STUDENTS PERCEPTION ON INTERNET SERVICES AS ALTERNATIVE FOR TEACHING AND LEARNING OF MATHEMATICS IN FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE

BY

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DECLARATION

I hereby declare that this project titled "Students Perception on internet services as alternative for Teaching and Learning of Mathematics in Federal University of Technology Minna Niger State" has been written by me and is a record of my own research work. All citations and sources of information are clearly acknowledged by means of references.

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ABSTRACT

This study examined Students Perception on Internet Services as Alternative for Teaching and Learning of Mathematics in Federal University of Technology Minna Niger State and the target population was Mathematics student from the department of science education, this study has three objectives as perception of students on the use of internet services as alternative source of teaching and learning mathematics, two research questions were raised in line with the objectives to guides the study. The population of the study was 612 students and one hundred and fifty (150) well-structured questionnaire was distributed. The research developed a self- designed four Likert scale structured questionnaire, titled "perceptions of students' on the use of internet services as alternative source of teaching and learning mathematics" which was validated by expert in science education department and industrial and technology education department. The study adopted a survey design. Data obtained from the respondents was analyzed using mean and standard deviation analysis method. However, finding of this research reveal that students have positive mindset toward mathematics. The aim of the study is to examine student perception on the usage of educational resource alternative strategy toward effective teaching and learning of mathematics. Based on the finding the following recommendations were made: The study established that there is lack of IT expert; hence, it is necessary for the school to employment people who are well experienced and have better IT knowledge by doing this it will help to fast track and aid smooth use of internet in teaching and learning of mathematics. Federal Government should also provide necessary learning aids that suitable for study such as learning equipment.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Today many schools in Nigeria are faced with the development challenges of the use of information communication technology (ICT) in terms of E-teaching and E-learning process. The federal ministry of education created ICT department and since had been collaborating with several government agencies, other stakeholders in the private sector to initiate ICT driven projects and programs to affect all levels of education sectors in Nigeria (OSAKWE, 2012). Like every issues of development country, all universities in Nigeria are Struggling to access the technology as a measure to ascertain academic performance or excellent through teaching and learning.

In an attempt to globalize the educational sector, leaders of the south –south states in Nigeria namely Bayelsa, Rivers, Akwa-ibom, Cross-River, Edo and Delta (BRACED) are viewing education and human capacity development as critical to the overall development of school, the development of strategies for the enforcement of ICT driven programs has become imperative. In this age of information explosion, one's skill in processing and distribution of data using computer hardware and software telecommunication and digital electronic will largely determine one's value in the work force, computer literacy will likely have such impact on career opportunities in the future just as the ordinary or Conventional literacy had in the pest. Cheung and Huang (2015) emphasized the use of ICT as an effective teaching tools in university education as many university lecturers now publish their course materials via internet, they suggested that it is insufficient for only university to use ICT for good job combination leaving out the student to do same, educational technologist have cited may reason as to why an

education system based on ICT can move effective result in positive pedagogic outcome than one based only on conventional technique.

According to Osakwe (2012), acquisition, deployment and management of information technology resources and services for teaching depend on electricity. Studies have shown that poor maintained equipment and poor network infrastructure are prominent obstacles to the integration of ICT. Tools in teaching poor technical equipment would make negative impact on teacher desire to integrate ICT tool in teaching all other subjects. Technological and science laboratories are run using electricity computers cannot operate without electricity even if all the equipment requires are present. A number of teacher today are limited to the use internet service in their lives and they are terrible shy when they are confronted with this new technology and the terminology associated with using them. Some schools do not have them provided for their teachers and some teachers may not be economically buoyant to buy one for themselves at the tertiary level of education, OKHIRA (2017) noted that national universities commission (NUC) in Nigeria has prescribed that there should be at least one computer to every four students and one to every two lecturers below the grade of lecturer1, one pc for senior lecture and one notebook per readers' professor. NUC has gone further to establish e-learning platforms fitted with twenty smart boards in twelve federal universities for the promotion of the use of ICT in teaching and learning, majority of the Nigeria universities have not achieved this recommended system ratio for their faculties, though some have made grant of notable strides in campus wide area networking and E-learning courses deliveries, institution like Obafemi Awolowo University (OAU) And University Of Nigeria, Nsunkka boast of its best-developed ICT system in the country with a personal VSAT access to the internet and a campus wide internet services. Universityof Jos which is blazing the trail for content development and e-learning in addition to

