, motion etc) into digital form (Moursund and Bielefeldt, 1999). Information and Communication Technology as tools

within the school environment in Nigeria include its use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning repetitive tasks, teaching/learning intellectual, thinking and problem solving skills, stimulating creativity and imagination, for research by teachers and students and as communication tool by teachers and students (Collis and Moonen, 2001, Derbyshire, 2003; Moursund and Bielefeldt, 1999).

The field of education in Nigeria has been affected by ICTs, which have undoubtedly affected teaching and research (Yusuf, 2005). A great deal of research has proven the benefits of ICT in improving quality of education (AL-Ansari, 2006). As a result of this, developed nations have integrated ICT into their educational system. Adomi and Kpangban (2010) observed that there are developments in the Nigerian education sector which indicate some level of ICT application in secondary schools in Nigeria. They traced the introduction of computer education in secondary schools to 1988, when Nigeria government enacted a policy on computer education. The Federal Government of Nigeria in the National Policy on education 2004 recognizes the prominent role of ICTs in the modern world and has integrated ICTs into education in Nigeria (Adomi and Kpangban, 2010). To actualize this goal, the document states that government will provide basic infrastructure and training at the primary school. At the junior secondary school, computer education is made a pre-vocational elective and is a vocational elective at the senior secondary school.

The Federal Ministry of Education launched an ICT-driven project known as SchoolNet, which was intended to equip all schools in Nigeria with computers and communication techniques. Under the SchoolNet programme, MTN provided fully operational computer laboratories with 21 personal computers, VSAT interconnectivity, and hand-on training in 24 secondary schools in Kaduna, Lagos, Enugu, Kwara, Rivers and the

Federal Capital Territory Abuja. In all, over 49,524 pupils and 2,412 teachers were trained on how to use ICT facilities (Abdul-Salaam, 2007).

To adequately provide ICT facilities to secondary schools, the Nigerian Federal Government commissioned a Mobile Internet Unit (MIU) which is operated by the Nigerian National Information Technology Development Agency (NITDA). The MIU is a locally-made bus that has been converted into a mobile training and cyber centre. Its interior has ten workstations, all networked and connected to the internet. The MIU is also equipped with printers, photocopiers and a number of multimedia facilities. Internet connectivity is provided via VSAT with a 1.2m dish mounted on the roof of the bus. It is also equipped with a small electric generator to ensure regular power supply. The MIU takes the internet to places, areas and various secondary schools (Adomi and Kpangban, 2010). They added that the number of these buses is so small and as a result most rural schools are yet to benefit from this project.

Successful integration of ICT in the Nigeria school system depends largely on the availability and competence and the attitude of teachers towards the role of modern technologies in teaching and learning. Research works have shown that most secondary schools have either insufficient or no ICT tools to cater for the ever increasing population of students in the schools and where they are available, they are by implication a matter of out-of-bounds to the students (Chattel, 2002; Cheng, 2003; Chiemekwe, 2004). Fakeye (2010) also found out in a study carried in Ibadan that in most of schools covered in the study do not have computers, hence are not connected to the internet. He added those who have computers do not use them for teaching but solely for administrative purposes. In another study by Okwudishu (2005), he found out that the unavailability of some ICT components in schools hampers teachers' use of ICTs. Lack of adequate search skills and of access points in

the schools were reported as forces inhibiting the use of internet by secondary school teachers (Adomi and Kpangban, 2010). A survey carried out by Cirfat and Longshak (2003) revealed that only one school, out of ten has computer sets. It is worth noting that none of the ten schools has internet facility. Ozoji (2003) reported in a study that most of our secondary schools do not have software for the computer to function. One of the unity schools has five computers against a population of 900 and no internet software was installed. The facilities are grossly inadequate for any meaningful teaching or learning to take place.

On teachers' competence, teachers in Nigerian secondary schools are not competent in basic computer operation and in the use of generic software (Yusuf, 2005), although they have positive attitude towards the use of computer in Nigerian secondary schools. And to eliminate this inadequacy in teachers, government in conjunction with National Board of technical Education (NBTE) started a capacity building exercise in the first phase, i.e. ICT literacy camps for teacher educators throughout Nigeria. The targeted technical education in the teachers in the first phase were covered in the 24 country wide camps and hands on interactive experience was provided through a series of self learning CDs developed by the NBTE. In this mode NBTE covered a large number of Technical education teacher's and could motivate the teacher educators to use computers in various activities. Other initiatives of the regulatory bodies include initiative of school programme in conducting Computer Literacy Programmes under the CLASS project, organizing computer programmes for teachers from the vocational and technical education streams by the Nigeria Society for Technical Education (ISTE), organizing Management Information System series for Higher education teachers by the governmental organization, etc. Apart for these statutory and Government organizations, various corporate sectors are actively involved in technology

enabled teacher development. Some of the initiatives in providing Teacher Training through use of Technology and ICTs either within the institute or in distance or at the practice teaching schools are enumerated below:

**Integrating ICTs as a Core Course at “A” level:** Realising the importance of ICTs in Education, a two credit compulsory course, namely, Information and Communication technology (ICT) was designed, developed and implemented in the in the A level curriculum programme, offered by the university, polytechnics, college of education, etc. The aim of this project is to integrate ICT into Teacher Education. The findings of the study conducted on the performance and need of the course shows that “the experience of institutionalization of ICT in education as a compulsory core course at the B.Ed. level (2002-2003). A level education has been quite encouraging but challenging. For strengthening the course there is a need of upgrading the course curricula. The experience of NBTE strengthens the opinion that ICT in education is highly desirable and should be integrated as a compulsory core course, if we have to develop a media culture in our teachers. The success of the programme, in spite of all the impeding factors- limited staff, inadequate laboratory facilities, maintenance problems sizable class and limited audio visual and electronic support facilities, inadequate technological culture, climate and attitude and that it could realize its objectives reasonably and satisfactorily shows the torch for other institutions to contextualise and replicate the experience

**Integration of ICTs in Teaching:**

In 1995, the School Improvement Programme was initiated with the financial support from the Rotary Club in Abuja. Since 1997 computers were donated BY NBTE and Rotarians created the Air-conditioned Computer Lab. They also donated the required software. So the infrastructure, Hardware and software, three important aspects of ICT

Integration were taken care of. After one and half years it was visible that ICT was not fully integrated in the school activities. Two major aspects viz. lack of e-Leadership on the part of the Principal and the apathy of the teaching staff were found responsible. This makes the Capacity building of Principal and teachers to be a crucial issue, which was not addressed properly.

In order to introduce the students to the ICT, a new teacher was appointed. The school teachers felt a little relieved that they do not have to teach ICT to the students (with their inadequate knowledge base). The new teacher was full time teacher having mastery over the content as well as the teaching skills. Through this the students learnt much application software and were enthused to use the skills for practical purposes. Hence they prepared invitation cards, thank you cards, charts, posters,

### **Factors Affecting Teachers' Use of ICTs**

As a classroom tool, the ICT has captured the attention of the education community. This versatile instrument can store, manipulate, and retrieve information, and it has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills (Jonassen & Reeves, 1996). Generally, three objectives are distinguished for the use of ICT in education (Plomp, Ten Brummelhuis, & Rapmund, 1996):

- I. The use of ICT as object of study: The use of ICT in education *as object* refers to learning about ICT, which enables students to use ICT in their daily life.
- II. The use of ICT as aspect of a discipline or profession: The use of ICT as aspect refers to the development of ICT skills for professional or vocational purposes.

