

**INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY
RESOURCES ON TEACHING OFFICE TECHNOLOGY AND MANAGEMENT
IN POLYTECHNICS IN NORTH-CENTRAL GEO-POLITICAL ZONE,
NIGERIA**

BY

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DECLARATION

I declare that, the work in this Thesis entitled “Influence of Information and Communication Technology Resources on Teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone. Nigeria” has been carried out by me in the Department of Vocational and Technical Education under the supervision of Prof. M. M. Aliyu and Prof. A. A. Udoh. The information derived from the literature has been duly acknowledged in the text and list of references provided. No part of this thesis was previously presented for another degree in this or any other institution.

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CERTIFICATION

This thesis entitled “Influence of Information and Communication Technology Resources on Teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria” by Acharu Faith TONY-OKEME, meets the regulations governing the award of the degree of Masters of Education (Business Education) of the Ahmadu Bello University, Zaria, and is approved for its contributions to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to the Almighty God.

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Abstract

This study focused on the influence of Information and Communication Technology Resources on Teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria. Descriptive survey design was used and the population which formed the sample for the study was all the Lecturers in the eleven (11) Polytechnics in the North-Central Geo Political Zone, Nigeria. Owing to the low number of the population of one hundred and thirteen (113), the whole population was used for the study. Five specific objectives, five research questions as well as five null hypotheses were raised for the study. The theoretical framework used for this study was Roger's Diffusion of Innovation Theory (2003). The instrument used for collection of data was a four-point scale rating questionnaire. Findings revealed that ICT resources were hardly available and inadequate thus the few lecturers who were proficient in its usage had no access to it. Based on the findings, the study recommended that adequate funds should be made available to institutions by the government for the purpose of procuring adequate ICT resources. The study also recommended that workshops, seminars, and comprehensive training and re-training programmes on ICT resource utilization should be organized by institutions for office technology and management lecturers at the Polytechnic to enable them gain current knowledge of the resources. The research concluded that owing to the fact that most ICT resources were not accessible to the lecturers for use; students were deprived of the benefits of learning with ICT related resources which could have improved their skills competence required for the office of today.

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LIST OF ABBREVIATIONS

ADAPTI	Advanced Digital Appreciation Programme for Tertiary Institutions
A	Agree
AA	Always Available
DBI	Digital Bridge Institute
D	Disagree
EMIS	Educational Management Information System
GI	Grossly Inadequate
HA	Hardly Available
I	Inadequate
IT	Information Technology
N	Total Number of Respondents
ND	National Diploma
NBTE	National Board for Technical Education
NCC	National Communications Commission
NITDA	National Information Technology Development Agency
NYSC	National Youth Service Corp
OTM	Office Technology and Management
SA	Strongly Agree
SD	Strongly disagree
SPSS	Statistical Package for Social Science
OA	Often Available
RA	Rarely Available

OPERATIONAL DEFINITION OF TERMS

- ICT Resources:** Information and Communication Technology hardware, software and services necessary for instructional delivery. It includes overhead projector, computer, Dictaphone, audio tape, video, printer, scanner, photocopier, facsimile machine, television and up to date software
- Hardware:** computer instruction or data that can be stored electronically in the computer
- Software:** physical components that make up a computer system
- Programming:** the process of developing and implementing various sets of instructions to enable a computer to do a certain task
- Data Construct:** a stream based component that stores information used by an associated stream based operator
- Telecommunication:** it is the exchange of information over significant distance by electronic means
- Overhead Projector:** a device that projects an enlarged image of a transparency placed on it into a wall or screen by means of an overhead mirror
- Optical Fiber:** a thin glass through which light can be transmitted
- Facsimile Machine:** a device that sends and receives printed pages to images over telephone lines by converting them to and from electronics
- CD ROM:** a compact disc used as a read only optical memory device for a computer system
- Digital Multimedia:** a general term meaning an application that has been authored using any combination of animation

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information and Communication Technology (ICT) in education has been continuously linked to higher efficiency, higher productivity, and higher educational outcomes, including quality of cognitive, creative and innovative thinking. ICTs is said to enhance the quality of education in several ways: by increasing learner's motivation and engagement and by facilitating the acquisition of basic skills (Wadi and Sonia, 2002, Adeosun, 2010). Rapid developments in ICTs have led to many changes in the responsibilities of the academics in tertiary institutions as the traditional methods of doing academic work are fast becoming inappropriate. Thus, ICT resources have been looked upon as a tool for lifting up the standard of education.

The growth of Information and Communication Technology (ICT) is dramatically reshaping teaching and learning processes in higher education (Pulkkinen, 2007). Nigeria, having observed the trend of events and change in the dimension of and pursuant of education with emphasis on ICT in other developed nations, has taken necessary steps by establishing National Information Technology Development Agency, (NITDA). The agency is saddled with the responsibility of facilitating the integration of ICT in key areas of the economy, education inclusive (NITDA, 2008). One of the pillars of successful implementation of effective Office Education programme at all levels is the availability and adequacy of teaching resources. This is in form of facilities, equipment and services needed to foster instructional deliveries and skills development to make for standard and quality products.

Educational experts maintain that ICT resources have a lot to do with achievement and performance in the teaching and learning process. Resources refer to something that can be used to help achieve an aim. It needs to be made available in adequate quantity to facilitate educational goals attained. According to Bongotons and Onyenwe (2010), availability and adequacy of ICT resources implies they are easily, readily, publicly, and generally found and enough in quantity and quality for use. Obviously, the availability and adequacy of these ICT resources is a necessary precondition for its use in the teaching process. Robert (1971) in Bongotons and Onyenwe (2010), reiterating the need for availability and adequacy of ICT resources in office technology and management programmes, opined that this will accelerate the achievement of all round preparation of an office manager. They further noted that resource availability and adequacy enhances the acquisition of knowledge and technical skills required in one or more areas of office technology and management thus providing enough practical experience in one or all office duties.

Teaching is an active process in which one person shares information with others to provide them with the information to make behavioral changes. Learning is the process of assimilating information with a resultant change in behavior. Research has made it clear that the quality of teaching is the key factor in improving learner's achievement. The most effective teaching is that which results in the most effective learning. Teaching can be said to be effective when an instruction is explicitly engaging, clear, takes cognizance of individual differences and ultimately leads to the learner's success. This suggests that the only way to improve learners' outcome is to improve instruction (Tinio, 2002). Teaching is becoming one of the most challenging professions in our society where knowledge is

expanding rapidly and demands are on teachers to learn how to use these technologies in their teaching. (Perraton, Robinson, and Creed, 2001).

Office Technology and Management (OTM) programme is the office education programme in the Polytechnic, which use to be the secretarial studies programme. This was approved in 2004 by NBTE, the supervisory body for Polytechnics in Nigeria. This change necessitated a comprehensive review of the curriculum (Atueyi, 2010). The new Objectives, theoretical and practical contents of the new curriculum are geared towards integrating students of OTM programme into the evolution of technology. Azuka (2000) noted that Nigerian Polytechnics are not just another set of institution of higher learning, as they are not only centres of learning and research but also institutions where technological, knowledge and skills (Office Technology and Management inclusive) are acquired for direct application in solving the problems of the society.

In view of the aforementioned, it is important to note that consequent upon the changes both in the curriculum and the name of the programme, emphasis is now being placed more than ever before on the skill aspect of teaching which involves Word Processing, spreadsheet and other ICT-related courses (Baba and Akarahu, 2012). There is therefore a need to emphasize on the utilization of ICT resources in the teaching of office technology and management courses in Polytechnics so that the effort made by the government to ensure high quality delivery system in education for the benefit of the learner and the larger society will not be in vain. This study will therefore focus on the influence of information and communication technology resources on teaching office technology and management in polytechnic in north-central geo-political zone, Nigeria. All these variables hitherto explained constitute the background for this research

1.2 Statement of the Problem

The UNESCO's policy paper for change and development in higher education requested that higher education (in which the Polytechnic is an integral part) should harness the benefits from the use of advances in ICT to improve the provision and quality of their education. As a corollary, the National Policy on Education realizing the need for a functional education for Nigerians mandated that teachers in particular must be ICT compliant (FGN,2004). This drive was reinforced by the policy provisions of National Communication Commission in Nigeria requesting for the integration of ICT into school curriculum and teaching (NCC, 2001)(Bongotons and Onyenwe ,2010).

In view of this, the Digital Bridge Institute (DBI) an initiative of the Federal Government of Nigeria through the Nigerian Communications Commission was established in 2004. Following this, in 2006, the Advance Digital Appreciation Programme for Tertiary Institutions (ADAPTI) was introduced by National Communication Commission as a capacity building programme aimed at improving the quality of teaching, research and administration. It was designed to train Vice Chancellors, Rectors, Provosts, Professors, Lecturers, and Non-Academic staff of tertiary institutions in basic Microsoft office tools, use of internet and e-learning. The programme is a "train the trainer" project for repositioning the nation's work force to translate the acquired skills into the quality of instructional deliveries in the classrooms, quality of students and graduates from Nigerian tertiary institutions. An analysis of the 9,149 beneficiaries, so far trained in this project showed that, 73 percent of them were academic staff involved in teaching and research (Nurudeen, 2011).

Despite the aforementioned benefits accrued to learners and the concerted effort made by the Government to provide training for lecturers on the utilization of ICT related resources in teaching, the researcher, through observation and personal interaction with lecturers of Polytechnics in North-Central Geo-political Zone, Nigeria has noted with dismay that ICT resources are still grossly underutilized in teaching office technology and management in these Polytechnics. This has no doubt deprived students of the benefits of learning with ICT resources, as experienced in other parts of the world. The foregoing problems prompted the researcher to carry out this research in order to identify the missing link with the aim of proffering possible solutions using empirical evidence.

1.3 Objectives of the Study

The main objective of this study was to assess the Influence of Information and Communication Technology Resources on Teaching Office Technology and Management in North-Central Geo-political Zone, Nigeria.

Specifically the study was intended to:

1. ascertain the of availability of ICT resources for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria
2. determine the adequacy of ICT resources for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria
3. ascertain whether ICT resources available for teaching Office Technology and Management are utilized for teaching in Polytechnics in North-Central Geo-political Zone, Nigeria

4. determine lecturers' competence in utilizing ICT resources in teaching Office Applications in Polytechnics in North-Central Geo-political Zone, Nigeria
5. determine the difference among male and female lecturer' perception of the influence of ICT resources utilization in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria.

1.4 Research Questions

The following questions were posed in line with the objectives of the study

1. What ICT resources are available for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?
2. To what extent are ICT resources adequate for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?
3. To what extent are ICT resources utilized for teaching Office Technology and Management by the lecturers in Polytechnics in North-Central Geo-political Zone, Nigeria?
4. To what extent are lecturers competent in the use of ICT resources for teaching Office Applications in Polytechnics in North-Central Geo-political Zone, Nigeria?
5. What is the difference among the male and female lecturers' perception of the influence of ICT resources utilization on teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?

1.5 Research Hypotheses

In line with the specific objectives and research questions, five null hypotheses were formulated to aid the research

1. There is no significant relationship between availability of ICT resources and teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria.
2. There is no significant relationship between adequacy to ICT resources and teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria.
3. There is no significant relationship between utilization of ICT resources and teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria.
4. There is no significant relationship between lecturers' ICT competence and teaching Office Applications in Polytechnics in North-Central Geo-political Zone, Nigeria.
5. There is no significant difference among the male and female lecturers perception of the usefulness of ICT resources utilization in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria.

1.6 Significance of the Study

The result of this study will be of importance to Polytechnic management, lecturers, students and the government. The researcher hopes that the findings of the study will help Polytechnic management and lecturers to see the benefits of utilizing ICT resources in teaching and its impact on learner's achievement so that they can be effectively committed to its usage. Also, it will aid the Polytechnic management in knowing the

state of ICT resources for lecturers' use, whether they are available, adequate and accessible or not.

Furthermore, it will enlighten the government and institutions on the importance of constantly organizing ICT training workshops and seminars for teaching staff so as to increase their mastery level, update their skills and boost their confidence. Finally, Office Technology and Management students will benefit as the outcome will add to existing literature on ways of improving the quality of classroom instructions so that they can fit effectively in the world of work after graduation.

1.7 Basic Assumptions of the Study

For the purpose of this study, it was assumed that:

1. ICT resources were accessible to Lecturers in Polytechnics in North-Central Geopolitical Zone, Nigeria
2. the Lecturers in Polytechnics in North-Central Geo-political Zone in Nigeria have gone through training on how to utilize ICT resources for teaching.

1.8 Delimitation of the Study

- a. The study was delimited to the eleven Polytechnics within the North-Central Geopolitical Zone in Nigeria. This is because these institutions were part of those whose lecturers were trained by ADAPTI and ETF Training workshops on the utilization of ICT resources in teaching.
- b. The ICT resources were delimited to the computer, overhead projector, audio tape, Dictaphone, video, printer, scanner, photocopier, facsimile machine, television, up-

to-date software and internet facilities because these were the ICT resources which graduate of the department are expected to be proficient in after graduation.

- c. The study was delimited to the Lecturers within the OTM department because the study was related to their field. In view of the foregoing, the researcher believes they were in the best position to provide accurate information that will help in the empirical study so as to have a more objective research result.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The discussion under this chapter focused on the following subheadings:

- 2.1 Theoretical Framework
- 2.2 Concept of Information Technology
- 2.3 Information and Communication Technology
- 2.4 ICT Policy in Nigeria
- 2.5 Benefits of ICT in Teaching
- 2.6 Barriers to the Utilization of ICT Resources in Teaching
- 2.7 Enablers to the Utilization of ICT Resources in Teaching
- 2.8 Teaching
- 2.9 Office Education
- 2.10 Empirical Studies
- 2.11 Summary of Reviewed Literature

2.1 Theoretical Framework

This research was based on Rogers Diffusion of Innovations Theory (2003) because it dealt with the adoption of technology which this current research looked at. Stuart (2000) described Rogers' Theory as a widely used theoretical framework in the area of technology diffusion and adoption. Similarly, Medlin (2001) asserted that Rogers' Diffusion of Innovations Theory is the most appropriate for investigating the adoption of technology in higher education and educational environments. Rogers (2003) usually used the word "technology" and "innovation" as synonyms. He opined that, adoption is a decision of full use of an innovation as the best course of action available and rejection is a decision not to adopt an innovation.

Four Main Elements in the Diffusion of Innovations Theory Innovation

The first element of the diffusion of innovation theory is innovation. Rogers (2003) offered the following description of an innovation: an innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption. An innovation may have been invented a long time ago, but if individuals perceive it as new, then it may still be an innovation for them. The newness characteristic of an adoption is more related to the three steps (knowledge, persuasion, and decision) of the innovation-decision process. According to Rogers (2003), Uncertainty is an important obstacle to the adoption of innovations. An innovation's consequences may create uncertainty. To reduce the uncertainty of adopting the innovation, individuals should be informed about its advantages and disadvantages to make them aware of all its consequences. Moreover, Rogers claimed that consequences can be classified as desirable versus undesirable, direct versus indirect, and anticipated versus unanticipated.

Communication Channels

The second element of the diffusion of innovations process is Communication Channels. For Rogers (2003), communication is a process in which participants create and share information with one another in order to reach a mutual understanding. This communication occurs through channels between sources. Rogers (2003) stated that a source is an individual or an institution that originates a message. A channel is the means by which a message gets from the source to the receiver. Rogers (2003) stated that diffusion is a specific kind of communication and includes these communication elements: an innovation, two individuals or other units of adoption, and a communication channel. Mass media and interpersonal communication are two communication channels, while

mass media channels include a mass medium such as television, radio, or newspaper, interpersonal channels consist of a two-way communication between two or more individuals.