the campus networking (Liverpool *et al.,* 2019). Very few of public higher institutions in the country are capable of meeting the ICT needs of their staff and student. The question now is what happens to the rest of the institutions? Many university lecturers and students have to go to commercial cyber cafes in town before they have access to computer, that is internet connection are at better off since majority of them like Convenant University (Cu), AfeBabalola University, American University of Nigeria (AAUN), etc have 24-hour internet connectivity in their campuses but the population of lecturers and students compared to public universities are few. At AAUN for instances, each students is provided a Laptop with the cost factored into the fee structure. That of course will not be within the reach of students.

Those are significant bodies of research relating to the obstacles of ICT integration in teaching and learning in the developed countries such as US and UK, but in the developing countries like NIGERIA, especially at the university level, such publications are few and scanty in scope, if they exist at all. Whereas such publication are valuable information sources for countries which would like to improve and make a success on ICT tools integration in teaching and learning. The decision to make for may in this regard is therefore, apt and lesson learned can serve as useful guidelines for universities within the area covered and the rest of the nations.

To remain globally competitive, universities are incorporating greater use of information and communication technologies (ICT) into their curriculum to provide students with more online learning options via the university's learning management system (LMS). Many have adopted a blended learning approach to deliver course content which combine traditional face-to-face teaching augment with online teaching resources. This has been a popular approach as it provides students greater flexibility and increasing accessibility learning to a diverse range of teaching materials to support them with the increasing pressure to provide more E-learning

options to students, it is important to consider student attitudes towards this shift away from the traditional face-to-face to online delivery. According to ONG and LAI (2016), gaining insight into the learner's motivation and attitudes to using technology may influence the level of E-learning utilization. The fact that student perception of the learning management system and its online materials may influence their level of engagement has been acknowledged by Basiadi de lange, Suward, and Wells (2012). These factors may impact upon students learning outcomes and their overall learning experience. Currently, only a few relevant studies on the impact of the internet on teaching and learning mathematics are available (National Mathematics Adversary Panel, 2018). The majority of the studies on university students of other fields than mathematics in recent reviews of research are in accounting education by Apostolou, Hussell, And Watson (2013), the need for more empirical studies into the effectiveness of using technology in mathematics are still very much in the infancy stage in Nigeria.

1.2 Statement of the problem

Mathematics is thus to be thought as a social phenomenon, a process of growth and change for all Involved. According to Rubstov and Margolls (2016), computers offer special and powerful new way for learners and instructors to engage in activity together. Computers are not merely a convenient device for conveying information but a new culture tool which may facilitate instruction and learning. In this case study, if internets are being use for teaching and learning mathematics, this will be intending shifting the focus from knowledge transmission to knowledge building.

The students will be actively engage in constructing their own knowledge, performing activities that called for understanding, connecting, gathering and selecting information, generating and testing hypothesis and generating inferences. Students will have the opportunities to explore new

information to interact and collaborate with other students. The instructor did not remove himself from the mathematics lecture process; his role shifted from being the deliverer of instruction to being the creator of learning experience for students. In fact, the computers become the tools for enhancing problem solving, critical thinking and communication skills. They will be on verge of explosion or the use of the internet in educational settings. This case study presented one example of the power of the internet as it can be incorporated into the classroom.

1.3 Aim and Objective of the study

The main aim of the study is to determine Students' Perceptions on the use of internet resources as Alternative means of teaching and learning mathematics a case study of federal university of technology minna niger state. Thus the specific objectives of the study is to:

1. Find the problem hindering student in using ICT in mathematics in Futminna.
2. Find out the challenges associated with the use of ICT in teaching and learning mathematics in Futminna.
3. Determine how the use of ICT among lecturers and students can enhance the quality of teaching and learning mathematics in Futminna.
4. Know the potential on what students perceive if internet service is to be used as a means in mathematics lecture in Futminna.

1.4 Research Questions

The following research questions have been raised so as to achieve the purpose to the study:

i. What is the students' perception on the use of the Internet as alternative means in teaching and learning mathematics in Federal University of Technology Minna?

ii. What are the challenges facing the use of internet in teaching and learning mathematics in Federal University of Technology Minna?