III. The use of ICT as medium for teaching and learning: The use of ICT as medium focuses on the use of ICT for the enhancement of the teaching and learning process (Drent, Meelissen, 2007).

It is a fact that teachers are at the centre of curriculum change and they control the teaching and learning process. Therefore, they must be able to prepare young people for the knowledge of the society in which the competency to use ICT to acquire and process information will be actualized (Plomp et al., 1996).

In general, the research literature on the implementation of ICT shows that it involves a large number of influencing factors (e.g., Mumtaz, 2000). Which can be categorized between non-manipulative and manipulative school and teacher factors, by reviewing several studies on factors that influence teachers' decisions to use ICT?

Non-manipulative factors are factors that cannot be influenced directly by the school, such as age, teaching experience, computer experience of the teacher or governmental policy and the availability of external support for schools (Ten Brummelhuis, 1995).

On the other hand, manipulative factors refer to the attitudes of teachers towards teaching and ICT, ICT knowledge and skills of teachers, commitment of the school towards the implementation process and availability of ICT support (Ten Brummelhuis, 1995).

Below are the examples of non-manipulative and manipulative school and teacher factors hindering the efficient use of ICT:

#### **Non-manipulative school and Teacher Factor:**

**A. Teachers' Characteristics:** Teachers' characteristics (e.g. individual's educational level, age, gender, educational experience, experience with the computer for educational purposes and financial position) can influence the adoption of an innovation (Rogers, 1995,

Schiller, 2003). The report by the National Board for Technical Education (2000) indicated that teachers with fewer years of experience were more likely to use computers in their classes than teachers with more years of experience. More specifically, teachers with three years or less teaching experience reported using computers 48% of the time; teachers with 4-9 years, 45% of the time; those with 10-19 years, 47% of the time, while teachers with 20 years or more reportedly used computers only 33% of the time. This may be due, in part, to the fact that new teachers have been exposed to computers during their training and therefore, have more experience using this tool. Then, one of the factors that determine the extent to which teachers use computers in their classes may be the number of years they have been teaching.

Furthermore, there are other personal characteristics that may influence how teachers use computer applications in their classrooms. The teacher's own learning style is certainly one such factor. For example, if a teacher is a creative thinker who likes the idea of constructing knowledge, is a life-long learner, a social learner, and a decision maker, he may be more likely to use computers in more integrative and transformational ways that are useful and valuable to students instead of ways that promote and support traditional classroom practices (Bielaczyc & Collins, 1999; Carvin, 1999). Therefore, personal characteristics of teachers are an important influence on how easily they take up an innovation.

**B. Parent and Community Support:** One way in which schools can move to student-centred use of ICT is through links with the wider community. Such links enable the development of a more authentic and contextualized approach to learning supported by ICT tools (Demetriadis et al., 2003). Thus, human responsibilities, roles and priorities within the

community must be rearranged. For example, assessment methodologies should be redesigned to allow all interested community members to play an appropriate role.

In this respect, Granger and his colleagues (2002) studied on four schools to identify factors contributing in successful implementation of ICT by teachers. Based on their findings, they concluded that successful implementation required not only computers but commitment and community, with the last two being closely interlinked. Also, they added that the schools worked continually with questions of equity, privilege, language, and community support. Each aimed to develop a philosophy of pedagogy informed by the unique characteristics of their specific communities.

In addition, Kington et al. (2002) carried out a study on innovative practice using ICT in schools. They showed how a school used the introduction of laptops to build up a 'connected learning community' in an area of lack of social and economic context. Kington and her colleagues categorized the main elements of the model developed by the school. They are as follows:

- The creation of an “open access” school where dialogue about learning between parents and teachers and children was encouraged;
- The provision of laptops at school and home: for pedagogical and personal purposes; to develop pupils' ICT skill and competence; and to support the adoption of new teaching approaches which motivate students and parents and which give students a sense of success;
- The arranging of e-Mentors in industry for students with little family history of formal employment;
- Access to skill development in ICT for parents through adult education courses on site;
- A network of support for students and parents learning about ICT together;

- The provision of a crèche to support parental access to learning;
- The celebration of the learning of adults and children through assemblies.

Therefore, instead of taking innovative ICT-based learning to the students, the students are taken to the innovative learning. Teachers should be aware of the influence of home on school success. When parents are encouraged to participate in and contribute to change management activities within a school's ICT master plan, change occurs more quickly (Bangkok, 2004).

The bonds between schools and homes and communities are also strengthened through increased interaction and communication.

### ***Manipulative School and Teacher Factors***

**A. Availability of Vision and Plan about the Contribution of ICT to Education:** Teachers need to know exactly how ICT is used as a teaching and learning tool. Many researchers have pointed out that a school's ICT vision is essential to effective ICT integration (Anderson & Dexter, 2000). Bennett (1996, p. 60) stressed the importance of a "well-defined mission that describes technology's place in education". In line with this idea, Ertmer (1999) wrote, "A vision gives us a place to start, a goal to reach for, as well as a guidepost along the way". Also, Means and Olson (1997) recommend that teachers and schools must develop a vision before they make substantial investments in hardware and software. In other words, users of technology must have a fundamental belief in the value of innovation or the innovation is doomed to failure.

Teachers must have opportunities to study, observe, reflect, and discuss their practice, including their use of ICT, in order to develop a sound pedagogy that incorporates

technology (Kearsley & Lynch, 1992). Hence, the vision should not be created by a single person or through a top-down process starting from the head of the school. It is crucial to involve those who have a stake in the outcomes, including teachers, parents, students, and the community, and allow them to assist in the creation of the vision by contributing their knowledge, skills, and positive attitudes. Therefore, a clear vision of ICT integration in schools that is shared by all members of the school community promotes effective use of ICT in the classroom.

Once the vision has been successfully created and accepted, the next step is to articulate an ICT integration plan, spelling out how the teachers are expected to integrate technology in their lessons (Strudler & Wetzel, 1999). In fact, an ICT master plan that is formulated according to a school's vision and its socio-cultural setting assures effective integration of ICT (Bangkok, 2004).

**B. Level of and Accessibility to the ICT Infrastructure:** Using up-to-date hardware and software resources is a key feature to diffusion of technology (Gulbahar, 2005). In recent years, most of the schools are equipped with different kinds of technological infrastructure and electronic resources available. For instance one Nigerian school has reported that it has provided personal notebook computers and their own web spaces, email access and workspace for all staff, and students from Year 5 onwards. Video conferencing is available and the school has established its own intranet, placing all its resources on-line. These are accessible via radio connections from school and home. In this college the use of radio is seen as an innovation that has completely changed the nature of teaching and learning (Richardson, 2000). Also, Richardson (2000) reported that many teachers integrated technology into their teaching and learning process in this school. This awareness appeared

when they saw the potential of on-line lessons and the possibility of creating shared, net-based teaching materials. Therefore, hardware, software and network infrastructure must be available to integrate ICT in education.

Albirini's (2006) substantiated globally felt barrier that computer access has often been one of the most important obstacles to technology adoption and integration worldwide (Pelgrum, 2001). On the other hand, Mumtaz (2000) stated that many scholars proposed that lack of funds to obtain the necessary hardware and software is one of the reasons teachers do not use technology in their classes.

In general, teachers who had computers in their classes were more likely to use them in instruction than teachers who did not; more than 50% of teachers who had computers in their schools used them for research and activities related to lesson preparation. A total of 78% of teachers surveyed cited limited access to computers as a barrier to effectively using computers in their classes. Of this total, 38% thought "not enough computers" was a "great barrier" to using technology in their classes. Therefore, efficient and effective use of technology depends on the availability of hardware and software and the equity of access to resources by teachers, students and administrative staff.

