AVAILABILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FACILITIES FOR TEACHING GEOGRAPHY IN SENIOR SECONDARY SCHOOLS IN ZARIA METROPOLIS, KADUNA NIGERIA.

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DEDICATION

I dedicate this research work to my Father Mal. Aminu Jamoh and Uncle, Dr. Isah Mohammad Abbas.

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LIST OF ABBREVIATIONS

Freq: Frequency

UN: United Nation

UBE: Universal Basic Education

FGN: Federal Government of Nigeria

NECO: National Examination Council

G.I.S: Geographic Information Science

SSCE: Senior Secondary School Certificate

WAEC: West African Examination Council

PPCM: Person Product Moment Correlation

OFSTED: Office for Standards in Education

ICT: Information and Communication Technology

NERDC: Nigerian Educational Research and Development

UNESCO: United Nation Educational, Scientific and Cultural Organization

OPERATIONAL DEFINATION OF TERMS

Availability of ICT Facilities: The available ICT facilities in the school during the teaching process of geography.

Utilization of ICT Facilities: The appropriate use of the available ICT facilities in the school during the teaching process of geography.

ICT: ICT stands for information and communication technology and is defined, as a varied set of technological tools and resources used to communicate and manage information based on human needs.

Geography: It is a school subject that has to do with the study of man and his environment towards the development of the society.

Secondary school: Is the place where student are educated immediately after primary school which prepare them to be an active citizen and to tertiary institutions.

ABSTRACT

This study investigated the availability and utilization of information and communication technology facilities in teaching geography in senior secondary schools Zaria Metropolis, Kaduna State Nigeria. The study was designed to determine the following objectives, availability of information and communication technology facilities, level of geography teachers ICT competence, how often geography teachers use ICT facilities, what are the factors that militate the successful use of ICT facilities and the strategies principals adopt for successful utilization of ICTs for teaching geography in senior secondary schools in Zaria Metropolis. Survey design was used for the study and sample of 39 Senior Secondary Geography Teachers and 20 Secondary School Principals participated in the study. Two research instruments were used in the study (one checklist and two questionnaires) ; A checklist for Availability of ICTs in the Schools (AISCL), Questionnaire for utilization of ICTs for Teaching Geography (UITGQ) and Questionnaire for Strategies Used for effective Utilization of ICTs for Teaching Geography (ASAUITGQ). All the instruments were found valid and reliable after pre-testing by being administered to respondents from 6 Senior Secondary Schools in Kaduna as Pilot Schools for this study. The reliable coefficient obtained from the first and second tests was: 0.82 and 0.73. Descriptive statistics inform of percentage and inferential statistic that is Chi-square were used to analyze the collected data. At the end of the study it was established that ICT facilities for teaching geography were not available in more than 50% of Senior Secondary Schools in Zaria Metropolis which result to low utilization of the ICT facilities even when more than 50% of the respondents were ICT competent.

CHAPTER ONE

INTRODUCTION

1.1Background of the Study

For a long time there is a concern that developing countries have been slow in terms of facilitation of learning among the majority of citizens. Huppert (2006), the National Grid for learning, UK government initiatives indicated that teachers must move swiftly to more internets and web based work in schools. According to Busari (2006), the whole world is experiencing the advancement of science and technology. Each nation is either a powerful producer of technology or a consumer of other nation's technology efforts. In fact technology has made the whole world a global village and ICT breakthrough has made anew landmark in globalizing education. The use of ICT is fast gaining prominence and becoming one of the most important elements defining the basic competencies of the teachers and students. The use of ICT in teaching is a relevant and functional way of providing education to learners that will assist in imbibing in them the required capacity for the world of work (Sunday 2010). Very few jobs today do not required the use of skills in technology, collaboration, teamwork, and information; all of these can be acquired through teaching with ICT. It fundamentally changes the way we live, learn and work. Technology has entered the classroom in a big way to become part of the teaching and learning process.

According to UNESCO (2011): ICT is a scientific technological and engineering discipline and management technique used in handling information in application and association with social, economic and cultural aspects. Application of information in society, which is what education, is all about and ICT can be used as medium to achieve that. There are so many researches supporting the use of ICT to promote education in society. Among others : The integration of information and communication technologies can help teachers and students (Noor-Ul-Amin, 2009). One of the most vital contributions of ICT in the field of education is easy access to learning (Sharma et al 2009). The use of ICT in geography help pupils learn by providing access to large quantities of information of people place and environment (teachingtimes 2015). Today all society is being integrated as per information in the age of globalism and ICT is one of the sources of that information.

However geography is a social science which deals with the world. In geography lesson, pupils learn about the location, distribution, distance, movement, region, scale, spatial association, and

spatial interaction and change over time (Reinfried, Schleicher and Rempfler, 2007). Map is an important asset in geography education, but many times it isn't enough. Geographical sciences and geographical teaching methods have passed many changes, it has being developing and the information updated, many aspect of geography needs more than a map, for example the physical, geological, geomorphologic and human aspect of geography. For many pupils it is difficult to understand only by teacher explain and reading of books and according to Obondo, Jaction & Violet (2013) teaching of some units such as physical environment remains a challenge to teachers as students do not score well in such units. This is probably because of teaching methods or techniques employed. Teachers mostly use traditional methods which encourage rote learning hence less retention, the role of the teacher in the classroom is important (Obondo, Jaction & Violet 2013). The teaching approach that the teacher may adopt is one factor that may affect student's learning and performance. And

*''Currently the realizations of the geographical studies and research and geographical teaching and learning process is connected with ICT .Although the science of geography is influenced very much by ICT, the use of ICT in secondary and high level school is steel low, this is major connected with the lack of hardware and software (*Zenelaj, 2012 P1).*''*

Many studies support that use of ICTs can enhance learning. It is an instructional medium which is generally recognized as a powerful means to boost students' achievement (Kulik, 2002) and according to Anthony et al *(*2009) ICTs have been found to significantly enhance the learning process by enabling increased access to knowledge and more collaboration and interactive learning techniques. ICT accelerate, enrich, deepen skill, and engage students actively in learning (Jongu, Mohammed and Abba 2008). Bingimla (2009) indicates that the success of the integration of new technology and information into education varies from curriculum to curriculum, place to place, and class to class, depending on the way is which it is applied. ICT in education sorely depend on the type, place, and time of education, that is ICTs to be used in teaching and learning geography may differ from other subjects, even within geography education the tools varies in terms of educational level, place and so on.

Nigeria education has been focused on the theoretical aspect, to the detriment of scientific and experimental approaches. These discourage open questions, inquiry and active participation of

students and makes geography classes difficult and boring (Sofowora & Egbedokun, 2010). Conventional approach which is widely used need to be integrated with technological innovations in teaching to alleviate the situation of low enrolment and conform to expected national quality and standard in Geography (Obondo, Jaction & Violet 2013). According to Christian (2009), the use of ICT is an important factor in determining which countries will succeed in the future, and central to this vision is the powerful metaphor of the 'information age' where media, business and industry become increasingly computer reliant. The Federal Government of Nigeria in the National Policy on Education (FRN 2004) is mindful of the importance of information and communication technology in the world of today that is ICT driven hence its integration in the school curriculum at all levels of education in the country. The document states that government will provide the necessary ICT infrastructure and training needed in the secondary schools. That is why the researcher is interested in finding out the Availability and Utilization of Information and Communications Technologies (ICTs) for Teaching Geography in Senior Secondary Schools in Zaria Metropolis.

Statement of the Problem

Information and communication technology covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, internet (Yusuf, Maina and Dare 2013).When ICT is mentioned, what readily come to mind is the computer and the Internet? These two are not the only components of ICT but have actually revolutionized the way we handle and disseminate information. Therefore Ogunsola (2005) sees ICT as an electronically based system of information transmission, reception, processing and retrieval which has drastically changed the way we think, the way we live and the environment in which we live. ICT resources capable of being used in teaching and learning include but are not limited to the following; radio, radio-cassette recorders, televisions, computer, multi-media projectors, fax machines, optic fibers, CD-Rom, internet, electronic notice boards, interactive white boards, slides and slide projectors, overhead projectors, video players and VCDs etc. Observation of the researchers during teaching practice supervision has shown that very many of these listed ICT resources were not available in the secondary schools (Ajaps, 2015). It is worthy of note that the tendency to use ICTs in teaching

and learning activities is highly determined by the availability of these resources in the schools. In a study that explored factors that influence classroom use of ICT in Sub -Saharan Africa. (Hennessey et al. (2010), cited in Kiptalam and Rodriguess, (2011) revealed that the integration of technology into education is highly dependent on the availability and accessibility of the resources in schools. Also Bingimla (2009) indicates that the success of the integration of new technology and information into education varies from curriculum to curriculum, place to place, and class to class, depending on the way in which it is applied. Among other research work that took ICT in teaching geography are as followed: Zenelaj (2012), the use of ICT in geographical teaching and learning in secondary and high schools in Albania, Sofowora and Egbedokun (2010), in an attempt to examine the technology application in teaching geography in Nigerian secondary schools using Osun state. James (2014) investigated the availability and preparedness of geography teachers for the utilization of ICT resources in senior secondary geography curriculum implementation as perceived by all the geography teachers in Akwa Ibom State. Wakhungu and Benjamin (2013) examined the Types of ICT Materials available for Teaching of Geography in Secondary Schools in Rongo District, Kenya. That is why the researcher seeks to find out the Availability and Utilization of Information and Communication Technology for the Teaching of Geography in Senior Secondary Schools in Zaria Metropolis.

1.3 Research Objectives

The study intends to achieve the following objective:

1 To find out the availability of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis.
2 To investigate how frequently Geography Teachers use ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis.
3 To investigate the level of ICT competence among Geography Teachers in Secondary Schools in Zaria Metropolis
4 To examine factor that militate against successful use of ICT facilities in teaching Geography in Senior Secondary Schools in Zaria Metropolis.
5 To find out the strategies principals adopt in ensuring effective utilization of ICT facilities for Teaching Geography in Senior Secondary Schools in Zaria Metropolis.

6 To determine the extent of male and female Geography Teachers competent in ICTs in Senior Secondary Schools in Zaria Metropolis?
7 To investigate how effective are male and female Geography Teachers in Utilizing ICTs in Senior Secondary Schools in Zaria Metropolis?

1.4 Research Questions

1 What are the available ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis?
2 How frequently Geography teachers use ICT facilities in Teaching Geography Senior Secondary Schools in Zaria Metropolis.
3 To what extent are Geography Teachers competent in the use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis?
4 What are the factors that militate against successful use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis?
5 What are the strategies principals adopt to ensure effective utilization of ICT facilities for Teaching Geography in Senior Secondary Schools in Zaria Metropolis?
6 To what extent are male and female Geography Teachers competent in ICTs in Senior Secondary Schools in Zaria Metropolis?
7 How effective are male and female Geography Teachers in Utilizing ICTs in Senior Secondary Schools in Zaria Metropolis?

1.5 Research Hypothesis

H_{O1} There is no significant difference between male and female geography teachers in ICT competence in senior secondary schools in Zaria Metropolis.

H_{O2} There is no significant difference between male and female geography teachers in ICT utilizations in senior secondary schools in Zaria Metropolis.

1.6 Significance of the study

The purpose of any research work is to make significant contribution to the existing knowledge. This work hopes to achieve the following:

It could help educational planners with information on the available ICT facilities for teaching geography in the schools under study and it will be of significance to the government in effective allocating of the geography ICT facilities supplied, so that they can re-plan their strategies for distribution and monitor the geography ICT facilities.

It will provide information on the most utilized ICT facilities for teaching geography and the reason for that and it is hoped that the study would create awareness among stakeholders on the need to provide and make use of the recent technology driven resources to marry the theoretical aspect of the existing geography syllabus with the practice so that failure rate in public examinations could reduce.

It will also provide information on geography teachers' competence in ICT facilities for teaching geography in the schools under study.

It will produce information on the male and female geography teachers ICT facility competence so as to know which of them need more ICT training.

The detailed content analysis would enable school principals and practitioners in educational enterprises to emphasize the importance of integrating ICT facilities in teaching geography, so as to facilitate the accomplishment of educational objectives. It would also serve as a data bank for future researchers.

1.7 Scope of the Study

This study is delimited to teachers and principals of public senior secondary schools in Zaria Metropolis to find out the availability and utilization of information and communication technology for teaching geography. The study area and schools were chosen because the researcher was not able to find study of this nature in the area (Zaria Metropolis).

1.7 Assumption of the study

The following are the assumptions of the study:

- The information and communication technology facilities in the study are based for teaching geography.
- Other subject teachers and senior secondary schools not offering geography in Zaria Metropolis are excluded from the research.
- Private secondary schools within Zaria Metropolis, government secondary schools within Zaria Metropolis and all secondary schools outside Zaria Metropolis are also not part of the research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0Introduction

This chapter deals with the review of related literature relevant to the topic of the research based on the following sub-headings:

2.1 Theoretical Framework

Kolb (1984) expressed that there are two nearly opposing way in which human being can learn: having concrete experiences or having abstract conceptualization. Learning from concrete experience happens through experience. Conversely, learning by abstract conceptualization happens through thinking about what is happening and analyzing it. Kolb also expressed that there are two nearly opposite ways in which a person can deal with two each experience: By actively experimenting or by reflective observation. Active experimenting occurs when people

physically involve with materials directly in the experience, while reflective observation is when people observe some experience and reflect on that observation. According to Ogbatogun (2010) the mode of instruction in Nigeria was paper based but now that the introduction of information and communication technology facilities in to geography teaching and learning has now positively changed everything. Students get to see and experience what was not possible before. The availabilities of ICT facilities in schools will determine the concrete experience of students on ICT facilities in the schools like what (Hennessey et al. (2010), cited in Kiptalam and Rodriguess, (2011) revealed that the integration of technology into education is highly dependent on the availability and accessibility of the resources in schools.