On the other hand, diffusion is a very social process that involves interpersonal communication relationships. Thus, interpersonal channels are more powerful to create or change strong attitudes held by an individual. In interpersonal channels, the communication may have a characteristic of homophily, that is, the degree to which two or more individuals who interact are similar in certain attributes, such as beliefs, education, socioeconomic status, and the like, but the diffusion of innovations requires at least some degree of heterophily, which is the degree to which two or more individuals who interact are different in certain attributes. In fact, one of the most distinctive problems in the diffusion of innovations is that the participants are usually quite heterophilous.

Time

According to Rogers (2003), the time aspect is ignored in most behavioral research. Rogers (2003) argued that including the time dimension in diffusion research illustrates one of its strengths. The innovation-diffusion process, adopter categorization, and rate of adoptions all include a time dimension.

Social System

The Social System is the last element in the diffusion process. Rogers defined the social system as a set of interrelated units engaged in joint problem solving to accomplish a common goal. Since diffusion of innovations takes place in the social system, it is influenced by the social structure of the social system. For Rogers, structure is the patterned arrangements of the units in a system. He further claimed that the nature of the

social system affects individuals' innovativeness, which is the main criterion for categorizing adopters.

The Innovation-Decision Process

Rogers described the innovation-decision process as an information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation. According to him, the innovation-decision process involves five steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. These stages typically follow each other in a time-ordered manner.

The Knowledge Stage

The innovation-decision process starts with the knowledge stage. In this step, an individual learns about the existence of innovation and seeks information about the innovation. "What?" "how?," and "why?" are the critical questions in the knowledge phase. During this phase, the individual attempts to determine what the innovation is and how and why it works. According to Rogers, these questions form three types of knowledge: (1) awareness-knowledge, (2) how-to-knowledge, and (3) principles-knowledge.

- 1. Awareness-knowledge:** Awareness-knowledge represents the knowledge of the innovation's existence. This type of knowledge can motivate the individual to learn more about the innovation and, eventually, to adopt it. Also, it may encourage an individual to learn about other two types of knowledge.
- 2. How-to-knowledge:** The other type of knowledge, how-to-knowledge, contains information about how to use an innovation correctly. Rogers (2003) saw this

knowledge as an essential variable in the innovation-decision process. To increase the adoption chance of an innovation, an individual should have a sufficient level of how-to-knowledge prior to the trial of this innovation. Thus, this knowledge becomes more critical for relatively complex innovations.

3. Principles-knowledge: The last knowledge type is principles-knowledge. This knowledge includes the functioning principles describing how and why an innovation works. An innovation can be adopted without this knowledge, but the misuse of the innovation may cause its discontinuance.

To create new knowledge, technology education and practice should provide not only a “how-to” experience but also a “know-why” experience. According to him, an individual may have all the necessary knowledge, but this does not mean that the individual will adopt the innovation because the individual’s attitudes also shape the adoption or rejection of the innovation.

The Persuasion Stage

The persuasion step occurs when the individual has a negative or positive attitude toward the innovation, but the formation of a favorable or unfavorable attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection. The individual shapes his or her attitude after he or she knows about the innovation, so the persuasion stage follows the knowledge stage in the innovation-decision process. Furthermore, Rogers states that while the knowledge stage is more cognitive- (or knowing) centered, the persuasion stage is more affective (or feeling) centered. Thus, the individual is involved more sensitively with the innovation at the persuasion stage. The degree of uncertainty about the innovation’s functioning and the social reinforcement from

others (colleagues, peers, etc.) affect the individual's opinions and beliefs about the innovation. Close peers' subjective evaluations of the innovation that reduce uncertainty about the innovation outcomes are usually more credible to the individual. Individuals continue to search for innovation evaluation information and messages through the decision stage.

The Decision Stage

At the decision stage in the innovation-decision process, the individual chooses to adopt or reject the innovation. While adoption refers to full use of an innovation as the best course of action available, rejection means not to adopt an innovation. If an innovation has a partial trial basis, it is usually adopted more quickly, since most individuals first want to try the innovation in their own situation and then come to an adoption decision. The vicarious trial can speed up the innovation-decision process.

However, rejection is possible in every stage of the innovation-decision process. Rogers expressed two types of rejection: active rejection and passive rejection. In an active rejection situation, an individual tries an innovation and thinks about adopting it, but later he or she decides not to adopt it. A discontinuance decision, which is to reject an innovation after adopting it earlier, may be considered as an active type of rejection. In a passive rejection (or non-adoption) position, the individual does not think about adopting the innovation at all. Rogers (2003) stated that these two types of rejection have not been distinguished and studied enough in past diffusion research. In some cases, the order of the knowledge-persuasion-decision stages can be knowledge-decision-persuasion. Especially in collectivistic cultures such as those in Eastern countries, this order takes place and group influence on adoption of an innovation can transform the personal

innovation decision into a collective innovation decision. In any case, however, the implementation stage follows the decision stage.

The Implementation Stage

At the implementation stage, an innovation is put into practice. However, an innovation brings the newness in which some degree of uncertainty is involved in diffusion. Uncertainty about the outcomes of the innovation still can be a problem at this stage. Thus, the implementer may need technical assistance from change agents and others to reduce the degree of uncertainty about the consequences. Moreover, the innovation-decision process will end; since the innovation loses its distinctive quality as the separate identity of the new idea disappears. Reinvention usually happens at the implementation stage, so it is an important part of this stage. Reinvention is the degree to which an innovation is changed or modified by a user in the process of its adoption and Implementation.

Also, he explained the difference between invention and innovation. While invention is the process by which a new idea is discovered or created, the adoption of an innovation is the process of using an existing idea. Rogers (2003) further discussed that the more reinvention takes place, the more rapidly an innovation is adopted and becomes institutionalized. As innovations, computers are the tools that consist of many possible opportunities and applications, so computer technologies are more open to reinvention.

The Confirmation Stage

The innovation-decision already has been made, but at the confirmation stage the individual looks for support for his or her decision. According to Rogers (2003), this decision can be reversed if the individual is exposed to conflicting messages about the innovation. However, the individual tends to stay away from these messages and seeks supportive messages that confirm his or her decision. Thus, attitudes become more crucial at the confirmation stage. Depending on the support for adoption of the innovation and the attitude of the individual, later adoption or discontinuance happens during this stage. Discontinuance may occur during this stage in two ways.

First, the individual rejects the innovation to adopt a better innovation replacing it. This type of discontinuance decision is called replacement discontinuance. The other type of discontinuance decision is disenchantment discontinuance. In the latter, the individual rejects the innovation because he or she is not satisfied with its performance. Another reason for this type of discontinuance decision may be that the innovation does not meet the needs of the individual. So, it does not provide a perceived relative advantage, which is the first attribute of innovations and affects the rate of adoption.

Attributes of innovation and rate of adoption

Rogers (2003) described the innovation-diffusion process as “an uncertainty reduction process” and he proposes attributes of innovations that help to decrease uncertainty about the innovation. Attributes of innovations entails five factors that can affect adoption of innovation. These includes: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. Rogers stated that “individuals’ perceptions of these characteristics predict the rate of adoption of innovations. Also,

Rogers (2003) noted that although there is a lot of diffusion research on the characteristics of the adopter categories, there is a lack of research on the effects of the perceived characteristics of innovations on the rate of adoption.

Rogers defined the rate of adoption as the relative speed with which an innovation is adopted by members of a social system. The perceived attributes of an innovation are significant predictors of the rate of adoption. Rogers reported that 49-87% of the variance in the rate of adoption of innovations is explained by these five attributes. In addition to these attributes, the innovation-decision type (optional, collective, or authority), communication channels (mass media or interpersonal channels), social system (norms or network interconnectedness), and change agents may increase the predictability of the rate of adoption of innovations. Rogers (2003) said, personal and optional innovations usually are adopted faster than the innovations involving an organizational or collective innovation-decision. However, Rogers (2003) saw, relative advantage as the strongest predictor of the rate of adoption of an innovation.

Relative Advantage

Rogers (2003) defined relative advantage as the degree to which an innovation is perceived as being better than the idea it supersedes. The cost and social status motivation aspects of innovations are elements of relative advantage. For instance, while innovators, early adopters, and early majority are more status-motivated for adopting innovations, the late majority and laggards perceive status as less significant. Moreover, Rogers categorized innovations into two types: preventive and incremental (non-preventive) innovations. A preventive innovation is a new idea that an individual adopts now in order to lower the probability of some unwanted future event. Preventive innovations usually

have a slow rate of adoption so their relative advantage is highly uncertain. To increase the rate of adopting innovations and to make relative advantage more effective, direct or indirect financial payment incentives may be used to support the individuals of a social system in adopting an innovation. Incentives are part of support and motivation factors. Another motivation factor in the diffusion process is the compatibility attribute.

Compatibility

In some diffusion research, relative advantage and compatibility were viewed as similar, although they are conceptually different. Rogers (2003) stated that compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. If an innovation is compatible with an individual's needs, then uncertainty will decrease and the rate of adoption of the innovation will increase. Thus, even naming the innovation is an important part of compatibility. What the innovation is called should be meaningful to the potential adopter. What the innovation means also should be clear. This is part of the complexity attribute.

Complexity

Rogers (2003) defined complexity as the degree to which an innovation is perceived as relatively difficult to understand and use. Opposite to the other attributes, complexity is negatively correlated with the rate of adoption. Thus, excessive complexity of an innovation is an important obstacle in its adoption. A technological innovation might confront faculty members with the challenge of changing their teaching methodology to integrate the technological innovation into their instruction, so it might have different levels of complexity. If hardware and software are user-friendly, then they might be adopted successfully for the delivery of course materials

Trialability

According to Rogers trialability is the degree to which an innovation may be experimented with on a limited basis. Also, trialability is positively correlated with the rate of adoption. The more an innovation is tried, the faster its adoption is. As discussed in the implementation stage of the innovation-decision process, reinvention may occur during the trial of the innovation. Then, the innovation may be changed or modified by the potential adopter. Increased reinvention may create faster adoption of the innovation. For the adoption of an innovation, another important factor is the vicarious trial, which is especially helpful for later adopters. However, Rogers (2003) stated that earlier adopters see the trialability attribute of innovations as more important than later adopters.

Observability

The last characteristic of innovations is observability. Rogers (2003) defined observability as the degree to which the results of an innovation are visible to others . Similar to relative advantage, compatibility, and trialability, observability also is positively correlated with the rate of adoption of an innovation. In summary, Rogers (2003) argued that innovations offering more relative advantage, compatibility, simplicity, trialability, and observability will be adopted faster than other innovations. Rogers does caution, getting a new idea adopted, even when it has obvious advantages, is difficult, so the availability of all of these variables of innovations speed up the innovation-diffusion process.

Rogers diffusion of innovation theory gives us an insight into human attitude towards the adoption of technology. It points out the key elements in innovation adoption as the innovation itself, communication channel, time, and social system. The theory goes

further to highlight uncertainty as an important obstacle to the adoption of an innovation, and suggests that for uncertainty to be reduced, individuals should be well informed about its advantages and disadvantages to make them aware of all its consequences. The theory notes that of all the communication channels available, interpersonal channels are more powerful to create or change a strong attitude held by an individual.

More so, it highlights the major enablers to the adoption of an innovation as technical assistance and opportunity for trial of innovation. It puts forward five characteristics of innovation as relative advantage, compatibility, complexity, trialability, and observability and adds that individual's perception of these characteristics predicts the rate of adoption of innovations. On the whole, the Rogers theory of diffusion of innovation helps to understand the desires and main behavior in the adoption and utilization of Information and Communication Technology by Lecturers, for teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zones in Nigeria.

2.2 Concept of Information Technology

Today's world is a world of information explosion. This information explosion is taking place in such a fast speed that even a literate person is feeling as if he or she is illiterate being unable to cope up with such an information explosion. It is Information Technology (IT) that can help in coping with the information explosion. Information Technology is all about coping up with explosion of Information. Information Technology (IT) is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro-electronics based combination of computing and telecommunication. The term in its modern sense first appeared in a 1958 article published

in the Harvard Business Review, in which it was commented that the new technology does not yet have a single established name but shall be tentatively called Information Technology. It spans a wide variety of areas that include but are not limited to things such as processes, computer software, computer hardware, programming, languages and data constructs.

Information Technology consists of two words Information and Technology. The term Information refers to any communication or representation of knowledge such as facts, data or opinions in any medium or form, including textual, numerical, graphic cartographic, narrative or audiovisual forms. It occupies a strategic role in the scheme of human existence; through communication of information, development is facilitated. Information means any communication or representation of knowledge in any form. Agomou (2005) refer to information as facts, instructions and processed data that have been organized in any medium or form such organized facts or data which is meaningful to the end users or recipients. It can also be seen as data which has been processed, while technology according to Galbraith (2000) is the systematic application of scientific or other organized knowledge to practical tasks. It can also be seen as the equipment, machine and devices used in the application of knowledge to practical tasks. Technology is the practical form of scientific knowledge or the science of application of knowledge to practical.

Information Technology has been defined by many authors in different ways; according to Long (1991) Information Technology is a faculty or force that is totally permeating concrete and abstract reality and creating a new conception, new forms of interpretation, new ways of management and new insight into our life styles. Robson (1997) defined Information Technology as the phase that covers all the machineries or

skill concerned with the capturing, storage, transmittal or presentation of information. Olive and Chapman (1993) saw IT as technology which supports activities involving the creation, storage, manipulation and communication of information together with their related method, management, and application.

Osuagwu (1993) agreed with Robson as he saw Information Technology as the convergence of microelectronics, telecommunications computers, and storage facilities.

Ohakwe (2001) on the other hand considered Information Technology beyond hardware and software. He rather considered it as a process of acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information. Osuwa (2002) defined Information Technology as the application of scientific study of the art of using skills in making things, the mastery and utilization of manufacturing and industrial methods. Information Technology is a scientific, technological and engineering discipline and management technique used in handling information, it's application and association with social, economical and cultural matters (UNESCO, 2003). In a nutshell, Information Technology is any equipment or interconnected system or sub system of equipments that is used in the acquisition, storage manipulation, management transmission or reception of data or information. It is anything that renders data, information or perceived knowledge in any visual format whatsoever, via any multimedia distribution mechanism, is considered part of the domains space known as Information Technology.

Communication Technology

Communication is an integral part of human existence. Communication is a kind of social interaction where at least two interacting agent share a common set of signs and a common set of semiotic rules (Ochai, 2007). It is communication that decides the very

identity of human beings Modern society is turning into an information society and communication is the exchange of information. The advent of technological advancements helped to foster effective information communication in education Technology is the science of the application of knowledge to practical purposes, it is regarded as a major platform for societal development. Blissmer (2003) considered technology as the practical application of knowledge, it refers to those activities directed to the satisfaction of human needs, which produce alterations in material work. Therefore, Communication Technology is the process of transferring information from a Sender to a receiver with the use of a medium in which the communication information is understood by both sender and receiver. Communication Technology implies the knowledge, skills and understanding needed to exchange information verbally or non-verbal (Liverpool, 2002).

2.3 Information and Communication Technology

The impact of Information and Communication Technology (ICT) is becoming more pronounced worldwide. It has become such that rarely is anything mentioned in any area of human endeavour without reference to this type of technology. ICT cuts across all sectors, and it is becoming the driving force for effective and efficient operations of trade and commerce, government, medicine, education, human resources development, arts and culture, agriculture, national security and other areas of human endeavour. Information and communication technology could be said to encompass all those gadgets that deal with the processing of information for better and effective communication. According to the United Nations (2008), ICT covers Internet service provision, telecommunications equipment and services, Information Technology equipment and services, media and broadcasting,

libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.

In the last few decades, ICT has increasingly played a critical role in all fields of human endeavors it is readily useful in the areas of agriculture, engineering, education, medicine, law, architecture, aviation, commerce, insurance, banking and finance as well as maritime activities. Information and Communication Technology (ICT) involves the use of computers, internet and other telecommunication technology in every aspect of human endeavor. Yusuf (2005) defined ICT as computer based tools and techniques for gathering and using information. It encompasses the hardware and software, the network and several other devices (video, audio, photographic camera, etc) that can convert information, images, and sound into common digital form. It includes electronic information in processing technologies such as computer and internet, as well as fixed-line telecommunication networks. It is an eclectic application of computing, communication, telecommunication and satellite technology.

