AVAILABILITY AND UTILIZATION OF COMPUTER IN TEACHING BASIC SCIENCE AND TECHNOLOGY IN JUNIOR SECONDARY SCHOOLS IN MINNA METROPOLIS

BY

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BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF EDUCATIONAL TECHNOLOGY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR IN TECHNOLOGY IN EDUCATION TECHNOLOGY (B. TECH) IN THE DEPARTMENT OF EDUCATIONAL TECHNOLOGY; SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA NIGERIA

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TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

This study assessed of the availability and utilization of computer Basic science and Technology in Junior secondary schools in Minna Metropolis. The study adopted the descriptive survey research design while the study population comprised 5 secondary schools in Minna, Niger State. The sample consisted of two (2) randomly selected secondary schools and fifty (50) teachers drawn randomly from the study population. The instrument used to collect data for the study was a questionnaire titled "Questionnaire on the Availability and Utilization of Computers in Teaching Basic Science and Technology" (QAUCTBST)" while the data collected was analysed using mean and percentage. The findings revealed that computers are available but are not adequately utilized in junior secondary schools in Minna Metropolis. The null hypotheses developed for the study were accepted at 0.05 level of significance. The finding revealed that, there was no significant difference found between the responses of male and female teachers on the utilization of computers by teachers in Junior secondary schools in Minna Metropolis; The study recommended among others that there should be strict adherence to the use of computers in teaching Basic science and technology in Junior secondary schools.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to The Study

Computers refer to the hardware that forms part of an ICT system (Siyavula, 2021). The ICT system refers to the overall set-up, consisting of hardware, software, data and the people that use it. It commonly includes communication technology, such as the internet. ICT is the field that looks at all these technologies as one. Computers' role in learning is to simplify reality, often with exaggerated cause-and-effect linkages that can be very successful in a teaching setting. (Kiarie, 2015). Computers are electronic devices capable of accepting, processing, storing and manipulation of data. “A computer is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming” (Wikipedia, 2021). Mugivane (2014) defined a computer is an electronic device that accepts user input (data) and processes it under the influence of a set of instructions referred to as programs to produce the desired output generally referred to as information. A computer is an electronic device, operating under the control of instructions stored in its own memory. These instructions tell the machine what to do. The computer is capable of accepting data (input), processing data arithmetically and logically, producing output from the processing, and storing the results for future use. Most computers that sit on a desktop are called Personal Computers (PCs). The "computer" is an ensemble of different machines that you will be using to get your job done. A computer is primarily made of the Central Processing Unit (usually referred to as the computer), the monitor, the keyboard, and the mouse. Other pieces of hardware are commonly referred to as peripherals (Adebisi, 2013).

Barroso (2019) argued that computers are one of the most valuable resources in a classroom because they serve so many useful functions. With computers and the internet, students today have a wealth of information at their fingertips that can help them develop their research and communication skills while preparing them for a future career in a workforce that is increasingly reliant on computer technology. Kazaure *et al*. (2019) observed that Computers are used actively in education to improve the quality and learning outcomes. Teachers can use audio, video and graphics aids through computer to prepare lesson plans. The use of Microsoft Power Point to prepare and deliver electronic presentations to the audiences is a very good aspect of interactive pedagogy. These electronic presentations will be displayed on multimedia projectors in the class rooms where everyone will be engaged in the modern teaching methodology. This will be interesting and easy to learn by the students. Multimedia presentations are easy to deliver by the teachers and for interactive participatory pedagogy. These presentations save a lot of efforts and time and ensure increase productivity in the overall classroom management. Moreover, multimedia presentations are interesting to view and hear and sound, visual effects make lessons much emphatic. Computers will be helpful in educational business and making it less boring for active engagement.

The utilization of computer resources within schools will impact additionally in technological advancements and in methodology of teaching and learning. At present the computer technology had witnessed advancements in all facets of human managerial responsibilities as it incorporates all aspect of media for its interactive engagement. Today, computer development is leading in innovation as it is rapidly creating headways in education through innovations looking at the increase in availability of modern computing device like Mobile phones and Personal Digital Assistance all with the capabilities to impact positively towards knowledge transfer. Changes in

science and technology had brought into lime light the key aspects of computer in the scope of information management in other words referred to as Information Technology (IT). Computers have touched the lives of many students living in the remotest part of our planet. There is no point denying the way that computers absolutely controlled the life of a typical student either graduate or undergraduate. In this presentation we outlined the applications or uses of computers and its significance to teaching and learning in the worldwide educational perspective.

Availability refers to the quality of being able to be used or obtained (Spagnuelo & Lenzini, 2017). Afshari *et al*, (2010) noted that the Pakistan Ministry of Education has spent a huge amount of money to promote the introduction of Information Communication Technology (ICT) into schools. They noted that education leaders and teachers in Iran were crucial influences in the introduction of ICT in schools – because teachers make choices on whether or not to integrate services into schools. Williams *et al* (2010) noted that computers are unavailable in schools in Africa which reflect concerns about infrastructure and students' ICT skills in poorer regions of the world. The availability of computers to teachers and learners is critical to their successful adoption as teaching resources. ICT resources are not available for effective teaching of computer education in most secondary schools (Nwana *et al*., 2017).

Computers have revolutionized the teaching profession in multiple ways. Teachers use computers to record grades, calculate averages, manage attendance and access data on student performance in online programs and assessments (Barosso, 2019). Computers have also made it easier for teachers to vary their instructional delivery. Kamene (2014) opined that there is willingness to use computers to teach but patience is required as the positive attitude precedes the implementation of teaching resources such as the computer. Nji and Idika (2018) indicated that teachers had low utilization of ICT in teaching and students also had low utilization of ICT in

learning. contribute to high quality lessons since they have potential to increase students' motivation, connect students to many information sources, support active in-class and out-class learning environments, and let instructors to allocate more time for facilitation. Therefore, use of ICT tools in teaching and learning process becomes a great area of research for many educators. These technologies increase students' motivation, self-confidence and self-esteem to learn. Additionally, new technologies usually encourage independent and active learning, as a result, the students feel more responsible for their own learning. Considerable number of researches on the contribution of ICT in modernizing learning and teaching, triggers attempts to incorporate these technologies in order to benefit in terms of quality of education, flexibility, access, and its cost (Cidemoglu & Akay, 2016).