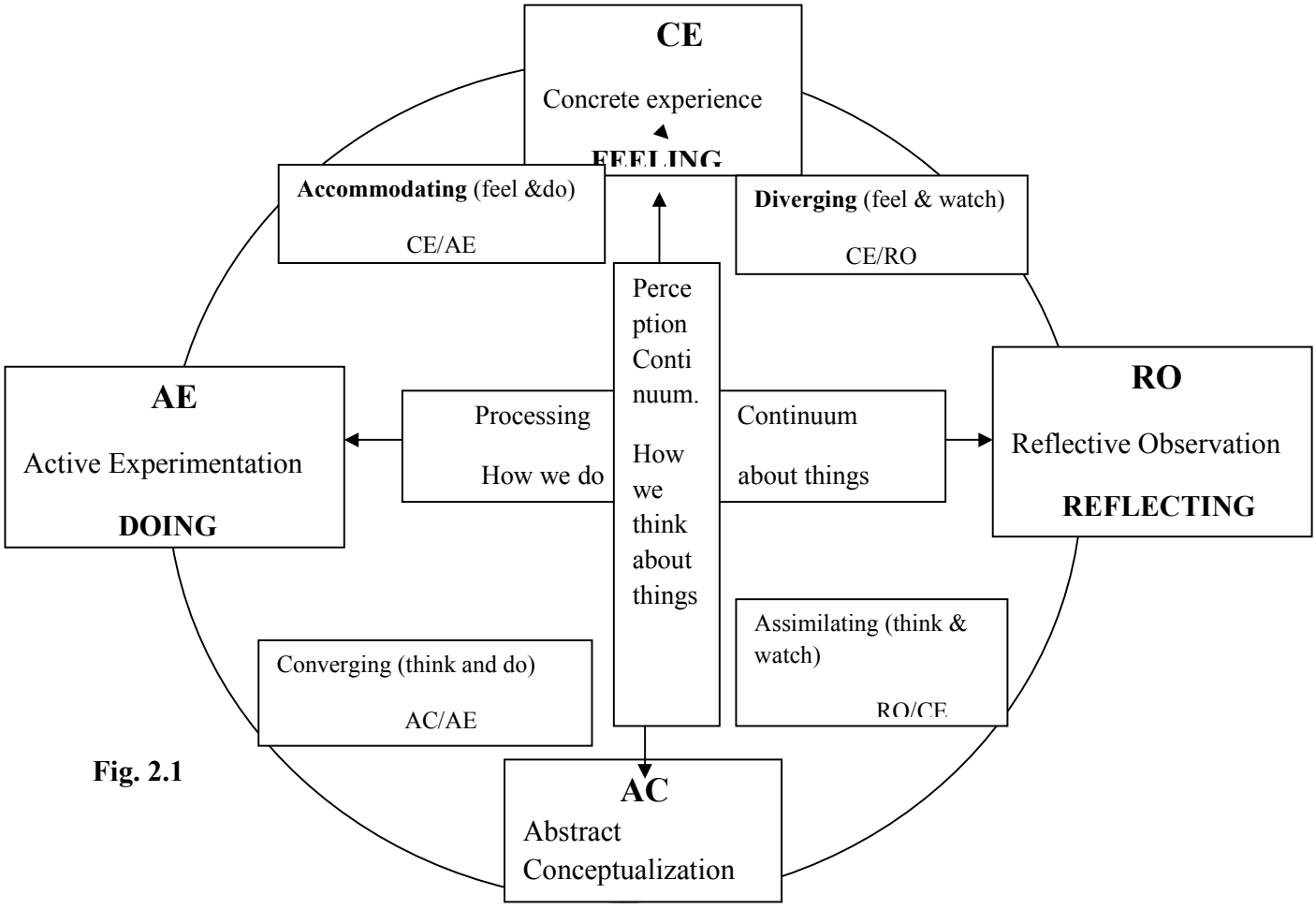

Fig. 2.1

Kolb's learning Circle Updated 2006 **Source: businessballs.com**

Many teachers and educators continue to have value and benefit by using learning style theory in one way or another, and as often applies in such situations, there is likely to be usage which is appropriate, and other usage which is not (businessballs 2006). According to Bingimla (2009) indicates that the success of the integration of new technology and information into education varies from curriculum to curriculum, place to place, and class to class, depending on the way in which it is applied. This implies any to be used in classroom must be appropriate for that class that is why the researcher is interested in investigating the availability and utilization of ICT facilities for teaching geography in senior secondary schools.

2.2 Conceptual Framework

2.2.1 Concept of Education

There is no universal accepted definition of education. Why? Because the method and applications involved in education are constantly evolving on an almost daily basis. The best way to think of education is how information can be used in building the society or producing better active citizens. Education is regarded as the tool for sustainable growth and advancement (Orji 2011). To this end, nations are reforming and strengthening their educational system to meet their aspirations as well as the global Millennium Development Goals.

Education is a process of facilitating, knowledge, skills, values and habits, of a group of people transferred to people through storytelling, discussion, teaching, training or research. Frequently takes place under the guidance of teachers but learners may also educate themselves in a process called autodidactic learning (Wikipedia 2015). The easiest way people learn about themselves and their environment is through education and geography is among others.

Education is the process by which society deliberately transmits its accumulated knowledge, skills and values from one generation to another (Humbbel 2012). Any knowledge, skill and value perceived as important, the society use a process called education to pass it from generation to generation.

Also, education can be any experience that has a formative effect on the way one thinks feels or act may be considered educational, (Ibid). Education construct society, most societies use education as a process of eradicate ignorance by empowering and making people aware of their surrounding as well as the rules and regulation of the society. Education can be formal or non-

formal. Society differs in the nature of education the pass, what may be accepted in one society may not be in another, that is why the study of man and his environment is important so as to know and understand each other, which is called geography education.

2.2.2 Public Secondary School Education in Nigeria

Public Secondary school in Nigeria are mostly state owned and part of the last three years of the basic educational sector (junior secondary school) and the whole three years of the post-basic sector of education in Nigerian senior secondary schools (Nigerian National policy on education 2004). Under the new Universal Basic Education (UBE) system 9-3-4 which replaced the universal primary education scheme of 6-3-3-4, students attend 6 years of primary schools and 3 years of junior secondary. Thus, 9 years of compulsory uninterrupted schooling this is followed by 3 years of senior secondary schooling. Junior secondary entry was based on common entrance examination result until 2006 and a junior secondary school certificate was awarded at every end of junior secondary school, students with credit and above in not less than 6 subjects will proceed to senior secondary school in the same or different institution of their choice. English, French, Nigerian languages (Hausa, Igbo, and Yoruba), Religion, social studies, business studies, integrated science and mathematics are the core subjects of junior secondary school in Nigeria.

In Nigeria majority of senior secondary schools students precede in the academic stream from junior secondary school. There is also technical stream in addition to vocational training outside the school system or apprenticeship options offering range of trades and crafts. Both private and public schools offer the same curriculum but some private school include Cambridge curriculum in case some of their students have the interest of studying abroad. English, mathematics, one science subject, one social science subject, geography and agricultural science or vocational subjects, one of which may be dropped in the final year. Most of the subjects taken in senior secondary schools are in depth of what was offered in junior secondary schools. The major issues and challenges of the Nigerian educational sector have been identified and discussed under four focal areas, viz: Access and Equity, Standards & Quality Assurance, Technical and Vocational Education/Training, and Funding and Resource Utilization. These were captured in the 'Roadmap for the Nigerian Education Sector' (Federal Ministry of Education, 2009). Nigerian education is in high demand, experiencing population explosion which makes access and equity, funding,

provision of adequate resources and utilization difficult and which is affecting geography education also, most researchers believe ICT can help in minimizing the above challenges as it was shown by other researchers. For Nigerian educational institutes, the development in the use of ICT provide an opportunity to overcome the perennial problem of non-availability of staff, books and even the lack of equipment in the laboratories (Massaquoi 2006). The need of ICT in Nigerian education cannot be over emphasized because the can be of great help to the attainment of educational objectives.

2.2.3 Purpose of Secondary School Education in Nigeria

According to National policy on education (FRN2004) the broad aims and objectives of secondary education in Nigeria educational system are preparations for useful living in the society. That is to acquire relevant functional trade/ entrepreneurship skills needed for poverty eradication, job creation and wealth generation; and in the process strengthened further the foundations for ethical, moral and civic values acquired at the basic education level. That is why the curriculum is planned to be skill-based which are practically oriented subjects designed to teach students skills which will empower them for job and literacy.

The next three years after junior Secondary phase has wider scope than the Junior Secondary (JS) phase and aims at broadening the knowledge and skills of a student beyond the JS level and thus prepares him/her for further education. Secondary education is academic and vocational in scope. A student has to offer minimum of seven and maximum of eight subjects, comprising the six core subjects: English Language and Mathematic are compulsory to all classes then five course will be based on your class either science, art or commercial and one from the optional subject that is Nigerian languages, geography or food & nutrition. Certification at the end of this phase depends on the performance of a student in the Continuous Assessment (CA) and Senior School Certificate Examination (SSCE), coordinated by West African Examinations Council (WAEC) and National Examinations Council (NECO). A child must obtain a minimum of five credits at maximum of two sittings including English Language and Mathematics to be able to proceed to the tertiary level of the educational system and student interested in geography related course in tertiary level must also have at least a credit in geography for him/her to be qualified. The Nigerian secondary education aims at preparing an individual for:

- Useful living within the society:

- Higher education.

Specifically, it aims at:

- Providing all primary school leavers with the opportunity for education of higher level irrespective of sex, social status, religious or ethnic background;
- Offering diversified curriculum to cater for differences in talents, opportunities, and future roles;
- Providing trained manpower in applied science, technology and commerce at sub-professional grades;
- Developing and promoting Nigerian languages, arts and culture in the context of the world's cultural heritage;
- Inspiring students with a desire for self improvement and achievement of excellence
- Fostering national unity with an emphasis on the common ties that unite us in our diversity
- Raising a generation of people who can think for themselves, respect the views and feelings of others, respect the dignity of labor, appreciate those values specified under our broad national goals, and live as good citizens; and
- Providing technical knowledge and vocational skills, necessary for agricultural, industrial, commercial, and economic development (National Policy on Education 2004 P23).

There are many new changes and challenges that teachers face, and are required to adapt to, like more modern and westernized approach from schools; new methods of teaching and learning, an increase in student numbers, and an explosion in the development of teaching with ICT. These mean teachers need to update their knowledge and skills to develop the educational process in the classroom like geography there are some topics that can better be understood when though with ICT facilities. That is why the researcher is interested in knowing the availability and utilization of ICT facilities for teaching geography.

2.3.1 Geography Curriculum in Nigeria

Nigeria, having realized the effectiveness of education as a powerful instrument for national progress and development, adjusted her secondary school educational system to encompass diversified curriculum that integrates academic with technical and vocational subjects with a view to empowering the individual for self-employment. Geography as a school subject is one of the most important subjects in secondary school education which is offered at the senior secondary

level and in the second tier of the current educational system in Nigeria (Opt Cit). Geography is as well relevant for both the students who are likely to continue to tertiary and those who will not proceed, this is because it equips students with a body of knowledge to make them functional and socially relevant in the fast changing world; it is a distinct and dynamic science and or social science discipline that deals with the study of man and his physical environment and therefore helps young people to appreciate the value of their environment and its vast natural resources. Geography is expressive and intellectually stimulating and as well exhibits a correlation with all other school subjects (Akintade, 2011). Geography has

"Geography has a fundamental relevance to young people because it relates to many aspects of their lives and the environment in which they are growing up, study at regional, national, international and global level is required, all are vital for pupils' understanding of the increasingly complex interdependent global village in which we live" (Lambert and Morgan 2011).

Geography curriculum of Nigeria both the environmental and human aspect, starts from the basics which is from the local to global which instills in the students the need to appreciate and develop a sense of responsibility towards their own society and to be aware of the changes happening around them: knowing their population in order to be able to use resources like vegetation, transportation, weather to their benefit and wisely. However, despite these benefits of geography, its study is on a decline, especially in Nigeria where 'professional' disciplines like medicine, engineering and law are prioritized to the detriment of other fields. Geography is not present in Nigeria's primary school and junior secondary curricula and optional in the last three years of secondary school, where only a few students choose it (usually because they need to have a minimum of nine subjects for the final certificate examination). According to Kerski (2011). With all these potentials in geography education, achieving aims of Nigerian secondary schools education will be faster and easier to achieve. According to the UN Decade of Education for Sustainable Development 2005-2014, geography is really closed with education for sustainable development, and ICT is the first tool that will help both, teachers and pupils. With ICT the lifelong learning will be easier and ICT in geography education will have more contribution to Nigerian Educational aims.