Similarly, Ochai (2007) defined ICT as any equipment interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, retrieval, movement, control, display, switching, interchange, transmission, reception of data. In another light, Information and Communication Technology is defined as the full range of electronic technologies and techniques used to manage information and knowledge (UNDP, 2003). Kayoma (2008) stated that ICTs are basically information handling tools, a varied set of goods, application and services that are used to reproduce, store, process, distribute and exchange information. Alkadi (2004) defined Information and

Communication Technology as a collection of individual technology component that are typically organized into computer based information systems.

More so, Ejide (2006) defined Information and Communication Technology as a set of tools that helps one work with information and to perform tasks related to information processing. And according to Onuma (2007), ICT is concerned with the aspect of managing and processing information through the use of electronics, computers, and computer software to convert, store, protect, process, transmit and retrieve information. ICT is also defined as computer based tools used by people to work with information and communication processing needs of an individual or an organization. It encompasses the computer, its hardware and software, the network and several other devices that converts information (text), images, sounds and motion and so on into common forms (Okute, 2010).

In addition to the aforementioned, ICT refers to the handling and processing of information for use by means of electronic and communication gadgets such as computers, overhead projectors, videos, it also encompasses the computer hardware and software, the network and several other devices (video, audio, photography camera, etc.) that convert information (text), images, sound, motion, and so on into common digital form (Milken Exchange on Education Technology, 1999). Boritz, (2000) saw ICT as the emergence of tools of microelectronic and telecommunications that are used in the automatic acquisition, analysis, storage, retrieval, manipulation, management, control, movement, display, transmission, reception, and interchange of quantitative and qualitative data). Lastly, Jimoh (2007) defined ICT as the handling and processing of information (texts, images, graphs,

instruction etc) for use, by means of electronic and communication devices such as computers, cameras, telephone.

Information and communication technology is daily giving rise to new concepts, new ideas and making impact not only in the industries or businesses but also in the education sector. Relating it to education, Miller and Akume, (2009) referred to it as the process of gathering accessing and dissemination of data for an enhanced learning. Similarly, Ofodu (2007) also referred to ICT as electronic or computerized devices, assisted by human and interactive materials that can be used for a wide range of teaching and learning as well as for personal use. From these definitions, ICT could therefore be seen as processing and sharing of information using all kinds of electronic device, an umbrella that includes all technologies for the manipulation and communication of information.

2.4 ICT Policy in Nigeria

Nigeria started implementing its ICT policy in April 2001 after the Federal Executive Council approved it by establishing the National Information Technology Development Agency (NITDA), as the implementing body. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realize the specifics of the country's vision of making Nigeria an IT capable country in Africa and a key player in the information society by the year 2015 through using IT as an engine for sustainable development and global competitiveness. The policy according to NITDA (2001) was:

- a. to create ICT awareness and ensure universal access in promoting ICT diffusion in all sectors of national life
- b. to create an enabling environment and facilitate private sector (national and multinational) investment in the ICT sector
- c. to encourage government and private sector joint venture collaboration
- d. to develop human capital with emphasis on creating and supporting a knowledge-based society
- e. to build a mass pool of ICT literate manpower using the NYSC, NDE, and other plat forms as a train-the-trainer scheme for capacity-building.

General objectives for ICT as stated in NITDA (2001) are:

- i. ensure that IT resources are readily available to promote efficient national development
- ii. guarantee that the country benefits maximally and contributes meaningfully by providing global solutions to the challenges of the information age

- iii. encourage local production and manufacturing of IT components
- iv. integrate Information Technology into the mainstream of education at all levels
- v. create Information Technology awareness and ensure its universal access in order to promote its diffusion in all sectors of Nigerian life
- vi. build a mass pool of IT literates and manpower.

Information and Communication Technology in Education

ICT in education according to Moursund, (2005) is a broad, deep and rapidly growing field of study. It was observed that an increasing number of countries are now undertaking training to develop skills in the use of ICT in teaching and other school activities, including classroom management, to ensure the teachers bring their skills to actual classroom teaching (UNESCO, 2003). It has been continuously linked to higher efficiency, higher productivity, and higher educational outcomes, including quality of cognitive, creative and innovative thinking. At present ICT is considered as an important means to promote new methods of instruction (teaching and learning). Pajo and Wallace, (2001) suggested that the use of ICT could improve performance, teaching, and administration, have a positive impact on education as a whole, and develop relevant skills in the disadvantaged communities.

A research review by Kozma (2005) suggested three significant concerns of consideration regarding ICTs impact on education. Firstly, student outcomes such as higher scores in school subjects or the learning of entirely new skills needed for a developing economy. And secondly, teacher and classroom outcomes such as development of teachers' technology skills and knowledge of new pedagogic approaches as well as improved

attitudes toward teaching Information and communication technology aims to improve students' performance by the intelligent application of technology that will increase the effectiveness and efficiency of teaching and learning process (Yusuf, 2005: Idih, 2005).

Business educator should use ICT to make their teaching more effective. It also provides students with individualized instructional activities that accommodate differences in students level of preparation, abilities and motivation to learn (Nwanewezi and Isifeh-Okpokwu, 2008). The ICT facilities used in the teaching learning process in schools according to (Bandeke, 2006); (Bolaji and Babajide, 2003) and (Ofodu, 2007) include; radio, television, computers, overhead projectors, optical fibers, fax machines, CD-Rom, Internet, electronic notice board, slides, digital multimedia, video/VCD machine and so on. They have provided innovation for teaching and learning, and have engendered advances in research about how people learn, thereby bringing about rethinking the structure of education (Lopez, 2003).

These various applications of ICT have a revolutionary impact on how we see the world and how we live. It also allows us to share experiences across geographical areas and organizations, so that we learn collectively and build on each others' advances. ICT as far as the education sector of the economy is concerned is more critical today than ever before since its growing power and capabilities are triggering changes in the learning environments available for education (Pajo and Wallace, 2001). At present, ICT is considered as an important means to promote new methods of instruction (teaching and learning). Volman and Van Eck (2001) opined that ICT can be a catalyst by providing tools which teachers use to improve teaching and by giving learners access to electronic media that make concepts clearer and more accessible. It can enhance educational opportunities

and outcomes for all categories of students, including students with intellectual disabilities (Anderson, 2009, Ademola, 2011).

Advantages of the Use of ICT in Education

In education, communication process takes place between teachers, students, management and administrative personnel which requires plenty of data to be stored for retrieval as and when required, to be disseminated or transmitted in the desired format. The hardware and software like Over Head Projector, Television, Radio, Computers and related software are used in the educational process. However ICT today is mostly focused on the use of Computer technology for processing the data. In this context, according to Trucano (2005) the advantages of ICT in education can be listed down as follows:

- 1.** quick access to information: Information can be accessed in seconds by connecting to the internet and surfing through Web pages.
- 2.** easy availability of updated data: Sitting at home or at any comfortable place the desired information can be accessed easily. This helps the students to learn the updated content. Teachers too can keep themselves abreast of the latest teaching learning strategies and related technologies.
- 3.** connecting geographically dispersed regions: With the advancement of ICT, education does not remain restricted within four walls of the educational institutions. Students from different parts of the world can learn together by using online, offline resources.

This would result in the enriching learning experience. Such collaborative learning can result in developing:

- a.** divergent thinking ability in students
- b.** global perspectives

- c. respect for varied nature of human life and acculturation
 - d. facilitation of learning
4. catering to the individual differences: ICT can contribute in catering to individual needs of the students as per their capabilities and interest. Crowded class rooms have always been a challenge for the teacher to consider the needs of every student in the class
 5. wider range of communication media: With the advent of ICT, different means of communication are being introduced in the teaching learning process. Offline learning, online learning, blended learning are some of the resources that can be used in educational institutions. Collaborative learning, individualized learning strategies can enhance the quality of group as well as individual learning with the real society. This can ensure the applicability of knowledge.

Wider learning opportunities for students application of latest ICT in education has provided many options to the learners to opt for the course of their choices. Many Online courses are available for them to select any as per their aptitude and interest. Students can evaluate their own progress through different quizzes, ready to use online tests. This can ensure fulfillment of the employment required in the job market thus minimizing the problem of unemployment. It can also provide more efficient and effective citizens to the society as per the changing needs (Trucano, 2005).

2.5 Benefits of ICT Resources in Teaching

Information and Communication Technology is more of an asset rather than a liability. Its importance in today's society cannot be underestimated; as it is a resource for the teaching and learning in our educational system. ICTs are exerting impacts on pedagogical approaches in the classrooms. Their contribution to changes in teaching

practices, school innovation, and community services is considerable. Few of ICTs benefits to the classroom teaching and learning process are listed to:-

- a. give greater exposure to vocational and workforce skills for students
- b. provide opportunities for multiple technologies delivered by teachers
- c. create greater enthusiasm for learning amongst students
- d. provide teachers with new sources of information and knowledge
- e. prepare learners for the real world
- f. producing people capable of working and participating in the new economies and societies arising from ICTs and related developments
- g. leveraging ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum (Kozma, 2005).

One of the benefits of using ICT resources is to convey information quickly and effectively to all students and to keep them interested in learning. It provides visuals of subjects to students that would result to their interest and motivation. More so, it increases learning and also saves time during lectures. To further buttress this fact, Cox, Preston and Cox (1999) carried out a study examining the factors relating to the uptake of ICT in teaching. The factors that were found to be the most important to these teachers in their teaching were: making the lessons more interesting, easier, more fun for them and the learner, more diverse, more motivating and more enjoyable.

Similarly, Ogunbote and Adesoye (2006) expressed that ICT resources adds new dimension to learning experiences because concepts were easier to present and comprehend when the words are complemented with images and animations. Stating further that it has been established that learners retain more when a variety of senses are

engaged in impacting knowledge: and the intensity of the experience adds retention and recall by engaging social, emotional and intellectual senses. ICT resources have also been shown to elicit the highest rate of information retention and result in shorter learning time (Ng, Miao, and Lee 2000).

2.6 Barriers to the Utilization of ICT Resources in Teaching

Although ICT has the potential to improve the educational system to a great extent, some countries are far from reaping these benefits because of certain barriers. Benzie, (1995) opined that understanding the pedagogical, psychological and cognitive barriers to the successful use of information and communication technology may be a vital precondition for improving the utilization of computers and other technological aids in the educational process. The barriers are categorized as external and internal barriers (Keengwe, and Onchwari 2008). According to Snoeyink and Ertmer (2001), the former include lack of equipment, unreliability of equipment, lack of technical support and other resource-related issues. The later include both institution level factors, such as organizational culture and teacher level factors, such as beliefs about teaching and technology and openness to change. How these external and internal barriers negatively influence the use of ICT in education are described below:

- 1. Inadequate Infrastructure and Resources:** The effective use of ICT resources in teaching would require the availability of equipment, supplies of computers and their proper maintenance including other facilities and accessories. Where constant electricity is absent, and provision is not made for alternative power supply, it becomes a challenge. Implementing ICT demands other resources, such as computers, printers, multimedia projectors, scanners, etc which are either not available or in short supplies in most of the

educational institutions. Besides, ICT requires up-to-date hardware and software. Using up-to-date hardware and software resources is a key feature in the diffusion of technology (Gulbahar 2007) but a rare experience in educational institutions.

- 2. Insufficient Funds:** Effective implementation of technology into education systems involves substantial funding. ICT-supported hardware, software, internet, audio visual aids, teaching aids and other accessories demand huge funds. Sharma (2003) states that the most notable of the barriers to the use of ICT in education in developing countries seems to be the political will of the people in the corridors of power. The allocation of sufficient funds for the educational sector which can be seen from the budgetary allocations in various countries. Mumtaz (2000) stated that many scholars proposed that the lack of funds to obtain the necessary hardware and software is one of the reasons teachers do not use technology in their classes. Afshari, Bakar, Su Luan, Samah, and Fooi. (2009) stated that efficient and effective use of technology depends on the availability of hardware and software and the equity of access to resources by teachers.
- 3. Lack of Vision and Plan:** Although many stakeholders, educators, government, in developing countries, consider that ICT investment enhances the instructional use of computers and improves teaching and learning, they neither provide computer tools in the classroom (Candiotti and Clark, 1998) nor provide state-of- the-art technology in order to make desirable learning changes in education (Kent and McNergney, 1999). This barrier mainly falls into two broad categories:
 - a. Government vision and plan:** Effective implementation of ICT in education is not merely a vision rather; it needs a proper plan, policies, execution and monitoring by respective government agencies.

- b. **Institution Vision and plan:** Ertmer (1999) wrote, “A vision gives us a place to start, a goal to reach for, as well as a guidepost along the way”. Many researchers have pointed out that an institution’s ICT vision is essential to effective ICT integration (Anderson and Dexter, 2000). Also, there are few higher educational institutions that have ICT facilities but cannot integrate it effectively due to lack of a proper vision and plan. So ICT integration is clearly related to actions taken at the institution level, such as the development of an ICT plan, ICT support, and ICT training (Haddad and Jurich, 2002) which is absent at most of the educational institutions.
4. **Teachers' Attitudes and Beliefs about ICT:** Teachers’ attitudes have been found to be major predictors of the use of new technologies in instructional settings (Almusalam, 2001). Mumtaz (2000) stated that, teacher’ beliefs about teaching and learning with ICT are central to integration. To be successful in computer use and integration, teachers need “to engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher”. Hence the successful use of ICT into classroom largely depends on teachers’ attitudes and belief relating to these. In fact, it has been suggested that attitudes towards computers affect teachers’ use of computers in the classroom and the likelihood of their benefiting from training. It is found that less technologically capable teachers, who possess positive attitudes towards ICT, require less effort and encouragement to learn the skills necessary for the implementation of ICT in their design activities into the classroom. Therefore, teachers who have positive attitudes towards ICT itself will be positively disposed towards using it in the classroom (Moseley and Higgins, 1999).

Moreover, Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals' negative attitudes is essential for increasing their computer skills. Therefore, if teachers want to successfully use technology in their classes, they need to possess positive attitudes to the use of technology. Such attitudes are developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use (Afshari et al 2009).

- 5. Lack of Knowledge and Skill:** According to Pelgrum (2001), the success of educational innovations depends largely on the skills and knowledge of teachers. Teachers' lack of knowledge and skills is one of the main hindrances to the use of ICT in education both for the developed and underdeveloped countries (Pelgrum, 2001; Ihmeideh, 2009). Integrating technology in the curriculum requires knowledge of the subject area, an understanding of how students learn and a level of technical expertise (Morgan 1996). Moreover, Berner (2003) found that the teacher's belief in their computer competence was the greatest predictor of their use of computers in the classroom. Therefore, lack of knowledge regarding the use of ICT and lack of skill on ICT tools and software have also limited the use of ICT tools in teaching.
- 6. Lack of Time:** These studies reported lack of time as one of the biggest constraints to the integration of ICT into the teaching learning situation. Teachers need time to learn how to use the hardware and software, time to plan, and time to collaborate with other teachers. Teachers also need time to develop and incorporate technology into their curriculum. Some teachers are unable to make appropriate use of technology in their own classrooms,

while others are unwilling to try because of anxiety, lack of interest, or lack of motivation (Duhaney 2001).

7. **Resistance to Change:** Nwaokocha (2004) lamented that some business educators in the teaching profession hold to their obsolete ideas and have refused to accommodate changes in the profession. According to him, they often say “this is how we were taught’. Therefore there are no innovation or dynamism in their dictionaries.