There is no ground for skepticism about the growing role of computers in education. Useful as teaching resources are, they cannot replace the teacher (Twoli *et al*., 2007); and the computer is one such resource. However, while it is possible that computers are capable of improving the learning experience, they are not a substitute for teachers and are only resources that teachers and learners can use. However, a lot depends on the affordability and use of computers in the classroom. Fakeye (2010) says that young and experienced teachers will benefit from the role that computers play; young teachers can access a wealth of teaching opportunities while old teachers can share their expertise with others who need it. It also points out that the Nigerian federal government has carried out a pilot project to integrate computers into 60 secondary schools and colleges with good results, while access to computer services was the greatest obstacle in both rural and urban areas.

Basic Science and Technology is science-based subject taught at primary and junior secondary school level, it is a product of the restructuring and integration of four primary and Junior

Secondary school (JSS) science curricula namely, Basic Science, Basic Technology, Physical and Health Education, and Computer Studies/Information and Communication Technology (Shittu *et al*., 2015). Okorie (2012) observed that there is need for Basics science and technology teachers to update their method of teaching, especially with regard to the use of modern multimedia ICT tools in lesson delivery. Retraining of teachers in the content area of the curriculum is often neglected, or relegated to the background. The content of the Basic science and Technology curriculum, for the 9-year basic education programme in Nigeria, compares in every respect with other science and technology curricula at that level in other parts of the world, and all of them are geared towards scientific literacy for all in line with the goal of science education across the globe in the 21st century (Okorie, 2010). The implication is that what is taught to Nigerian children must be current, and should meet globally acceptable standard. The teacher in the Nigerian educational system must therefore be current, knowledgeable academically competent and able to effectively deliver instructions on the concepts and contents of the curriculum.

Computers have been used at the primary, secondary and tertiary school level in Nigeria to teach science related courses such as basic science, basic technology, biology and others. However, at the secondary school level it is not very clear whether basic science and technology teachers use computers where they are available to them. It is clear though that some teachers of Basic Science may be using computers even if it is only for the preparation of examinations and or for social purposes. This research therefore endeavored to establish whether computers were available at the secondary school level and if so verify whether they were used by Basic Science and Technology teachers and their learners for teaching and learning purposes.

1.2 Statement of Research Problem

Basic Science and Technology is a science-based subject with abstract content that students may find difficult, this has led to poor academic performance and loss of interest due to traditional method of teaching. In most junior secondary schools in Nigeria, instruction is delivered using conventional lecture method that is not stimulating and motivating for students to adequately learn. Computers are useful in teaching and learning as they help in demystifying abstract topics and concepts taught in Basic Science. Computers help students learn more by developing their learning environment and growing their learning resources. Availability and the utilization of computers to Basic Science and technology teachers is the first stage in the successful adoption of computers in teaching the subject in secondary schools. This is because teachers can only be competent and interested users of computers as teaching tools if they are readily available and accessible. Teachers will not include computer technologies in their instructional tasks unless computers are available in the first place. There are also problems that impede the use of computers in the classroom. However, when used successfully, computers provide a profound impact on teachers and learners. Hence, this research was undertaken to determine the degree to which computers were available and utilized by teachers, and whether they were used for teaching Basic Science and Technology in secondary schools in Minna, Niger State.

1.3 Aims and Objectives of the Study

This study investigates the availability and utilization of computers in teaching basic science and technology in Junior Secondary Schools in Minna Metropolis. Specifically, the study is to achieve the following objectives:

(i) Investigate the availability of computers to teachers of Basic Science and Technology in Junior Secondary Schools in Minna Metropolis

(ii) Examine the utilization of computers to teachers of Basic Science and Technology in Junior Secondary Schools in Minna Metropolis.

(iii) Examine the difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis?

1.4 Research Questions

The following research question were formulated to guide this study:

1. What is the level of availability of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis?
2. What is the level of utilization of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis?
3. Is there any difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis?

1.5 Research Hypothesis

$HO_{1:}$ There is no significant difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis.

1.6 Significance of the Study

The findings of this study will also be of great benefit to students, parents, school administrators, policy makers, government, researchers and other concerned adults to better understand the importance of computers for teaching and learning.

Findings of this research study could be of great benefit to students as they will realize the benefits of computers in teaching and learning, the provision of computers in schools will lead to improvement in their academic performance. The use of computers in education will engage students and improve their academic performance through carefully planned teaching strategies that will motivate and stimulate them to learn.

Parents will also be able to consult this study and gain valuable knowledge and information regarding the utilization of computers in the lives of their children. The use of ccomputers in education will enhance the academic performance of their children and make them become good citizens of the society.

The findings of this study will prove to be beneficial to school administrators, they study will serve as a guide in the provision and usage of computers in Junior Secondary schools. The provision and utilization of computers will make learning interesting, fun and engaging and elevate school attendance and expand participation.

This study will also serve as reference guide to the government, agencies, parastatals and relevant stakeholders on the importance of computers in schools and this will lead to the availability and proper utilization of computers in Junior secondary schools.

1.7 Scope of The Study

The study was conducted in Minna Metropolis Niger State Nigeria, this study will be carried out in Junior secondary schools in Minna metropolis to investigate the availability and utilization of computer in teaching Basic Science and Technology. This study will last for three weeks and it will be conducted within Junior secondary school students in Minna Metropolis, Niger state.

1.8 Operational Definition of Terms

1. Computer: A computer is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming
2. ICT: an abbreviation for Information and Communication Technology which refers to technologies that provide access to information through telecommunication
3. Basic Science and technology: Basic Science and Technology subjects are to provide background knowledge on human resources training in applied science, technology and trade, to provide preliminary knowledge and skills acquisition necessary for physical, agricultural, industrial, commercial and economic development, to provide students with early basic scientific knowledge for improvement and to provide solutions for environmental issues.

CHAPTER TWO

2.0 LITERATURE REVIEW

The major areas reviewed under this project work have been classified under

1. Conceptual framework
2. Theoretical framework
3. Empirical study
4. Summary of Literature Reviewed

2.1 Conceptual Framework

Learning can be reinforced with different teaching and learning resources because they stimulate, motivate as well as focus the learners' attention for a while during the instructional process (Saidu & Garba, 2016). Multimedia teaching and learning resources are highly important in teaching and learning since they are stimulating and motivate learners by capturing their attention and make the learning process concrete since they transform spoken words and writings into vivid and "eye-catching" illustrations.

Computers are multimedia designated teaching and learning materials that may be locally or commercially produced. They appeal almost to all the sense organs from seeing, hearing and touch, they characterized by a combination of texts, graphics, animations, videos and sounds that are spun into a content and presented in different ways or forms, for example, television, computers, multimedia projector, etc. which appeal to the sense of seeing and hearing. ICT resources are important teaching and learning materials that could be used to facilitate the teaching and learning.

Theoretically, Computers has shown promise in the aspect of teaching and learning due to its stimulating, engaging and motivating components but there is need to investigate its real-life

impact on classroom teaching and learning, hence this study is aimed at practicalizing the availability and utilization of computers in teaching basic science and technology.