**C. Availability of Time, to Experiment, Reflect and Interact:** According to Mumtaz (2000), lack of time is a factor that hinders technology integration in schools. This barrier becomes manifest in two ways: (a) release time and (b) scheduled time (Mumtaz, 2000). Results of a study conducted by the ministry of education (2000) with in-service teachers revealed that 82% of the participants thought that lack of release time was the most significant factor that prevented them from using computers in their classes as well as prepare materials for use with their classes. Teachers felt that, with their regularly scheduled classes, they did not

have enough opportunities to practice using computers in their classes. Also, lack of time scheduled on the timetable to use computers with students is a factor mentioned by teachers as a barrier to using computers in their classes. Approximately 80% of the teachers surveyed in the aforementioned study thought there was not enough time scheduled for students to use computers. Even though some of the teachers had a genuine need to use computers with their students, there was no available time to do it. Hence, the lack of time required to successfully integrate technology into the curriculum is a recurring issue.

**D. Available Support to Computer-Using Teacher in the Workplace:** The National Council for the Accreditation of Teacher Education (NCATE) (1997) reported the lack of technical support as one of the major barriers that resulted in computers being under-utilized in the classes. Teachers did not want to use computers because they were not sure where to turn for help when something went wrong while using computers. Butler and Sellbom (2002) carried out a study on barriers to adopting technology for teaching and learning, Regarding to the role of technical support staff, they recommended that schools should work to convince technology staff that reliability is very important, especially concerning technology in classrooms in the following ways:

- encourage the purchase of highly reliable technologies;
- improve systems for checking and maintaining classroom technologies;
- create new approaches (including staff training) to assure that extremely rapid responses are made to breakdowns;
- New classroom technology setups should be tested by faculty before they are installed.

- classrooms should be as similar as possible; differences in the technologies in each classroom should be well documented ;
- help faculty learn by encouraging faculty discussions about teaching, learning and technology;
- Rapid response system must be in place that can deal with a wide range of problems, among others.

Bangkok, 2004 added to Sellbom (2002) work, and he said that ICT coordinator or head of department should advise teachers on ICT solutions to their teaching or learning problems, help teachers to acquire ICT resources, and conduct training needs assessment of teachers' ICT-related capacities and advise them on their professional development.

**E. School Culture:** Social system is an important parameter in the innovation diffusion process (Rogers, 1995). Martinez (1999) found that one of the major challenges facing developing countries is to make technology an essential part of the culture of the people. According to Hodas (1993), the diffusion of technologies may be inhibited by the micro culture of a certain institution or organization. Hence, acceptance of a new technology in a society depends on how well the proposed innovation fits the existing culture. Therefore, there must be a match between organizational culture and new technology into an organization. Within the school organization, school culture is an important consideration in terms of ICT integration (Tearle, 2003). School culture can be defined as the basic assumptions, norms and values, and cultural artefacts that are shared by school members (Maslowski, 2001). These meanings and perceptions indirectly affect attitudes and behaviour in the organization of schools (Devos et al., 2007). Hence, if the technology is not received well by teachers, there must be a mismatch of values between the culture of

schools and the technology (Albirini, 2006). Thus, teachers who have positive perceptions about the cultural relevance of computer technology will apply ICT in education.

**F. Computer Attributes:** According to past research, Rogers (1995) stated that characteristic of an innovation as perceived by individual in a social system affect on the rate of adoption. Also, he identified five innovation attributes that may contribute to the adoption or acceptance of an innovation: <sup>(1)</sup> relative advantage, <sup>(2)</sup> compatibility, <sup>(3)</sup> complexity, <sup>(4)</sup>observability, and <sup>(5)</sup>trialability. The relationship between an innovation's attributes and adoption has been examined in a number of diffusion studies. For example, Albirini (2006) found that the computer attributes were significantly correlated to teachers' attitudes towards computer. Albirini's study accentuated the importance of computer attributes in the process of computer adoption in developing countries. Also, Dillon and Morris (1996) stated that "innovations that offer advantages, compatibility with existing practices and beliefs, low complexity, potential friability, and observability will have a more widespread and rapid rate of diffusion". Therefore, if teachers perceive ICT as a beneficial tool, compatible with their current activities, easy to use and have observable outcomes, they will demonstrate positive attitudes towards ICT.

### **I. Computer Competence**

According to Pelgrum (2001), the success of educational innovations depends largely on the skills and knowledge of teachers. Also, he found that teachers' lack of knowledge and skills was the second most inhibiting obstacle to the use of computers in schools. Similarly, in the United States, Knezek and Christensen (2000) hypothesized that high levels of (attitude), skill and knowledge (proficiency), and tools (level of access) would produce

higher levels of technology integration that will reflect on student achievements positively. Their model postulated that educators with higher levels of skill, knowledge, and tools would exhibit higher levels of technology integration in the classroom. Moreover, Berner (2003) studied the relationship between computer use in the classroom and seven independent variables: perceived relevance; desire to learn; emotional reaction to technology; beliefs about computer competence; beliefs about technology; administrative support; and peer support. He found that the faculty's belief in their computer competence was the greatest predictor of their use of computers in the classroom. Therefore, teachers should develop their competence based on the educational goals they want to accomplish with the help of ICT.

#### **ICTs IN TEACHER'S TRAINING IN NIGERIA**

Education is generally acknowledged as one of the crucial allies of the development process. Thus, Nigerian educational policy makers and social planners, in recognition of its potentials for leveraging existing social stratifications, have placed a huge premium on the development of the education sector. This is reflected in the emphatic resonance in the National Policy on Education (NPE 1977, revised 1998, (2005) that 'no nation can rise above the quality of its education system'. Based on this self evident truth, the national policy formulators recommend, as a priority, the training of those responsible for facilitating the education of Nigerians in the development planning process. As a result the National Policy on Education unequivocally stated that 'teacher education will continue to be given attention in all our education planning, because no education system can rise above the quality of its teachers'. This view was crystallized by Lassa (2000) who noted that the importance of teachers and the roles that they play in the educative process is central to

[basic] education, particularly in third world countries. However, the challenge of teacher training appears to be the most daunting challenge facing the education system in general.

This has been observed by researchers who have reiterated that out of all the educational problems that beset the African continent today, none is as persistent or as compelling as the one relating to the training of ICT enabled/competent teachers who directly and indirectly is bound to influence the quality and quantity of services provided by all other teachers and professors, as poor teachers tend to produce their own kind (Fafunwa 1967; Afe, 1999) in Afe 2002).

In terms of quality of ICT teachers in Nigeria, experts have submitted that there is only modest evidence of the effectiveness of the Nigerian teacher education system. The curriculum has been criticized as often not well matched with students' own background and culture of the society that the would-be teachers are expected to teach (Afemikhe, 2004; Afe 2002 & Obanya 1999). From time immemorial, the training of teachers on ICT has been an issue of concern to researchers and lay members of society alike. Fafunwa (1974) argued that teacher education continues to be the key to educational development, here [in Nigeria] and elsewhere, for without adequately trained teaching cadre Nigeria cannot hope to expand her educational facilities. However, till date the pre-service training and in-service professional development of Nigerian teachers has not reflected the attention and focus of these observers of our education system. As observed by Jegede (2002), the teacher training system in Nigeria, has failed to adhere to the provisions of the National Policy on education that teacher education shall continue to take cognizance of changes in methodology and in the curriculum, and that teachers shall be regularly exposed to innovations in their professions.