2.7 Enablers to ICT Resource Utilization in Teaching

Scholars like Jones, Gulati, Franklin and some others have put forward some factors that could enable the utilization of ICT resources by Lecturers, these include the following:

1. **Readily available technical support staff:** Most ICT enhanced teaching experiences require expertise beyond that usually possessed by Lecturers, Jones (2004) reported that the breakdown of a computer causes interruptions and if there is lack of technical assistance, then it is likely that the regular repairs of the computer will not be carried out resulting in teachers not using computers in teaching. The effect is that teachers will be discouraged from using computers because of fear of equipment failure since no one would give them technical support in case there is technical problem.
2. **Perceived usefulness:** Where Lecturers perceive ICT resources to be useful in their teaching and the students' learning, then according to the empirical evidence of previous studies (Tella, Tella, Toyobo, Adika and Adeyinka 2007) they are more likely to have a positive attitude to the use of ICT in the lecture.
3. **Accessibility of ICT resources:** Effective adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Obviously, if teachers cannot access ICT

resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology (Plomp, Anderson, Law, and Quale, 2009)

Therefore, most significant factor for utilizing ICT resources in teaching is for them to have regular access to functioning and relevant ICT resources on a consistent basis or acquire a computer for themselves. Regular use of ICT resources outside the classroom makes Lecturers comfortable and confident to utilize it in teaching.

- 4. Adequacy of ICT resources:** An adequacy of ICT resource within educational institutions is another major enabler to its utilization in teaching. Adequacy of computers (both hardware and software) and other ICT-supported tools which in turn results in sufficient computer experience for Lecturers in the institution can seriously enhance the use of it. (UNESCO 2002).
- 5. Supportive policies:** Effective implementation of ICT utilization in education requires commitment from the government, administrators, and teachers. A clearly spelt out ICT Policy at a national and institutional level with a budget that shows government support and commitment will no doubt go a long way (Gulati, 2008).
- 6. Adequate training:** Afshari et al, (2009) states that professional training is necessary for teachers to enable them to effectively use technology to improve student learning. It must prepare teachers to use technology effectively in their teaching. But this training should not consist merely of short workshops or training, which is not enough to build proper knowledge and skills.

Similarly, Bauer and Kenton, (2005); Franklin, (2007) opined that, teachers' training is a key factor to successful integration of computers into classroom teaching.

They carried out a study which revealed that whether beginner or experienced, ICT related training programs develop teachers' competences in computer use, influence teachers' attitudes towards computers as well as assisting teachers reorganize the task of technology and how new technology tools are significant in student learning. Fullan (1993) suggested that training should not be one-shot workshops, but rather ongoing experiences so that learners/teachers can be kept up to date with ever-changing technologies.

2.8 Teaching

What constitutes teaching may be subject to debate as it would be simplistic and reductive to insist on a monolithic definition of teaching, considering the multiplicity of factors that come into play. Most scholars would agree that the basic purpose of teaching is to enable learning. And the most effective teaching is that which results in the most effective learning. Therefore, teaching can be said to be an instruction that is explicitly engaging, clear, takes cognizance of individual differences and ultimately leads to the learner's success. According to Mohanan (1999) teaching is one with learning outcomes that effect changes in knowledge, abilities, skills, attitudes and mindset. Likewise, teaching is one that concerns students' learning outcomes, it entails lesson clarity, instructional variety, task orientation and it engages students in the learning process that leads to their success (Borich, 1992). In a nutshell, teaching is an active process in which one person shares information with others to provide them with information to make behavioral changes.

The Four Aces of Teaching

The four aces of teaching represent a consolidated way of thinking about the “process” of teaching as it influences the “product” students learning. Students’ learning is better, faster and or more long-lasting when teachers are able to apply the four aces. These aces according to Bulger, Mohr and Walls (2004). are:

1. **Outcome:** the first ace of teaching concerns the utilization of an outcome-based instructional orientation. Outcomes enable students to focus their attention on clear teaching goals. These outcomes inform students of where they are going and how to get there. Outcomes also provide the teacher with a framework for design and delivering the course content. Furthermore, outcomes enable teachers to assess student learning as a measure of their own instructional effectiveness.
2. **Clarity:** the second ace of teaching involves the clarity of instruction. More effective teachers typically provide students with highly explicit direction and explanations concerning the course organisation and content. When delivering instruction, nothing should be left to chance. If students are not meeting your expectations, your methods of delivery may lack the required degree of clarity. Additionally, the course should be structured in a way that affords students the opportunity to make connections between the new material that is being presented and the concept that they have already learnt.
3. **Engagement:** the third ace of teaching is engagement. The principle suggests that students learn by doing. The formal lecture represents an archaic model defined by instructor as “deliverer” and students as “receiver”. The model exemplifies one way communication and perpetuates an incomplete model of education. Accordingly teachers must create a dynamic

educational environment that affords students the opportunity to practice every concept that they are learning.

More effective teachers utilize instructional strategies that engage students repeatedly throughout the entire lesson. This engagement should begin early in the lesson and continue throughout the lesson: introduction, body and closure. As a general rule, a teacher should limit a lecture to not more than thirty minutes before employing a learning activity that actively engages all students. Furthermore, these engagement activities are intended to facilitate the development of knowledge, skill, and attitudes that will enable the students to accomplish the previously identified lesson outcome.

4. **Enthusiasm:** as straight as this may seem, if you hate to teach it, your students will hate to learn it. Conversely, if you love to teach, your students may very well love to learn. Enthusiasm is contagious. More effective teachers display a high level of enthusiasm that reflects their professional competence and confidence. These are derived from the individual subject matter knowledge and instructional experience. Teachers can begin to establish a positive learning environment by showing their passion for the subject matter using students names, reinforcing students' participation during classes and being active in moving among the students. The most critical component of fostering classroom enthusiasm however is student success. Accordingly the teacher's responsibility is to establish a classroom environment that allows a high degree of student achievement. Ultimately, high level of student achievement serves as a powerful motivator for both students and teacher.

Similarly, Okolocha and Onyeneke (2013) identified ten research supported characteristics of effective teaching to include: attention on students achievement, quality

teaching, responsive to students learning processes, effective and efficient learning opportunities, pedagogical practices that create cohesive learning communities, effective links between school and cultural context of the school, multiple tasks to support learning cycles, aligned curriculum goal effectively, pedagogy scaffolds feedback on students' task engagement among others.

2.9 Office Technology and Management

Office technology and management is an integral part of business education. It can be seen as a series of instruction designed to prepare middle and senior level manpower for government, industrial and business offices. It is defined as a programme of instruction aimed at developing skills, knowledge and understanding that are necessary to facilitate business, information, control and processing (Osuala, 2003). Office Technology and Management (OTM) use to be the secretarial studies programme in the Polytechnic in Nigeria. This change and new design was an initiative of the National Board for Technical Education (NBTE) (FRN, 2004a) to replace the Secretarial Studies programme offered in Nigerian Polytechnics. Office Technology and Management is now the new name for the former Secretarial Studies. This was approved in 2004 by NBTE, the supervisory body for Polytechnics in Nigeria. This change necessitated a comprehensive review of the curriculum (Atueyi, 2010). The new Objectives, theoretical and practical contents of the new curriculum are geared towards integrating graduate students of OTM programme into the evolution of technology. Ntukidem (2000) noted that the wind of change heralded by technological advancement has enveloped business education especially secretarial profession and its training programme.

The curriculum of Office Technology and Management programme was designed to equip students with vocational skills in Office Technology and Management and socio-psychological work skills for employment in various fields of endeavour and this is in line with the provision of the National Policy on Education (FRN, 2004b) with the aim of acquiring appropriate skills, abilities and competencies; both mental and physical, as equipment for the individual to live in and contribute to the development of the society (Aquah and Obi, 2001). The new name, Office Technology and Management programme is used as a comprehensive term referring to those aspects of the educational process involving general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life.

According to Adelakin (2009), the OTM programme was designed for two major reasons; first, as a response to the yearnings of the secretarial studies students and practitioners on the need to change the name of the programme as their products are only suitable for the traditional office environment. Secondly, and most importantly, as a result of the change in curriculum with more emphasis on Information and Communication Technology (ICT) and Management so as to enrich the knowledge of the students and equip them with necessary skills needed in today's office environment. The aim of the OTM programme, according to Dolor (2002), is to impart skills, knowledge and competencies, which makes the beneficiaries self-reliant. In addition to the aforementioned, Office Education can be said to be a type of education that is concerned with office occupations or the acquisition of the skills, aptitudes, attitude and knowledge for carrying out successfully, the functions in the office (Osagie, 1990).

Objectives of Office Education (Office Technology and Management)

Among the objectives of Office Education (office technology and management) according to Osuala (2003) were to:

1. to make judicious, socio-economic decisions as citizens.
2. to provide career information that helps students relate their interest, needs and abilities to occupational opportunities in business.
3. to provide educational opportunities for students preparing for career in fields other than business to offer knowledge and skills needed to function effectively on these careers. For example, to handle effectively both oral and written communication and to develop effectively interpersonal and human relation skills.
4. to provide skills needed to compete effectively on this challenging global competitiveness.

Economic Goals Served by Office Education

Office Education makes a significant impact on the nation's economy through the preparation of clerical workers for entry into the labour force. Its general objective is to develop knowledge and competencies in the area by:

- a. developing basic awareness of the contribution which office employees make to the nation's economic system
- b. improving personal qualities and building activities necessary for adjustment to personal and employment situation.
- c. developing the abilities of students to their maximum
- d. guiding the individual for suitable placement in office employment (Osuala, 2003).

Course Content of OTM the Polytechnic

National Diploma Programme in OTM

Technical English I, Citizenship Education, Introduction to Business, Shorthand I, ICT I, Office Practice I, ICT II, Citizenship Education II, Introduction to Entrepreneurship, Principles of Law Career Development, Shorthand II, Modern Office Technology, Technical English II, Research Techniques, Shorthand III, Records Management, Office practice II, Desktop Publishing, Principles of Accounting, Social Psychology, Principles of Economics, Web Page Design, Communication skills, Project, Small Business Management (NBTE, 2004).

Higher National Diploma Programme in OTM

Shorthand IV, ICT Office Applications, Office Administration and Management, Business Communications, Social Psychology, Business Law, Research Methods, Nigerian Labour Law, Professional career, development, ICT Office Application II, Office Administration and Management II, Human Capital Management, Advanced Transcription, Business Communications II, Database Management System, Oral communication skills, Elements of Human Resource Management, Advanced Desktop Publishing, Management Information Systems, Professional Ethics and Social Responsibility, Entrepreneurship, Advanced Web Page Design, Nigerian Labour Law, Project, (NBTE, 2004).

2.10 Empirical Studies

For the purpose of this study, the following empirical studies related to this research work were reviewed.

Jebba (2010) carried out a research titled: Survey of Accessibility and Usage of Information and Communication Technology among Students of Technical Education in

Tertiary Institutions in Niger state, Nigeria. The main objective of the study was to investigate the extent of availability, level of accessibility and use of ICT by students of technical education in Niger State tertiary institutions. The study adopted survey research design. The population of the study comprised of all the 1161 students of technical education department from the two tertiary institutions offering technical education programmes in Niger State. Yaro Yamane's sampling formula was used to sample 297 students from the two institutions while purposive sampling technique was adopted to select students that have spent at least one year in the institutions under study. Four research questions were formulated to guide the study.

A structured questionnaire was employed as the instrument for data collection. The questionnaire titled: Accessibility and use of Information and Communication Technology Questionnaire (AUICT) had 40 items generated to address the research questions. The questionnaire was structured with a four point scale. Data for the study were analyzed using mean and standard deviation to answer the research questions. To determine the level of acceptance, a mean score of 2.50 was chosen as the decision point. Consequently, any item with a mean score of 2.50 and above was considered acceptable (Agree) while responses with a mean score of 2.49 and below were regarded as not acceptable (Disagree).

The findings of the study revealed among other things that ICT facilities were not available for students' use at the Department and as such they do not have access to them. Some recommendations were made in line with the findings which among others include the urgent need for the department to make ICT facilities available and easily assessable to the students also the need to mandate students to create email addresses also was highlighted and the need to present assignments, paper presentations or course projects

using power point projector. While this researcher based his research on two technical institutions within Niger state the current researcher focused on Polytechnics within the North-Central Geo-political Zone, Nigeria. In addition, this researcher generated four research questions and purposively chose his sample but the current researcher used five research questions and the entire population for sample.

Vajargah, Jahani and Azadmanesh (2010) carried out a study in Tehran, Iran on application of ICTs in teaching and learning at University level: the case of Shahid Beheshti University. The objective was on the obstacles, facilitators, and the risks of using these technologies in teaching and learning in higher education. The Research population consisted of the three major groups: University academics, curriculum planners and ICT's professionals. The population of University professors was 578. A sample was selected using stratified sampling technique 231. Due to the smallness of the sizes of other sections of population (23 for curriculum planners and 18 for ICT's professionals) all of them were requested to participate in the study bringing the sample total to 272.

The researchers employed a survey research method using a questionnaire and designed in 4 sections with 40 items in Likert scale system. Validity of the instrument was reviewed by employing a specialist dominated focus group with participation of 10 experts and the questionnaire was revised based on the session results. The questionnaire's reliability was calculated through two methods: Alpha coefficient (0.90) and Split-half (0.91) and the results confirm the instrument reliability.

Research findings revealed several challenges pertaining to ICT application in Iran such as lack of National Policy for using ICT in Higher Education, lack of adequate investments, cultural obstacles, financial challenges, lack of continuity in ICT use, and lack

of systematic training and development programs. In view of these the researchers recommended that the institution should provide training programs aimed at keeping Lecturers informed on new developments in ICT, improving faculty members' belief on effectiveness of ICT. These researchers based their research on the utilization of ICT for teaching and learning, the current researcher will be focusing on teaching alone. More so, the research was carried out in Iran but the current researcher conducted this research work in Nigeria. However the current researcher adopted the split-half method of determining the reliability of the instrument.

Ubulom, Enyekit, Onuekwa, and Amaehule, (2011), conducted a research titled: Analysis of Information and Communication Technology Accessibility and Utilization in Teaching Business Studies in Secondary Schools in Andoni Local Government Area of River state, Nigeria. The study's main objective was to investigate information and communication technology (ICT) accessibility and utilization in teaching of business studies in secondary schools. This researcher adopted the descriptive survey design. Sixty-six (66) business studies teachers drawn from 30 secondary schools were used. From the above population, 40 were males while 26 were females. A 20 item questionnaires titled Information and Communication Technology Facilities Accessibility Questionnaire (ICTFAQ) and Information and Communication Technology Facilities Utilization Questionnaire (ICTFUQ) were designed for data collection for the study. Respondents were asked to rate each of the items on 4 point scale.

A split-half method was used with a pilot group of 10 business studies teachers from neighboring communities in Ogoni to derive the reliability coefficient of 0.86 using the Spearman Brown formula. The data gathered from the study were analyzed using the

mean (\bar{x}) and standard deviation as statistical tools. The mean of 2.5 was regarded as “Reject” while a mean response on or above 2.5 were regarded as “Accept” for research questions, while the null hypotheses were tested at 0.05 level of significance such that any calculated t-test value of 1.96 or above at 0.05 level of significance ($P > 0.05$) were regarded as “significant”. The findings revealed that ICT facilities were not available, and accessible by teachers in secondary schools in Andoni. It was also revealed that business studies teachers in these schools do not also have the skills of utilizing ICT for teaching of the subjects.

Finally, recommendations on ways of solving the above challenge were suggested for further consideration and implementation by both state and local government authorities. These researchers based their research on secondary schools within the Local Government, but the current researcher focused on Polytechnics within the North-Central Geo-political Zone Nigeria. More so, the statement of their null hypothesis sought to find differences in the mean scores of respondents, but current researcher sought for relationships between the variables.

In the South-East of Nigeria, Akude and Ebeniza (2012) conducted a study on Application of Information and Communication Technology in Teaching and Learning in State Owned Colleges of Education. The purpose of the study was to examine the level of application of ICT in teaching and learning. Four specific objectives and four research questions were formulated to guide in the achievement of the purpose of the study. The research design adopted for the study was the descriptive survey. The researcher employed the use of questionnaire to gather information from the sampled population. The reliability index of the questionnaire was calculated using the Pearson

Product Moment Correlation Coefficient and it gave 0.71. There are four (4) state owned Colleges of Education in the South East of Nigeria having a total of and six hundred and forty one (641) Lecturers.