2.1.1 Concept of basic science and technology

Ewesor and Itie (2015) defined Basic Science and Technology Education as the way in which children learners in primary schools tries to learn and understand their environment, observed and explores the world around them. Science should be introduced to children even before they get to primary school in order for the children to learn fast when they are in primary school. Children between the age of birth and eight learn rapidly using all their senses and the whole body to take sensation and to experience the world around them. In this period of their lives, they engage in play which they spent most of their waking time on. Through play activities their exploration cuts across areas of development, like social, emotional, motor, language and physical developments. Wynneled (1985) declared that the brain of the child has to be developed in order to learn science that will help him/her to understand the world around them. Conezio and French (2002) categorically declared that children are biologically prepared to learn the world. They are inquisitive and eager to satisfy their curiosity at the slightest opportunity. As observed by Ogunsanwo (2004), children play with water, mud, insects, whatever they can touch, smell or hear. As they play with these things, a lot of scientific skills such as observing and making references are learnt

2.1.2 Basic science and technology curriculum in Nigeria

Curriculum can be viewed as an interaction between teachers and learners, between learners and learners, between learners and curriculum content. (Igwebuike, 2008) consider curriculum as an organized sequence of intended learning experiences, their implementations and the evaluation of their effectiveness, (Okunloye, 2014) conceptualized Curriculum as all planned experiences

designed for and m Bade available to learners for the purpose of achieving some objectives ends including knowledge acquisition, skill development and cultivation of altitude and value and other capacities for personal and social problem solving and effective living usually under the auspices of the school. Implicit in this definition are the following ideas: There is a source from which content and learning experiences are selected, one or more people select content and learning experiences and their selection is based on specified criteria and /or influenced by a number of factors and that, the learner should experience a change in behaviour and these changes should be those expected by educators in the teaching learning process.

Basic Science and Technology Curriculum (revised,2012) is a product of the restructuring and integration of four primary and Junior Secondary school (JSS) science curricula namely, Basic Science, Basic Technology, Physical and Health Education, and Computer Studies/Information and Communication Technology. The integration of the science curricula become necessary as a result of recommendations of the Presidential Summit on Education (2010) to reduce of subjects offered in Primary and Junior Secondary School and the need to promote the holistic view of science at the Basic Education level for better understanding of contemporary and changing world.

The 9 – year Basic Science and Technology Curriculum according to Adeniyi (2007) is the product of re – alignment and restructuring of the revised curricula for Primary Science and Junior Secondary School Integrated Science. Curriculum content can be seen as a body of knowledge or information that makes up learning materials, the body of knowledge may comprise of facts, laws, principle or generalization. In selecting the basic science and technology curriculum contents, major issues shaping the development of nations worldwide, and influencing the world of knowledge today were identified. These are globalization, information and communication technology, security challenges and entrepreneurship education.

The ways in which the learning experiences and content are put together and organized greatly affect achievement of the desire objectives. In considering the organization of learning experience two kinds of relationship or patterns exist, there is the relationship over time and there is the relationship from one area to another, these two relationships are referred to as the vertical and horizontal relations. The contents were sequenced in spiral form across the 9– year of Basic Education in order to sustain the interest of learners and promote meaningful learning. (Fatima and Umaru, 2011) affirmed it that, the new UBE Basic Science and Technology Curriculum can be said to be carefully planned, well written and documented having all it entails to bring socio – economic development through the achievement of the Millennium Development Goals and the critical elements of National Economic Empowerment and Development Strategy. But the workability of any curriculum depends on its effective delivery which involves the learner, the teacher, the resources, the methods of teaching and evaluation as well as the physical and psychological environment

The overall objectives of the new Basic Science and Technology Curriculum content as outlined by Junior Secondary School Curriculum, for Science and Technology (2010), are to enable the learners to; Develop interest in science and technology; Acquire basic skills in science and technology; Apply scientific and technological knowledge and skills to meet societal needs; Take advantage of the numerous career opportunities offered by science and technology; Avoid drug abuse and related vices, be safety and security conscious and finally become prepared for further studies in science and technology.

2.1.3 Availability of computers in schools

The availability and usage of technology for school teachers and learners can decide the part that computers perform in the classroom. Kamene (2014) have now shown that students will use

computers to help them break out of the classroom walls to share and have access to all the great knowledge and insight that is now available. Schindler *et al* (2017) agrees that access to computers can encourage students to think and eventually move them to a better learning experience. It was important to verify in this study whether the findings, such as these, were in the Nigerian context. Accessibility of computing should improve the ease of use of computers when students and teachers alike are more frequently employed.

Ogbomo (2011) claims that rapid developments in information technologies and expanded access to computers have taken place in both developed and developing countries over the last few decades. This is also expected to be the case in Nigeria, while Nigeria is undeniably lagging behind the developed world. Global figures suggest that schools around the world are relatively well equipped for computing hardware. The Ministry of Education acknowledges that access to computers in schools is funded by parents, development institutions such as the NEPAD e-school programme and the private sector (Kamene, 2014). This funding takes the form of gifts of computer hardware from the business community or supporting the purchase of hardware and software. Access to technology may, however, be significantly enhanced if it were the government's duty to ensure that all schools have computers. This is because the private sector cannot be challenged by the government for the inequitable allocation of computing capital.

2.1.4 Utilization of computers in schools

Classroom teachers are the most basic educational administrators when it comes to the use of teaching resources. Okongo *et al.* (2015) notes that the achievement of quality in teaching and learning depends substantially on making learning resources, such as computers, as accessible and interactive as possible. Organizational support provided to technology is crucial to its long-term

sustainability. Changes in institutional systems and processes, increased technical assistance for employees and pupils, and additional staff recruitment and training have been funded.

Researchers such as Krašna *et al.* (2018) say that computers are still underused in many classrooms. Statistics on internet access in schools tell us nothing about the quality and quantity of learning and teacher contact with computers. It was important to assess the efficiency and quantities of computers used in our schools; this study was meant as a starting point, as it aimed to determine whether computers were usable and used by teachers and learners in basic science and technology. Although computers may be accessible in classrooms, only a few teachers use them according to Wanjiku *et al*. (2016). Could this still be the case for basic science and technology in Nigeria today? Teachers can play a critical role in introducing students to computer technologies by showing how they can be used successfully for teaching and learning. Teachers will play this role only if they are well trained and assured that technology is advantageous.