2.4 Concept of ICT in Education

ICT is an acronym that stands for Information and communications Technology. There is no universally accepted definition of ICT because the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis. It depends on the local culture and the particular ICT available and how is configured and managed (Gokhe 2015). ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, internet (Yusuf, Maina and Dare 2013). Yunus (2007) described ICT as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media. Adeleke (2005) viewed ICT as a cluster of associated technologies defined by their functional usage in information access and communication. Rahman (2002) defined ICT as the creation, processing, storage, retrieval and transmission of data and information. It covers computer hardware, software, the network and other digital devices like video, audio, camera and so on which convert information (text, sound, motion etc) into digital form. The best way to think about ICT is to consider all the uses of digital technology that already exist to help individuals, businesses and organizations dealing with information.

Information and Communication Technology are computer based tools used by people to work with information and communication processing for the needs of an organization Muchleison (1997). Information and communication Technology as tools within the school environment include use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning tasks, teaching/learning intellectual, thinking and problem solving skills, stimulating creativity and imagination, for speech by teachers and students and as communication tool by teachers and students (Pennington, 1996 and Moore 1996). Since this research is based on availability and utilization of ICTs for geography teaching and according to Bingimla (2009) which indicates that the success of the integration of new technology and information into education varies from curriculum to curriculum, place to place, and class to class, depending on the way is which it is applied. ICT in education sorely depend on the type, place, and time of education, that is ICTs to be used in teaching and learning geography may differ from other subjects, even within geography education the tools varies in terms of educational level, place and so on for example Microsoft word for text base and idris salva for analyzing remote sensing or GIS data.

ICT Competence in Education

The European Commission has defined digital competence as involving the confident and critical use of Information Society. Technology for work, leisure and communication, digital competence is grounded on basic skills in ICT (Punie & Cabrera, 2006 in Ilomäki 2008). Simply having ICT in schools will not guarantee their effective use. Regardless of the quantity and quality of technology placed in classrooms, the key to how those ICT facilities are used is the teacher; therefore teachers must have the competence and the right attitude towards technology (Kadel, 2005). According Bordbar (2010), teachers' computer competence is a major predictor of integrating ICT in teaching. According to Peralta & Costa (2007), teachers with more experience with computers have greater confidence in their ability to use them effectively and Jones (2004) reported that teachers competence relate directly to confidence. Teachers' confidence also relate to their perceptions of their ability to use computers in the classroom, particularly in relation to their children's perceived competence. According to Liaw, Huang and Chen (2007), teachers' computer self-efficacy influences their use of ICT in teaching and learning. Peralta and Costa (2007) conducted a study on 20 teachers' competences and confidence regarding the use of ICT in classrooms. They revealed that in Italy, teachers' technical competence with technology is a factor of improving higher confidence in the use of ICT.

Gender gap exists in education in sub-Saharan Africa, and out-of-school children, more of whom are girls, are deprived of any opportunity to gain ICT related knowledge and skills in school (Yusuf and Balogun 2011). African women have the lowest enrolment rates in the world in science and technology education at all levels. A study conducted in four African countries identified that while in principles girls are given the same opportunity as boys of access to computer, gender equity does not exist in practice (Derbyshire, 2003). In addition, the three computer related occupation (computer scientists, computer engineers and system analysts, and computer science and engineering) are the top career choices for boys. According to Bebetsos and Antoniou (2008), female also have more negative attitude towards computer, studies revealed that male teachers used more ICT in their teaching and learning processes than their female counterparts (Kay, 2006). Similarly, Markauskaite (2006), investigated gender differences in self reported ICT experience and ICT literacy among first year graduate trainee teachers. The study revealed significant differences between males and females in technical ICT capabilities, and

situational and longitudinal sustainability. Males' scores were higher. Jamieson-Proctor, Burnett, Finger and Watson (2006) conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers. But the situation was different in mid-western US basic schools where Breisser (2006) found that females' self-perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged in a lego-logo project. The study was in agreement with (Adams, 2002) that female teachers applied ICT more than the male teachers. This study confirms report by Yukselturk and Bulut (2009) that gender gap has reduced over the past years, presently, a greater number of females than males have used internet and web 2.0 technologies. However, some studies revealed that gender variable was not a predictor of ICT integration into teaching (Norris, Sullivan, Poirot & Soloway, 2003). In a research conducted by Kay (2006), he found that male teachers had relatively higher levels of computer attitude and ability before computer implementation, but there was no difference between males and females regarding computer attitude and ability after the implementation of the technology. He claims that quality preparation on technology can help lessen gender inequalities. Thus they are often less computer literate than males.

On teachers' competence, teachers in Nigerian secondary schools are not competent in basic computer operation and in the use of generic software. Nigeria is yet to fully commit to ICT integration in education as two key ingredients are lacking- skilled teachers and ICT tools and other infrastructures **(**Adeosun, 2014). Yusuf, (2005) revealed the low level of ICT penetration in the Nigerian school system, although the attitudes of teachers have been positive According to Adeyinka et al (2010), technical support are lacking in the schools and teachers lack of expertise in using ICT was indicated as being the prominent factors hindering teachers readiness and confidence of using ICTs during lesson. Furthermore, the results show that teachers perceived ICT as being easier and very useful in teaching and learning. This is why the teachers show positive attitude toward utilization of ICT in teaching and learning (James, Olutola and Isiah 2013) even though according to Titilayo (2010) the number of teachers who have basic skill in use of IT is low. Moreover, just a few of the schools have enough numbers of computers to serve the school population; this is even not to talk about how accessible they could be to both students and teachers. ICT challenges in Nigerian secondary schools affect every subject like in senior

secondary school geography, lack of skills and cost of utilization ranked highest as one of the factors preventing teachers from using the new technologies in teaching Geography. (Sofowora and Egbedokun 2010). According to James (2014), most Geography teachers were not computer literate and show low level of preparedness to applying modern ICT technology to Geography curriculum implementation. The case of secondary schools in Zaria Metropolis may not be different, that is why the researcher seeks to find the availability and utilization of ICT facilities in teaching geography in secondary schools in Zaria Metropolis.

2.4.2 Use of ICT for the Teaching of Geography

According to curriculum planners it is mandatory that schools teach ICT across the curriculum and teachers are under pressure to show how their schemes of work incorporate this requirement (Moore 2005). There are evidences supporting the introduction and use of new technologies in instruction. For example: The World Bank (2004) opined that ICTs should be considered within education for the purpose of reforming curriculum, reinforcing teaching/learning and to improve leaning. The UN Secretary of State (2005) speaking on the role of technology in education said we must ensure that Information and Communication Technologies (ICTs) are used to help unlock the doors of education As a result, Millennium Development Goals (MDG's) came up with this policy "to co-operate with the private sector, to make available the benefits of new technologies, especially ICTs to increase educational opportunities and unlock the door of education. As a result of this, new technologies are being disseminated into educational institutions at a rapid rate. For the new technologies to be effectively utilized in education, teachers at all levels need not only to be proficient in the technologies but must also be well versed in its effective integration into their instruction. The use or lack of use of the new technologies may widely affect the students in future as regard whether to use them or not. All the above encourages the use of ICT in education and geography education is part and parcel of that education which is offered in both the secondary and in tertiary level of education in Nigeria.

ICTs have penetrated the society which led to a concern about the need for ICT knowledge and skills in everyday life. Many more researches have shown how useful ICT is in education: The integration of information and communication technologies can help teachers and Students (Noor-Ul-amin, 2009). ICT increase quality of education, one of the most vital contributions of ICT in the field of education is easy access to learning (Sharma, Ghandhar and Seema 2009). ICT will

not only benefit the educators even learners are not left behind, before the development of ICT a lot of information where not easy to access, they are either classified, far within reach, or too expensive but now ICTs have ease a lot on that, information is now easier and cheaper to acquire.Technology can be used in a very different field of education (Bučar, 2011, Becter 2003 indicates that success of the integration of new technology and information into education varies from curriculum to curriculum, place to place and class to class, depending on the way is which is applied in depended (Bingimla, 2009). The ICT in education sorely depend on the type, place, and time of education, i.e. the technological tools to be used in teaching and learning geography may differ from other subjects, even within geography education the tools varies in terms of educational level, place and so on. Both teachers and student must have knowledge on how to use appropriate technological tools in education. Before using any tool in any type of teaching and learning processes, you must know pretty well about that subject for you to be able to identify which tool is best for it.

As for contributions of ICT in geography education: according to the UN Decade of Education for Sustainable Development 2005-2014, geography is really closed with education for sustainable development, and ICT is the first tool that will help both, teachers and pupils. With ICT the lifelong learning will be easier. Information processing, problem solving and visualization can be done by integrating ICTs into geography teaching and learning. The use of ICTs in geography education, teaching and learning will become easier and faster so as sustainable development. The OFSTED (2004), the evaluations of many beginning teachers considering ICT in their geography lessons tend to boil the motivation and enthusiasm factor. All teachers hope their students to be self motivated, some need more extrinsic motivation than others and even motivated students occasionally need their teachers to prompt them to complete their tasks.

Geography education needs ICT, the provision of both software and hardware in schools will enhance geography education. To employ visualization tools often enhance conceptual understanding among students (Barak & Dori, 2005). We all know seeing is believing, most of geography education in Nigeria lack experiment, almost 100% oral but with visualization tools provided will enhance more understanding. Video is more effective in teaching than text for presenting real-life situation in order to enhance learner's satisfaction, comprehension and retention (Isiaka, 2007). ICT resources could be used as tools to experience and understand the concept of simultaneity (Massey 2007) and so it will be important in strengthening geography's

unique contribution to the curriculum. The social and political impact of using webcams in geography teaching is the ability to see the pass events or programs; it makes life to be dynamic rather than static, this is one part of so many uses of webcam in geography teaching which allow students to not only hear about historical events but see history. The importance of spatial thinking as a focus to the use of ICT (especially GIS) for geography has been identified by (Lidstone and Stoltman, 2006). The present of technological tools has made spatial understanding to be more real and understanding, like in remote sensing and GIS what eyes cannot see because of distance, ICT made that possible. Internet map viewers are hugely popular means of getting started with simple GIS, as shown by the number of beginning teachers opting for these tools, whilst assigned to develop GIS on their teaching practice. There are so many ICTs that are made specifically for geography teaching, among others Google Earth, Arc GIS, IDRISI salva, cameras, and satellites, all for processing managing geographical information.

2.4.2 ICT facilities Available for Teaching Geography in Secondary Schools

In any educational system, the level of available resources places a restriction on the degree to which any new subject can be introduce into the school curriculum, especially where only the most basic facilities have so far been provided (Gokhe 2015). But ICT is of such importance to the future industrial and commercial health of a country that investment in the equipment, teacher education, and support services necessary for the effective delivery of an ICT-based curriculum should rank high in any set of government priorities. The curriculum proposed takes account of these resource issues and specifies minimum requirements for effective delivery in different circumstances. The Federal Government of Nigeria in the National Policy on Education (FRN 2004) is mindful of the importance of information and communication technology in the world of today that is ICT driven hence its integration in the school curriculum at all levels of education in the country. The document states that government will provide the necessary ICT infrastructure and training needed in the secondary schools. Chiriswa (2002) noted that effective teaching and learning depends on the availability of suitable adequate resources such as books, laboratories, library materials and host of other visual and audio teaching aids which enhance good performance in national examination. A survey carried out by Adeleke (2005) revealed that only one school, out of ten has computer sets. It is worth noting that none of the ten schools has internet facility. Ayodeji (2004) reported in a study that most of our secondary schools do not

have software for the computer to function. One of the secondary schools has five computers against a population of 900 and no internet software was installed. The facilities are grossly inadequate for any meaningful teaching or learning to take place. This finding revealed the low level of ICT availability in the Nigerian school system.

Education is in the process of a major change, where through innovations in technology and teaching methodology, academic institutions are being given an opportunity to work for the benefit of the student (Bunyi, 1999). There are different kinds of product of technology that are useful for teaching Geography. They include; internet, interactive digital television, video, web-based instruction, Intelligent Tutoring Systems, photography, computers/computer Assisted instruction, video conferencing and discussion group. Wakhungu and Benjamin (2013) considered the following ICT materials as generally useful for the teaching of Geography:

- Radios for audience
- Computers for visualization
- Televisions for visualization
- Satellite for taking far images
- Google maps for map readings
- Cameras for taking close images
- Scientific calculators for calculations
- Internet for searching geography materials
- Cell phones for visualization and searching teaching materials
- Idrisi salva and other software for analyzing remote sensing data

Total Quality (TQ) is the most important thought provoking revolution in the world of modern management. Souls (2005) assert that the secondary school teacher's major task in improving school performance is to provide sound teaching methods to the students Souls (1). Fry & O'Neill (2002) note that we can have a dramatic impact on raising the quality of school teaching, we will have a dramatic improvement in student achievement across the board Fry & O'Neill (1). During this information age, the growth in information and knowledge and the evolution of technologies that make information and knowledge growth possible has become increasingly faster. In order to deal with this complexity, the issue of educational management in the information age cannot be ignored. The changing nature of educational access, the realities of the information age, new

global partnerships and awareness of technological changes drove this study, which is the availability and utilization of ICTs for teaching of geography in Zaria Metropolis.