1.5 Significant of the study

The significance of the research study includes:

To shows whether there is significance difference in the perception of students and lecturers between online to face-to-face to highlights one of the problems militating against effective practices in mathematics students and tends to cater for individual differences to some extends. To caters for critical thinking, problems solving and self-confidence through the use of computers. Give students ability to go for further research and self-competence in mathematics teaching and development which can leads to more economic development in the country.

1.6 Scope of the Study

The fact that only one university was use as the research is in itself a limitation as the finding cannot be generalized but will give a deeper understand of the concerned school and can only be relevant to other pilot schools.

The fact that the research was not practical's in itself is a limitation due to the fact that there has not been such project in the university or in government agenda.

1.7 Definition of Terms

ICT: Information and communication technology.

CHAPTER TWO

2.0 REVIEW OF LITERATURE

This chapter reviews literature that are related to the study. The review is done under three (3) main sub-headings: conceptual framework, theoretical framework and review of empirical study. There is of course the summary of the literature review.

2.1 Conceptual Frameworks

2.1.1 Concepts of ICT

The Internet has revolutionized the computer and communications world like nothing before. The invention of the telegraph, telephone, radio, and computer set the stage for this unprecedented integration of capabilities. The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location. The Internet represents one of the most successful examples of the benefits of sustained investment and commitment to research and development of information infrastructure

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (often called TCP/IP, although not all applications use TCP) to serve billions of users worldwide.

It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked Hypertext documents of the World Wide Web (WWW) and the infrastructure to support email.

2.1.1.2 Services of Internet (E-mail, FTP, Telnet, WWW)

a. E-Mail (Electronic Mail)

E-mail or Electronic mail is a paperless method of sending messages, notes or letters from one person to another or even many people at the same time via the Internet. E-mail is very fast compared to the normal post. E-mail messages usually take only few seconds to arrive at their destination. One can send messages anytime of the day or night and it will get delivered immediately.

b. FTP (File Transfer Protocol)

File Transfer Protocol, is an Internet utility software used to upload and download files. It gives access to directories or folders on remote computers and allows software, data and text files to be transferred between different kinds of computers.

c. Telnet (Remote Computing)

Telnet or remote computing is telecommunication utility software, which uses available telecommunication facility and allows you to become a user on a remote computer. Once you gain access to the remote computer, you can use it for the intended purpose.

d. WORLD WIDE WEB (WWW)

WWW is the acronym for the World Wide Web. It is also commonly known as 'The Web'. The WWW is a system that we use to access the Internet. It is hypertext based information retrieval tool, it uses the hypertext to access the various forms of information available on the world's different networks.

One can easily surf the Web by jumping from one document to another using the links in those documents. These documents can be in many formats, such as text, graphics, animation, sound and latest is video. They may also be a combination of all these. All the information on Internet

are presented to the user as a document or more popularly known as Web Page. All these Web Pages are link to each other or even to section within a Web Page. And these links are known as Hyper Links.

2.1.2 Concepts of mathematics

Traditionally, mathematics is defined as the scientific study of quantities, including their relationship, operations and measurements expressed by numbers and symbols. In mathematics dictionary by **James & James (2001)** ‘’it has been defined as the science of logical study of numbers, shape, arrangement, quantity, measure and many related concepts’’.

Today it is usually described as a science that investigates abstract structures that it created itself for their properties and patterns”.

According to **Wikipedia** Mathematics is the study of quantity, structure, space. Mathematics seeks out patterns and uses them to formulate new conjectures.

Aristotle has defined mathematics as ‘’The science of quantity? “ (**Wikipedia 2020)**

Benjamin Pierce defined it as ‘’Mathematics is the science that draws necessary conclusions“(**Wikipedia 2020)**.

Haskell Curry defined mathematics simply as “the science of formal systems” (**Wikipedia 2020)**.

Albert Einstein stated that “as far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality” (**Wikipedia 2020)**.

More recently, **Marcus du Sautoy** has called mathematics “the Queen of Science ..... the main driving force behind scientific discovery” (**Wikipedia 2020)**.

Thus although all most all great mathematicians stated something for it, no generally accepted definition could be produced.

A little attempt has been done in this article to define mathematics in a single sentence and exact form, which will be accepted for centuries without any counter example.