However, the researcher purposively sampled 50% of the Lecturers. Thus, a sample of 321 Lecturers was arrived at and used. Data were collected using a questionnaire of a four point modified Likert type scale. The reliability of the instrument was ascertained by using ten teachers from another College of education to carry out a test – re-test exercise, and a reliability coefficient of 0.71 was established using Pearson Product Moment Correlation Coefficient Statistics. Data were analyzed using the mean and standard deviation statistical tools. Generally, the study revealed that the extent of Lecturers' utilization of the ICT facilities was very low as a result of poor electricity power supply, insufficient ICT facilities and lack of basic computer operational skills.

The researcher recommended that Lecturers at all level should try to improve on their capacity and ICT competencies, through trainings and workshops participation and that the government and college authorities should provide sufficient ICT facilities to enable Lecturers and students use them in teaching and learning. These researchers based their research on COE, but the current researcher focused on Polytechnics. More so, four research questions were generated, the present researcher utilized five research questions. In addition to these, these researchers selected 50 percent using purposive sampling; but the present researcher utilized the whole population as sample.

Similarly, Adegbemile (2012) conducted a research on Information and Communication Technology (ICT) Availability and Utilization in Management of Secondary Schools in Kaduna State, Nigeria. The purpose of the study was to

investigate the availability and utilization of ICT facilities in the management of secondary schools . The study adopted the descriptive survey design. The population of this study comprised of all secondary schools in Kaduna State. 50 secondary schools were selected by stratified random sampling from all the 118 Senior Secondary Schools located in the state. The principals in the 50 schools were the sample used for this study. A 20 item questionnaire titled Information and Communication Technology Facilities Availability and Utilization Questionnaire (ICTFUAQ) was designed for data collection for the study. Respondents were asked to rate each of the items on a 4 point scale.

To ensure the reliability of the instrument, a test-re-test technique was employed. A pilot study was carried out by administering the ICTFUAQ instrument at intervals of two weeks on 10 non participating Secondary School Principals in Sabon - Gari Local Government Area of the State. The reliability index was calculated using the person product moment correlation. A correlation co-efficient index of 0.98 was obtained. The mean of 2.5 was regarded as “Reject” while a mean response on or above 2.5 were regarded as “Accept”. The independent t – test was used to test hypothesis1 and 2. The two null hypotheses were tested at 0.05 level of significance. The study revealed that the available ICT facilities in the State were not adequate in schools and their utilization was a matter of concern.

The study further revealed that the views of both the Male and Female Principals on ICT facilities availability and utilization in the management of secondary schools did not differ. It was recommended that Government should as matter of urgency sponsor the training of principals on the utilization of ICT facilities in Educational Management and The Federal and State Ministries of Education should ensure the provision of electricity in

every school. The researcher recommended based on the results and findings of the study that government should also sponsor the re-training of principals on the utilization of ICT in Educational Management, and that school principals should involve the parent-teacher associations in the provision of ICT facilities in schools. This researcher was based on the use of ICT for administrative purpose in secondary schools within Kaduna state, but the current researcher focused on ICT for teaching in Polytechnics within The North-Central Geo-political Zone, Nigeria. More so, the statement of their hypothesis sought to find differences in the mean scores of respondents, but current researcher sought for relationships between the variables. In addition to that a 20 item questionnaire was used but the current researcher used a 48 item questionnaire.

In Katsina-Ala, Inibehe and Dankaro (2012) conducted a research on ICT Resource Utilization, Availability and Accessibility by Teacher Educators for Instructional Development in College of Education Katsina-Ala. The study investigated the utilization of ICT in the instructional mix by teacher educators in College of Education (COE) Katsina-Ala, Benue state, Nigeria. A total of forty COE Katsina-Ala teacher educators from 5 schools randomly selected, formed the sample size from a population of 287. The study adopted the Ex post Facto design based on the fact that the variables had already occurred. The population of the study comprised all 287 teacher educators (academic staff) in COE Katsina-Ala, Benue State. Forty (40) teacher educators out of the 287 were sampled for the study using the random sampling technique.

The instrument designed and used for data collection was the Teacher Educators' Information and Communication Technology Resource Utilization Questionnaire

(TEICTRUQ). Its reliability was ascertained in a test run in a private COE not used in the main study using Cronbach Alpha that yielded 0.71 coefficient, proving that the questionnaire was reliable. Furthermore, the Yes/No response category was adopted for the instrument in collecting data while frequencies and percentages were used in analyzing data. A score of less than 50% meant that the item was of no effect while a score of 50% and above meant that the item had significant effect.

The findings revealed that ICT resources were not available and for that reason, teacher educators could not access them for instructional development purposes. Based on these, it was recommended that the college authority should avail teacher educators in the institution with ICT resources and sponsor them on training and retraining programmes to produce ICT compliant students. While these researchers used a single institution, and a yes or no response questionnaire, the current researcher considered 11 institutions and a four-point-scale questionnaire.

In this particular chapter, six empirical studies were reviewed in all. These researcher's findings and recommendations helped the current researcher in the choice of objectives. However, the researcher from the review noted that none of the study focused on the Polytechnic, none of them considered the variable of teaching alone, none focused on the North-Central Geo-political Zone as a whole. The reviewed studies all sought to test for differences in opinions of the groups of respondents, while the current researcher sought to test for relationships between the variables involved in the study. In view of the above, these were some of the gaps noticed which the current study closed.

2.11 Summary of Reviewed Literature

This chapter reviewed in details works of theorist, researchers and writers related to the topic under research. The study considered the theory of Rogers(2003), which according to Medlin (2001), is the most appropriate theory to base a research on when it bothers on the lecturers' uptake of technology at the higher institution. The theory enumerated four main elements of the diffusion theory as innovation, communication channels, time and social system. According to Rogers (2003), the innovation decision process involves five steps which are knowledge, persuasion, decision, implementation and confirmation. These stages Rogers (2003) opined typically follow each other in a time-ordered manner. This chapter went further to look at the concept of information and communication technology.

The study saw information as any communication or representation of knowledge such as facts, data, or opinions in any medium or form including textual, numerical, graphic cartographic, narrative or audio visuals. In the same vein it referred to communication as a kind of social interaction where at least two interacting agent share a common set of signs and a common set of semiotic rule. And technology was considered to be the practical form of scientific knowledge or the science of the application of knowledge to practical. On the whole this chapter saw ICT as processing and sharing information using all kinds of electronic devices.

In the same light, it considered ICT in education as being linked with higher educational outcomes and higher quality pedagogy. And some of its advantages were said to include quick access to information, easy availability of updated data, connecting geographically dispersed region, catering to individual differences, and its possession of a

wide range of communication media. This chapter also looked at the specific benefits of ICT resources in teaching to include amongst others, preparation of learners for the real world, creation of great enthusiasm for learning among students and giving greater exposure to vocational and workforce skills for students. On the other hand, it considered barriers to the utilization of ICT resources in teaching, which includes: inadequate infrastructure and resources, insufficient funds, lack of vision and plan, teacher attitudes and beliefs about ICT, lack of knowledge and skills, lack of time and resistance to change.

Furthermore, this chapter highlighted enablers to ICT resource utilization in teaching and these are: readily available technical support, perceived usefulness, access to ICT resources, adequacy of ICT resources, supportive policies, and adequate training. In addition to these, this chapter considered teaching as an instruction that is explicit engaging, clear, takes cognizance of individual differences and ultimately leads to learners' success. It outlined outcome, clarity, engagement and enthusiasm as the four aces of teaching. Office Education was also considered in this chapter, it was seen as an integral part of business education and its objectives includes amongst others to make judicious socio-economic decision as citizens, and to provide skills needed to compete effectively in this challenging global competitiveness.

Finally, six empirical studies were reviewed, and from the review, the researcher noted that none of the study focused on the Polytechnic, none of them considered the variable of teaching alone, none focused on the North-Central Geo-political Zone as a whole. The reviewed studies all sought to test for differences in opinions of the groups of respondents, while the current researcher sought to test for relationships between the

variables involved in the study. These have created the gaps which the current researcher has filled.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter presented the different methods and procedures that was adopted to collect and analyse the data for this study under the following sub-headings:

- 3.1 Research Design
- 3.2 Population of the Study
- 3.3 Sample Size and Sampling Procedures
- 3.4 Instrument for Data Collection
 - 3.4.1 Validity of the Instrument
 - 3.4.2 Pilot Study
 - 3.4.3 Reliability of the Instrument
- 3.5 Procedure for Data Collection
- 3.6 Procedure for Data Analysis

3.1 Research Design

The descriptive research design was used in this study. This research design is a reliable tool for educational research because it is one of the least expensive methods of carrying out research. It allows the researcher to examine many variables (demographic, perception, competence). It also helps the researcher to detect what people think and what they do; it can be used for both small and large sample population. Mamman (2011) asserted that descriptive research design is suitable for the collection of large amount of data from a sizeable population in an economical way, based often on questionnaire, those

data are standard, allowing easy comparison. This design is easily understood. Descriptive research design therefore gives a remarkable accurate picture of a phenomenon.

3.2 **Population of the Study**

The population of the study is one hundred and thirteen (113) Lecturers of the Department of Office Technology and Management in the Polytechnics within the North-Central Geo-political Zones in Nigeria (Table 3.1). The States involved in this study were Kogi, Kwara, Nasarawa, Niger, Plateau and the Federal Capital Territory. There were four Federal Polytechnics, six State Polytechnics, and one Private Polytechnic. Benue state had only one State Polytechnic with eight Lecturers; Kogi State had a Federal and a State Polytechnic with twelve and thirteen Lecturers respectively. Nasarawa State had both a Federal and a State Polytechnic with ten and nine Lecturers respectively, Kwara State equally had two Polytechnics, and the Federal had eleven Lecturers while the State had nine Lecturers. Also, Niger had one Federal Polytechnic and one State Polytechnic; the former had thirteen Lecturers, while the later had nine. Plateau State on the other hand had a State Polytechnic with twelve Lecturers and FCT had a private Polytechnic with seven Lecturers. Table 3.1 shows the breakdown of population of the study.

Table 3.1: Population of the Study

States in Nigeria	North-Central	Names of institutions	No. of Lecturers
Benue		Benue State Polytechnic, Ugbokolo	08
Kogi		Federal Polytechnic, Idah	12
		Kogi State Polytechnic, Lokoja	13
Kwara		Federal Polytechnic, Offa	11
		Kwara State Polytechnic, Illorin	09
Nasarawa		Federal Polytechnic, Nasarawa	10
		Nasarawa State Polytechnic, Lafia	09
Niger		Federal Polytechnic, Bida	13
		Niger State Polytechnic, Zungeru	09
Plateau		Plateau State Polytechnic, Barikin- Ladi	12
FCT Abuja		Dorben Polytechnic, Bwari	07
		Total	113

Sources: (1) JAMB Brochure (2013), Polytechnics offering Office Technology and Management.

(2) Figures from Heads of Department of Office Technology and Management of the various private, states and Federal Polytechnics (2013).

3.3 Sample Size and Sampling Procedures

These six states and FCT Abuja made up the North Central Geo-political Zone, Nigeria. The researcher decided to study the entire sample population since they were few in number. This is also in line with the recommendation by Ademiluyi and Okwuanaso (2009) that it is ideal to study the entire population whenever it is not more than 250. Based on the size of the population, there was no sampling procedure.

3.4 Instrument for Data Collection

The main instrument that was used for collection of data is a four-point scale questionnaire. This was in line with the recommendation of Agbamu (2005), who opined that this will enable the respondents to indicate the degree of their opinion on a given statement. One hundred and thirteen (113) copies of the questionnaire were administered to the Lecturers to collect primary data. The questionnaire items were based on the objectives of the study and the research questions.

The questionnaire had forty-nine (49) items; it was divided into six sections. Section A focused on respondents' bio-data. Section B with items 1 - 12 focused on research question one which was on the availability of ICT resources for teaching Office Education. Section C bothered on research question 2 which focused on accessibility to ICT resources for teaching, with items 13 – 24. Section D with items 25 - 31 covered research question three which was on the utilization of ICT resources for teaching. Section E was based on research question four and it focused on lecturer's ICT competencies; it had items 32 – 38.

Finally, Section F was on research question five with items 39 – 45 which bothered on Lecturer's perceived usefulness of ICT resources in teaching. These helped to answer the five research questions. Thus the responses to questionnaire items 1 – 12 were based on a four-point-scale rating of Always Available (AA-4points), Often Available (OA-3 points), Rarely Available (RA-2 points) and Never Available (NA-1 point). Similarly, the responses to questionnaire items 13 – 24 were Very Accessible (VA-4 points), Accessible (AC-3 points), Inaccessible (I-2 points) and Grossly Inaccessible (GI-1 point). Then the

responses to questionnaire items 25 – 45 were Strongly Agree (SA-4 points), Agree (A-3points), Disagree (D-2points), and Strongly Disagree (SD-1point). (Please refer to Appendix III for details).

3.4.1 Validity of the Instrument

After designing the questionnaire, it was subjected to content and face validity by the researcher's supervisors and other experts in the field Research Methodology in Ahmadu Bello University, Zaria. The questions which were not related to the research topics were removed, while others were modified. Their suggestions and corrections were used in re-drafting the items of the instrument.

3.4.2 Pilot Study

A pilot study was carried out at Nuhu Bamali Polytechnic, Zaria. The researcher chose this institution because it possessed the same characteristics with the Polytechnics in the North-Central Geo-political Zone Nigeria. A total of thirteen (13) copies of questionnaire were distributed to all the Lecturers in the Office Technology and Management Department of the institution. The purpose of the pilot study was to determine the reliability of the designed questionnaire and to assess the ease with which the Lecturers responded to it. It was also to detect ambiguities in the questionnaires and to evaluate its ability to fulfill the objectives of the study and test the null hypotheses stated. The completed questionnaire were collected and subjected to statistical analysis in order to determine the internal consistency of the instrument for data collection.

3.4.3 Reliability of the Instrument

The method used to establish the reliability coefficient was the split-half as recommended by Nnamdi (2010). Pearson Product Moment Correlation (PPMC) was used to determine and obtain the correlation coefficient of 0.878. This was then corrected using Spearman Brown Formula. After subtracting the correlated value into the Spearman Brown Formula, the value of 0.94 ($p < 0.5$) was obtained. This result could be considered to be reliable, valid and consistent because Uche (2005) stated that when an instrument has a reliability coefficient of between 0.65 to 1, the instrument is reliable.

3.5 Procedure for Data Collection

The researcher obtained an approved letter of introduction from the Department of Vocational and Technical Education, Ahmadu Bello University Zaria to the various Polytechnics under study. Data collection was carried out by two research assistants. This was done by visiting the entire Polytechnics offering Office Technology and Management to administer copies of the research questionnaire. One research assistant covered Plateau, Nassarawa, Lafia and Niger State, while the second research assistant handled that of Kogi, Kwara, Benue State and the Federal Capital Territory. These research assistants visited each of the institution on a rotational basis to distribute the copies of the questionnaire and also to collect them back after completion. One hundred and thirteen (113) copies of the questionnaire were distributed to the Lecturers in the 11 Polytechnics situated within the North–Central Geo-political Zone Nigeria. The whole exercise lasted for twelve weeks.

3.6 Procedure for Data Analysis

The bio-data of respondents was analysed using percentages, and the research questions were analysed using mean. Null hypotheses one to four were tested using two-tailed Pearson Product Moment Correlation Coefficient at 0.01 level of significance. According to Osuala (2004), PPMC should be used when testing relationships between the dependent and independent variable. Hypothesis five was tested using independent t-test at 0.05 level of significance.

Decision rule: For the research questions, weighted mean score of 2.50 and above were considered as agree, while weighted mean scores of 2.49 and below were considered as disagree. For the analysis of null hypotheses one to four, where the **r-value** was less than the critical value (**r-value < r-critical value**), the null hypothesis was retained; on the other hand if the **r-value** is greater than the critical value (**r-value > r-critical value**), the null hypothesis was rejected. Also, for the analysis of hypothesis five, where the **t-calculated** value of **t-test** is greater than the **t-critical value** of **t-test** the null hypothesis was rejected otherwise it was retained. The null hypotheses were tested at 0.01 significant level (for hypotheses one to four while the fifth was tested at 0.05 level of significance).