2.5 Concept of ICT Utilization in Secondary Schools

Utilization of teaching resources in general in the classroom setting, that is both ICT and non ICT resources. There are some plans and principles identified by Ughamadu (2006) to be followed by the teacher, which include;

a. Preparing himself/Herself: For the classroom teacher to make effective use of any ICTs for teaching, he/she should always prepare himself/herself adequately well in advance. The teacher should be physically, mentally and psychologically fit to analyze teaching resources in the classroom setting. In addition, the teacher should be innovative and resourceful and be well acquainted with the procedures for utilization in the classroom.

b. Preparing the Environment: Effective utilization of teaching resources demands that the teacher should put the learning environment in order and make sure that all required materials are ready. For instance, if an overhead projector is to be used, the teacher should ensure that it is reserved, properly set up and ready for use at the appropriate time.

c. Preparing the Class: The classroom should be prepared by having the students well arranged, seated and free from all hindrances to learning. The teacher should introduce the students to the teaching resource to be used and make them to appreciate why it should be used. The students should be given a brief description on what the teaching resource covers, with emphasis placed on what is vital to be learned from it.

d. Utilizing the Teaching Resources: This demands the proper utilization of a particular teaching resource by the teacher. If film for instance is to be used, it should be shown properly. Images should be in proper focus and projected above the heads of the class viewers. In the use of sound, for instance, the volume and tune should be properly adjusted so that all members of the class may hear, understand, enjoy and appreciate the message

Some useful principles that will guide teachers in the utilization of teaching resources are as follows:

a. The selection of teaching resources to be used should be based on valid learning objectives and the unique characteristics of the learners.

b. The use of teaching resources should essentially be followed by the development of adequate learner readiness. This will make for effective learner participation.

c. All necessary physical facilities and conditions for using teaching resources should be arranged by the classroom teacher in a manner that provides for economy of time and optimum learner attention and participation.

d. The teacher should of necessity guide learners in their responses to experiences with teaching resources.

e. The teacher should on a continuous basis subject various forms of teaching resources to evaluation.

In fact, the teacher should ensure effective and judicious use of teaching resources. Resourceful teacher can utilize teaching resource at the onset of a lesson, at the middle or at the end to summarize a lesson. As a matter of fact, teaching resources can be utilized at anytime during the teaching and learning processes to motivate the students, clear any misconception, transmit and explain information. Having examined the utilization of teaching resources, what are the challenges to effective management and utilization of teaching resources?

2.5.1 Factors Affecting Utilization of ICT facilities in Secondary Schools

Johan (2004) states that educational outcomes in schools are closely linked to utilization and adequacy of teaching/learning resources in different ways; poor utilization, underutilization, unqualified educators brings forth low educational achievement. The inadequacy of physical and material resources in schools is a major factor responsible for learning outcome of students. Schools that do not have adequate facilities such as workshops, laboratories, classrooms, teaching learning materials are unlikely to post good results. The principles of facilitating effective learning and teaching involves having the practical skills and putting the learners own experience into practice. They receive inputs from the external environment in form of human and material resources, process them and empty the same into the society as finished products and services. The quality of the products bears a direct relationship with the qualities of the facilities deployed in the process of production. It has been in

SEDL Research report (2007), which focused on examination of resources allocation in education that among the other factors that militate against the utilization of resources in the schools included inter alia:

- Student-teacher and school heads ineffective use of resources
- Poor knowledge and skills in using resources
- Poor condition of resources available in schools

Student-Teacher and Head of School Ineffective use of Resources: where leaning materials are very simple and easy to manage, it would be easy for the teachers and learners to operate. This will therefore increase the teacher-student production. On the other hand the head of school is responsible to co-ordinate the utilization of the resource material in school. The head of teachers in secondary school is the principal. Akundayo (2011), secondary school can only be productive if there is effective and efficient management of human and material resources in the system by the principal.

Poor Knowledge and Skills in using Resources: great hopes were that advanced technology would help and facilitate learning facts that is why schools rush to patronize the idea of acquiring them. Schools do not have clear idea of what is for and the administrator know little about or nothing about how to use them in instruction, let alone the teachers most of whom were yet to be trained on how to use and handle the equipment or facilities. On teachers' competence, teachers in Nigerian secondary schools are not competent in basic computer operation and in the use of software, although they have positive attitude towards the use of computer (Yusuf, 2012) while Sofowara and Egbedokun (2010) Geography teachers that had access to computer but did not have the pre-requisite ICT skills, out of the modern technologies available for teaching Geography which is supported by James (2014) said most Geography teachers were not computer literate and show low level of preparedness to applying modern ICT technology to Geography curriculum implementation.

Poor Condition of Resources Available in School**s:** some conditions like class size, environmental resources and teachers' ineptitude and resource malfunctions may affect the use of resources in Schools. **SEDL** Research Report (2007). Students in large classes are not likely to have access to

teachers' expertise. Nieer (2004) smaller class sizes are associated with greater educational effectiveness and other benefits. Class size has great effect on student.

2.6 Challenges of ICT Utilization in Secondary Schools in Nigeria

I. Inadequate facilities

The absence of the necessary hardware and differences in the development between rural and urban areas affect pupils, because bring deficiencies in their training and education (Zenelaj 2012), most secondary school in urban areas have more opportunity in education and educational facilities than the rural area. The computer is not part of classroom technology in more than 90 percent of Nigerian public schools (Ogiegbaen and Iyamu 2005), this implies that the chalkboard and textbook continue to dominate classroom activities in most Nigerian public secondary schools. ICT development and application are not well established in Nigeria because of poor information infrastructure. According Yusuf Maina and Dare (2013), there is a dearth of ICT facilities in secondary schools in Kaduna as there are only very few of such facilities available in most of the schools visited. In most senior secondary schools in Nigeria where there are no adequate ICT tools, very few have access to them and for that very few have the knowledge of using ICT tools. ICT Resources are hardly used in teaching processes mostly used in administrative. So must subjects like Geography are being thought and learned using the traditional method of teaching.

II. Inadequate funding

Another and perhaps the greatest challenge facing the application of ICT in Nigerian geography education is poor funding, this is not on the part of government alone, but also on the part of private owners of academic institutions. The problem of poor funding is listed by various studies among others: (Rilwan, Akahomen and Gbakeji 2014). On funding a study by Jegede (2009) revealed that majority of the respondents who had undergone formal ICT training did so at personal expense and that even where trainings were organised by schools' authorities and computer centers, payments in many of the cases have been from personal purses. This shows the gravity and centrality of the problem. Because teachers' possession of the requisite knowledge and competence is a necessary prerequisite to achieving any ICT education programme of a nation, to live, learn, and work successfully in an increasingly complex, information-rich and knowledge based society, students and teachers must utilize technology effectively within a sound

educational setting. Poor funding expresses itself in different areas such as poor power supply, poor human resources development and poor state of telecommunication and roller ICT infrastructure. Without the necessary funding, none of the above problems facing the use of ICT in education can be solved. Also, without funding, all advances such as in human resource development are surely doomed. With enough funding on ICT, provision and maintenance of ICTs, implementation of ICT policy will be well covered in Nigeria educational system.

III. Lack of ICT skills

The European Commission has defined digital competence as involving the confident and critical use of Information Society. Technology for work, leisure and communication, digital competence is grounded on basic skills in ICT (Punie & Cabrera 2006, in Ilomäki 2008). That is, the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet. However the adoption of necessary skill and competence to use ICT needs to be complemented with the mastering and understanding of ICT. It has been discovered that knowledge of (ICT) usage improves human capacity in every field of human endeavour, including business transaction, industrial operations, educational programmes and activities and life in general (Ijeoma, Joseph and Franca 2010) and competencies that need to be developed at the early stage of ICT adoption will include according to Pelgrum and Law (2003) the training of teachers in the use of common office application programme, sending of e-mails, making use of the internet, use of ICT in subject based teaching and class room practices. Production of multimedia course materials, data competencies that teachers need to develop.

There is a severe and pronounced “low level computer literacy among Nigerians” (Okiy, 2005). This makes it difficult for them as users and patrons of academic to make full use of available ICT facilities. This problem is further aggravated by the “shortage of technology literate staff in secondary schools, the lack of skilled human resources to install and manage technology networks and poor funding to attract such staff or develop such skill in existing staff. Most schools, both private and government, do not offer ICT training programs (Goshit 2006). This lack of appropriate skill in the use of ICT gadget on the part of the Geography teachers has resulted in both teachers and students being denied access to effective teaching and learning tools in a country where the level of students performance in senior secondary Geography is low (WAEC, 2006). In most geography senior secondary schools lack the necessary ICT tools and which would

also be used by the administrators, principals, teachers and students to learn appropriate ICT skills. Even if the undergo some ICT training, practice makes perfect and without available ICT facilities, practice can never be done. Gülbahar (2008) in his study found that although pre-service teachers are willing to use technology but this rarely occurred because of the inadequacy of lessons to facilitate them with necessary skills to be technology competent teachers.

IV. Poor Policy Implementation on ICT

Loto and Abidoye (2010) noted that acquisition of ICT skills, infrastructures, and inadequate incentives for entrepreneurs, insufficient time to learn, participation, leadership and commitment are the problems facing the use of ICT in the management of entrepreneurship education in Nigeria. Before any policy can be well implemented, available resources of that thing most be provided. In Nigeria there is a great lack of ICT facilities and without them the ICT policy will never be well implemented. Like the policy of ICT in secondary schools, when the ICT tools are adequately provided then the ICT policy can be well implemented and the use of ICT in geography education will also be easy in Nigeria secondary schools. Carlson and Gadio (2002) state that teacher training in the use of ICT is the best starting point in the ICT policy of a country because they are the key to making learning happen. This according to them is so because teachers who succeed in making use of ICT in their work process, do not only contribute to improved learning outcomes in their students, but may also benefit personally from enhanced work productivity, reduced isolation and increased professional satisfaction.

2.6 Review of Empirical Studies

The following are researches from different places based on information and communication technology for the teaching geography in secondary schools:

Zenelaj (2012), conducted research on: the use of ICT in geographical teaching and learning in secondary and high schools in Albania. Paper written for the 1st International Conference on Research and Education Challenges Toward the Future in the University of Shkodra Luigj Gurakuqi Shkodra, Albania. The samples of the study were 30 Albanian foreign academics 50 teachers and 100 students of geography in different secondary and high school in Albania making the total sample of 180. Questionnaire was used as instrument for data collection which was analyzed using descriptive statistic of percentages. The researcher found out that ICT is useful for both teachers and students, simplifier their work to transmit or learn geography, through the ICT

the teachers and the pupils have the opportunity to see more than one simply map, The entire pupils use ICT for geographical learning. The main obstacles of using ICT for teaching and learning processes of Geography are lack of technology, lack of software, lack of hardware, lack of Training courses for teacher. The researcher recommends, removing the classical methods of teaching, accompanied by difficulties, which lies in the fact of their age and knowledge for ITC, or the recognition of foreign languages; therefore arise as a necessity of continuing training of teachers.

Sofowora and Egbedokun (2010), in an attempt to examine the technology application in teaching geography in Nigerian secondary schools using Osun state as the study area. The population of the study comprised of all the secondary schools in Osun state which 241 teachers were drawn out as a sample of the study, the 241 schools were selected based on location, local government area, school type (i.e. public or private, rural and urban) while the teachers were selected base on gender and subject. The researcher used survey research in the study because it helped the researcher to describe the existing conditions and made references related to his study and questionnaire was used to collect data. The data collected through questionnaire for this study was analyzed with the use of percentages. The researcher found out that 55% of the Geography teachers have access to computers but majority of them do not have the pre-requisite ICT knowledge and skills needed of the modern technologies available for teaching Geography in schools. The researcher recommends, all categories of teachers must be equipped with the pre-requisite skills in using modern technologies. Future training and development in ICT should focus on its applications and benefits for the teachers.

James (2014) investigated the availability and preparedness of geography teachers for the utilization of ICT resources in senior secondary geography curriculum implementation as perceived by all the geography teachers in 83 public secondary schools in Ikot Ekpene Senatorial district of Akwa Ibom State. The population and sample of this study was all the 86 geography teachers in the 86 public secondary schools in Ikot Ekpene. The researcher employed survey research design to conduct the study and data was collected through the administration of questionnaire. Data was analyzed using descriptive statistics. The researcher found out that Most of the modern ICT resources are neither available nor accessible and most Geography teachers in Ikot Ekpene senatorial district of Akwa Ibom State are not computer literate, with low level of preparedness to apply the new technologies in Geography curriculum delivery. Availability and

preparedness of geography teachers for the utilization of ICT resources in senior secondary education curriculum implementation is part of what is needed to a successful use of ICT in geography education in secondary schools. The researcher recommends, every Geography teacher should mandatorily become computer literate and The Federal and State Government, as well as other stakeholders in the education industry should procure and install modern ICT resources in schools.

Wakhungu and Benjamin (2013) examined the Types of ICT Materials available for Teaching of Geography in Secondary Schools in Rongo District, Kenya. The study adopted the descriptive survey design and targeted a population of consisting of form two Geography teachers and students from 40 registered secondary schools in Rongo district. Simple random sampling was used to select 12 schools in Rongo district` of which 30% of total number of enrolment that is 1,200 students, 360 of them were used as respondents. Data was collected using closed and open ended questionnaires and was analyzed using descriptive statistics including percentages mean and frequency tables. Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 15 computer program. The results of the study indicated that ICT resources are inadequately supplied in most schools in Rongo District. The researcher recommends that teachers who are creative in the production of and integration of ICT resources in the teaching of Geography should be noticed and motivated or rewarded accordingly.