2.2 Theoretical Framework

Research has been variously defined. According to Craighead *et al.,* (2007), research is vitally important in any discipline because it enhances the understanding of those involved in the discipline. Mackenzie and Knipe (2006) characterized research as an exploration in which collected data is analyzed and interpreted to "understand, describe, predict, or control an educational or psychological phenomenon or to empower individuals in such contexts" (p. 194). Mertens (2005) argued that "the exact nature of the definition of research is influenced by the researcher's theoretical framework".

A theoretical framework also can be referred to as a paradigm, and a study's paradigm guides how the subject matter is studied, analyzed, and interpreted (Glesne, 2011). This current study is based on constructivist and interpretive theory and Moore's Transactional Distance Theory.

2.2.1 Moore's Transactional Distance Theory

According to Moore (2009), analyzing distance education necessarily involves attending to dialogue, structure, and learner autonomy. Moore emphasized that these considerations are separate from technological ones, focusing on instructional and learning behaviors and the interaction between the two. This (2009) analysis was based on the assumption that distance learning requires different teaching techniques and learning dynamics than does traditional face-to-face instruction. Moore further described pedagogy as consisting of course structure and instructional dialogue, claiming that distance learning is a function of those two variables, plus learner autonomy. Moore (2009) expatiated that the transactional distance theory is an attempt to

explain the interaction among learners, teachers, and course structure and to account for how that interaction affects the learning environment.

For Moore (2009), distance education is characterized by the transaction that occurs when there is a separation of time and space between learner and teacher, a separation that "leads to special patterns of learner and teacher behaviors" (p. 1). Moore cautioned that these behaviors should be considered relative rather than absolute because transactional distance is not a fixed measurement.

In considering the interactive dimension of distance education, Moore distinguished among three types of interaction: Faculty-student, Student-content, and Student-student. He also emphasized the importance of what he called student character.

A. Faculty-Student Interaction

Moore (2009) described dialogue as "an interaction or a series of interactions having positive qualities that other interaction might not have" (p. 2) and singled out interaction as one of the most important components of online learning. Faculty-student interaction, Moore stated, is influenced by educational philosophy, personality, course subject matter, and the environment. Moore noted that in distance education, like face-to-face teaching, some communication will be one-way. But a reliance on one-way communication, he argued, leads to greater transactional distance and less favorable learning experiences. Reducing transactional distance, then, means controlling communication.

Other researchers have also acknowledged the importance of faculty-student interaction. Tomei (2006) described it as playing a "pivotal role in student attitudes about online learning and distance education" (p. 532). Swan (2001) found that "students who had perceived high levels of interaction with the instructor also had high levels of satisfaction with the course and reported

higher levels of learning than students who thought they had less interaction with the instructor" (p. 316).

B. Student-Content Interaction

Course structure reflects the "rigidity or flexibility of the program's educational objectives, teaching strategies and evaluation methods" (Moore, 2009 p. 3). Course structure influences learning experience because it determines how well a given course meets the varied expectations of individual students. Course structure affects communication specifically, how much dialogue is allowed or encouraged (Moore, 2009). Highly structured programs, Moore charged, have little allowance for dialogue and are thus ill-equipped to respond to student input.

Moore (2009) defined student-content interaction as "the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective or the cognitive structures of the learner's mind" (p. 3) and characterized it as "the defining characteristic of education" (p. 3). Course content includes assignments, presentations, discussions, and assessments (Reisetter *et al.*, 2005).

According to Moore and Kearsley (2012), highly structured content influences students' perception of their learning experiences in an online program, an assertion that was explored in the current study.

C. Student-Student Interaction

According to Dobbs *et al*. (2009), although many researchers have studied the structure of online programs, few have examined interaction among students. In traditional education, student-student interaction occurs face to face. In online education, it is mediated electronically, through email, discussion boards, instant messaging, Skype, and document sharing (Jackson *et al.*, 2010).

Some distance learning institutions require residencies, where students physically assemble at a given location for seminars and communication with faculty and peers.