### ***Effective teachers training program in Nigeria***

The teacher has an important role to play in the teaching/learning paradigm shift, with ICT facilitating the development of a higher level of cognitive skills in evaluating arguments, analyzing problems and applying what is learnt. Although teachers play an important role in the learning environment, they are often not consulted regarding changes to teaching learning procedures (Bangkok, 2004). In fact, the teachers' needs under changing conditions of ICT have to be continuously assessed and activities to satisfy these have to be developed. So, professional development is necessary for teachers to enable them to effectively use ICT to improve student learning. Staff development should be collaboratively created, based on faculty input and school needs. It must prepare teachers to use technology effectively in their teaching.

According to Spillane (1999), teachers who have a strong engagement towards their own professional development are more motivated to undertake activities, which lead to a better understanding of the goals of an innovation. Similarly, Fullan (1992) pointed out that teachers who are actively involved in their own professional development are more able to implement changes in their teaching. Hence, having a recognition system for innovative and effective use of ICT integration in schools will motivate teachers to use ICT in teaching. For example, formal certification of in-service professional development that leads to diplomas or degrees could provide an incentive for teachers to upgrade and update their skills in and knowledge of ICT integration.

The initial teacher training process and the continuing professional development of Nigerian teachers is currently besotted by a number of challenges. These are directly connected with the incessant modification of the planning policies several times before such policies have been appropriately implemented in its original form. These problems have

been further accentuated by the parlous state of economic development, which has made 'teaching' a less desirable profession for many youth.

The NPE (1977, revised 1998, 2005) provided the objectives of teacher education through the use of ICT in Nigeria as follows:

- to provide highly motivated, conscientious and efficient classroom teachers;
- to encourage further the spirit of enquiry and creativity in teachers;
- to help teachers to fit into the social life of the community and society at large;
- To enhance teachers commitment to the teaching profession.

However, many researchers have noted that these 'lofty' objectives have scarcely been met (Okebukola, 2002; Isyaku, 2002; Ukeje, 2002; Jegede, 2002 & Afemikhe, 2004).

These are, to do wit, the Foundations of Education (Historical, Psychological, Sociological, Philosophical and Religious Foundations); Pedagogy courses (Classroom Management, Curriculum Design & Development, General and Special Teaching Methodology, Measurement & Evaluation, Counselling, Design & Construction of Instructional Aids, etc.); and Teaching Subjects under the broad categorizations science, arts, social sciences. In addition, there is usually a teaching practice exercise whose duration varies across institutions. This is what the teacher training model looks like in a Nigerian Teacher education institution. This model is rather restrictive in the sense that it fails to take into cognizance the burgeoning possibilities of information and communication technologies in the teacher production process. Knowing that the convergence of information and communication technologies has turned the whole world into a global village, making it possible to foster interaction with people in remote geographical locations of the world at previously unimaginable speed.

This phenomenon has also shortened the turnaround period of knowledge such that 'knowledge becomes obsolete almost as soon as it is acquired or learnt'. The result of this development is that teachers are now challenged to be at the cutting-edge of knowledge production, modification and application.

### **Methods of training technical teacher's with the use of ICTs in teaching**

There are various method of training technical teacher's to use ICTs in teaching among them are:

1. According to Burniske (2001), he typified that the most appropriate method to train teacher in order to use ICTS in teaching is through improvement in teachers confident and motivation and he explain them in the following ways:
  - A. Elimination of fears: it was been discover that fear prevent many teachers to use ICT. E.g. they might be scare that the computer might break down and they don't know how to repair. To solve this government should provide a technical support for schools that will seek to solve this problem whenever it arises.
  - B. Teacher should be encouraged to use ICT to teach at the beginning of their teaching live: exposure to ICT can be an important motivation tools to promote and enable teachers professional development.
  - C. Assessment of ICT facilities: the most significant for continuing the development of teacher's ICT-related skills is for them to have regular access to functioning and relevance ICT equipment.
2. According to UNESCO (2003), he typified that another method to train teacher in order to use ICT in teaching depends on the object knowledge and he explain them in the following ways:

- A. Teachers subject knowledge: teacher should be train on the form of ICT that relate to their area of specialization because if it's done it will enhance the teachers participation every time which will tends to increase the teachers knowledge of ICT in that area. E.g. a teacher who teaches electrical installation should learn auto-card has an aspect of ICT, which will help him in the smooth delivery of his duties.
  - B. Student subject knowledge influence the training of teachers on ICT: teacher should be train on the type of ICT to adopt that will best suit their student. i.e. if the teacher passive that the student are not understanding his lesson as he expected he might decide to change the ICT method his using (e.g. from auto-card to stimulation when teaching electrical installation)which will tends to increase his knowledge of ICT
3. According to Peter Scrimshaw (2004), he posited that provision of enabling factors is an effective way to train teacher in order to use ICT in teaching and he explain them in the following ways:
- A. A variety of changes must be implemented to optimize teacher use of ICTs Shifting pedagogies, redesigning the curriculum and assessment, and providing more autonomy to the schools help to optimize the use of ICT. With sufficient enabling factors in place, teachers can utilize ICTs in as 'constructivist' a manner as their pedagogical philosophies would permit.
  - B. Functioning technical infrastructure is (obviously) crucial: Teachers must have adequate access to functioning computers, and be provided with sufficient technical support, if they are to use ICTs effectively
  - C. Adequate time must be allowed for teachers to develop new skills, explore their integration into their existing teaching practices and curriculum, and undertake necessary additional lesson planning, if ICTs are to be used effectively.

- D. There should be Support from school administration in other to facilitate teachers efficient use of ICT. I.e. the community should give important Support of school administrators and, in some cases, the surrounding community, for teacher use of ICTs is seen as critical if ICTs are to be used at all, let alone effectively. For this reason, targeted outreach to both groups is often necessary if investments in ICTs to support education are to be optimized
- E. Communities of practice can be important tools to support teacher professional development the existence of formal and informal communities of practice and peer networks can be important tools to support ICT in education initiatives and activities. Such support mechanisms can be facilitated through the use of ICTs.

### **Summary of related literature**

In summary, information and communication technology has contributed significantly to the student achievement in all levels of education. The research base review in preparation for this report indicates that the use of ICT as a supplement to conventional instruction which tends to produces higher achievement than the use of conventional instruction alone. Research is inconclusive regarding: technical college education in Nigeria which is one of the most important institution were ICT is used; Concept of information and communication technology; Information and communication technology in Nigeria i.e. the comparative effectiveness of conventional instruction alone and ICT alone; Information and communication technology and computer assisted in instruction i.e. the major form of ICT mostly used in education setting which is CAI and its subdivisions; Factors affecting teachers use of information and communication technology i.e. non-manipulative factors and

manipulative factors; information and communication technology in teachers training in Nigeria, methods of training technical teacher's with the use of ICT in teaching.

The literature also emphasize on teacher trainees in most developing countries as been hardly introduced to the emerging approach, and where it is done, is only exists in a peripheral basis neglecting the more sophisticated and practical levels of infusing and applying. This creates a concern for the plight of learners in these societies, considering the fact that the ascendancy of ICTs has turned it into an invariable constant in everyday life. Which calls for improvement in the hand of teachers?

The use of ICTs for professional development of teachers who had already completed their training but need to be introduced to new methodologies and innovations in their subject areas must be seriously explored. Since it may be impractical to resend all teachers that are currently teaching in the classrooms back to the institutes for retooling and re-skilling in the new emerging fields of knowledge, distance learning through the use of modern ICT tools may well be the only means of retraining the corps of teachers in the field who are in need of serious retraining. Consequently, the government, non-governmental and international agencies could set policy agenda for introducing an ICT driven teacher education curricular for developing countries such as Nigeria and they would do well if they are guided by the continuum model which is depicted in this study.