The empirical study of this research was based on ICT in geography education in Nigeria and other countries. Many countries are looking for methods and techniques in education that will help achieve their educational goals and objectives and most are taking ICT into consideration. The researchers in the empirical study using different research case study, design, population, sample, technique, instrument and analyses but little differs in their findings. All the studies have found out some benefits, problems and challenges of ICT use in teaching and learning geography. The empirical study gave the researcher foundation, which will help lot in the process of the research on the level of availability and utilization of ICTs for Teaching Geography in Zaria Metropolis.

2.8 Implication of Literature Reviewed.

This chapter reviewed related literature on the topic under investigation, that is, the availability and utilization of ICT facilities for Teaching Geography. The researcher made more emphasis on resource allocation, availability and utilization in secondary schools. All the reviewed literature

served as a foundation to this research work, the literatures provide the researcher with more knowledge on the availability, competence and utilization of ICT facilities in secondary schools in Nigeria.

The reviewed literature showed that the teaching and learning of geography in Nigeria secondary has been based on abstract. Ogbatogun (2010) the mode of instruction in Nigeria was paper based but now that the introduction of information and communication technology facilities in to geography teaching and learning has now positively changed everything. These discourage open questions, inquiry and active participation of students and makes geography classes difficult and boring (Sofowora & Egbedokun, 2010). The above study has shown that the degenerative state of geography education can be saved with the use of Information and communication facilities which will make geography classes more interesting and satisfying. Conventional approach which is widely used need to be integrated with technological innovations in teaching to alleviate the situation of low enrolment and conform to expected national quality and standard in Geography (Obondo, Jaction & Violet 2013). This can only be done when the ICT facilities are available; the teachers are ICT competent and the available ICT facilities are successfully utilized. That is why the researcher is interested in finding out availability and utilization of ICTs for teaching geography in senior secondary schools in Zaria Metropolis.

The availability and utilization of ICTs in Teaching Geography is the extent on how ICTs are available and utilized in promoting geography to yield a fruitful geography teaching and students performance. This study comprised of teachers and principals in public Senior Secondary Schools in Zazzau Metropolis, which the researcher did not come across this exact type of research in all the literatures reviewed only similar ones, most of the literature patterning ICT in geography education were found outside Kaduna State. This study is among the few if there is any in Zaria Metropolis which focused at finding the availability and utilization of ICTs for the teaching of Geography in Secondary Schools in Zaria Metropo

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methods of the study; it explains the research design, population of the study, sample size, sampling techniques, data collection instrument, reliability of the instrument, validity of the instruments, data collection procedures and data analyses procedures.

3.2 Research Design

For this study descriptive survey design was adopted. According to Sheka (2005) survey research design studies large and small population by selecting and studying samples drawn from the population, to find meaning about some phenomenon of a population, or obtain an understanding of the present condition of the population. The survey research technique not only allows the researcher to know where, when and how to source relevant data but also it is well known in educational research.

For the purpose of the present study therefore, it was found out that survey research design is appropriate for this study since it involves describing a situation as it exist in a particular setting and a sample was studied to investigation the availability and utilization of ICTs for the Teaching of Geography in Secondary Schools in Zaria Metropolis.

3.3 Population and Sample of the study

3.3.1 Population of the study

The population of the study comprised of the entire public geography Senior Secondary School teachers and principals in Zaria Metropolis. According to Kaduna State Ministry of education out of 25 public senior secondary schools, there are 20 senior secondary schools offering geography (8 in Sabon gari Local Government and 12 in Zaria Local Government) in Zaria Metropolis.

Table 3.1

Population of Geography Teachers and Principals in Senior Secondary Schools in Zaria Metropolis According to the research.

S/N	Name of Local Government	No. of Schools offering geography	Names of the schools	No. of Geography Teachers	No of Principal
1	Sabon Gari	8	GGSSS Chindit Girls	3	1
			GGSSS Dogon Bauchi	2	1
			GSSS Chindit Boys	3	1
			GSSS Kwangila	2	1
			GSSS Muchiya	2	1
			GSSS Samaru	2	1
			GSS Sakadadi	1	1
			GSSS Aminu	1	1
2	Zaria	12	GGSS Pada	2	1
			GSS Zaria	3	1
			GGSS Zaria	2	1
			GSS Kofan Kuyanbana	2	1
			GGSS Kofan Gayan	2	1
			GSS Tudun Jukum	1	1
			Alhudahuda	2	1
			Barewa Colledge	3	1
			GSS Dakace	2	1
			GGSS Kaura	2	1
			GSS Gyallesu	2	1
			GSS Bogari	1	1
	Total	20		30	20

Source: Kaduna State Ministry of Education (2015)

3.3.2 Sample of the study

Sample is a sub-set of people, items, or events from a large population that you collect and analyze to make inferences, to represent the population well, a sample should be randomly collected and adequately large (minitab 2015). A total sample of 59 respondents made up of 20 principals and 39 teachers was used for the study because of 1 research mortality. In this case the

researcher used all the population of the study as the sample, because of the small size of the population.

Table 3.2 : Sample Size.

S/N	NAME OF SCHOOLS	NO OF GEO. TEACHERS	NO OF PRINCIPALS
Sabon gari L.G.			
1	GGSSS Chindit Barracks	3	1
2	GGSSS Dogon Bauchi	2	1
3	GSSS Chindit Barracks (Boys)	3	1
4	GSSS Kwangila Zaria	2	1
5	GSSS Muchia	2	1
6	GSSS Samaru	2	1
7	GSS Sakadadi	1	1
8	Aminu GSS	1	1
Zaria L.G.	12	24	12
1	GGSS Pada	2	1
2	GSS Zaria	3	1
3	GGSS Zaria	2	1
4	GSS Kofan Kuyan Bana	2	1
5	GGSS Kofan Gayan	2	1
6	GSS Tudun Jukum	1	1
7	Alhudahuda	2	1
8	Barewa College	3	1
9	GSS Dakace	2	1
10	GGSS Kaura	2	1
11	GSS Gyallesu	2	1
12	GSS Bogari	1	1
	Total	24	12

3.4 Sampling Technique

According to Thomas, Nelson and Silverman (2005), convenience sampling involves picking of a sample based on investigators' judgment to suit the research needs in their opinion, convenience sampling may be done to select a group that demonstrate a certain theory or a model particularly well , or simply to investigate a simply group that is of particular interest to the researcher. Convenience sampling technique was used because the whole population of the study was used as the sample of the study since the population is small and can be studied within the research period of time.

3.5 Data Collection Instrument

The following instruments were used for data collection:

1 Availability of ICTs for teaching geography in Schools Check list (AISCL)

2 Utilization of ICTs for Teaching Geography Questionnaire (UITGQ)

3 Strategies Used for effective Utilization of ICTs for Teaching Geography questionnaire (ASEUITGQ)

3.5.1 Availability of ICTs in the Schools Checklist (AISC)

This was a researcher made checklist targeting respond from availability of ICTs in public senior secondary schools in Zaria metropolis. The checklist was made up ICT facilities that can be used for teaching geography in senior secondary schools in Zaria Metropolis.

3.5.2 Utilization of ICTs for Teaching Geography Questionnaire (UITGQ)

This was a researcher made questionnaire targeting respond from geography teachers teaching in public senior secondary schools in Zaria metropolis. The questionnaire was made up of two sections; section A sought information on demographic data of the respondents (sex, years of experience and educational status of the respondents), Section B; Sought information on the Utilization of ICTs for Teaching Geography in senior secondary schools in Zaria Metropolis.

3.5.3 Strategies Adopted for effective Utilization of ICTs for Teaching Geography questionnaire (SAPUITGQ)

This was a researcher made questionnaire targeting respond from principals in public senior secondary schools in Zaria metropolis. The questionnaire was made up of two sections; section A sought information on demographic data of the respondents (sex, years of experience and educational status of the respondents), Section B; Sought information on the Strategies Used by principal for effective Utilization of ICTs for Teaching Geography questionnaire in senior secondary schools in Zaria Metropolis.

Tab 3.3: Scoring Format

Often used = 3	Sufficiently competent = 3
Rarely used = 2	Somewhat competent =2
Not used =1	Not competent = 1

3.6 Validity, Pilot Study and Reliability

3.6.1 Validation of instrument

To ensure instrument measures what it was suppose to measure, the research instruments (AISCL, UITGQ, and SUPUITGQ) were vetted by the supervisor Dr. Garba Shuaibu (test and measurements) and three other experts with skills in test and measurement from the Department of Science and Technology Education, Dr. Idris Danladi, Mal. Nura, Bayero University Kano for content validity. Their suggestions, corrections, criticism and comments made were incorporated into the final draft of the instrument before administration. The final version was considered valid in content validity.

3.6.2 Pilot Study

A pilot study was conducted using re-test technique on a sample of 20 respondents outside the study population (14 geography teachers and 6 principals) in Kaduna state.

Table 3.4:Pilot Test

State	School s	No. of Geo. Teachers	No of Principals
Kaduna	Sardauna Memorial College	3	1
	GSSS Rimi	3	1
	GSSS Kawo	2	1
	GSSS Maimuna Gwarzo	2	1
	GSSS Kargi	2	1
	GGSSS kawo	2	1
Total		14	6

3.6.3 Reliability of the Instrument

The reliability of the results obtained from pilot testing were tested using person product moment correlation co-efficient. A coefficient of 82 and 0.73 was obtained; therefore the instrument was adjusted as reliable for administration.

3.7 Data Collection Procedure

An introductory letter was collected from the Head of Department Science and Technology Education, Bayero University Kano; the letter was taking to the Director of Ministry of Education Zaria Zonal Office, Kaduna State and to the principals of the geography senior secondary schools in Zaria Metropolis.

The research instruments were personally administered by the researcher to the sample respondents and highlighted to the respondents on how to answer the questionnaire and ensured

that data collection was conducted in an efficient way, avoiding disruptions on normal school activities. The completed questionnaire was retrieved from the respondents.

3.8 Data Analysis Procedure

Summary and conclusion drawn from this research was based on the data collected, the data collected in this study through questionnaire were analyzed:

1 Are there available ICT facilities in teaching geography in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.
2 To what extent are Geography Teachers competent in the use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.
3 How frequently Geography teachers use ICT facilities in Teaching Geography Senior Secondary Schools in Zaria Metropolis. Analyzed using percentages.
4 What are the factors that militate against successful use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.
5 What are the strategies principals adopt to ensure effective utilization of ICT facilities for Teaching Geography in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.
6 To what extent are male and female Geography Teachers competent in ICTs in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.
7 How effective are male and female Geography Teachers in Utilizing ICTs in Senior Secondary Schools in Zaria Metropolis? Analyzed using percentages.

H_{O1} There is no significant difference between male and female geography teachers in ICT competence in senior secondary schools in Zaria Metropolis. Analyzed using Chi-square.

H_{O2} There is no significant difference between male and female geography teachers in ICT utilizations in senior secondary schools in Zaria Metropolis. Analyzed using Chi-square.

CHAPTER FOUR

DATA PRESENTATION ANDANALYSIS

4.1 Introduction

This section deals with the presentation and analysis of the data collected from the field survey and discussions of findings.

4.2 Analysis on Research Questions

4.2.1 What are the available ICT facilities in teaching geography in Senior Secondary Schools in Zaria Metropolis?

Table 4.1 Result on The availability of ICT facilities in the schools:

	Available		Not available		Total	
ICT Facilities						
	Freq	%	Freq	%	freq	%
E-library	17	85	3	15	20	100
Computer	15	75	5	25	20	100
Printer	14	70	6	30	20	100
Internet service	14	70	6	30	20	100
Projector	1	5	19	95	20	100
Projector screen	1	5	19	95	20	100
Photocopy machine	9	45	11	55	20	100
Scanning machine	3	15	17	85	20	100
Computer accessories	6	30	14	70	20	100
Geography Software	2	10	18	90	20	100
Radio Tape	2	10	18	90	20	100
Television	6	30	14	70	20	100
Lap top	8	40	12	60	20	100

Table 4.1 presents the result of the availability of ICT facilities in the respondents' schools. The result shows that the following ICT facilities are available in more 50% of the senior secondary schools in Zaria: 17(85%) E-Library, 15(75) Computer, 14(70%) internet service and 14(70%) printers. While the availability of other ICT facilities like photocopy machine 9(45%), laptop 8(40%) followed by computer accessories 6(30%), television 6 (30%), scanning machine 3 (15%), radio 2(10%) projector 1(5%) and projector screen 1(5%) are available in less than half of the schools. The answer to research question 1 is that there are very few ICT facilities for teaching geography in senior secondary schools in Zaria metropolis.

4.2.2 To what extent are Geography Teachers competent in the use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis?

Table 4.2 Geography Teachers responses on how ICT competent they are.