D. Student Character

Another variable of transactional distance that influences students' learning experiences is the personalities of students themselves. An important component of personality for distance learners is autonomy the ability to work independently. Moore (2009) defined learner autonomy as "the extent to which in the teaching/learning relationship it is the learner rather than the teacher who determines the goals, the learning experiences, and the evaluation decisions of the learning program" (p. 5). Confessore and Park (2004) described learner autonomy as consisting of four components: desire to learn, initiative, resourcefulness, and persistence. Moore took issue with Knowles's assumption that autonomous behavior is natural for most adults. For Moore, autonomy is a learned skill rather than a natural outcome of aging.

E. Age

Many researchers on online education have noted the importance of age as a variable in student satisfaction and success (Dobbs *et al.,* 2009; Jackson *et al.,* 2010). As Roach and Lemasters (2006) noted, age is a predictor of one's comfort with computers. Undergraduate distance learners tend to be older than their counterparts at brick-and-mortar schools (Sargeant, *et al.,* 2006). In the current study, participants were divided into two groups those ages 18 to 31 years (G1) and those 32 years old or older (G2) to see if there were differences in learning experiences and perceptions of online courses based on age.

2.2.2 Constructivist and Interpretive Theory

Mertens (2005) gave an insight into what is the interpretive/constructive paradigm originated.

“The interpretivist/constructivist paradigm grew out of the philosophy of Edmund Husserl's phenomenology and Wilhelm Dilthey's and other German philosophers' study of interpretive understanding called hermeneutics” (Mertens, 2005).

The constructivist-interpretative approach relies on the sample studied to generate data to understand participants’ backgrounds and experiences. In that approach, a researcher develops patterns of meaning from data and usually relies on qualitative data collection methods and analysis (Mackenzie & Knipe,2006). A constructivist-interpretive approach was justified for the current study because it involved examining patterns of meaning in order to understand how students interpreted their experiences in internet services as alternative source of instruction in mathematics.

A constructive interpretive approach was preferred because it presented a thorough understanding of the experiences and perceptions of internet services as alternative source of instruction in mathematics in FUTMINNA and reporting the findings as it were. That is, researching and understanding how the participants made meaning of their experiences and perceptions by looking through their lenses (Koskinen *et al.,* 2011).

Online Education

The growth in online education has heightened competition among postsecondary institutions (Loyen, Magda, &Rikers, 2008). With that competition has come increasing emphasis on attending to student satisfaction (Jackson, Jones, & Rodriguez, 2010).

Dobbs, Waid, and del Carmen (2009) found that distance learning students are attracted by the convenience and flexibility of online courses.

In an online learning environment, students are expected to take a more active approach to their education, and course outcomes depend heavily on students' attitudes towards online learning (Neely & Tucker, 2010).

2.3 Review of Empirical Studies

2.3.1 Studies on role of internet services uses in mathematics

The emphasis is on how students (as distinct from their lectures) might use websites to learn mathematics or about mathematics, although some of those can certainly be used effectively with groups of students by a lecturer. There is no space here to provide a large number of examples for any of the five categories. Instead the reader is referred to KISSANE (2019) where there are link to many different examples together with brief opinion on their particular significance. The example has been carefully chosen to highlight good use of the internet in my opinion and to reduce the need for those interested in such maternal (whether student, lecturer, parent or others) to rely on browsing with search engines to find valuable reference.

Five different kinds of internet use for mathematics are identified and exemplified

1. Interactive opportunity
2. Reading interesting materials
3. Preference material
4. Communication
5. Problem solving

Interactive opportunity: In recent years, the internet has used to allow students to interact directly with mathematical object in a vanity of way. An example is from the excellent National library of virtual Manipulative (2019). The experiment provided are very difficult to provide in other ways and engage the student directly in mathematic actively and corresponding need think

about what they see on the screen. Most of these require that the browser has particular capabilities such as being java-enabled or having a plug-in for flash software. These days, many sophisticated computers have such capabilities without the user even knowing what they do, so that significant expertise is not needed to take advantage of them.

Virtual manipulative provides an opportunity for student to interact directly with (virtual) mathematics objects. Manipulations with physical objects have long be considered productive for learning aspects of mathematics, leading to widespread use of materials for younger student such as multi-purpose arithmetic blocks, pattern blocks, and Cuisenaire Rods, visual version of these have the same mathematics properties and have extra of being in unlimited supply, unlike real manipulative. The evidence for the use of these is promising (Galinde 2015) both for young children and the older student (Moyer and Bolyard 2012). It would normally be quite difficult to provide students with opportunities to explore the nature of such transformations in an effective way; in this case, the virtual manipulative provides a good Alternative virtual manipulative are not restricted to unsophisticated mathematical environment; the demonstration project at the wolfram math world site.