There huts to be embargo on teachers in a country to have no choice but to embrace ICT as a style of teaching and learning. Which can be achieve by placing a huge responsibility of an establishment, defined by –government, policy makers, institutional and individual stakeholders etc, who must make sure that teacher trainees have all that they need in terms of resources for learning, during their professional training.

The literature also include the palpable benefits to derived from a full scale deployment of ICTs in the education and training of teachers include exposure to different technologies for teachers and learners; enhancement of teaching and learning effectiveness; Enhancement of varieties of teaching and learning methods; among others.

Literature has revealed that important of information and communication technology in teaching. Despite the recognition, limited approach has been attempted to verify the effect of information and communication technology in technical colleges in Nigeria. To fill this gap, therefore, it become necessary to train and retrains electrical installation and maintenance work teachers on the effective usage of ICT in their daily instructional delivery at technical college level.

## **CHAPTER III**

### **METHODOLOGY**

This chapter described the procedures used in the study, this include research design, population of the study, instrument for data collection, validation of the instrument, administration of the instrument, method of data analysis and decision rule.

#### **Research Design**

In carrying out this study, descriptive survey research design was used. The study therefore is focused on training needs of Electrical Installation and Maintenance Work teachers on Information and Communication Technology in technical colleges of Niger state. The survey method is considered for this study because of the type of information needed for this investigation

#### **Area of study**

The study was carried out in Government Technical College New-Bussa and covered the Department of Electrical Installation and Maintenance Work.

#### **Population of the study**

The target population of this study was 116. The total population is made up of 21 teachers and 95 students from the Department of Electrical Installation and Maintenance Work, Government Technical College New-Bussa. Since the population is small, no sampling was used. Hence the population was used.

### **Instrument for data collection**

The instrument used for this study was a structures questionnaire developed by the researcher. The questionnaire was divided into four sections;

Section A contain personal data, Section B contain (14) items which sought for information on the word processing trainings needed by the teachers of electrical installation and maintenance work to improve learning. Section C contain (12) items which deals with the various internet training required by teacher of electrical installation and maintenance work. Section D contain (4) item which deal with the programming trainings needed for by teachers for effective management industrial machine needed by electrical installation and maintenance work programme. Section E contain (6) items that deals with the various training needed by teachers for the use and management of electrical installation and maintenance work database. While Section F with (7) items was arranged to identify the requirement for digital content delivery by electrical installation and maintenance work teachers.

### **Validation of instrument**

The instrument was validated by the three lecturers from Department of Industrial and Technology Education in Federal University of Technology Minna. Their opinion and correction was used to improve the instrument before the instrument before the administration.

### **Administration of instrument**

The researcher administered the questionnaire to the respondent personally with the help of the research assistants from each section, the administered questionnaire were collected back immediately. The procedure for the administration allowed our 100 percent return

### **Method of data analysis**

Analysis of the data for the research questions and hypothesis were answered using mean, standard deviation, and t-test. Mean was used to determine the degree of acceptance and rejection in the research questions, while t-test was to test the hypothesis of the two groups of respondents.

### **Decision rule**

A 4-point scale as showed below was used

Strongly agree	(S.A)	=	4 points
Agree	(A.)	=	3 points
Disagree	(D.)	=	2 points
Strongly	(S.D.)	=	1 point

To determine the acceptance level, a mean score of 2.50 was computed inline with the four rating scale. Any item with a value up to 2.50 and above were considered agreed, while any item below 2.50 was considered disagreed. For hypotheses testing,  $\pm 1.96$  was chosen at t-critical value based on the 438 degree of freedom. Hence, any item that has to

be calculated  $t$ -less than or  $t$ -critical was regarded as not significant while, any item that has its calculated  $t$ -less than or equal to  $t$ -critical was regarded as not significant while, any item that has calculated greater than  $t$ -critical was regarded significant

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

This chapter deals with the presentation and analysis of data with respect to the research questions and hypothesis formulated for this study.

#### Research question 1:

What are the word processing trainings needed by the teachers of Electrical Installation and Maintenance Work to improve learning?

**Table 1:**

**Mean response of teachers and student of Electrical Installation and Maintenance Work program on the word processing trainings needed by teachers to improve their delivery of duties.**

$N_1=21$        $N_2=96$

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	Remarks
1	Ability to manipulate the Microsoft word window	3.38	3.58	3.48	Agreed
2	Producing image intensive products such as glossy magazine or newspaper	3.08	3.75	3.42	Agreed
3	Producing graphical document which include news letter and simple posters.	3.23	3.08	3.16	Agreed
4	Creating, editing and formatting a document properly.	3.54	3.58	3.56	Agreed
5	Understanding the basic tools of editing document and how they are put to use	3.23	3.42	3.33	Agreed
6	Understanding the functionality of Microsoft word templates and wizards	3.31	3.42	3.44	Agreed
7	Opening a new document in Microsoft word and have the ability of initiating a new task	3.46	3.42	3.44	Agreed
8	Understanding the functionality of moving and coping text using basic features such as cut, copy and paste	3.46	3.33	3.40	Agreed
9	Dragging and dropping content within the Microsoft word window	3.77	3.67	3.72	Agreed
10	Naming, saving and deleting documents	3.31	3.67	3.72	Agreed
11	Using strategic name convention for naming and saving documents	2.85	3.50	3.16	Agreed
12	Preparing word documents using page setup features including adjust merging, paper size, page orientation etc.	3.15	3.50	3.16	Agreed
13	Printing documents after editing and formatting	3.46	3.17	3.32	Agreed
14	Understanding the importance of and method of proofing documents	3.62	3.42	3.52	Agreed

KEY:	$\bar{X}_1$	=	Mean of Electrical Installation and Maintenance Work teachers.
	$\bar{X}_2$	=	mean of Electrical Installation and Maintenance Work student.
	$\bar{X}_t$	=	average mean of both teachers and students.
	$N_1$	=	numbers of Electrical Installation and Maintenance Work teachers
	$N_2$	=	number of Electrical Installation and Maintenance Work students

Table 1 shows that the respondents agreed with average mean scores of 3.16 – 3.72 respectively. This revealed that word processing skills are key Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers for effective delivery of their duties, considering that all the items were agreed by the groups of respondent.

## Research question 2

What are the various internet training required by teacher of Electrical Installation and Maintenance Work?

**Table 2:**

**Means response of teachers and students of Electrical Installation and Maintenance Work on the internet training required by teachers for improve learning. N<sub>1</sub>=21 N<sub>2</sub>=96**

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	Remarks
1	Understanding the device and method of connecting to the internet	3.54	3.58	3.56	Agreed
2	Knowing how to get connected to the internet	3.23	3.67	3.45	Agreed
3	Understanding how the internet works	3.31	3.58	3.45	Agreed
4	Knowing and understanding the terminology and functionality of internet service	3.23	3.75	3.49	Agreed
5	Defining key internet applications and ways that they can improve the internet experience.	3.46	3.50	3.48	Agreed
6	Defining terminology used to navigate the world wide web	3.15	3.58	3.42	Agreed
7	Understanding the nature and function of search engines a and what they offer to those seeking information via the World-wide web.	3.31	3.17	3.24	Agreed
8	Describing additional internet applications and how they can be used.	3.31	3.67	3.49	Agreed
9	Realizing the important of evaluating information before downloading	3.38	3.25	3.44	Agreed
10	Understanding the different between shareware and freeware	3.38	3.58	3.48	Agreed
11	Describing and naming different file types.	3.31	3.58	3.45	Agreed
12	Understanding how different programme can be downloaded, saved and installed	3.23	3.50	3.28	Agreed

The data's presented in table 2 revealed that the respondent agreed with all the items with mean score ranging between 3.24 – 3.56, this revealed that internet skills are key Information and Communication Technology skills needed by Electrical Installation and Maintenance Work teachers for improve learning. Considering that all the items were agreed by the groups of respondent.