	Sufficiently competent		Somewhat competent		Not competent		Total	
Task	freq	%	freq	%	Freq	%	freq	%
Using the computer for presentation in geography class	10	25.6	20	51.3	9	30	39	100
Using the computer to keep records of geography students	14	35.9	20	51.3	5	12.8	39	100
Using Word processor in creating text based documents.	6	15.4	20	51.3	13	33.3	39	100
Using Power Point for Presentation	6	15.4	20	51.3	13	33.3	39	100
Using search engine such as Google to browse the internet for teaching materials.	19	48.7	18	46.2	3	7.7	39	100
Using an e-mail address	12	30.8	19	48.7	8	20.5	39	100
Using software such as Arc GIS for teaching	4	10.3	11	28.2	24	61.5	39	100
Using a scanner to copy images into computer.	6	15.4	14	35.9	19	48.7	39	100
Using printer to print out materials from a computer.	9	23.1	17	43.6	13	33.3	39	100
Using projector to support lessons	0	0.0	15	38.5	24	61.5	39	100
Using audio and video CDs, DVDs to convey lessons to the students	4	10.3	24	61.5	11	28.2	39	100
I require more ICT training	12	30.8	22	56.8	5	12.8	39	100
ICT will enhance and build my confidence in the classroom	16	41.0	17	43.6	6	15.4	39	100

Table 4.2 present results on the competence of geography teachers in using ICT facilities in teaching geography, more than 50% of the respondents, that is, 34(87.2%) can use the computer to keep students records, require more ICT training, 33(92.3)% can use search engines, ICT can enhance and build their confidence in class, 31(79.5 %)can use email to communicate with

students, 28(71.8%) can use Audio, video, DVDs and CDs, 26(66.7%) can use Microsoft word, PowerPoint and printer, 20(51.3%) can use scanner while less than half of the respondents, 15(38.5%) can use geography software like ARC GIS and can use the projector. The result of research question 2 showed that there are a lot of ICT competent geography teachers in senior secondary schools in Zaria Metropolis.

4.2.3 How frequently Geography teachers utilize ICT facilities for Teaching Geography Senior Secondary Schools in Zaria Metropolis?

Table 4.3 Teachers responses on the utilization of ICT facilities in geography teaching process.

	Often used		Rarely used		Never used		Total	
Task	freq	%	freq	%	Freq	%	freq	%
Using the computer for presentation in geography class	3	7.7	10	15.4	28	71.8	39	100
Using the computer to keep records of geography students	5	12.8	4	10.3	30	76.9	39	100
Using Word processor in creating text based documents.	0	0.0	2	5.12	37	94.9	39	100
Using Power Point for Presentation	0	00	2	5.12	37	94.9	39	100
Using search engine such as Google to browse the internet for teaching materials.	17	43.6	9	23.0	13	33.3	39	100
Using an e-mail address to communicate with students	0	0.0	0	0.0	39	100	39	100
Using software such as Arc GIS for teaching	0	0.0	3	7.7	36	92.3	39	100
Using a scanner to copy images into computer.	4	10.3	6	15.4	29	74.4	39	100
Using printer to print out materials from a computer.	9	23.1	11	28.2	27	69.2	39	100
Using projector to support lessons	0	0.0	0	0.0	39	100	39	100
Using audio and video CDs, DVDs to convey lessons to the students	3	7.7	3	7.7	33	84.6	39	100

Table 4.3 shows that 17 (43.6%) of respondents often use internet search engines to get teaching materials, followed by the use of computer for presentation 11(28.2%), printer and photocopy machine 9(23.1%), scanning machine 4 (10.3%), audio and video 3 (7.7%), which according to the respondents responses less than half of them often make use of ICT facilities. As seen on the table, the use of word processor to create text based documents, PowerPoint for presentation is rarely used 2(5.12%) while communicating between teachers and students through email and using of projector to convey lesson is 0 (0%), is never used this could be as a result of some factors that militate against the successful use of ICT facilities in the schools. This indicates that the level of utilization of ICT facilities in secondary schools in Zaria Metropolis is very poor. Over all, most of the teachers were not regular ICT users. In fact, most of the teachers recorded never used of the few ICT facilities that were available in their schools. Result on question 3 showed that there is less utilization of ICT facilities for teaching geography in senior secondary schools in Zaria Metropolis.

4.2.4 What are the factors that militate against successful use of ICT facilities in Teaching Geography in Senior Secondary Schools in Zaria Metropolis?

Table 4.4 Teachers Responses on Factors Militating against Effective Utilization of ICT facilities in teaching Geography.

	Yes		**No**		**Total**	
factors	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Electricity	32	82.1	7	17.9	39	100
Inadequate facilities	35	89.7	4	10.3	39	100
Inadequate funding	37	94.9	2	5.1	39	100
Lack of expertise on the use of ICT facilities	28	71.8	11	61.5	39	100
Lack of interest among many members of staff to adopt the use of computers and others	1	38.5	24	30.8	39	100
Lack of interest by many individual to learn the usage of ICT facilities in schools	19	48.7	20	51.3	39	100

Table 4.4 above indicates that the variable "Inadequate funding" 37 (94.9%), ranked first, followed by inadequate ICT facilities 35 (89.7%), electricity 32 (82.1%), Lack of expertise on the use of ICT facilities 28(71.8), Lack of interest by many individual to learn the usage of ICT facilities in schools 19 (48.7) while Lack of interest among many members of staff to adopt the use of computers and others was the least factors with 15(38.5). there are many factors militating against successful utilization of ICT facilities for teaching geography in senior secondary schools in Zaria Metropolis.

4.2.5. What are the strategies principals adopt to ensure effective utilization of ICT facilities for Teaching Geography in Senior Secondary Schools in Zaria Metropolis?

Table 4.5: Principal Responses on strategies adopt in ensuring effective utilization of ICT for teaching geography in the schools.

Strategies	**Frequency**	**%**
Record keeping	10	50
observation	7	35
interaction	2	10
Others (monthly evaluation)	1	5
Total	20	100%

Table 4.5 Going by the above table, record keeping is the most adopted method to ensure effective utilization of teaching and learning resource materials with 10 (50.0%) respondents, followed by observation 7(35.0%), interaction 2 (10.0%) and others 1 (5%) . This result shows that few principals use interaction as strategies for effective utilization of ICT facilities in teaching geography in senior secondary schools in Zaria Metropolis.

4.2.6 To what extent are male and female Geography Teachers competent in ICTs in Senior Secondary Schools in Zaria Metropolis?

Table 4.6 Analyses on male and female geography teachers' ICT competence

	Sufficiently competent				Somewhat competent				Not competent				Total			
Task	freq		%		freq		%		Freq		%		freq		%	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Using the computer for presentation in geography class	10	0	25.6	0	18	2	46.1	5.1	5	4	12.8	10.2	33	6	84.6	15.4
Using the computer to keep records of geography students	12	2	30.8	5.1	18	2	46.1	5.1	3	2	7.7	5.1	33	6	84.6	15.4
Using Word processor in creating text based documents.	6	0	15.4	0	18	2	46.1	5.1	9	4	23.1	10.3	33	6	84.6	15.4
Using Power Point for Presentation	6	0	15.4	0	19	1	48.7	26.6	9	5	23.1	12.8	33	6	84.6	15.4
Using search engine such as Google to browse the internet for teaching materials.	17	2	43.6	5.1	15	3	38.5	7.7	2	1	5.1	2.6	33	6	84.6	15.4
Using an e-mail address	12	0	30.8	0	16	3	41	7.7	5	3	12.8	7.7	33	6	84.6	15.4
Using software such as Arc GIS for teaching	4	0	12.8	0	10	1	25.6	2.6	19	5	48.7	12.8	33	6	84.6	15.4
Using a scanner to copy images into computer.	6	0	15.4	0	14	0	35.9	0	13	6	33.3	15.4	33	6	84.6	15.4
Using printer to print out materials from a computer.	9	0	23.1	0	17	0	43.6	0	7	6	17.9	15.4	33	6	84.6	15.4
Using projector to support lessons	0	0	0	0	15	0	38.5	0	19	6	48.7	15.4	33	6	84.6	15.4
Using audio and video CDs, DVDs to convey lessons to the students	4	0	10.3	0	20	4	51.3	10.3	9	2	23.1	5.2	33	6	84.6	15.4
I require more ICT training	6	6	15.4	15.4	22	0	56.4	0	5	0	12.8	0	33	6	84.6	15.4
ICT will enhance and build my confidence in the classroom	10	6	25.6	15.4	17	0	43.6	0	6	0	15.4	0	33	6	84.6	15.4

Table 4.6 shows that more than 50% of the male geography teachers that is: 32(97%) can use search engine, followed by 30(90.9%)can use computer to keep students record, 28(84.8%)can use computer for presentation and can use email address for communication, 26(78.8%)can use a printer, 25(75,8%)can use power point for presentation, 24(72.7%)can use word processing to create word based document and projector for presentation, 20(60.6%)can scan documents, while less than 50% 15(45.5%)can use projector 14(42,4%)can use geography software and 22(66.6%)need more ICT training and 27(81,8%)ICT will enhance and build their confidence in the class room. More than 50% of the female geography, 5(83%) can use search engine, 4(66.6%) keep students record in computer and use audio and video, 3(50%) can use email address, while less than 50% of the geography teachers 2(33.3%) use computer for presentation and processing for text based documents, 1(16.6%) can use power point and geography software, none of them can use projector, scanner and printer and 6(100%) need more ICT training and 6(100%) ICT will enhance and build their confidence in the class room. This revealed that male geography teachers are more ICT competent than the female geography teachers in senior secondary schools in Zaria Metropolis. This proves Markauskaite (2006), revealed significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability. Males' scores were higher.

H_{O1} There is no significant difference between male and female geography teachers in ICT competence in senior secondary schools in Zaria Metropolis.

Table 4.7 Difference between Male and Female Geography Teachers in ICT Competence in Schools

Gender	Competent	Not competent	Total	df	Critical Value	x^2
Male	25	8	33	1	3.84	15.5
Female	2	4	6		(P>0.05)	s

As shown in table 4.7 the result of the analysis of difference between male and female geography teachers in ICT competence in senior secondary schools. The obtained Chi-square value is 15.5 which compared with the critical value= 3.84 at df =1 at 0.05. The result indicates that the calculated x^2 is greater than the critical value, thus the analysis Chi-square shows significant difference between male and female geography teachers in ICT competence in senior secondary schools in Zaria Metropolis. Therefore the null hypothesis is rejected.

4.2.8 How effective are male and female Geography Teachers in Utilizing ICTs in Senior Secondary Schools in Zaria Metropolis?

Table 4.8 Analysis on male and female geography teachers' effective utilization of ICTs.

	Often used				Rarely used				Never used				Total			
	freq		%		freq		%		Freq		%		freq		%	
Task	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Using the computer for presentation in geography class.	3	0	7.7	0	10	0	25.6	0	22	6	56.4	15.4	33	6	84.6	15.4
Using the computer to keep records of geography students.	5	0	12.8	0	4	0	12.8	0	24	6	61.5	15.4	33	6	84.6	15.4
Using Word processor in creating text based documents.	0	0	0	0	2	0	5.1	0	21	6	53.8	15.4	33	6	84.6	15.4
Using Power Point for Presentation.	0	0	0	0	2	0	5.1	0	21	6	53.8	15.4	33	6	84.6	15.4
Using search engine such as Google to browse the internet for teaching materials.	16	1	41	2.6	7	2	17.9	5.1	10	3	25.6	7.7	33	6	84.6	15.4
Using an e-mail address to communicate with students.	0	0	0	0	0	0	0	0	33	6	84.6	7.7	33	6	84.6	15.4
Using software such as Arc GIS for teaching.	0	0	0	0	3	0	7.7	0	30	6	76.9	15.4	33	6	84.6	15.4
Using a scanner to copy images into computer.	4	0	12.8	0	6	0	15.4	0	23	6	59.0	15.4	33	6	84.6	15.4
Using printer to print out materials from a computer.	9	0	23.1	0	11	0	28.2	0	13	6	33.3	15.4	33	6	84.6	15.4
Using projector to support lessons.	0	0	0	0	0	0	0	0	33	6	84.6	15.4	33	6	84.6	15.4
Using audio and video CDs, DVDs to convey lessons to the students.	3	0	7.7	0	3	1	7.7	2.6	27	6	69.2	15.4	33	6	84.6	15.4

According to table 4.8 utilization of ICTs based on male geography teachers are as follows: 23 (69.8%) use search engines, 20(60.6%) use printer, 13(39%) use computer for presentation, 10(30%) use scanning machine, 9(27%) use computer to keep records, 6(18.2) use audio and video, 3(9.1&) use geography software, 2(6.1) use word processor and power point, none use email and projector. Among the female geography teachers only 4 (66%) use search engine and 1 (6.6%) use DVD and videos in teaching geography in senior secondary schools in Zaria Metropolis. This shows male geography teachers utilize more ICTs in teaching geography than the female geography teachers in senior secondary schools in Zaria Emirate.

H_{O2} There is no significant difference between male and female geography teachers in ICT utilizations in senior secondary schools in Zaria Metropolis.

Table 4.9 Difference between Male and Female Geography Teachers in ICT Utilizationin Schools.