Osondo *et al.* (2010), concluded that computers are underused even though they are accessible, they noted that around the year 1994 computers were used in the United States of America for a broad variety of school events, including drill and practise or lesson guidance, the promotion of writing and language skills, and the use of software problem-solving or programming language learning. It will also assess the availability of computers in secondary schools in Minna. Initially, there was distrust and anxiety of computers intrusive in the developing world, such as the USA. The concern was that it would be blamed for the inadequate use of computers in the early years of adoption in most countries and subjects.

In this research work, the researcher was interested in figuring out whether there were similar fears in Nigeria or whether the period had passed. Computers are no longer a recent development and

their use is projected to grow as teachers and learners have been increasingly introduced to their use either in school or in social settings. Computer exposure could be the key to their use in our education system in general and in basic science and technology in particular. The researcher believes that the availability and use of computers is worth investigating because computers in education have the capacity to replace so many teaching technologies such as flipcharts, resource persons, textbooks and even, to some extent, real events and things. The versatility of computer technology in the teaching of basic science and technology and other subjects is wonderful, if only its availability and use could be well understood.

2.1.5 Attitudes towards the use of computers in schools

Barger (2016) clarifies that teachers are the key gatekeepers in encouraging instructional technologies to propagate to their classrooms. Learners' trust in their teachers is very high in Nigerian society. This may also mean that the way teachers interpret computers could make or break when it comes to enforcing their use by the government or some other entity in this matter. Also, the effectiveness of any technology adoption project in the education programme depends very much on the encouragement and behaviour of the teachers involved as.

Osondo *et al* (2010) have shown that positive attitudes about computers are favourably associated with teachers due to the level of familiarity with information technology. Awareness, anxieties and concerns over the use of computers in schools seem to decline, and morale grows for both teachers and students. The saying that experience makes perfect sense in relation to the usage of computers in classrooms. Accordingly, the trust that a teacher has in using computers along with the usability of computers will significantly affect his or her successful use of technology in the classroom of today. This research sought to find out whether the conclusions that have been drawn by

researchers in other parts of the world and especially in the industrialized world hold in Minna, Niger State in the teaching of Basic Science and Technology.

2.1.6 Benefits of using computers in teaching and learning

Although it is generally recognized that the adoption of computers in education in the developed countries has progressed well in the acquisition of basic skills in different areas of study, according to the Ministry of Education's National Information and Communication Strategy for Education and Training (2001), Information and communication technologies and knowledge integration could be used to achieve national integration in Nigeria. Nevertheless, reported observations have been: rapid expansion of knowledge, improved examination outcomes, enhanced communication and technical efficiency as well as decentralization in the delivery of educational services. These are great benefits although not in relation to the direct subjects taught in the school system such as Basic Science and Technology. The Ministry also realizes the fact that computers have a more powerful role of increasing resources and improving the learning environment. This was echoed by researchers such as Dabas (2018) and Kamene (2014). This benefit can only be meaningful where a teacher sees that the learning environment (for the learner) is being improved in the same measure as the teaching environment (for the teacher).

Blanco *et al*. (2016) emphasized that the use of computers in teaching would increase student achievement. They found out that computers help students increase motivation due, among other factors, to its novelty. It would be interesting to know whether computers improve student achievement in Nigeria, and to know the role of inspiration in learning. This may be true because computers provide what text books cannot provide in all subjects; Basic Science and Technology included; for example, using computers, students can easily do a project and compare data with students in far off areas through the internet. Research also showed that students who used

computers were more engaged and more independent in the classroom. Kamene (2014) points out that computers could give immediate feedback to the learner with the individual focus that pushes him or her to great heights in terms of motivation.

Another benefits of having computers in schools is that it trains students for the outside world, this is a conclusion worth exploring because, in order to be able to do so in today's work market, one must be competent in the use of technology-specifically computers. The U.S. Bureau of Labor Statistics found in 2012 that more than half of jobs required some kind of technology skills (The Courier, 2017). Educators must then train their children so that they can be marketed while they are in school. The secondary school level would be the best level at which the use of computers must be insisted upon. As seen earlier in this research, secondary school is the structure within which the use of computers should be seriously implemented to take root and be carried into the tertiary level and eventually into the job market.

2.1.7 Challenges experienced in the use of computers for teaching

Teachers must be responsible for presenting their learners with the best learning experience possible. Professional development of teachers remains the greatest obstacle for the use of computers in the classroom (Johnson *et al*., 2016). There is no exemption for teachers of fundamental science and technology in Nigeria. Computers can also provide a particularly daunting tool for incorporation into teaching and learning, since technology is evolving at a rapid rate. This may hinder the seamless acquisition and acceptance of this technology, as it may leave teachers in a position to fix whether this technology is worth following. In order to make effective use of this technology, educators must constantly update their technological skills. This continual shift can make teachers feel like perpetual novices. Predictably, this feeling could lead to a hostile

outlook about the use of computers in the classroom. Teachers also tend to view the use of computers as a source of increased workload in the preparation of lessons.

There is also the risk of becoming very disappointed as the lessons that have taken months to plan cannot be learned due to the technological and practical challenges that come with the use of computers and their associated technology. This may deter teachers from using technology and therefore return to old ways of teaching. The Government of Nigeria, through the Ministry of Education, Science and Technology (2006), states that teachers are a significant obstacle to the introduction of ICTs and associated innovations in education.

The use of information technology in Nigerian secondary schools, beginning with Basic Science and Technology, must therefore be examined. This is because computers are an integral part of the ICT infrastructure. Kamene (2014) acknowledged the difficulty that any time computer power or technology improves, it is ahead of the capability and budgets of public schools, leaving schools with obsolete models and software. This has been considered to be worth figuring out in our public schools. Bianchi *et al*. (2021) also indicated that up-to-date computers were more likely to be located in wealthy, suburban schools. Poorer inner-city or rural schools usually had older computer models. Teachers around the UK called for assistance with the integration of information technologies into the classroom around the year 2003.

Similarly, multiple educators have emphasized the need for training for employees and material resources to support their integration of computer technology into their teaching (Ghavifekr *et al*., 2014). In Nigeria, the recruitment of support personnel in relation to ICT enforcement in schools is undertaken personally by the heads of schools and not as a matter of government policy. This condition should be changed in order to maximize access and reduce the costs involved. Ayieko

et al. (2017) maintains that the level of comfort of teachers when using computers in the classroom influences the level of use of computers. However, a greater level of convenience can only be achieved with the continuous use of computers in schools.