**Research question 3:**

What are the programming trainings needed by teachers for effective management of Industrial Machine needed by Electrical Installation and Maintenance Work program?

**Table 3:**

***Mean response of teachers and student of Electrical Installation and Maintenance Work on the programming training required for effective management of Industrial Machine needed by Electrical Installation and Maintenance Work teachers to improve learning***

**N<sub>1</sub>=21 N<sub>2</sub>=96.**

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<b>S/N</b>	<b>ITEMS</b>	<b><math>\bar{X}_1</math></b>	<b><math>\bar{X}_2</math></b>	<b><math>\bar{X}_3</math></b>	<b>Remarks</b>
1	Using the compiler to change from one programming language to the other	3.31	3.17	3.56	Agreed
2	Conversance with various programming language	3.15	3.58	3.42	Agreed
3	Conversance with programming terms and how they are put to use	3.46	3.50	3.48	Agreed
4	Good coding knowledge	3.54	3.58	3.56	Agreed

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Table 3 revealed that the respondents agreed with all the items with the mean score ranging from 3.24 – 3.56. This revealed that the programming training are the key Information and Communication Technology training needed for Electrical Installation and Maintenance Work teachers for good delivery of their duties, considering all the items were agreed by the group of respondent.

#### Research question 4

What are the various training needed for the use and management of Electrical Installation and Maintenance Work database?

**Table 4: mean response of teacher and student of Electrical Installation and Maintenance Work on the various training needed for the use and management of Electrical Installation and Maintenance Work database**

		N <sub>1</sub> =21	N <sub>2</sub> =96		
S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	Remarks
1	Ability to open a new work book including the use of template and wizard	3.38	3.58	3.48	Agreed
2	Recognizing the ability to use the standard and formatting toolbar of the Microsoft spread sheet.	3.38	3.25	3.44	Agreed
3	Understanding various terminology of the excel sheet	3.31	3.25	3.44	Agreed
4	Knowledge on the use of the excel spread sheet	3.31	3.67	3.49	Agreed
5	Entering the editing data in Microsoft excel including text, values, dates and formula	3.31	3.58	3.45	Agreed
6	Knowledge of the function within excel for moving and copying data from cell to cell or cell to workbook.	3.23	3.50	3.28	Agreed

Table 4 revealed that the respondents agreed with all the items with the mean response score ranging from 3.28 -3.49. This revealed that database management skills are the key Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers for effective delivery of their duties. Considering that all the items were agreed by the group of respondent.

**Research question 5:**

What are the requirements for digital content delivery by Electrical Installation and Maintenance Work teachers?

**Table 5: mean response of teachers and students on electrical installation and maintenance work on the requirement for digital content delivery by electrical installation and maintenance work teachers**

		N <sub>1</sub> =21	N <sub>2</sub> =96		
S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	Remarks
1	Ability to use a template or wizard to create to create a presentation	3.62	3.33	3.48	Agreed
2	Proficiency with the tools available to them for designing and delivering presentation	3.23	3.42	3.33	Agreed
3	Ability to create a presentation from a blank slide	3.15	3.50	3.33	Agreed
4	Knowledge of the basic features and terminologies of PowerPoint's	3.54	3.58	3.56	Agreed
5	Ability to work with pictures and drawings when preparing a presentation	3.69	3.23	3.47	Agreed
6	Ability to accept and load clip art gallery items in a presentation	3.22	3.25	3.24	Agreed
7	Knowledge on the basic process for running a slide show including custom animation	3.31	3.75	3.53	Agreed

The table 5 revealed that the respondents agreed with all the items with the mean score ranging from 3.24 – 3.56. This revealed that content delivery skills are key Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers for improved learning, considering that all the items were agreed by the groups of respondent.

## Hypothesis 1

HO<sub>1</sub> There is no significant difference in the mean response of teachers and students on the word processing training needed by the teachers of Electrical Installation and Maintenance Work to improve learning.

**Table 6:**

**t-test analysis on the word processing training needed by the teachers of Electrical Installation and Maintenance Work to improve learning.**

S/N	ITEMS	N <sub>1</sub> =21		N <sub>2</sub> =96		Remarks
		SD <sub>1</sub>	SD <sub>2</sub>	t		
1	Ability to manipulate the Microsoft word window	0.53	0.51	-1.00		NS
2	Producing image intensive products such as glossy magazine or newspaper	0.80	0.44	-2.58		S
3	Producing graphical document which include news letter and simple posters.	0.41	1.04	0.47		NS
4	Creating, editing and formatting a document properly.	0.49	0.51	-0.20		NS
5	Understanding the basic tools of editing document and how they are put to use	0.44	0.47	-5.59		S
6	Understanding the functionality of Microsoft word templates and wizards	0.44	0.47	-0.61		NS
7	Opening a new document in Microsoft word and have the ability of initiating a new task	1.16	0.47	0.59		NS
8	Understanding the functionality of moving and coping text using basic features such as cut, copy and paste	0.51	0.64	0.59		NS
9	Dragging and dropping content within the Microsoft word window	0.41	0.45	0.50		NS
10	Naming, saving and deleting documents	0.95	0.50	-0.63		NS
11	Using strategic name convention for naming and saving documents	0.76	0.50	-1.27		NS
12	Preparing word documents using page setup features including adjust merging, paper size, page orientation etc.	0.68	0.65	-1.27		S
13	Printing documents after editing and formatting	0.51	0.36	1.72		NS
14	Understanding the importance of and method of proofing documents	0.46	0.47	1.00		NS

KEY	$SD_1$	=	Standard deviation of teachers of Electrical Installation and Maintenance Work
	$SD_2$	=	Standard deviation of students of Electrical Installation and Maintenance Work
	$t_{cal}$	=	t-test analysis of respondents
	$X_1$	=	Mean of teachers of Electrical Installation and Maintenance Work
	$X_2$	=	Mean of students of Electrical Installation and Maintenance Work
	NS	=	Not Significant
	S	=	Significant

Table revealed that the t-test analysis accept the null hypothesis of each items except items 2, 5, and 12 at 0.05 level of significance, meaning that there is no significant different for all items accepted but there is significant different between the items rejected in the mean rating of teachers and students on identifying Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers to improve learning.

## Hypothesis II

HO<sub>2</sub> There is no significant different between the mean response of teachers and student on the various internet trainings required by teachers of Electrical Installation and Maintenance Work.