All the “Always Available” and “Often Available” were classified as “Often Available”; similarly all the “Rarely Available” and “hardly Available” were grouped as “Rarely Available”. Also, all the “Very Adequate” and “Adequate” were classified as “Adequate”; similarly all the “Inadequate” and “Grossly Inadequate” were grouped as “Inadequate”. And all the “Strongly Disagree” and “Disagree” were classified as “Disagree”, while all the “Strongly Agree” and “Agree” were grouped as “Agree”.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter presented the results and interpretation of the findings of the study. It was presented under the following subheadings:

4.1 Analysis of Respondents Bio-Data

4.2 Answers to Research Questions

4.3 Test of Null Hypotheses

4.4 Summary of Major Findings

4.5 Discussion of Major Findings

4.1 Analysis of Respondents' Bio-data

A total of one hundred and thirteen (113) Lecturers in the Department of Office Technology and Management at the Polytechnics in North Central Geo-political Zone, Nigeria were issued questionnaires. However, only one hundred and eight (108) of them completed and returned theirs. Therefore the data in this chapter were based on one hundred and eight (108) respondents. Their demographic characteristics selected for the study were: institution, highest qualification, teaching experience and gender. These variables were tabulated in frequencies and percentages.

Table 4.1: Analysis of Respondents by their institution

Institutions	No of Lecturers	Percentage (%)
Benue State Polytechnic , Ugbokolo	8	7.4
Federal Polytechnic , Idah	12	11.1
Kogi State Polytechnic, Lokoja	13	12
Federal Polytechnic, Offa	10	9.3
Kwara State Polytechnic, Ilorin	9	8.3
Federal Polytechnic, Nasarawa	9	8.3
Nasarawa State Polytechnic, Lafia	8	7.4
Federal Polytechnic , Bida	12	11.1
Niger State Polytechnic, Zungeru	9	8.3
Plateau State Polytechnic, Barkin-Ladi	11	10.2
Dorben Polytechnic, Bwari	7	6.5
Total	108	100

Source: Field survey, 2014

The classification in table 4.1 revealed that Kogi State Polytechnic, Lokoja, had the highest number of lecturers with 13(12%), this was followed by Federal Polytechnic, Idah and Federal Polytechnic, Bida, with 12 (11.1%) lecturers each. Dorben Polytechnic, Bwari had the least number of lecturers with 7 (6.5%). Other involved were 8 (7.4%) from Benue State Polytechnic, Ugbokolo, 10 (9.3%) were from Federal Polytechnic, Offa. 9 (8.3%) lecturers were from Kwara State Polytechnic, Ilorin, 9 (8.3%) were from Federal

Polytechnic, Nasarawa, 8(7.4%) were from Nassarawa State Polytechnic, Lafia. 12(11.1%) were from 9 (8.3%) were from Niger State Polytechnic, Zungeru and 11 (10.2%) were from Plateau State Polytechnic, Barkin-Ladi.

Table 4.2: Analysis of Respondents by Educational Qualification

Highest qualification	Frequency	Percentage
HND	39	36.1
PGDE	28	25.9
B.BEd./BSc	10	9.3
M.Ed/M.Sc	22	20.4
Ph.D	9	8.3
TOTAL	108	100

Source: Field survey, 2014

From the classification on table 4.2, 39 (36.1%) of the Lecturers were Higher National Diploma Certificate holders, 28 (25.9%) were PGDE holders, 10 (9.3%) were B.BEd/B.Sc holders while 22 (20.4%) had M.Ed/M.Sc and 9 (8.3%) of them had Ph.D.

Table 4.3: Analysis of Respondents by their Teaching Experience

Years of Teaching Experience	Frequency	Percentage
Less than 5 years	14	12.9
6 – 10years	20	18.5
11 – 15years	25	23.1
16 – 20 years	30	27.8
20 years and above	19	17.7
Total	108	100

Source: Field survey, 2014

The teaching experiences as indicated in table 4.3 shows that they Lecturers had teaching experiences. Requisite teaching experiences enough to know much about the availability and utilization of Office Education in their Polytechnics. The classification indicated that 19 (17.6%) have above 20 years of teaching experience, while 30 (27.8%) have between 16 – 20 years of teaching experience. A total of 25 (23.1%) had between 11 – 15 years teaching experience while 20 (18.5%) had between 6 -10 years. Then 14 (12.9%) Lecturers had 5 years teaching experience and less.

Table 4.4 Analysis of Respondents by Gender

Gender	No. of respondents	Percentage
Male	68	63
Female	40	37
TOTAL	108	100

Source: Field Survey, 2014

The table 4.4 revealed that sixty-eight (68) respondents which constituted 63% of the population were male while forty (40) which constituted 37% of the population were female.

4.2 Answers to Research Questions

The results of the respondents are presented and analysed in respect to each of the research question. A 4-point scale was used for all the computations

4.2.1 Research Question One

What ICT resources are available for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?

The summary of items 1 – 12 of the questionnaire meant to answer research question one is shown in table 4.5

Table 4.5: Answer to Research Question One

S/N	Availability of ICT resources	OA	RA	N	CF	X	Decision
		7	3	4	10	2.5	
1	Computer	328	12	108	340	3.15	Often available
2	Over head projector	44	116	108	160	1.48	Rarely available
3	Audio tape	219	73	108	292	2.70	Often available
4	Dictaphone	85	92	108	177	1.6	Rarely available
5	Internet connectivity	72	117	108	189	1.75	Rarely available
6	Video	57	158	108	215	2.0	Rarely available
7	Printer	287	29	108	316	2.9	Often available
8	Scanner	60	174	108	234	2.17	Rarely available
9	Photocopiers	203	79	108	282	2.6	Often available
10	Facsimile machine	04	107	108	111	1.02	Rarely available
11	Television	56	106	108	162	1.5	Rarely available
12	Up to date software	53	103	108	156	1.44	Rarely available
	Grand Mean	1468	1176	1296	2644	2.04	Rarely available

Source: Field survey, 2014

Based on rating shown in table 4.5, Item no one (1), the responses on the availability of the computer can be seen at a glance. It showed the score of 328 for often

available, 12 for rarely available. The mean rating for the scores on the item was 3.15 which implied often available.

Item two (2) focused on the availability of overhead projector for teaching office technology and management. The score of often available was 44, rarely available was 116. The mean rating for the scores was 1.48, implying rarely available.

Item three (3) was to determine the availability of audio tapes for teaching office technology and management. The scores were 219 for often available, 73 for rarely available . The mean rating for the score on the item was 2.70 which implied often available.

Item four (4) focused on the availability of Dictaphone for teaching office technology and management. The score on often available was 85, that of rarely available was 92. The mean rating for the scores was 1.6, implying rarely available.

Item five (5) was to determine the availability of internet for teaching office technology and management. The scores were 72 for often available, and 117 for rarely available. The mean rating for the score on the item was 1.75 which implied rarely available.

Item six (6) was to determine the availability of video for teaching office technology and management , the score on often available was 57, while the score for rarely available was 158, with a mean rating of 2.0 which meant rarely available.

Item seven (7) was to determine the availability of printers for teaching office technology and management . The score on often available was 287, the scores for rarely available was 29. The mean rating was 2.9, this means often available.

Item eight (8) focused on the availability of scanners for teaching office technology and management. The scores were 60 often available, and 174 for rarely available. The mean rating for the score on the item was 2.17 which implied rarely available.

Item nine (9) focused on the availability of photocopiers for teaching office technology and management. The score on often available was 203, that of rarely available was 79. The mean rating for the scores was 2.6, implying often available.

Item ten (10) was to determine the availability of facsimile machine for teaching office technology and management. The scores were 4 often available, and rarely available 107. The mean rating for the score on the item was 1.02 which implied rarely available.

Item eleven (11) focused on the availability of television for teaching office technology and management . The score on often available was 56, that of rarely available was 106. The mean rating for the scores was 1.5, implied rarely available.

Item twelve (12) was to determine the availability of up-to-date software for teaching office technology and management. The scores were 53 for often available, and 103 for rarely available . The mean rating for the score on the item was 1.44 which implied rarely available

The grand mean total score of those who indicated that these ICT resources were often available for the teaching of office technology and management was 1468 often

available, while 1176 was for rarely available. The mean rating for the score on the item was 2.04 which implied rarely available. Therefore it could be inferred that most ICT resources were rarely available for teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria.

4.2.2 **Research Question Two**

To what extent are ICT resources adequate for use in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?

Items no 13 – 24 on the questionnaire answered this question as shown in table 4.6

Table 4.6.: Answer to Research Question Two

S/N	Adequacy of ICT resources	VA	I	N	CF	X	Decision
		7	3	4	10	2.5	
13	Computer	223	69	108	292	2.70	Adequate
14	Over head projector	35	129	108	164	1.51	Inadequate
15	Audio tape	194	91	108	285	2.64	Adequate
16	Dictaphone	38	148	108	186	1.72	Inadequate
17	Internet connectivity	36	116	108	152	1.41	Inadequate
18	Video	41	106	108	147	1.36	Inadequate
19	Printer	59	145	108	204	1.89	Inadequate
20	Scanner	42	117	108	159	1.47	Inadequate
21	Photocopiers	57	101	108	158	1.46	Inadequate
22	Facsimile machine	21	111	108	132	1.22	Inadequate
23	Television	53	109	108	162	1.5	Inadequate
24	Up to date software	47	96	108	143	1.32	Inadequate
	Grand Mean	846	1338	1296	2180	1.68	Inadequate

Source: Field survey, 2014

Based on rating shown in table 4.6, Item no thirteen (13), the responses on the adequacy of the computer can be seen at a glance. It showed the score of 223 for adequate while 69 was for inadequate. The mean rating for the score on the item was 2.70 which implied adequate.

Item fourteen (14) focused on the adequacy of overhead projector for teaching office technology and management. It showed the score of 35 for adequate while 129 was for inadequate. The mean rating for the scores was 1.51, which implied inadequate.

Item fifteen (15) was to determine the adequacy of audio tapes for teaching office technology and management. It showed the score of 194 for adequate while 91 was for inadequate. The mean rating for the score on the item was 2.64 which implied adequate.

Item sixteen (16) focused on the adequacy of Dictaphone for teaching office technology and management. It showed the score of 38 for adequate while 148 was for inadequate. The mean rating for the scores was 1.72. It implied inadequate.

Item seventeen (17) was to determine the adequacy of internet for teaching office technology and management. It showed the score of 36 for adequate while 116 was for inadequate. The mean rating for the score on the item was 1.41 which implied inadequate.

Item eighteen (18) was to determine the adequacy of video for teaching office technology and management. It showed the score of 41 for adequate while 106 was for inadequate, with a mean rating of 1.36 signified inadequate.

Item 19 was to determine the adequacy of printers for teaching office technology and management. It showed the score of 35 for adequate while 129 was for inadequate. The mean rating was 1.89, this meant inadequate.

Item 20 focused on the adequate of scanners for teaching office technology and management. It showed the score of 42 for adequate while 117 was for inadequate. The mean rating for the score on the item was 1.47 which implied inadequate.

Item twenty-one (21) focused on the adequacy of photocopiers for teaching office technology and management. It showed the score of 57 for adequate while 101 was for inadequate. The mean rating for the scores was 1.46, this meant inadequate.

Item twenty-two (22) was to determine the adequacy of facsimile machine for teaching office technology and management. It showed the score of 21 for adequate while 111 was for inadequate. The mean rating for the score on the item was 1.22 which implied inadequate.

Item twenty-three (23) focused on the adequacy of television for teaching office technology and management. It showed the score of 53 for adequate while 109 was for inadequate. The mean rating for the scores was 1.5. It implied inadequate.

Item twenty-four (24) was to determine the adequacy of up-to-date software for teaching office technology and management. It showed the score of 47 for adequate while 96 was for inadequate. The mean rating for the score on the item was 1.32 which implied inadequacy

The grand mean total score of those who affirmed that the itemized ICT resources were adequately available for teaching office technology and management were 846 while inadequate were 1338. The mean rating for the score on the item was 1.68 which implies inadequate. Therefore it could be inferred that most ICT resources are in adequate for use in teaching Office Technology and Management in Polytechnics in North-Central Geopolitical Zone, Nigeria.

4.2.3: **Research Question Three**

To what extent are ICT resources utilized for teaching Office Technology and Management by the Lecturers in Polytechnics in North-Central Geo-political Zone, Nigeria?

Items 25 – 31 on the questionnaire answered this question as shown in table 4.7

Table 4.7: Answer to Research Question Three

S/N	Utilization of ICT resources	SA	D	N	CF	X	DECISION
		7	3	4	10	2.5	
25	Lecturers do not utilize ICT resources in teaching because the available ones are unreliable due to lack of regular servicing	112	120	108	232	2.5	Agree
26	I always make allowance for ICT resource usage in all my lectures	42	120	108	162	1.50	Disagree
27	Usage of ICT resources is not necessary in teaching	179	67	108	246	2.28	Disagree
28	Lecturers do not utilize ICT resources in teaching due to the fact that they have no access to available ICT resources	178	69	108	247	2.29	Disagree
29	Lecturers do not utilize ICT resources because there are no technical support staff	180	77	108	257	2.38	Disagree
30	The available ICT resources are not utilized in teaching as they are outdated	178	69	108	247	2.29	Disagree
31	The available ICT resources are not regularly used due to lack of electric power supply.	294	27	108	321	2.97	Agree
	Grand Mean	1163	720	864	1712	1.98	Disagree

Source: Field Survey, 2014

Based on rating shown in table 4.7, Item no 25, the responses on whether the Lecturers do not utilize ICT resources in teaching because the available ones are unreliable due to lack of regular servicing. It showed the score of 112 for agree and 120 for disagree. The mean rating for the score on this item was 2.15 which were disagree.

Item 26 was on whether respondents always made allowance for ICT resource usage for teaching office technology and management. It showed the score of 42 for agree

and 120 for disagree. The mean rating for the score on the item was 1.5 which implied agree.

Item 27 sought to know whether the usage of ICT resources is not necessary in teaching office technology and management. It showed the score of 179 for agree and 67 for disagree. The mean rating for the scores was 2.28, it meant disagree.

Item 28 was on whether Lecturers do not utilize ICT resources in teaching due to the fact that they had no access to available ICT resources. It showed the score of 178 for agree and 69 for disagree. The mean rating for the score on the item was 2.29 which implied disagree.

Questionnaire item 29 sought to find out whether Lecturers do not utilize ICT resources because there were no technical support staffs. It showed the score of 180 for agree and 77 for disagree. The mean rating for the scores on the item was 2.38 which implied agree.

Item number 30 wanted to know if the available ICT resources are not utilized in teaching as they are outdated. It showed the score of 178 for agree and 69 for disagree. The mean rating for the scores on the item was 2.29, that was agree.

Item 31 was on whether the available ICT resources are not regularly used due to lack of electric power supply. It showed the score of 294 for agree and 27 for disagree. The mean rating for the scores on the item was 2.97, which implied agree.

The grand mean total score of those who agreed that the ICT resources were utilized for teaching office technology and management were 1163 while 720 for disagree.

The mean rating for the score on the item was 1.98 which implied disagree. This means that they do not utilize of ICT resources in teaching Office technology and management in Polytechnics in North- Central Geo-political Zone, Nigeria.

4.2.3 **Research Question Four**

To what extent are Lecturers competent in the use of ICT resources for teaching Office Applications in Polytechnics in North-Central Geo-political Zone, Nigeria?