Ghavifekr *et al*., (2014) also believes that teachers should consider their own experience and ease with the subject and approaches by which they plan to teach using computers. Kamene (2014) described the design of computer-based lessons as a complex undertaking. These are insights which cannot be taken for granted by teachers of basic science and technology if they wish to use computers effectively in teaching the subject. Limited number of computers was an issue, but more recent researchers saw this as a less prevalent challenge. In Nigeria, the following are some of the issues outlined by the Ministry of Education, Science and Technology (2006).

i. High levels of poverty that hindered access to computers and related facilities.
ii. Unavailability of ICT teachers.
iii. High cost of hardware and software for educational institutions.
iv. Frequent power disruptions and limited access to electricity.
v. Obsolete computers in schools due to the rapid changes in the computing technology.
vi. Increased moral degradation as a result of the continued use of computers in schools.

The first and second problems have been tackled over the past seven years and might not be as pronounced as they were in 2006. However, these issues have been discussed by other scholars in relation to developed countries, while the fourth is special to the Nigerian society.

2.2 Theoretical framework

2.2.1 Behavioural Learning Theory

Graham (2010) noted that Behaviourist viewed learning as a process in which experience with the environment leads to a relatively permanent change in behaviour or the potential for a change in behaviour. Behaviourism is a philosophy of psychology that focuses on observable behaviours and requires an objective, observable behaviour to demonstrate a state of mind or learning. It stresses that psychological events are confirmed and observed by behavioural measures. It dismisses the inner experience in learning and focuses learning as nothing more than gaining a new and observable behaviour. To the behaviourists, "learning occurs when new changes in Behaviour are acquired as a result of an individual response to the antecedent and consequent stimuli. The external environment shapes an individual's behaviour by presenting antecedent stimuli that reinforces behaviour" (Cognitive Design Solution, 2003). The Stanford Encyclopedia of Philosophy (2014) points out the three basic commitments of Behavioral Theory:

1. Psychology is a science in behavioural psychology. Psychology is also not the philosophy of mind.

2. Behavior may be described and explained without regard to mental experiences or internal psychological mechanisms. Behavior origins are external (environmental) and not internal (internal) (in the mind).

3. In the process of theoretical evolution of psychology, whether, in a sense, mental words or principles are used to define or justify behaviour, either:

i. These terms or concepts should be eliminated and replaced by behavioural terms or

ii. They can be translated or paraphrased into behavioural concepts.

This shows that the Behavioural theory was mostly concerned with behavioural concepts rather than the cognitive or mental concepts. The Behaviourism Theory was developed by the work of B. F. Skinner 1951. (the theory of Operant Conditioning). Operating conditioning takes place as reinforcements are used to train a stimulus response. A Skinner box was developed and used to instruct pigeons to perform different behaviours by rewarding actions as naturally occurred until the pigeons responded to the stimuli with the reward action. Ivan Pavlov's Classical Conditioning Theory is another major theory of Behaviorism (1927). Pavlov's Classical Conditioning Principle discusses natural biological reactions and cue reflexes. The stimulus that is inserted does not teach a new behaviour, it is used to induce a current behaviour to occur. Pavlov (1927) used salivating dogs at the sight of food to prove his classical conditioning hypothesis. Cognitive Design Solution (2003) argued the importance of behavioural theory, they noted that many instructional arrangements seem 'contrived', but there is nothing wrong with that. It is the teacher's function to contrive conditions under which students learn. It has always been the task of formal education to setup behaviour, which would prove useful or enjoyable, cater in a student's life. To the behaviourists, behaviours that the teacher wishes to encourage will be reinforced with positive stimulus or removal of negative stimulus. If behaviour followed a positive stimulus, it is more likely that it will be repeated in the hope of eliciting the same positive stimulus. Teacher has to be consistent. Teacher should also reward students for their work with treats, play privileges or grades (good or bad) for positive and negative behaviours. MCNeeley (2007) used the behaviourist theory to teach students lesson on milk production. Here are the steps and procedures she followed:

1. "The teacher begins the lesson by having the children gathered during group time on large carpet. As the children sit on the larger carpet facing the teacher only, he or she presents the book 'The

Milk Makers' by Gail Gibbons. The children face only the teacher to avoid undesirable reinforcement that could distract from goal of the lesson"

2. "The teacher uses the picture book to explain the topic because the children are engaged with the visual material as the teacher narrates the pictures. As the children listen to the story, they receive a summary of the information they are expected to learn. When the teacher finished reading the story, he or she re-explains the four stages of milk production.
3. "As the teacher summarizes the information, he passes to each child set of pictures to view. The teacher tests the children on their understanding by having them hold up the pictures in sequential order".

This assessment, according to McNeeley (2007), was based on both classical and operant conditioning. Each child will hold up a picture, the Unconditioned Response, when the teacher asked for a certain card, the Unconditioned Stimulus. The teacher positive feedback, a Conditioned Stimulus will prompt the choice, the Conditioned Response, according to the lesson. Operant Conditioning is utilized as the children are reinforced with stickers and chosen activities. During the teacher's assessment, the children hold up one picture at the time. The children face the teacher so each child is focusing on appropriate picture and the teacher's feedback. Each child who holds up the appropriate picture receives a star. When a child receives four stars in a row, he or she may leave the group area for a chosen activity. The teacher retests the remaining children until each has mastered the material.

The Behaviourist theory simply focused the child's attention on the materials displayed by his teacher. The teacher must also remain focus to avoid any distraction. The Behaviourist's Teaching Machine Phase, The Programmed Instruction Motivation Movement, Individual's Instructional Approach, Computer-Assisted Instruction and The Systems Approach are basic versions of what

educational software and computer can accomplish now. The teaching machine, according to Ebert (2009), could be compared to a box that sat on students' desk that each individual student could use to record answers to certain prompted question. In using the device, the student refers to the numbered items in a multi-choice test. He presses the button corresponding to his first choice of answer. If he or she is right the device move on to the next item, if he or she is wrong, the error is tallied and he must continue to make choice until he or she is right. The example by Ebert (2009) has further buttressed the assertions that there were similarities between The Skinner's Teaching Machine and today's Instructional Computer Software designed for reinforcing students' behaviour. Skinner (1974) as quoted by Cognitive Design Solution (2003) referred to the Teaching Machine as "devices, which arrange optimal condition for self-instruction".