Reading interesting materials: There are many interesting materials related to mathematics on the internet, in sharp contrast to many schools' libraries. Many libraries restrict themselves to mathematics textbooks which are often not very interesting to students especially if they already have a textbook of their own. Of course, the nature of school libraries varies immensely across Nigeria for a range of practical reasons not the least of which is the cost of books and the availability of suitable materials for students of different ages. Another factor in the availability of reading materials is the case with what they can fund: few mathematical magazines are available widely and even many bookshops hold limited reading materials of interest of students,

such as works in popular mathematics as well as good written materials. Some internet readings may have interactive elements, good illustration, hyperlinks and so on. Some materials intended for the general public are suitable for students, especially older students and there are also good materials written expressly for students. As well as being of direct relevance as a resource for school project, high quality readings may kindle Interest in mathematics that would otherwise not be sparked by more conventional school experiences. When mathematical expertise is in short supply as it seems to be in many schools, materials that generate interest in mathematics among students may be critical importance to the future. Better reading on the internet for school students are likely to e fairly short and liberally sprinkled with images or even interactive elements. Some take the form of regular magazines such as the excellent companion websites plus and NRICH based at Cambridge university in the UK.

There is a range of materials available in the categories to suit the need of the students and others. Not all "reading" are in the form of article, the America mathematics moments website which provide posters of various kinds intended for download and displays for various audiences and for some of these podcast as well, the posters provide many example of the relevance of contemporary mathematics to societies. Other website in this category includes visual materials such as film and television, although these of course increase both the access requirement and the costs for students to access then.

Reference materials: The internet is sometimes interpreted as a massive encyclopedia and can be used as a means of looking up various kinds of mathematics information for various purposes. These might be used by students directly from home especially a few homes will have a mathematics reference source such as a mathematics dictionary or encyclopedia, they might also be used in school by both individual students and teachers or by the whole class seeking

clarification or information of a reference kind. While printed mathematics dictionaries are available for both young readers and sophisticated professional Mathematicians, it is unusual for students to have routine access to these. Indeed, it is still surprisingly unused for school textbooks to routinely include a glossary (or sometimes even an index). For this reason, internet mathematics dictionaries might be more accessible to students than the other kinds of mathematics dictionaries and may be more helpful to standard dictionaries because of the possibility of cross linking of entries and even dynamic interactive definitions. Internet mathematics dictionary are available for a range of year levels from least to the most sophisticated. Encyclopedias provide more detailed and expensive information than dictionary, which (at least in paper form) focus on the meaning of particular terms, encyclopedias provide more than merely meaning but offer support to readers to locate ideals in contexts, including historical practical, theoretical and social contexts.

On the internet, there is a gradual bumming of the distinction between dictionaries and encyclopedias with increasing each of these having some of the characteristic of the other. For this reason, students using quality mathematical reference material on the internet will generally be offered more information and support for learning mathematics than they expected would be likely to obtain by consulting paper-based sources. So encyclopedias such as WOLFRAM MATHWORLD (weisst 2019) provide an extraordinary depth of information that no school or home could ever hope to provide.

Communication: The internet offers opportunities for student to communicate with other students or teachers, lecturers regardless of geographical location (but limited to those speaking the Same language most likely English, in the case of Australian students) for student, some opportunities to be part of a wider mathematics community are provided. An example of this

aspect of internet use is the Ask Dr Math site (the math forum @ Drexel 2019). Students have been asking mathematical question of the fictions DR MATH at the (enormous) math forum site in the use for more than a decade now and both questions and (often multiple) answer have been archived to avoid repetition.

Problem solving: While a great deal of problem solving ought to happen in regular classrooms, the internet can theory offer some extra benefits to students including a regular supply of suitable targeted problems, opportunities to share solutions and even opportunities to get professional feedback on their work. There seems little argument for a set of problems on the internet that could just as easily be written in a textbook with nothing extra added. An example on how internet might offer increased opportunities for problem solving with a very large NRICH site. The typical month shown include a wide range of mathematical problems for school children at a range of levels of sophistication. Some of these problems include interactive elements, so they comprise more than merely description of problems, as it might be found in textual resource as well as problems, the site provides hints, a printable vision, some notes for students or teachers and opportunities to contribute solutions online. Importantly, the site also publishes solution from students themselves to previous problems, highlighting the range of way in which problems can be solved as the students around the world are interested in such activity.