		N <sub>1</sub> =21	N <sub>2</sub> =96			
S/N	ITEMS	SD <sub>1</sub>	SD <sub>2</sub>	t	Remarks	
1	Understanding the device and method of connecting to the internet	1.13	0.45	-1.69	NS	
2	Knowing how to get connected to the internet	0.32	0.51	1.59	NS	
3	Understanding how the internet works	0.41	0.51	0.86	NS	
4	Knowing and understanding the terminology and functionality of internet service	0.46	0.47	1.00	NS	
5	Defining key internet applications and ways that they can improve the internet experience.	0.60	0.50	-1.91	NS	
6	Defining terminology used to navigate the world wide web	0.59	1.24	0.98	NS	
7	Understanding the nature and function of search engines and what they offer to those seeking information via the world-wide web.	0.46	0.51	0.20	NS	
8	Describing additional internet applications and how they can be used.	1.12	0.49	-0.29	NS	
9	Realizing the important of evaluating information before downloading	0.60	0.76	1.04	NS	
10	Understanding the different between shareware and freeware	1.06	1.26	-0.04	NS	
11	Describing and naming different file types.	0.82	0.44	-2.00	S	
12	Understanding how different program can be downloaded, saved and installed	0.59	0.92	-0.84	NS	

Table 7 Revealed that the t-test analysis accept the null hypothesis of each item except item 25 at 0.05 level of significant difference between the items rejected in the mean rating of teachers and students on identifying the Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers to improve learning.

### Hypothesis III

HO<sub>3</sub> There is no significant different between the mean response of teachers and student on the various training needed for database management.

**TABLE 8:**

**t-test analysis of the respondent on the various skill needed for the use and management of Electrical Installation and Maintenance Work programme database.**

		N <sub>1</sub> =21	N <sub>2</sub> =96			
S/N	ITEMS	SD <sub>1</sub>	SD <sub>2</sub>	t	Remarks	
1	Ability to open a new work book including the use of template and wizard	0.58	0.65	-1.00	NS	
2	Recognizing the ability to use the standard and formatting toolbar of the Microsoft spread sheet.	0.44	0.51	-1.59	NS	
3	Understanding various terminology of the excel sheet	0.73	0.66	-0.71	NS	
4	Knowledge on the use of the excel spread sheet	0.73	0.44	0.54	NS	
5	Entering the editing data in Microsoft excel including text, values, dates and formula	0.49	0.66	-0.17	NS	
6	Knowledge of the function within excel for moving and copying data from cell to cell or cell to workbook.	0.68	0.50	-1.46	NS	

TABLE 8: revealed that the t-test analysis accept the null hypothesis of each items at 0.05 level of significance, meaning that there is no significant different for all items accepted but there is difference between the items rejected in the mean rating of lecturers and students on identifying the Information and Communication Technology training needed by Electrical Installation and Maintenance Work teachers to improve learning.

## **Finding**

The followings are the findings of the study

### ***Finding on the word processing training needed by Electrical Installation and Maintenance***

#### ***Work teacher for effective delivery of their duties identified the following trainings:***

- 1 Ability to manipulate the Microsoft word window
- 2 Producing image intensive products such as glossy magazine or newspaper
- 3 Producing graphical document which include news letter and simple posters.
- 4 Creating, editing and formatting a document properly.
- 5 Understanding the basic tools of editing document and how they are put to use
- 6 Understanding the functionality of Microsoft word templates and wizards
- 7 Opening a new document in Microsoft word and have the ability of initiating a new task
- 8 Understanding the functionality of moving and coping text using basic features such as cut, copy and paste
- 9 Dragging and dropping content within the Microsoft word window
- 10 Naming, saving and deleting documents
- 11 Using strategic name convention for naming and saving documents
- 12 Preparing word documents using page setup features including adjust merging, paper size, page orientation etc.
- 13 Printing documents after editing and format
- 14 Understanding the importance of and method of proofing documents

***The various internet training required by teacher of Electrical Installation and Maintenance Work include***

- 1 Understanding the device and method of connecting to the internet
- 2 Knowing how to get connected to the internet
- 3 Understanding how the internet work
- 4 Knowing and understanding the terminology and functionality of internet service
- 5 Defining key internet applications and ways that they can improve the internet experience.
- 6 Defining terminology used to navigate the World Wide Web
- 7 Understanding the nature and function of search engines and what they offer to those seeking information via the World Wide Web.
- 8 Describing additional internet applications and how they can be used.
- 9 Realizing the important of evaluating information before downloading
- 10 Understanding the different between shareware and freeware
- 11 Describing and naming different file types.
- 12 Understanding how different programme can be downloaded saved and installed

***The programming trainings needed by teachers for effective management of Industrial Machine needed by Electrical Installation and Maintenance Work programme include:***

- 1 Using the compiler to change from one programming language to the other
- 2 Conversance with various programming language
- 3 Conversance with programming terms and how they are put to use
- 4 Good coding knowledge

***The various training needed for the use and management of Electrical Installation and Maintenance Work database are:***

- 1 Ability to open a new work book including the use of template and wizard
- 2 Recognizing the ability to use the standard and formatting toolbar of the Microsoft spread sheet.
- 3 Understanding various terminology of the excel sheet
- 4 Knowledge on the use of the excel spread sheet
- 5 Entering the editing data in Microsoft excel including text, values, dates and formula
- 6 Knowledge of the function within excels for moving and copying data from cell to cell or cell to workbook.

***The requirements training for digital content delivery by Electrical Installation and Maintenance Work teachers include:***

- 1 Ability to use a template or wizard to create to create presentation
- 3 Proficiency with the tools available to them for designing and delivering presentation

- 3 Ability to create a presentation from a blank slide
- 4 Knowledge of the basic features and terminologies of PowerPoint's
- 5 Ability to work with pictures and drawings when preparing a presentation
- 6 Ability to accept and load clip art gallery items in a presentation
- 7 Knowledge on the basic process for running a slide show including custom animation

### **Discussion of findings**

Discussion of finding of this study is organized and presented according to the research question and hypothesis as regarded to the identifying various training of ICT that will help improve the performance or increase the effective delivery of teachers of Electrical Installation and Maintenance Work programme.

The finding of this study shows that there is necessity for the acquisition/training of ICT skills by teachers of Electrical Installation and Maintenance Work programme so as to be efficiency in the delivery of their duties. This study further show that ICT skill training is a necessity as it tends to upgrade to teachers knowledge to meet with the currents advance technology.

In the same way, the finding indicate that the various ICT training required by the Electrical Installation and Maintenance Work teachers should be made part of the department curriculum, grouping all skill to be trained on into various courses to be offered by each teacher.

For the purpose of better understanding of the various applications of ICT skills in teaching there is a need of proper application of ICT in teachers training curriculum and there is also need for periodic retraining in other for the teacher to be in space with the advancing technology. Teachers must be well trained to used ICT as a delivery mechanism, as a compliment to instruction and as an instructional tools (Imel, 1998)

The finding also shows that the interaction of combining new technology with human skills has led to increase and most effective instructional delivery.

The study revealed that in education, the delivery of knowledge using ICTs has influenced the design of various curricula programme nationally and globally in launching of different educational programmes.

The current technology for example, allows learner interaction with the computer screen rather than the teacher, so the teacher must be train to put the necessary thing student need to learn on the computer for them. Secondly through the computer network, learners were able to communicate with the teacher on the material and could discuss assignment involved. In this process learner were able to attend lectures “online”. Current Technology in e-learning such as Aula Net tend to provide a group wear for creation, participation and maintenance of web base course emphasizing group learning where individual share ideas online (Gay and Lantini, 1995 and Fuks, 2000). It has been argued that ICT in teachers was a way of moving from elite to mass education though digital media where more learners could get more access for both campus and distance learning students Kennedy 2001. ICT is seen as a way to promote educational change, improve the skill of learner and prepare them for global economy and information society (haddad and Draxler, 2002. UNESCO, 2002) ICT is used to improve the delivery of and access to education. ICT as focus of teachers, it tends

to improve their delivery of their subject matter been thought, increase quality of education thereby increase the impact of education on the economy. While basically ICTbase innovation can occur in classrooms, their linkage to national policies is essential to achieve intended social and economic outcomes.