Gender	Utilized	Not Utilized	Total	df	Critical Value	x^2
Male	7	22	33	1	3.84(P>0.05)	19.2
Female	1	5	6			s

As shown in table 4.8 the result of the analysis of difference between male and female geography teachers in ICT utilizations in senior secondary schools. The computed x^2 value of 19.2 with df 1 indicates statistical significant difference when compared with critical value 3.84 (P=0.05). Therefore there is significant difference between Male and Female Geography Teachers in ICT Utilization in Schools, was rejected. This result is in conformity with Jamieson-Proctor, Burnett, Finger and Watson (2006) that female teachers were integrating technology into their teaching less than the male teachers. According to Kay, (2006) studies revealed that male teachers used more ICT in their teaching and learning processes than their female counterparts. For example, Finger and Watson (2006) conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers.

4.5 Summary of Findings

The data analyzed and presented in this chapter were obtained from respondents with respect to research questions raised in the study. The following are major findings of the study:

1. The study revealed that e-library, computer, internet and printers are availability in more than 50% of the schools under investigation while others like photocopy machine, laptop, computer accessories; printers are available in less than 50% of the schools.

2. The study shows that more than 50% of the respondents can use computer, search engine, printers and scanner, less can use geography software and projector for teaching geography.

3. The Utilization of ICT facilities for teaching geography is not as impressive as the ICT competence of the geography teachers, less than 50% of the geography teachers utilize ICT facilities in teaching geography.

4. The study confirm that, inadequate funding, followed by inadequate facilities, electricity, lack of expertise on the use of ICT facilities, lack of interest among many members of staff to adapt the use of computers and others and lack of interest among many individuals to learn how use of ICT facilities in schools are considered to be factors that militate against successful utilization of ICTs in teaching geography in secondary schools.

5. The study revealed that the principal's have different strategies in monitory effective utilization of ICT facilities in their school such as record keeping which is the most common then observation, discussion and monthly evaluation.

6. The study has confirmed that percentage of ICT competent geography male teachers are more than that of female geography teachers.

7. The study also revealed that male geography teachers utilize more ICTs than the female geography teachers.

H_{01} The hypothesis in the study revealed that there is significant difference between male and female geography teachers in ICT facilities competence for teaching geography in senior secondary schools in Zaria Metropolis.

H_{02} Also revealed that there is significant difference between male and female geography teachers in utilizing ICT facilities for teaching geography in senior secondary schools in Zaria Metropolis.

4.6 Discussion of Results.

The data analyzed and presented in this chapter were obtained from respondents with respect to research questions raised in the study. Questions were asked on the respondent's educational qualification, years of teaching experience, gender and location of the study. Also on availability of ICT facilities, often utilization of ICT facilities, strategies adopt by principals to ensure effective utilization of ICT facilities and factors militating against effective utilization of ICT facilities. Another data is on hypothesis testing.

Research question one the result of the study revealed that the availability of most of the ICT facilities in the schools under study for teaching geography mostly not available. According to the study, E-library is the most available, found in more than 50% of the senior secondary schools, followed by computer, printer and internet service while others are not available in more than 50% of the schools. The stake holders, more especially the ministry of education is responsible for the provision and supply of resources to various schools, the researcher is of the opinion that ministry of education should see to the provision of the technological resources that is well equipped laboratories with the required facilities in every senior secondary schools under study as the building of e-library alone is not enough to make teaching and learning of geography effective. There is a need of the administrators to make it available in order to achieve the senior secondary geography education desired objectives. According to (Andrea, 2003) Thus, it can be deduced that the success of any secondary school education depends upon the resources available to it. Money is very important in education because by it, all other vital elements in the school such as school buildings, purchases, allowances, as well as running expense can be made. The school administrators as those responsible for the acquisition of the materials input should therefore made it available and monitor it utilization in order to eliminate the problem of the Secondary School Students' poor academic performance. This research is in conformity with Yusuf Maina and Dare (2013) there is a dearth of ICT facilities as there are only very few of such facilities available in most of the schools.

Research question two the results of the study revealed that more than 50% of the respondents fell under either sufficiently competent or somewhat competent (table 4.6) and also believe ICTs will enhance and build their confidence in the classroom. This means if the required ICT facilities are available and the factors militating against successful utilization of ICTs in teaching geography are eradicated, the utilization of ICTs will be much easier since ICT competence among to most of the geography teachers in senior secondary schools in Zaria Metropolis is not a problem. Jongur, Mohammed & Abba (2008) opined that ICTs provides real opportunity for individual instruction accelerating, enriching, deepening skill, and engaging students actively in learning and Loto and Abidoye (2010) noted that acquisition of ICT skills, infrastructures, and inadequate incentives for entrepreneurs, insufficient time to learn, participation, leadership and commitment are the problems facing the use of ICT in the management of entrepreneurship education in Nigeria. This research is disagreeing James (2014) which revealed that most Geography teachers were not computer literate and Sofowora and Egbedokun (2010) lack of skills and cost of utilization ranked highest as one of the factors preventing teachers from using the new technologies in teaching Geography.

Research question three from the responds of the research question on utilization, the result revealed that less than 50% of respondents utilized the ICT facilities under investigation for teaching of geography, some rarely utilized while most of the ICT facilities were never utilized (table 4.7). The researcher observed that computer is the most utilized ICT facility this could be attached to the fact that it is the only much available ICT facility and making use of only computer is not enough to make teaching and learning of geography effective. The researcher also observed that schools with larger number of geography staff utilized the available ICT resources more than the schools with small numbers of geography staff. The unavailability of the essential ICT facilities could hinder the effectiveness of the teaching learning process of geography which could result to poor academic achievements. Therefore, there is a need for the government to make the ICT facilities available and teachers to effectively utilize the available resources in their various schools for the achievement of the educational goals and objectives. Okorie (2001) student learning outcomes in schools is largely dependent on availability and appropriate utilization of resources, because the students acquire skills using these resources. The result of this research question is in line with the opinion of Adeyinka et al (2010), technical support are

lacking in the schools and teachers lack of expertise in using ICT was indicated as being the prominent factors hindering teachers readiness and confidence of using ICTs during lesson.

Research question four, the findings from the study shows that electricity, inadequate facilities, inadequate funding, lack of expertise on the use of ICT facilities, lack of interest among many members of staff to adapt the use of computers and others and lack of interest among many individuals to learn the usage of ICT facilities are all considered to be factors that can militate against successful utilization of resource materials (table 4.8). The researcher is of the opinion that government should make the required ICT facilities available, organize seminar and workshop to train teachers and administrators on how to effectively utilize the ICT facilities and create conducive learning environment in order to motivate students to learn and the school administrators should ensure the teachers preparation for teaching and utilization of the ICT facilities provided. One assumes that making required resources available, effective utilization of the resources and conducive learning environment could brings about fruitful learning outcomes since it stimulates and motivates students. The problem of poor funding is listed by various studies inter alia: (Rilwan, Akahomen and Gbakeji 2014). This shows the gravity and centrality of the problem. Poor funding expresses itself in different areas such as poor power supply, poor human resources development and poor state of telecommunication and roller ICT infrastructure. Without the necessary funding, most of the above problems facing the use of ICT in geography education can be solved.

Research question five, the researcher observed that principal's strategies play a significant role in the issue of effective utilization of teaching and learning resources. Study revealed that the most strategies adopted by principal to ensure effective utilization of ICT facilities are record keeping followed by observation (table 4.8) The researcher is of the view that, with the falling standard of education, record keeping is not sufficient to ensure effective utilization of ICT facilities, inventory of items and constants observation in order to check or find out how the ICT facilities are being utilized in the classroom it is a more yielding approach. Where the principals observed some problems during the course of the teaching and learning process, he can organize a resource improvement seminar or workshop to cover such areas, train the teachers on the preparation of modern lesson note or planning to enhance effective utilization of the ICT facilities for teaching geography. SEDL Research report (2007) the head of school is responsible to co-ordinate the utilization of the resource material in school. The head of teachers in secondary

schools is the principal. Akundayo(2011) secondary school can only be productive if there is effective and efficient management of human and material resources in the system by the principal.

Research question six, the researcher saw a very hug difference between the number of male geography teachers with 33(84.6%) and female geography teachers with 6(15.4%). The findings of this study are in line with majority findings in Nigeria. In terms of gender, male are always more in number than female due to domestic engagement and activities. Also some men don't allow their wives to work more especially in the northern part. ICT competence is more common in male geography teachers, since the responses in the research instrument shows more than 50% of male geography teachers are competent in carrying out more than 50% of the ICT tasks while less than 50% of the female geography teachers are competent in carrying out less than 50% of the ICT tasks in senior secondary schools in Zaria Metropolis.

Research question seven, both the male and female effective utilization of ICTs is low due to the factors mentioned above that hinders the successful utilization of ICT facilities but still the level of ICT facilities utilization by male geography teachers exceed that of the female geography teachers in senior secondary schools in Zaria Metropolis.

H_{01} there is a huge gap between male and female geography teachers in ICT facility competence for teaching geography in senior secondary schools in Zaria Metropolis which is probably according to Derbyshire, 2003 in principles girls are given the same opportunity as boys of access to computer, and gender equity does not exist in practice which is not in conformity with Adams, 2002 that female teachers applied ICT more than the male teachers.

H_{02} and also there is a significant difference between male and female geography teachers in utilizing ICT facilities for teaching geography in senior secondary schools in Zaria Metropolis which is in line with Burnett, Finger and Watson (2006) conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter comprised of three parts: Summary of the study, conclusion and recommendation on the study that are considered by the researcher to be useful to the readers.

5.2 Summary of the Study

The study investigated the availability and utilization of ICT facilities for teaching geography in senior schools in Zaria Metropolis, The chapter one part of the study deals with basic elements such as introduction, background of the study, statement of the problem, research Objectives, research questions, research hypothesis, significant of the study, scope and delimitations of the study as well as the definitions of the terms.

Chapter two reviewed literature related to the topic under study. The reviewed literature among others include; Concept of education, Secondary school education in Nigeria, Purpose of secondary schools in Nigeria, Geography Curriculum in Nigeria, Concept of ICTs in Education, Use of ICT for teaching geography, Availability of ICT facilities for Teaching Geography, Concept of ICT Utilization in Secondary Schools, Factors Affecting resources utilization, Implications of Reviewed Literature and Review of Empirical study.

The third chapter outlined the methods for the collection of data relevant to the study which includes, research design, population of the study, sample size, sampling technique, data collection instruments, data collection procedure and data analysis procedure. A survey research design was used for the study, instrument used was a questionnaire. The respondents were teachers from the twenty schools offering geography from Zaria Metropolis and the principals of the schools. Spearman's rho correlation coefficient was used to test the hypothesis of the study.

Chapter four analyzed and present the data collected in accordance with the objectives of the study. It was found that majority of the respondents were male and most of them have not less than five years of teaching experience. Furthermore, the result also shows that majority of the respondents has B.A/B.Sc, B.A.Ed/ B.S.Ed and NCE respectively. Findings from the research

revealed the availability of ICT facilities like internet service, photocopy machine, scanning machine etc are less available. While ICT facilities like projector, projector screen, fax machine is not available. The finding also revealed that ICT facilities were not often utilized because most of the ICT facilities were either less available or not available. Also, the study confirm that, electricity, inadequate facilities, inadequate funding, lack of expertise on the use of ICT facilities, lack of interest among many members of staff to adapt the use of computers and others and lack of interest among many individuals to learn the usage of ICT facilities in schools were among factors that can militate against successful utilization of ICT facilities. The study also revealed that the principal's strategies in monitory effective utilization of resources were not quite adequate and male geography teachers are more ICT competent and make more effective utilization of ICTs than the female geography teachers. Both hypotheses rejected, that is there is significant difference between male geography teachers and female geography teachers in both ICT competence and utilization in secondary schools in Zaria Metropolis.

Chapter five of the work summarized the major findings of the study; draws conclusion based on the findings and offered appropriate recommendations towards improving the availability and utilization of ICT facilities for teaching geography in Zaria Metropolis.

5.3 Conclusion

In view of the present situation of the availability and utilization of ICT facilities for teaching geography in the schools under investigation which is not impressive, the researcher concludes that most of the resources were not available which result to ineffective utilization and even though most of the respondents are ICT competent. From the research findings, the respondents agreed that electricity, inadequate facilities, inadequate funding, lack of expertise on the use of ICT facilities, lack of interest among many members of staff to adapt the use of computers and others and lack of interest among many individuals to learn the usage of ICT facilities in schools were among factors that militates against a successful utilization of ICT facilities in schools. The researcher concludes by advocating that Government should make necessary ICT facilities for teaching geography available and other subjects if needed, provide a conducive learning environment, and train teachers through workshop, seminar etc for effective utilization of the available teaching ICT facilities, and daily checking and observation approach to

ensure effective utilization of the available ICT facilities for the improvement on the students' academic performance in geography.

5.4 Recommendations

In view of the important of availability of ICT facilities and utilization to the educational outcomes, the researcher, during the course of study discovered some important factors which could improve the availability and utilization of ICT facilities for teaching geography in the schools. The following recommendations are made to enhance the students' geography academic performance:

5.4.1 Recommendation for the study

- The State ministry of education should provide the necessary ICT facilities for teaching of geography to all senior secondary schools in the State.
- Teachers should equally be trained and re-trained regularly in the use and management of ICT facilities for effective Geography curriculum delivery.
- Training and re-training of School administrators and teachers should be intensified by state ministry of education so as to empower them on modern methodologies and skills required for effective utilization of the available teaching and learning resources materials in schools.
- The state ministry of education should look for a way of eradicating or minimizing the factors that militate against successful utilization of ICT facilities in teaching geography.
- The school principals should imbibe the culture of daily checking and observation to ensure teachers preparation for teaching and effective utilization of available ICT facilities.
- During ICT training, special attention should be giving to less ICT competent teachers which in this study are the female geography teachers.