Items number 32 – 38 on the questionnaire answered these questions as shown in table 4.8

Table 4.8: Answer to Research Question Four

S/N	Lecturers ICT skill competency for teaching Office Education.	A	D	N	CF	X	DECISION
		7	3	4	10	2.5	
32	I do not feel incompetent with the use of ICT resources in teaching	12	120	108	132	1.22	Disagree
33	I feel inadequate using ICT resources in teaching	157	97	108	216	2.00	Disagree
34	Lecturers need further trainings to be able to utilize ICT resources	259	59	108	319	2.94	Agree
35	Most lecturer do not know how to operate some of the available ICT resources	62	151	108	213	1.97	Disagree
36	I can present lectures using PowerPoint presentation application	178	69	108	257	1.94	Disagree
37	I am proficient in word processing application	242	72	108	314	2.90	Disagree
38	I have no knowledge on spreadsheet application	262	50	108	312	2.89	Agree
	Grand Mean	1080	672	756	1752	2.30	Disagree

Source: Field Survey, 2014

Based on rating shown in table 4.8, Item no 32, the responses on whether the Lecturers do not feel incompetent with the use of ICT resources in teaching. It showed the

scores of 12 agree and 120 disagree. The mean rating for the score on the item was 1.22 which was disagree.

Item 33 was on whether respondents felt inadequate using ICT resources in teaching office technology and management. It showed the scores of 157 agree and 97 disagree. The mean rating for the score on the item was 2.00 which implied agree.

Item 34 sought to know whether the Lecturers needed further trainings to be able to utilize ICT resources in teaching office technology and management. It showed the score of 259 agree and 59 disagree. The mean rating for the scores was 2.94, it implied disagree.

Item 35 was on whether they Most lecturer do not know how to operate some of the available ICT resources. The scores were 62 for agree, 151 for disagree. The mean rating for the score on the item was 1.97 which implied disagree

Item 36 was on whether they could present lectures using PowerPoint presentation application. It showed the score of 178 agree and 69 disagree. The mean rating for the score on the item was 2.29 which implied disagree

Questionnaire item 37 sought to find out whether they were proficient in word processing application. It showed the score of 242 for agree, 72 for disagree. The mean rating for the scores on the item was 2.38 which implied agree.

Item number 38 wanted to know if they have no knowledge on spreadsheet application. It showed the score of 262 for agree, 50 for disagree. The mean rating for the scores on the item was 2.29, which was agree.

The grand mean total score of those who agree was 1080 while for disagree was 672. The mean rating for the score on the item was 2.3 which implied disagree. This signifies that Lecturers ICT competence was low for the utilization of ICT resources in teaching Office Application in Polytechnics in North- Central Geo-political Zone, Nigeria.

4.2.5 Research Question Five

What is the difference among the male and female lecturers' perception on the influence of ICT resources utilization in teaching Office Technology and Management in Polytechnics in North-Central Geo-political Zone, Nigeria?

Items 39 – 45 on the questionnaire answered this question as shown in table 4.9

Table 4.9: Answer to Research Question Five

S/NO	Perceived influence of ICT by lecturers	A	D	N	CF	X	Decision
		7	3	4		2.5	
39	Utilization of ICT resources can make teaching more captivating, interesting and enjoyable	240 (120)	16 (0)	108	376	3.48	Agree
40	Teaching could be highly explicit when utilizing ICT resources	224 (132)	16 (0)	108	372	3.44	Agree
41	Utilization of ICT resources may not improves the rate of assimilation and retention	108 (126)	30 (24)	108	288	2.67	Agree
42	Students are not enthusiastic about learning with ICT resources.	76 (39)	62 (45)	108	222	2.06	Disagree
43	Utilization of ICT resources in teaching might not improve students' performances	248 (30)	60 (6)	108	344	3.19	Agree
44	ICT resource utilization could make teaching more tedious.	48 (138)	20 (40)	108	212	1.96	Disagree
45	Utilization of ICT resources makes lecture preparation difficult	48 (165)	26 (28)	108	246	2.28	Disagree
	Grand mean	944 (696)	284 (146)	108	2070	2.74	Agree

Scores in bracket are for male lectures and those inside are for female lecturers

Source: Field Survey, 2014

Based on rating shown in table 4.9, Item number 39 wanted to know if the utilization of ICT resources can make teaching more captivating, interesting and enjoyable. The scores for male and female were 240 and 120 for agree, the scores for disagree 16 and 0 for male and female respectively. The mean rating was 3.48, this meant agree.

Item 40 sought the opinion of respondents on whether teaching could be highly explicit when utilizing ICT resources. The scores for male and female were 224 and 132 for agree, the scores for disagree 16 and 0 for male and female respectively. The mean rating was 3.44, this meant agree.

Item 41 sought the opinion of respondents on whether utilization of ICT resources may not improve the rate of assimilation and retention. The scores for male and female were 108 and 126 for agree, the scores for disagree 30 and 24 for male and female respectively. The mean rating was 2.67, this meant agree.

Item 42 wanted to know if students are not enthusiastic about learning with ICT resources. The scores for male and female were 240 and 120 for agree, the scores for disagree 16 and 0 for male and female respectively. The mean rating was 2.60, this meant agree.

Item 43 was to find out if the utilization of ICT resources in teaching might not improve students' performance. The scores for male and female were 248 and 30 for agree, the scores for disagree 60 and 6 for male and female respectively. The mean rating was 3.19, this meant agree.

Item number 44 wanted to know if ICT resource utilization could make teaching more tedious. The scores for male and female were 48 and 138 for agree, the scores for

disagree 20 and 40 for male and female respectively. The mean rating was 1.96, this meant agree.

Item 45 which is the last item on the questionnaire sought the opinion of the respondents on whether utilization of ICT resources makes lecture preparation difficult. The scores for male and female were 48 and 165 for agree, the scores for disagree 26 and 28 for male and female respectively. The mean rating was 2.28, this meant agree.

The grand mean scores for male was 944 and that of female was 696 for agree, while that of disagree was 284 and 146 for male and female respectively. With a mean rating for the score as 2.74, it therefore, it could be deduced that both gender were of the opinion that the utilization of ICT resources had influence on the teaching office technology and management in Polytechnics within the north central geo-political zones in Nigeria.

4.3. Test of Null Hypotheses

Five null hypotheses were raised in the study to determine possible relationships between the variables and difference in opinions of the respondents. Null hypotheses one to four were tested using Pearson Product Moment Correlation (PPMC) with 0.01 level of significance (2-tailed), while the independent t-test was used to analyse null hypothesis five at 0.05 level of significance. The analysis of the null hypotheses were presented in Tables 4.10 to 4.14

4.3.1 Null Hypothesis One: There is no significant relationship between availability of ICT resources and teaching office technology and management in Polytechnic in North-Central Geo-political Zone, Nigeria.

Table 4.10 provided a PPMC test of relationship between Teaching and Availability of ICT Resources.

Table 4.10: Test of Null Hypothesis one (1) (HO1)

Variable	N	Mean	SD	r-value	r-crit value	p-value	Decision
Teaching	108	3.20	1.27	8.90	1.65	0.000	Significant
Availability of ICT	108	2.01	0.53				

Note: Correlation is significant at 0.01 level (2 tailed test)
Source: Field study 2014

The results obtained from table 4.10 revealed that there was a relationship between availability of ICT related resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria, This position was confirmed by the outcome of the table which showed that the value of teaching had a mean score of 3.20, standard deviation of 1.27, while availability of ICT resources had a mean score of 2.01 and a standard deviation of 0.53. The r-value was greater than the r-critical value ($8.90 > 1.65$). It therefore implied that the null hypothesis which stated that there is no significant relationship between availability of ICT related resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria was thereby rejected.

4.3.2 Null Hypothesis Two: There is no significant relationship between adequacy of ICT resources and teaching of office technology and management in Polytechnic in North-Central Geo-political Zone, Nigeria.

Table 4.11 provides a computed PPMC test for relationship between Teaching and Adequacy of ICT Resources.

Table 4.11: Test of Null Hypothesis Two (2) (HO2)

Variable	N	Mean	SD	r-value	r-crit value	p-value	Decision
Teaching	108	3.20	1.27	11.33	1.65	0.000	Significant
Adequacy of ICT	108	1.68	0.61				

Note: Correlation is significant at 0.01 level (2 tailed test)
Source: Field study 2014

The results obtained from table 4.11 revealed that there was a relationship between adequacy of ICT resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria, This position was confirmed by the outcome of the table which showed that the value of teaching had a mean score of 3.20, standard deviation of 1.27, while adequacy of ICT resources had a mean score of 1.68 and a standard deviation of 0.61. The r-value (11.33) was greater than the r-critical value (1.65). It thus meant that the null hypothesis which stated that there was no significant relationship between adequacies of ICT resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria was thereby rejected.

4.3.3 Null Hypothesis Three: There is no significant relationship between utilization of ICT resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria.

Table 4.12 provides a computed PPMC test for the Relationship between Teaching and Utilization of ICT Resources.

Table 4.12: Test of Null Hypothesis Three (3) (HO3)

Variable	N	Mean	SD	r-value	r-crit value	p-value	Decision
Teaching	108	3.20	1.27	6.52	1.65	0.000	Significant
Utilization of ICT	108	2.15	0.10				

Note: Correlation is significant at 0.01 level (2 tailed test)

Source: Field study 2014

The results obtained from table 4.12 showed that the value of teaching had a mean score of 3.20, standard deviation of 1.27, while utilization of ICT resources had a mean score of 2.15 and a standard deviation of 1.10. The r-value of 6.52 is greater than the r-critical value of 1.65 ($6.52 > 1.65$). It therefore meant that the null hypothesis which stated that there was no significant relationship between utilization of ICT resources and teaching of office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria was rejected.

4.3.4 Null Hypothesis Four: There is no significant relationship between lecturers’ ICT skills competence and teaching Office Applications in Polytechnics in North-Central Geo-political Zone, Nigeria.

Table 4.13 provides a computed PPMC test for the Relationship between Lecturers’ ICT Skill Competence, and teaching of Office Application.

Table 4.13: Test of Null Hypothesis Two (2) (HO2)

Variable	N	Mean	SD	r-value	r-crit value	p-value	Decision
Teaching	108	3.20	1.27	7.36	1.65	0.000	Significant
Competence in ICT	108	2.32	0.26				

Note: Correlation is significant at 0.01 level (2 tailed test)
Source: Field Study, 2014

Table 4.13: analyzed the relationship between lecturers’ ICT skill competence and teaching of Office Application in Polytechnics. The outcome of the table which showed that the value of teaching had a mean score of 3.20, standard deviation of 1.27, while Lecturers skill competence in ICT resources had a mean score of 2.32 and a standard deviation of 0.26. The r-value was greater than the r-critical value ($7.36 > 1.65$). It therefore implied that the null hypothesis which stated that there was no significant relationship between Lecturers’ perceived level of ICT skill competence and teaching of Office Application in Polytechnics in North-Central Geo-political Zone, Nigeria was rejected.

4.3.5 Null Hypothesis Five: There is no significant difference among male and female lecturers' perception of ICT resources utilization for teaching of Office Education in Polytechnics in North-Central Geo-political Zone, Nigeria.

Table 4.14 provides a computed t-test for differences in Opinion among male and female lecturers' Perception of the influence of ICT Resources Utilization for Teaching office technology and management.

Table 4.14: Test of Null Hypothesis five (5) (HO5)

Variable	N	Mea	SD	t-cal	t-crit	P-value	Decision
Male	68	2.78	0.36	0.56	1.69	0.96	Not Significant
Female	40	2.64	0.27				

Source: Field Study, 2014

The outcome of table 4.14 showed that the value of male had a mean score of 2.78, standard deviation of 0.36 while female had a mean score of 2.64 and a standard deviation of 0.27. The t-cal was less than the t-crit ($0.56 < 1.69$). It therefore implied that the null hypothesis which stated that there is no significant difference among male and female lecturers' perception on the usefulness of ICT resources utilization in teaching of office technology Polytechnics in North-Central Geo-political Zone, Nigeria was thereby accepted.

4.4 Summary of Major Findings

The following are the major findings of the study:

1. There was a significant relationship between availability of ICT resources and teaching office technology and management in North-Central Geo-political Zone, Nigeria.(p-value 0.000)
2. There was a significant relationship between adequacy of ICT resources and teaching office technology and management in North-Central Geo-political Zone, Nigeria. (p-value 0.000)
3. There was a significant relationship between utilization of ICT resources and teaching office technology and management in North-Central Geo-political Zone, Nigeria. .(p-value 0.000)
4. There was a significant relationship between lecturer's ICT competence and teaching office application in Polytechnics in North-Central Geo-political Zone, Nigeria. .(p-value 0.000)
5. There was no significant difference in opinion among the male and female lecturers' perception of the influence of ICT resources utilization on teaching office technology and management in North-Central Geo-political Zone, Nigeria.(p-value 0.96)

4.4 Discussion of Findings

This research work was specifically carried out to assess the influence of ICT resources on teaching office technology and management in North-Central Geo-political Zone, Nigeria. In order to achieve this purpose, five research questions and five null hypotheses were raised. The first research question stated that, what ICT resources are availability for use in teaching office technology and management in North-Central Geo-

political Zone, Nigeria? The null hypothesis one stated that there is no significant relationship between availability of ICT resources and teaching office technology and management in North-Central Geo-political Zone, Nigeria. It can be seen from table 4.5 with a grand mean score of 2.04 showed that most ICT resources like the overhead projector, internet connectivity, video, scanner, facsimile machine, television, and up-to-date were rarely available.

More so, the study found that there was a significant relationship between availability of ICT resources and teaching office technology and management in these Polytechnics as shown by an r-value of 8.90 which is greater than the r-critical value of 1.65 (p-value of 0.000). This finding was consistent with Okoro (1991), who made it known that ineffective teaching of Vocational and Technical Education (Office Education inclusive) may be caused by lack of suitable resources, equipment and materials. He added that they had to be supplied if effective teaching and remarkable improvement in the performance of students was to be made. The general observation was that most lecturers were of the opinion that few of the ICT resources were available. Those available ICT related resources were the computer, printer, photocopying machine and audio tape. But in view of the requirement for Office Education course implementation, most of those ICT related resources which were not available in these institutions happen to be equally vital.

The second research question posed was, to what extent are ICT resources adequate for use in teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria? And the null hypothesis two stated that there was no significant relationship between adequacy to ICT resources and teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria. It could

also be observed from table 4.6, the grand mean score of 1.68 showed that ICT resources were not adequate for use by lecturers. This was also confirmed by null hypothesis two which also showed an r-value of 11.33 which was greater than the r-critical value of 1.65. This result revealed a significant relationship between ICT resource and teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria.

Most ICT resources were inadequate and in some in some cases lacking. This applied to overhead projector, internet connectivity, video, scanner, facsimile machine, television, and up-to-date software. Likewise available ICT resources in these Polytechnics also could not be said to be adequate. This was particularly the case with photocopiers and printers. This situation also applied to virtually most of the Polytechnics involved in the study within the Zone. This finding agreed with Jegede (2008) who reported that a strong relationship exists between adequacy of ICT resources and usage in teaching and learning. This finding was also in line with Gulbahar (2007) who opined that adequacy and accessibility to up-to-date hardware and software resources was a key feature in the diffusion of technology, but a rare experience in educational institutions. Adequacy of computers (both hardware and software) and other ICT-supported tools which in turn results in sufficient computer experience for lecturers in the institution can seriously enhance the use of it (UNESCO 2002). Effective adoption and integration of ICT related resources into teaching in schools depends mainly on the adequacy and accessibility of hardware, software, etc. Obviously, if teachers cannot access ICT related resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology (Plomp, Anderson, Law, and Quale, 2009).

The third research question stated that to what extent are ICT resources utilized for teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria? And the null hypothesis also stated that there is no significant relationship between utilization of ICT resources and teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria.