## CHAPTER V

### SUMMARY CONCLUSIONS AND RECOMMENDATION

#### Summary of the study

The main purpose of the study was to identify the training needs of Electrical Installation and Maintenance Work teachers on Information and Communication Technology in technical colleges of Niger state. Five research questions were formulated and used for the study.

Related literature were reviewed under the following heading; Technical College in Nigeria, Concept of Information and Communication Technology in Nigeria, Information and Communication Technology and computer assisted instruction, Factors affecting teachers use of Information and Communication Technologies, Information and Communication Technology in teacher's training in Nigeria, training needs of technical teacher's on the usage of ICTs in teaching, and the summary of related literature. A forty nine (49) items questionnaire was used to identified various training needs of Electrical Installation and Maintenance Work teachers on usage of Information and Communication Technology. Data's was collected and analyzed using Mean( $\bar{X}$ ) While t-test was used to test the three null hypothesis at 0.05 level of significance.

The populations of this study consisted of 21 teachers and 96 students of Electrical Installation and Maintenance Work programmed in Government Technical College New-Bussa, Niger state. Administration of the instrument was carried out by the researcher and collected back immediately. The formulated questionnaire was analyzed using Mean( $\bar{X}$ ) and standard deviation While t-test was used to test null hypothesis at 0.05 level of significance. A survey designed was used for the study because it involves the study of a group of items by collecting and analyzing data from only a few people. Recommendations were made in

relation to findings such training in word processing, database management, internet, content delivery and programming required by Information and Communication Technology students for improve learning.

### **Implication of the study**

The findings of this study have implication on teachers and even the student and society at large. If the Information and Communication Technology training needed for improved learning by Electrical Installation and Maintenance Work teachers are properly implemented, it will result to effectiveness of teachers in their area of work, student will be learning as they oath to because the teacher would be using the most effective way to teach through the use of ICT.

### **Conclusion**

The studies find out that there are enormous advantages in the use of ICT in the educational sector of this Country. It was also discovered that there are only few ways in which ICT skill have achieve its success in the Department of Electrical Installation and Maintenance Work due to the lack of various training needed to be proficient in the use of ICTs. These implies that there should be adequate implementation of the various training needed by Electrical Installation and Maintenance Work teachers in the department curriculum.

### **Recommendation**

Base on the findings of the study, the following recommendation were made: the content of the envisaged curriculum of the Electrical Installation and Maintenance Work department should include knowledge and skills in using word processing software's, knowledge and skill in database management, internet, content delivery and programming.

The curriculum for producing teachers of Electrical Installation and Maintenance Work, who are proficient in using advanced technological machine, should be put in place and it should comprise knowledge and skills in Information and Communication Technology. Such Information and Communication Technology portion of the teacher's curriculum should contain enough doses of internet concepts, programming, word processing, content delivery and database management skills and knowledge respectively.

The department of Electrical Installation and Maintenance Work NewBussa should encourage and even involve in the financing of the various needs for implementing the ICT skill in the department.

### **Suggestion for further research**

The following suggestion were made for further research

1. Strategies of improving ICT skill in electrical installation and maintenance work department.
2. Implementation of ICT training in electrical installation and maintenance work department.
3. Information and Communication Technology current trends and critical crisis.

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# FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

*ELECTRICAL AND ELECTRONIC TECHNOLOGY OPTION*

## QUESTIONNAIRE ON:

TRAINING NEEDS OF ELECTRICAL INSTALLATION AND MAINTENANCE WORK  
TEACHERS ON INFORMATION AND COMMUNICATION TECHNOLOGY IN  
TECHNICAL COLLEGES OF NIGER STATE

### SECTION A

#### PERSONAL DATA

**INTRIDUCTION:** please complete this questionnaire as faithfully as possible and sincerely by ticking the column that best represent your perception about the research topic. The information is needed for this research work and will be strictly used for the purpose.

ICT EXPERT                       LECTURERS                       STUDENT

Instruction: a four (4) points decision rule is used to indicate your opinion, tick the word which best described your agreement as shown bellow

STRONGLY-AGREE  
DISAGREED

(S.A)

AGREE

(A)

DISAGREED

(D)

STRONGLY

(SD)

## SECTION B

### Research question 1

What are the word processing trainings needed by electrical installation and maintenance work teachers to improve learning?

S.NO	ITEMS	S.A	A	D	S.D
1	Ability to manipulate the Microsoft word window				
2	Producing image intensive products such as glossy magazine or newspaper				
3	Producing graphical document which include newsletter and simple posters.				
4	Creating, editing and formatting a document properly.				
5	Understanding the basic tools of editing document and how they are put to use				
6	Understanding the functionality of Microsoft word templates and wizards				
7	Opening a new document in Microsoft word and have the ability of initiating a new task.				
8	Understanding the functionality of moving and coping text using basic features such as cut, copy and paste				
9	Dragging and dropping content within the Microsoft word window				
10	Naming, saving and deleting documents				
11	Using strategic name convention for naming and saving documents				
12	Preparing word documents using page setup features including adjust merging, paper size, page orientation etc.				
13	Printing documents after editing and formatting				
14	Understanding the importance of and method of proofing documents				

## SECTION C

### Research question 2

What are the various internet training required by teacher of electrical installation and maintenance work?

S/NO	ITEMS	S.A	S	D	S.D
1	Understanding the device and method of connecting to the internet.				
2	Knowing how to get connected to the internet				
3	Understanding how the internet works				
4	Knowing and understanding the terminology and functionality of internet service				
5	Defining key internet applications and ways that they can improve the internet experience.				
6	Defining terminology used to navigate the world wide web				
7	Understanding the nature and function of search engines and what they offer to those seeking information via the world wide web.				
8	Describing additional internet applications and how they can be used.				
9	Realizing the important of evaluating information before downloading				
10	Understanding the different between shareware and freeware				
11	Describing and naming different file types.				
12	Understanding how different programme can be downloaded, saved and installed				

## SECTION D

### Research question 3

What are the programming trainings needed by teachers for effective management of industrial machine needed by electrical installation and maintenance work programme?

S/NO	ITEMS	S.A	A	D	S.D
1	Using the compiler to change from one programming language to the other				
2	Conversance with various programming language				
3	Conversance with programming terms and how they are put to use				
4	Good coding knowledge				

## SECTION E

### Research question 4

What are the various training needed for the use and management of electrical installation and maintenance work database?

S/NO	ITEMS	S.A	A	D	S.D
1	Ability to open a new work book including the use of template and wizard				
2	Recognizing the ability to use the standard and formatting toolbar of the Microsoft spread sheet.				
3	Understanding various terminology of the excel sheet				
4	Knowledge on the use of the excel spread sheet				
5	Entering the editing data in Microsoft excel including text, values, dates and formula				
6	Knowledge of the function within excel for moving and copying data from cell to cell or cell to workbook.				

## SECTION F

### Research question 5

What are the requirements for digital content delivery by electrical installation and maintenance work teachers?

S/NO	ITEMS	S.A	A	D	S.D
1	Ability to use a template or wizard to create to create a presentation				
2	Proficiency with the tools available to them for designing and delivering presentation				
3	Ability to create a presentation from a blank slide				
4	Knowledge of the basic features and terminologies of PowerPoint				
5	Ability to work with pictures and drawings when preparing a presentation				
6	Ability to accept and load clip art gallery items in a presentation				
7	Knowledge on the basic process for running a slide show including custom animation				