2.2.2 Bates Action Model

Bates (1995) wrote his book with administrators of distance education in mind. The ACTIONS Model provides a framework for selecting e-technology, considerations that experts, educators and designers should use in choosing the proper technology for delivering distance education courses. His idea was to make it easy for them to choose the appropriate technologies that should make course delivery more flexible or more accessible to distance education students. Bates was aware that many a times when asked to implement technologies, teachers do not know where to start. In many cases they are unaware of the available technologies while in other cases they know what is available but do not know how to choose the best suited technology to their teaching. The researcher chose this theory because the ACTIONS theory can be applied to determine the availability and where available, the utilization of the computer technology in schools

2.3 Empirical Studies

In the developed world, using computers in classrooms has proved to be a worthwhile experience leading to a push for provision of computers for schools in developing nations such as Nigeria. Researchers such Kamene (2014) sought to establish the availability and utilization of computers for teaching and learning Business Studies in Nairobi County‟s Westlands district – Kenya. The study was significant because its findings can be used to help teachers, students and teacher training institutions to improve the availability, accessibility and use of computers in education and eventually help in achieving Kenya‟s economic blueprint Vision 2030. This study was guided by Bates ACTIONS theory. The independent variables were teacher and learner characteristics, computer as a teaching/learning resource and teaching strategies. The dependent variables were; improved teaching environment, class participation and improved performance in exams. This research was a descriptive study that used both qualitative and quantitative analysis. The target population was made up of all the head teachers, Business Studies teachers and students of the 23-secondary school in Westlands District. The researcher used stratified sampling in order to ensure all types of schools were represented. In each category, simple random sampling was used to pick the sample population. Data was collected using questionnaires, interview schedules and observation then analysed using percentages, frequencies and charts. This study found that head teachers were aware of the general trend towards the use of computers in education. It also found that although both teachers and students have a positive attitude toward the use of computers in the teaching and learning 62.5% of teachers did not use them for instructional purpose. The most pressing challenges were; low literacy levels, lack of time within teaching time and a fact that teachers were not taught how to use the computer as a teaching resource. The researcher concludes that there is willingness to use computers to teach but patience is required as the positive attitude precedes the implementation of teaching resources such as the computer. One of the

recommendations of this study is a revision of the curriculum to allow integration of this emergent technology in our classrooms at all levels and in all subjects because computers are now an inevitable tool of trade in all spheres regardless of the career choice of any person

Nwana *et al* (2017) investigated the availability and utilization of ICT resources in the teaching of Computer Education among Secondary School Teachers in Anambra State. Two research questions guided the study. The population consisted of 450 computer teachers teaching computer education in the schools. From the population, 300 computer teachers were sampled and used for the study. The instrument for data collection was a self-developed 40 – item questionnaire. It was validated by experts and the reliability co-efficient stood at 0.79. The data collected were analysed using frequencies and percentages. The findings revealed that many of the ICT resources needed for the teaching of computer education are not available. It was also revealed that majority of the resources needed for the teaching of computer education are not being used by the teachers. In view of the findings, recommendations were made.

Itighise and Babayemi (2018) investigated availability and utilization of educational technology laboratory in higher education and its implication for lifelong learning in basic science and technology for sustainable development. The study adopted a survey research design, using purposive sampling technique. One hundred and three (103) lecturers from two purposively selected higher institutions (Universities) participated in the study. Two instruments used were; Educational Technology Laboratory Gadget Availability Questionnaire, ETLGAQ (r=0.78) and Educational Technology Laboratory Gadget Usage Questionnaire, ETLGUQ (r=0.89). Two research questions and one hypothesis were constructed and tested at 0.05 level of significance to guide the study. Data were analyzed using weighted mean, frequency count, percentage scores and t-test statistics. The results showed that most educational technology laboratory gadgets were

available in the selected institutions but the frequent use of the gadgets by the lecturers was poor. Also, the result revealed that there was no significant difference in how often male and female lecturers use available educational technology laboratory gadgets ($t = 1.510$, $df = 101$, $p>0.05$). It is therefore, recommended that lecturers should always use educational technology laboratory gadgets in their instructional delivery for long life learning and sustainable national development.

Achimugu (2016) appraised the availability and utilization of the information technology (IT) gadgets/facilities among the senior secondary school teachers in Kogi State. A survey design was used for the study and the sample consisted of one hundred and eighty-four (184) chemistry teachers drawn from one hundred and five (105) senior secondary schools in Kogi State. Data was collected using teacher's questionnaire tagged availability and utilization of information technology gadgets for teaching chemistry (AUITGTC). Frequencies and Simple percentages were used to analyse the research questions, while hypothesis was tested with t – test at 0.05 alpha level. The result showed that IT gadgets/facilities are not available in most of the Senior Secondary Schools and that most chemistry teachers do not utilize even the few available IT gadgets/facilities in teaching. It was also found that there was no significant difference between male and female chemistry teachers in their level of utilization of IT gadgets/facilities. Based on the low availability and utilization of the IT gadgets/facilities in the schools, recommendations were made that, government and non – governmental organizations should make efforts to furnish the senior secondary schools with IT gadgets/facilities and chemistry teachers should utilize them in teaching chemistry among others.

The researcher learnt from the study that despite the vitality of the use of ICT to enhance academic achievement of students in secondary schools. It still appears that many teachers do not make use of them. While some have argued that ICT will lead to distractions during the teacher and learning

process, others have argued in favour of the utilization of ICT in the classroom. This left people with pertinent questions about the impact of multimedia in the academic performance of students. In regards to this effect, the present investigation is an attempt to bridge this gap with a particular reference to the availability and utilization of ICT in teaching and learning of Basic Science and Technology in secondary schools.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Research Design

This study used a descriptive survey approach due to its fact-finding nature. This approach enabled the researcher to obtain information relating to the availability and utilization of computers in teaching Basic Science and Technology from teachers and students as well as the school heads. Neuman (2006) noted that a research design should address the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

3.2 Population of the Study

The population of the study consists of three hundred and eleven (311) teachers from ten secondary schools in Minna metropolis. The target population for the study was the JSSII Basic Science and Technology teachers in secondary schools in Minna Metropolis, Niger State.

S/N	SCHOOLS	POPULATION
1	Ahmad Bahago Secondary School, Minna	30
2	Government Day secondary School, Tunga	27
3	Government Girls Secondary school, Minna	31
4	Zarumai Model Secondary school, Minna	34
5	Government Secondary School Limawa, Minna	35
6	Kowa Secondary School	32
7	El-Amin Secondary school, Minna	28
8	St. Clement Secondary school	29
9	Police Secondary School, Minna	32

10	Government Day Secondary School, Minna	33
	Total	**311**

Source: Field Survey (2021)

3.3 Sample and Sampling Technique

A sample of fifty (50) teachers from two secondary schools were randomly sampled for the study, the two (2) secondary schools were randomly selected as representative of the population.