5.4.2 Suggestions for further study

- A More research should be done on the availability and utilization of ICT facilities for different subjects and to include both public and private secondary schools in Nigeria, because secondary school is a bridge between primary and tertiary. According to Onsonu, Mutaka, Ngware and Kosimbei (2006), central to the educational process is secondary education which provides a

vital link between basic education and the world of work on one hand and further training on the other.

5.4.3 Limitation of the study

- This study is limited to the availability and utilization of ICT facilities for Teaching Geography in Senior Secondary Schools in Zaria Metropolis. Because of delimited time and resources the researcher limited her research on the availability and utilization of ICT facilities for teaching geography in only public Senior Secondary Schools in Zaria Metropolis and generalization was only based on that.

5.5 Contribution to Knowledge

Below are the research contributions to knowledge:

1. The researcher observed that ICT facilities like e-library, computer, internet and many others are important for geography teaching. Teachers who are creative in utilizing ICT facilities in the teaching of Geography if noticed and motivated or rewarded accordingly will challenge other teachers to strive and improve their performance in utilizing ICT facilities in teaching.
2. The study was able to provide information about availability of information and communication technology facilities which is less than 50%, more than 50% of geography teachers are ICT competent, less than 50% geography teachers utilize ICT facilities as a result of some factors that militate against successful utilization of ICT facilities in senior secondary schools in Zaria Metropolis.
3. The researcher discovered different strategies used by principals to ensure successful utilization of ICT facilities for teaching geography in senior secondary schools in Zaria Metropolis.
4. The gap in competence and utilization of ICT facilities for teaching geography between male and female geography teachers it's relatively high in senior secondary schools in Zaria Metropolis.

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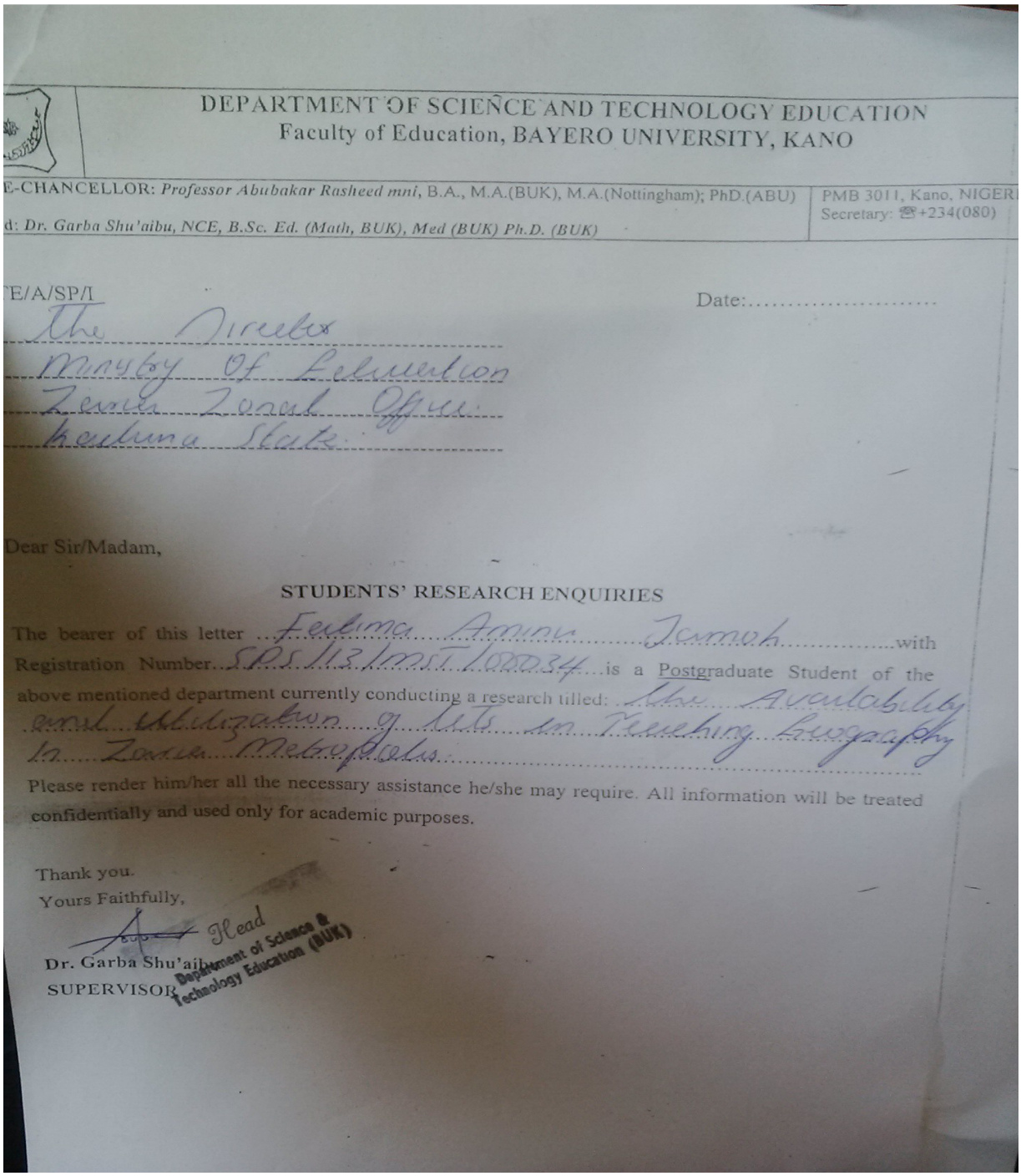
Appendix: One

Letter of Introduction from Science and Technology Education Department.



DEPARTMENT OF SCIENCE AND TECHNOLOGY EDUCATION
Faculty of Education, BAYERO UNIVERSITY, KANO

E-CHANCELLOR: *Professor Abubakar Rasheed mni*, B.A., M.A.(BUK), M.A.(Nottingham); PhD.(ABU)
d: *Dr. Garba Shu'aibu, NCE, B.Sc. Ed. (Math, BUK), Med (BUK) Ph.D. (BUK)*

PMB 3011, Kano, NIGERI
Secretary: ☎+234(080)

'E/A/SP/1

Date:.....

The Director
Ministry Of Education
Zonal Zonal Office
Kaduna State.

Dear Sir/Madam,

STUDENTS' RESEARCH ENQUIRIES

The bearer of this letter ...Fedlima Aminu Jamoh.....with Registration Number...SPS/13/MST/00034....is a Postgraduate Student of the above mentioned department currently conducting a research titled: ...the Availability and Utilization of Arts in Teaching Geography in Zaria Metropolis.....

Please render him/her all the necessary assistance he/she may require. All information will be treated confidentially and used only for academic purposes.

Thank you.
Yours Faithfully,

Head
Department of Science & Technology Education (BUK)

Dr. Garba Shu'aibu
SUPERVISOR

Appendix: Two

List of senior secondary schools offering geography in Zaria Metropolis

Sabon gari L.G.

S/N	NAME OF SCHOOLS	NO OF GEO. TEACHERS	NO OF PRINCIPALS
1	GGSSS Chindit Barracks	3	1
2	GGSSS Dogon Bauchi	2	1
3	GSSS Chindit Barracks (Boys)	3	**1**
4	GSSS Kwangila Zaria	**2**	**1**
5	GSSS Muchia	**2**	**1**
6	GSSS Samaru	**2**	**1**
7	GSS Sakadadi	**1**	**1**
8	Aminu GSS	1	1
Total	8	16	8

Zaria L.G.

S/N	NAME OF SCHOOLS	NO. OF GEO. TEACHERS	NO. OF PRINCIPALS
1	GGSS Pada	**2**	**1**
2	GSS Zaria	**3**	**1**
3	GGSS Zaria	**2**	**1**
4	GSS Kofan Kuyan Bana	**2**	**1**
5	GGSS Kofan Gayan	**2**	**1**
6	GSS Tudun Jukum	**1**	**1**
7	Alhudahuda	**2**	**1**
8	Barewa College	**3**	**1**
9	GSS Dakace	**2**	**1**
10	GGSS Kaura	**2**	**1**
11	GSS Gyallesu	2	1
12	GSS Bogari	1	1
Total		24	12

Appendix: Three

Check List

1. Available ICT facilities for teaching geography in Senior Secondary Schools in Zaria Metropolis.

   Availablble: [1] Not available [0]

ICT Facilities	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
e-library																				
compuer																				
Printer																				
Internet service																				
Projector																				
Projector screen																				
Photocopy machine																				
Scanning machine																				
Computer accessories																				
Geography software																				
Radio cassetts																				
television																				
laptop																				

Appendix: Four

Teacher's Questionnaire.

Utilization of ICTs for Teaching Geography Questionnaire

Section A: Background Information

Instruction: please thick in the bracket/box (/) / ☐

1. Your Highest Educational Qualification?
   a) M.Ed ( )
   b) B A Ed/B Sc Ed ( )
   c) B A/B Sc ( )
   d) Others (please specify)……..

2. For how long have you being teaching?
   a) Less than 5 years ( )
   b) Between 5 and 10 years ( )
   c) Between 11 and 15 years ( )
   d) Between 16 and 20 years ( )
   e) Between 21 and above
3. Gender:
   a) Male ( )
   b) Female ( )

Section B: Utilization of ICTs

1. How often do you utilize the following ICT Facilities in teaching geography**?**

Tasks	Often used	Rarely used	Not used
Using the computer for presentation in geography class			
Using the computer to keep records of geography			

students			
Using Word processor in creating text based documents.			
Using Power Point for Presentation			
Using search engine such as Google to browse the internet for teaching materials.			
Using an e-mail address			
Using software such as Arc GIS for teaching			
Using a scanner to copy images into computer.			
Using printer to print out materials from a computer.			
Using projector to support lessons			
Using audio and video CDs, DVDs to convey lessons to the students			

2. How competent are you in using the following ICT facilities in teaching Geography?

ICT Facilities	Sufficiently competent	Somewhat competent	Not competent
Booting the computer			
Using the computer for presentation in geography class			
Using the computer to keep records of geography students			
Using Word processor in creating text based documents.			
Using Power Point for Presentation			
Using search engine such as Google to browse the Internet for teaching materials.			
Using an e-mail address			
Using software such as Arc GIS for teaching			
Using a scanner to copy images into computer.			
Using printer to print out materials from a computer.			
Using projector to support lessons			
Using audio and video CDs, DVDs to convey lessons to the students			
I require more ICT training			
ICT will enhance and build my confidence in using ICT facilities in the classroom			

3. What are the major factors that militate against successful use of ICT in teaching geography?

Factors militating against ICT use in teaching geography	Yes	No
Electricity		
Inadequate facilities		
Inadequate funding		
Lack of expertise on the use of ICT equipment		
Lack of interest among many members of staff to adopt the use of computers and other		
Lack of interest by many individuals to learn the usage of ICT facilities in schools		

Any other factor(s) state ……

……

……

……

Thank you for your participation

Fatima Aminu Jamoh

Appendix: Five

Principal Questionnaire.

Strategies Adopted for Ensuring Effective Utilization of ICTs for Teaching Geography Questionnaire..

Section A: Background Information

Instruction: please thick in the bracket/box ( ) / ☐

1. Your Highest Educational Qualification?

e) M.Ed ( )
f) B A Ed/B Sc Ed ( )
g) B A/B Sc ( )
h) Others (please specify)……..

2. For how long have you being teaching?

f) Less than 5 years ( )
g) Between 5 and 10 years ( )
h) Between 11 and 15 years ( )
i) Between 16 and 20 years ( )
j) Between 21 and above

3. Gender:

c) Male ( )
d) Female ( )

4. What strategies do principals adopt in ensuring effective utilization of ICTs in teaching geography in the school?
a) Observation ( )
b) Recording ( )
c) Interaction ( )
d) Other (specify)……

Thank you for your participation

Fatima Aminu Jamoh

Appendix: Six

Raw data on available ICTs for teaching geography in senior secondary schools in Zaria Metropolis

ICT Facilities	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
e-library	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
Computer	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0
Printer	1	1	0	0	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0
Internet service	1	1	0	0	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0
Projector	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Projector screen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Photocopy machine	1	1	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	1	0	0
Scanning machine	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0
Computer accessories	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0
Geography software	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Radio Tape	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
television	0	1	0	0	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0
laptop	1	1	0	0	0	0	1	0	1	1	1	0	0	0	1	1	0	0	0	0

Appendix: Seven

Pilot Testing Result

1. Correlations

Geography Teachers		Test	Retest
Person product moment correlation	Test	1,000	.73”
			000
		20	20
	Retest	73”	1,000
		.000	
		4	4

Pilot Testing Result

2. Correlations

Geography Teachers		Test	Retest
Person product moment correlation	Test	1,000	.82”
			000
		39	39
	Retest	82”	1,000
		.000	
		4	4