The result of research question three could be seen from table 4.7 which showed a grand mean score of 1.98 meant that most respondent disagreed that they always made use of ICT resources teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria, however they agreed that the available ICT resources were not utilized due to lack of technical support staff as well as lack of power supply. On the other hand, the test result of null hypothesis three showed that the r-value is greater than the r-critical value ($6.52 > 1.65$) at a p-value of 0.000. This indicated that there was significant relationship between utilization of ICT resources and teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria. This finding was in agreement with Snoenyink and Ertmers (2001) who said external barriers to the utilization of ICT related resource in teaching included lack of equipment, unreliability of equipment, and lack of technical support staff. Non-availability of technical support staff and lack of constant power supply were unanimously pointed out as a challenge to the use of ICT resources in teaching.

Jones (2004) also confirmed that the breakdown of a computer causes interruptions, and if there was lack of technical assistance, then it was likely that the regular repairs of the computer will not be carried out resulting in Lecturers not using computers in teaching. The effect according to him is that Lecturers will be discouraged from using computers in

teaching because of fear of equipment failure since no one would give them technical support in case there are technical problems.

The fourth research question stated that, what is the lecturers' competence in utilizing ICT resources in teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria? While the null hypothesis stated that there is no significant relationship between Lecturers' ICT competence and teaching office applications in Polytechnics in North-Central Geo-political Zone, Nigeria. The finding as indicated in table 4.8 was a clear picture of the popular saying that a teacher cannot give what he does not have as it showed a 2.30. Although most Lecturers agreed that they did not feel incompetent and inadequate utilizing ICT resources in teaching, they however were of the opinion that lecturers needed further training to be able to use ICT resources in teaching. They also agreed that they cannot present lectures using power point, and they were not proficient in spread sheet application. The result of null hypothesis four supporting research question four, showed an r-value of 7.36 and an r-critical value of 1.65($r\text{-value} > r\text{-crit. value}$). It therefore implied that a significant relationship exists between Lecturers' ICT skill competence and teaching Office Application in Polytechnics in North-Central Geo-Political Zone, Nigeria.

This finding was consistent with Badau and Sakiyo (2013) who reported a low level of teacher competence in ICT skills. This finding was also supported by Pelgrum (2001) who opined that the success of educational innovations depends largely on the skills and knowledge of Lecturers. He went further to point out that Lecturers' lack of knowledge and skills was one of the main hindrances to the use of ICT resources in education both for the developed and underdeveloped countries. Similarly, Berner (2003) found that the teacher's

belief in their competence was the greatest predictor of their use of computers in teaching. Therefore, lack of knowledge regarding the use of ICT and lack of skill on ICT tools and software have also limited the use of ICT tools in teaching.

Afshari et al, (2009) suggested that professional training was necessary for teachers to enable them to effectively use technology to improve student learning, that the training must prepare teachers to use technology effectively in their teaching. They added that this training should not consist merely of short training workshops, which is not enough to build proper knowledge and skills. Further supporting, Bauer and Kenton, (2005); Franklin, (2007) opined that, teachers' training was a key factor to successful integration of computers into classroom teaching. They carried out a study which revealed that whether beginner or experienced, ICT related training programs develop teachers' competences in computer use, influence teachers' attitudes towards computers as well as assisting teachers reorganize the task of technology and how new technology tools are significant in student learning. Fullan (1993), suggested that training should not be one-shot workshops, but rather ongoing experiences so that learners/teachers can be kept up-to-date with ever-changing technologies.

The fifth objective of this study was to determine the difference among the male and female lecturers' perception of the influence of ICT resources utilization on teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria. While the null hypothesis stated that there is no significant difference among the male and female lecturer's perception on the influence of ICT resources on teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria. The t-test showed that the t-calculated was 0.56 while the t-critical was 1.69. Since the t-

calculated was less than the t-critical, it therefore implied that the null hypothesis was accepted. Therefore there is no a significant difference among the male and female lecturer's perceived influence of ICT resources in teaching office technology and management in Polytechnics in North-Central Geo-political Zone, Nigeria. From table 4.2.5 it could be seen that both the male and female lecturers were of the opinion that ICT resources influences teaching. They were unanimous in their perception of the fact that utilization of ICT resources makes teaching more captivating, interesting and enjoyable.

This finding agreed with the study carried out to examine the factors relating to the uptake of ICT in teaching by Cox, Preston and Cox (1999). According to them, the factors that were found to be the most important to these teachers in their teaching were: making the lesson more interesting, easier, more fun for them and the learner, more diverse, more motivating, and more enjoyable. However, they were divided in their opinion on the fact that teaching could be highly explicit when utilizing ICT resources, as well as the fact that ICT resource usage could make teaching more tedious.

Mumtaz (2000) stated that, teacher' beliefs about teaching and learning with ICT are central to integration. Teachers who have positive attitudes towards ICT itself will be positively disposed towards using it in the classroom (Moseley and Higgins, 1999), while Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. Hence the successful use of ICT resources in classroom largely depends on teachers' attitudes and belief relating to it. Where lecturers want to successfully use technology in their lectures, they need to possess positive attitudes to the use of technology. Such attitudes are developed when teachers are

sufficiently comfortable with technology and are knowledgeable about its use (Afshari et al, 2009).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary, conclusion and recommendation under the following headings

- 5.1 Summary
- 5.2 Conclusion
- 5.3 Recommendation
- 1.4 Limitation of the study
- 5.5 Suggestion for further study
- 5.1 Summary**

The main objective of this study was to establish how availability, accessibility and utilization of ICT resources influence the teaching of office technology and management in North-Central Geo-political Zone, Nigeria. The specific objectives were five, among others to determine the ICT resources available for teaching office technology and management Polytechnics in North-Central Geo-political Zone Nigeria, to ascertain whether ICT resources are adequate for teaching office technology and management Polytechnics in North-Central Geo-political Zone Nigeria and to determine the difference among male and female lecturers perception of the influence of ICT resources utilization on teaching Office Education in Polytechnics in North-Central Geo-political Zone, Nigeria.

In line with the specific objectives, five research questions were posed and five null hypotheses were formulated. The study reviewed in details works of theorist, researchers and writers related to the research topic. The research was based on Rogers Diffusion of Innovation Theory (2003), which according to Medlin (2001), was the most appropriate

theory to base a research on when it bothers on the Lecturers' uptake of technology at the higher institution. More so, the study looked in some details at the ICT policy in Nigeria and enumerated the general objective of ICT as put forward by Nigerian National Policy for ICT, and considered the benefits of ICT in education. Furthermore it highlighted enablers to ICT resource utilization in teaching and these are: readily available technical support, perceived usefulness, access to ICT resources, adequacy of ICT resources, supportive policies, and accessible training. In addition to these, the study considered teaching as an instruction that is explicitly engaging, clear, takes into cognizance individual differences and ultimately leads to learners' success. It outlined outcome, clarity, engagement and enthusiasm as the four aces of teaching.

Six empirical studies were reviewed in all. All these researcher's findings and recommendations helped the current researcher in the choice of objectives. However, the researcher noted that none of the study focused on the Polytechnic, none of them considered the variable of teaching alone, none focused on the North-Central Geo-political Zone as a whole. The reviewed studies all sought to test for differences in opinions of the groups of respondents, while the current researcher sought to test for relationships between the variables involved in the study. In view of the above, these are some of the gaps noticed and which the current study will close.

Descriptive research design was used in this study. The population for the study consisted of One hundred and thirteen (113) Lecturers of the Department of Office Technology and Management in the Polytechnics within the North-Central Geo-political Zone, Nigeria. The States involved in the study included Kogi, Kwara, Nasarawa, Niger, Plateau and the Federal Capital Territory. The researcher used the entire sample population

since they were few in number. The instrument used for the study was a four-point scale rating questionnaire. Section A focused on the Bio-data of respondents Section B with items 1 - 12 focused on the availability of ICT resources for teaching. Section C focused on adequacy of ICT resources for teaching, with items 13 – 24. Section D with items 25 - 31 focused on utilization of ICT resources for teaching. Section E focused on lecturer's ICT competencies; it had items 32 – 38. And finally section F with items 39 – 45 bothered on lecturer's perceived usefulness of ICT resources in teaching. The responses to Section A were analysed using percentages, while Sections B, C, D, E, and F were analysed using mean. The PPMC was used to analysed the first four hypothesis at 0.01 significant level, while independent t-test was used to analyze null hypothesis five which was tested at 0.05 alpha level of significance where the r-value was greater than the critical value, the null hypothesis was rejected otherwise it was accepted. The first four hypotheses were rejected but the fifth null hypothesis was accepted.

The major findings of the study were:

1. With the exception of the computer, audio tape, printer and photocopier all other ICT resources included in this study were agreed by a good majority of respondents that they were not available.
2. The few ICT resources such as the computer, audio tape, printer and photocopier that respondents confirmed their availability, were grossly inaccessible with the exception of computer and audio tape.
3. Although most Lecturers claimed that they had knowledge about ICT resources, and a good portion of them could effectively utilize it in teaching, virtually most of them did not make

provision for its usage due to irregular power supply and non availability of technical support staff.

4. Despite the fact that most Lecturers had a general knowledge of ICT resources, they were not proficient in some Office Education applicable packages like the spread sheet and power point presentation.
5. In spite of the fact that Lecturers perceived that the utilization of ICT resources could increase learners achievement by making it more interesting and effective, some of them were also of the opinion that it was could cause distractions in the class as well as make lecture preparations difficult.
6. Irregular power supply and non-availability of technical support staff was an impediment to the utilization of ICT resource in teaching.

5.2 Conclusion

Based on the findings major findings of this research work, the following conclusions were drawn:

The availability, adequacy and utilization of ICT resources for teaching office technology and management in Polytechnics within the North Central Geo-Political Zones, Nigeria is low. This phenomenon will definitely affect the quality of graduates from these institutions. In spite of the obvious benefits of ICT resources in instructional delivery it is yet to record same impression among lecturers in these Polytechnics.

Lecturers still required in-depth training to be able to utilize ICT resources. Few of the Lecturers who were proficient in ICT resource usage could not utilize it for the benefit of the student because they had no technical support staff. Also, disruptions caused by

epileptic power supply without the presence of an alternative power supply also prevented some Lecturers from utilizing ICT resources in teaching. Lecture preparations when using ICT resources especially in a situation where Lecturers were required to take more than two different courses can be rigorous and cumbersome. This situation has also contributed to it not being used.

Finally, utilization of ICT resources in teaching office technology and management in Polytechnics in North-Central Geo-political Zone Nigeria Office Education is capable of enhancing learners understanding, assimilation and retention of knowledge and skills. Unfortunately Office Technology and Management Students of the Polytechnics in North-Central Geo-political Zone have been deprived of these enormous benefits which could have gone a long way in raising the fallen standard of education in the country.

5.3 Recommendations

Based on the findings of this study, the following recommendations were made:

1. The government should endeavor to make sufficient funds available so as to procure adequate ICT related resources, and where this is not forthcoming, institutions should appeal to business organization within the institution's locality for either financial or material resources.
2. Alternative power supply sources such as power generators or solar energy to drive these resources should be provided in the Polytechnics and where government cannot make these available, institutions should put up an internal arrangement where the cost is built into the students' school fees or tuition in order to pay for the cost of these infrastructures.

3. Workshops, seminars, and comprehensive training and re-training programmes on ICT resource utilization should be organized by institutions for Office Education Lecturers at the Polytechnic to enable them gain current knowledge of the resources.

5.4 Limitations for the Study

The prolong nationwide strike embarked upon by Academic Staff Union of Polytechnics (ASUP) made things very difficult in the course of the research as the researcher and the research assistants had to prolong their stay in the various locations so as to meet respondents individually, and in some cases in their homes. Consequently the research work fell behind the initial schedule for its completion.

5.5 Suggestions for Further Study

Based on the limitations of this study, the researcher wishes to suggest empirical studies in the following areas:

- a. Information and Communication Technology (ICT) resource usage in Polytechnics and Universities in the North-Central Nigeria: a comparative study.
- b. Influence of Availability, Adequacy, and Utilization of Information and Communication Technology Resources on Teaching Office Education in Polytechnics in North - Eastern Nigeria.

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APPENDIX I

APPENDIX II

LETTER TO RESPONDENTS

Department of Vocational and Technical Education,
Faculty of Education,
Ahmadu Bello University, Zaria.

7th April 2014.

Dear Respondent,

REQUEST TO COMPLETE QUESTIONNAIRE

I am a postgraduate student undergoing masters in business education at the above mentioned institution. Currently, I am conducting a research entitled: **Influence of Information and Communication Technology Resources on Teaching Office Technology and Management in Polytechnics in the North-Central Geo-political Zone, Nigeria.** I sincerely hope you will be kind enough to complete the attached questionnaire as your response will be useful in this research. Please note that all the information you will provide will be treated with utmost confidentiality. Kindly be as honest as possible to enable the researcher get valid information.

Thank you in anticipation for your cooperation.

Yours sincerely,

Acharu Faith Tony-Okeme

APPENDIX III

QUESTIONNAIRE FOR OFFICE TECHNOLOGY AND MANAGEMENT LECTURERS

Research questionnaire to determine the Influence of ICT Resources on the Teaching to determine the ICT resources available for Teaching Office Technology and Management Polytechnics in North-Central Geo-political Zone Nigeria.

SECTION A

Instruction please tick where appropriate

Personal Data

1. Name of institution.....
2. Your highest academic qualification obtained:
PHD ()
M.ED ()
B.BED ()
PGDE ()
HND ()
3. Teaching experience:
1 – 5 years ()
6 – 10 years ()
11 – 15 years ()
16 – 20 years ()
20 years and above ()
4. Gender:
Male ()
Female ()

Please answer all the questions in sections B, C, D, E and F. There are four options provided for each question, please tick one as it applies in you institution.

SECTION B	Availability of ICT resources and teaching of Office Education	Always Available	Often Available	Rarely Available	Never Available
1	Computer				
2	Over head projector				
3	Audio tape				
4	Dictaphone				
5	Internet connectivity				
6	Video				
7	Printer				
8	Scanner				
9	Photocopiers				
10	Facsimile machine				
11	Television				
12	Up-to-date software				
SECTION C	Adequacy of ICT resources and teaching of Office Education	Very Accessible	Accessible	Inaccessible	Grossly Inaccessible
13	Computer				
14	Over head projector				
15	Audio tape				
16	Dictaphone				
17	Internet connectivity				
18	Video				
19	Printer				
20	Scanner				
21	Photocopiers				
22	Facsimile machine				
23	Television				
24	Up-to-date software				
Section D	Utilization of ICT resources for teaching of Office Education	Strong Agree	Agree	Disagree	Strongly Disagree
25	Lecturers do not utilize ICT resources in teaching because the available ones are unreliable due to lack of regular servicing				

26	I always make allowance for ICT resource usage in all my lectures				
27	Usage of ICT resources is not necessary in teaching				
28	Lecturers do not utilize ICT resources in teaching due to the fact that they have no access to available ICT resources				
29	Lecturers do not utilize ICT resources because there are no technical support staff				
30	The available ICT resources are not utilized in teaching as they are outdated				
31	The available ICT resources are not regularly used due to lack of electric power supply.				
Section E	Lecturers' ICT skill competencies for teaching of Office Education	Strong Agree	Agree	Disagree	Strongly Disagree
32	I do not feel incompetent with the use of ICT resources in teaching				
33	I feel inadequate using ICT resources in teaching				
34	Lecturers need further trainings to be able to utilize ICT resources				
35	Most lecturer do not know how to operate some of the available ICT resources				
36	I can present lectures using PowerPoint presentation application				
37	I am proficient in word processing application				
38	I have no knowledge on spreadsheet application				

SECTION F	Lecturers' Perceived influence of ICT in Teaching	Strong Agree	Agree	Disagree	Strongly Disagree
39	Utilization of ICT resources can make teaching more captivating, interesting and enjoyable				
40	Teaching could be highly explicit when utilizing ICT resources				
41	Utilization of ICT resources may not improves the rate of assimilation and retention				
42	Students are not enthusiastic about learning with ICT resources.				
43	Utilization of ICT resources in teaching might not improve students' performances				
44	ICT resource utilization could make teaching more tedious.				
45	Utilization of ICT resources makes lecture preparation difficult				