Table 3.2 Sample Distribution

S/N	SCHOOLS	POPULATION
1	Ahmad Bahago Secondary School, Minna	27
2	Government Day secondary School, Tunga	23
	Total	**50**

3.4 Research Instrument

The researcher developed a questionnaire for data collection, two questionnaires were developed for this research. The questionnaires were for Basic Science and Technology teachers. The questionnaire titled "Questionnaire on the Availability and Utilization of Computers in Teaching Basic Science and Technology" (QAUCTBST) was carefully constructed as they were the heart of the study. In order to ensure that the questionnaires captured data accurately, the wording was carefully done to avoid ambiguity. The questionnaires had three sections each. The Section A aimed at collecting biographical data of the respondents. The Section B aimed at collecting data relating to the availability of computers while Section C aimed at collecting data from the respondent towards the use of computers in teaching and learning.

3.5 Validity of the Instrument

Validity determines whether the research truly measures that which it was intended to measure and how truthful the research results are (Neuman, 2006). The researcher employed the face and content validity; hence the instrument was validated by two (2) experts in the Department of Educational Technology, School of Science and Technology Education (SSTE). Corrections and recommendations from these experts were effected before final distribution of the instrument.

3.6 Reliability of the instrument

The researcher sought to ensure that the instruments provide consistent results because the reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials (Gray 2004). The researcher employed the test-retest method by administering the questionnaire to ten (10) teachers which were not part of the sample for the study. Using the Cronbach alpha, a reliability rating of 0.78 and 0.76 was produce which enough to determine the instrument reliable.

3.7 Method of data collection

The researcher sought consent of participants in the research through the appropriate channel in each case. The heads of schools were directly approached for consent to the interviews as well as to permit the administration of the questionnaires to Basic Science and Technology teachers and students. Once the head teacher gave the permission for the researcher to contact the Basic Science and Technology teacher, he or she became the contact person in that school and in turn gave consent for data to be collected from the students. Questionnaires were taken to the participating schools to collect data. The researcher met teachers, gave them the instruments and agreed to pick them after one week. As for the students, the researcher visited the sampled schools as arranged through the school head, met the students in an area provided by the school administration and

gave the questionnaires. Collection of the instruments was done soon after the students were done with them. To ensure 100% collection of the instruments, the students gave back the questionnaire as they left the room.

3.8 Method of Data Analysis

The researcher analyzed the data using descriptive analysis; frequencies and percentage tables were generated using Statistical Package for Social Sciences (SPSS) version 25.00.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION OF DATA

4.1 Introduction

The purpose of the study is to determine the Availability and Utilization of Computer in Teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis. This chapter discusses the data analysis, presentation of the results of data analyzed and discussion of the results. The data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 25. The biodata of the respondents was analyzed using a bar chart, while the research questions were analyzed using mean and standard deviation. A satisfactory scale was set to infer disagree and agree for the availability and utilization of computers; 1.0 – 2.4 disagree, 2.5 – 4.0 agree. Disagree and strongly disagree were merged together while agree and strongly were merged together.

4.2 Description of Study Variables

A total of fifty (50) questionnaire was retrieved out of the fifty (50) questionnaire distributed.

Table 4.1 Gender Distribution of students

Gender	Frequency	Percent
Male	28	56.0
Female	22	44.0
Total	50	100.0

In Table 4.1, the respondents are classified by gender. The table shows the respondents by their gender. The male respondents are greater than that of the female respondents, with the males making 56.0% of the sampled population and females making up the remaining 44.0% of the population.

4.3 Response to Research Questions

This research determined the Availability and Utilization of Computer in Teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis, Niger State. In the analysis of the variables, the researcher made use of the descriptive analysis. These variables are assessed independently with specific research questions and objectives as follows:

Research Question One: What is the level of availability of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis? The answer is shown below on table 4.2

Table 4.2 Availability of Computers

S/N	Items	N	Mean	Std. Deviation	Decision
1	There are enough desktop computers for teaching and learning in my school	50	2.38	1.12	Disagree
2	There are printers in the classroom for teaching topics	50	2.66	0.798	Agree
3	My school has scanners for teaching and learning	50	2.86	0.94	Agree
4	There are photocopiers classroom for teaching and learning.	50	2.82	1.24	Agree
5	There are laptop computers in my school for delivering instruction.	50	2.60	1.24	Agree
6	My school has mobile computers such PDAs and smartphones used for teaching	50	2.98	1.30	Agree
7	There are keyboards in my school that can be used for teaching and learning.	50	2.30	1.03	Disagree

8	There are multimedia projectors used for teaching and learning in the classroom	50	2.30	1.23	Disagree
9	There are monitors and television in the school for instructional delivery.	50	2.66	1.06	Agree
10	There is internet connectivity in my school for playing educational videos to enhance teaching and learning.	50	2.00	0.94	Disagree
	Grand Mean	**50**	**2.55**		**Agree**

Decision mean: 2.50

Table 4.2 shows the Mean and Standard Deviation of student's response on the availability of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis. The table reveals the computed mean score of 2.38 with Standard Deviation of 1.12 for item one, 2.66 with Standard Deviation of 0.79 for item two, 2.86 with Standard Deviation of 0.94 for item three, 2.82 with Standard Deviation of 1.24 for item four, 2.60 with Standard Deviation of 1.24 for item five, 2.98 with Standard Deviation of 1.30 for item six, 2.30 with Standard Deviation of 1.03 for item seven, 2.30 with Standard Deviation of 1.23 for item eight, 2.66 with Standard Deviation of 1.06 for item nine, 2.00 with Standard Deviation of 0.94 for item ten. The table revealed further that, the grand mean score of responses to the ten items was 2.55 which was greater than the decision mean score of 2.50. This implies the availability of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis

Research Question 2: What is the level of utilization of computers to teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis? The answer is revealed in Table 4.3

Table 4.3 Utilization of Computers

S/N	Items	N	Mean	Std. Deviation	Decision
1	Teachers make use of desktop computers when teaching in the classroom	50	1.94	0.89	Disagree
2	Printers are utilized during teaching and learning	50	1.80	0.78	Disagree
3	Scanners are used to teach during classroom instruction	50	2.14	0.72	Disagree
4	Teachers use photocopier machines when teaching	50	2.08	0.75	Disagree
5	During teaching, teachers make use of laptop to teach	50	2.20	0.60	Disagree
6	PDAs and smartphones are appropriately utilized to teach in the classroom	50	1.94	0.97	Disagree
7	Teachers use multimedia projectors for delivering lessons in the classroom	50	2.36	1.10	Disagree
8	Keyboards are used to teach and learn	50	2.48	0.93	Disagree
9	Teachers make use of monitors and television to explain concepts	50	3.06	1.13	Agree
10	The teacher uses internet connectivity to teach in the classroom	50	3.00	1.01	Agree
	Grand Mean	**50**	**2.30**		**Disagree**

Decision Mean: 2.50

From Table 4.3, The table reveals the computed mean score of 1.94 with Standard Deviation of 0.89 for item one, 1.80 with Standard Deviation of 0.78 for item two, 2.14 with Standard Deviation of 0.72 for item three, 2.08 with Standard Deviation of 0.75 for item four, 2.20 with Standard

Deviation of 0.60 for item five, 1.94 with Standard Deviation of 0.97 for item six, 2.36 with Standard Deviation of 1.10 for item seven, 2.48 with Standard Deviation of 0.93 for item eight, 3.06 with Standard Deviation of 1.13 for item nine, 3.00 with Standard Deviation of 1.01 for item ten. The table revealed further that, the grand mean score of responses to the ten items was 2.30 which was less than the decision mean score of 2.50. This implies the non-utilization of computers by teachers in teaching Basic Science in Junior Secondary Schools in Minna Metropolis.

4.4 Hypothesis Testing

Hypothesis 1: There is no significant difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis

Table 4.5 T-test for the gender difference and the utilization of computers

Group	N	df	$\bar{x}$	SD	t-value	p-value	Decision
Male	28		2.36	0.49			
		48			1.17	0.24	NS
Female	22		2.21	0.35			

Not Significant at 0.05 level

The t-test for table 4.5 revealed that there was no significant difference on gender and the utilization of computers for teaching and learning. The p-value of 0.24 which was greater than 0.05 which was the level of significance, confirmed that there was no significant difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis. Hence, the null hypothesis was accepted.

4.5 Discussion of Findings

Findings revealed that computers are available in special school in Minna Metropolis as the responses gave a grand mean score of 2.55 indicating the availability of computers, the grand mean scores on the availability of computers was above the established mean of 2.50. The finding of this study is in line with Itighise and Babayemi (2018) who revealed that computers are available in secondary schools.

The data analyzed also revealed that there was inadequate utilization of computers in teaching Basic Science in Junior Secondary schools in Minna Metropolis, with the grand mean score of 2.30 indicating inadequacy, the grand mean scores on utilization of computers were below the already established decision mean of 2.50. This in line with the findings of Nwana *et al*. (2017) and Achimugu *et al* (2016) who revealed that computers are not utilized in secondary schools.

The t-test statistics also revealed that there was no significant difference among the male and female teachers in the utilization of computers in teaching Basic Science and Technology in Junior Secondary Schools in Minna Metropolis as the p-value gave a score of 0.24 which was above 0.05 level of significance. This is in line with Achimugu *et al*. (2016) who reveled that there is no significant difference between male and female teachers in their level of utilization of computers.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the Study

The research determines the availability and utilization of computer in teaching Basic Science and Technology in Junior secondary schools in Minna Metropolis. However, the study is divided into five chapters in which each chapter is discussed extensively.

Chapter one of the research contains the background of the study, statement of the problem, research questions, significance of the study, scope of the study, methodology, limitations of the study and definition of the terms. Similarly, in Chapter two, many relevant literatures from several authors were used to expose what various writers have done in the area of instructional materials for teaching and learning. In Chapter three of the study that based on research methodology, the descriptive survey research design was adopted in which questionnaires were administered. Simple random sampling technique was also adopted to select respondents. Chapter four of the project revolved on the data analysis and interpretations of findings. The frequency and percentage method of data analysis was used. This chapter contains the summary, conclusion and recommendation of the study.

5.2 Major Findings of the Study

The following findings were made from the research work

1. The findings of the study revealed that computers are available in junior secondary schools in Minna Metropolis
2. The findings of this study also revealed that there is no adequate utilization of computers in teaching Basic science at Junior secondary schools in Minna Metropolis.

3. The findings of this study also revealed that there was no gender difference in the use of computers by teachers in Junior secondary schools in Minna Metropolis.

5.3 Implications of the Major Findings

The following are the implication of the major findings.

1. The study revealed that computers are available in Junior secondary schools in Minna Metropolis
2. The study revealed that there is no utilization of computers in Junior secondary schools in Minna metropolis
3. The study also revealed that there is are no gender difference in the use of computers by teachers in Junior secondary schools in Minna metropolis

5.4 Recommendations

The following can be recommended after critical examination of the responses and review of the previous literature.

1. Computers should be made available in Junior secondary schools so as to promote effective teaching methods.
2. There should be strict adherence to the use of computers in teaching Basic science and technology in Junior secondary schools
3. It is important to note that the current study utilizes quantitative research method and uses only a survey questionnaire to collect date. Therefore, it is recommended that for a more comprehensive study, other instruments such as interviews and class observations be conducted to get a more through picture on availability and utilization of computers to teach Basic science and technology in Junior secondary schools.

5.5 Suggestions for Further Research

1. Further research should not be limited to a specific area, it should cover a wider geographic area

2. Further research should investigate the impact of computers on learning outcomes (achievement, retention and interest) using the experimental research design to enlighten teachers on the impact of computers.

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APPENDIX A

QUESTIONNAIRE ON THE AVAILABILITY AND UTILIZATION OF COMPUTER IN TEACHING BASIC SCIENCE AND TECHNOLOGY

Section A: BIODATA

Instruction: Tick (√) the appropriate spaces and columns

Gender: Male [ ] Female [ ]

Section B: Availability of Computers

Kindly tick (√) the appropriate option of your selection that corresponds with your view

S/N	Availability of Computers	SA	A	D	SD
1	There are enough desktop computers for teaching and learning in my school				
2	There are printers in the classroom for teaching topics				
3	My school has scanners for teaching and learning				
4	There are photocopiers classroom for teaching and learning.				
5	There are laptop computers in my school for delivering instruction.				
6	My school has mobile computers such PDAs and smartphones used for teaching				
7	There are keyboards in my school that can be used for teaching and learning.				
8	There are multimedia projectors used for teaching and learning in the classroom				
9	There are monitors and television in the school for instructional delivery.				
10	There is internet connectivity in my school for playing educational videos to enhance teaching and learning.				

Section C: Utilization of Instructional Materials by Teachers

Strongly Agree (SA) Agree (A) Disagree (D) Strongly Disagree (SD)

S/N	Utilization of Instructional Materials in Schools	SA	A	D	SD
11	Teachers make use of desktop computers when teaching in the classroom				
13	Printers are utilized during teaching and learning				
13	Scanners are used to teach during classroom instruction				
14	Teachers use photocopier machines when teaching				
15	During teaching, teachers make use of laptop to teach				
16	PDAs and smartphones are appropriately utilized to teach in the classroom				
17	Teachers use multimedia projectors for delivering lessons in the classroom				
18	Keyboards are used to teach and learn				
19	Teachers make use of monitors and television to explain concepts				
20	The teacher uses internet connectivity to teach in the classroom				