Internet pedagogy: It is one thing to have access to good resources for learning but another for these to be used effectively. A focus of this paper is on the sorts of resources that are independently accessible by students of mathematics who may access the internet at school, but who also may do so at home without direction from the lecturers. In practice, however, it still seems likely that most internet use will be suggested by and supported by the work of the mathematics teachers or lecturers so that some attention to this is warranted. The use available

resources to teachers or lectures are of course constrained by the available facilities; Alejandre (2005) has provided an extensive discussion of the various ways which teachers or lectures might use their available classroom or lectures room resources effectively.

2.3.2 Studies on the use of ICTs in mathematics lecturing and learning

Currently, only a few relevant studies on the impact of the internet on lecturing and learning mathematics are available (National Mathematics Advisory Panel, (2018). the majority of the studies focus on university students of other fields than mathematics. This is due to the fact that online lecturing has no tradition at primary and secondary school. Given the fact that in education, the internet was first used for university distances learning courses, the studies undertake in the late 1990s focused on the results of students whose distance educations was supported by the internet.

2.3.3 Studies on the use of ICTs in education

The term ICT stands for information and communication technologies, which according to Whitten and Bentley (2018) describes the combination of computer technology (hardware and software) with telecommunications technology (data, image and voice networks) that enable processing, exchanging and management of data information and knowledge. These equipments allow users to access, retrieve, store, organize, manipulate and present information by electronic means. Examples include: Scanners, computers and projection equipment classified as hardware Database, spreadsheet, and multimedia software programs classified as software; and Fax machine, teleconference phones and moderns classified as data image and voice network.

The use of ICT in education has evolved with the development of computer technology. In the olden days the computers were big, slow and very expensive. With the development of technology, they are small, cheap and fast. Together with other technological devices, they

generate and process information quickly. Thus information becomes quickly and easily accessible. However, this remains true for developed countries. For developing countries, it is challenge they have to face if they went to survive and stay competitive in the global village (Haddad &Draxler, 2012).

Minister Asmal (2013) in his foreword on Draft White paper on e-education states: Information and communication technologies (ICTs) are central to the changes taking place throughout the world. Digital media has revolutionized the information society and advances in ICTs have dramatically changed the learning and teaching process. With lots of changes on worldwide, education is also not left behind. There is a need to meet these changes in education. Haddad and Draxler (2012), state that in order to meet these changes in education, there is a need for paradigm shifting as exemplified in the table. It shows a move from an educational model in industrial age to a model in the information age (Haddad &Draxler, 2012).

2.3.3.1 Reasons for ICTs usage in education

Application or uses of computers in the classroom, technology takes the following form:

Training tool: Learners can use technology in online quizzes, drill and practice software, or programs that guide learners through specific concepts or problems, serving as a tutor;

Research tool: Learners can use technology in exploring and accessing information, from online resources, networked libraries, and CD-ROMS;

Intellectual development tool: Learners can use the computer to construct and produce a variety of information through engaging in interactive games and real life simulations; and

Communication tool: Learners can use the technology as a medium of communication through the different networks levels that are available.

These technological applications, which support learning in the mentioned ways, are often described as cognitive tools to be learner activity and engagement that they support and encourage, not the information and knowledge that they carry. Bearing in mind the varying functions of the technology, it will be much easier for educators to start from the goals of their learning activities and then see which technology is relevant for them. This will help in eliminating the use of technology in a wrong or less than successful manner in the classroom.

According to the Department of Education (2013), it is indicated that effective usage of ICT resources enhance creativity, problem solving, high order thinking skills and reasoning. Technology is seen to support the following educational goals:

- Improve teaching and learning in content areas.
- Develop learners' skills considered to be essential in the modern world
- Increase motivation for teaching and learning
- Change the social organization of the classroom to be more learner centered
- Enrich interaction among learners, teachers and other schools and
- Creative and collaboration.

2.3.3.2Use of ICTs in Nigeria Universities

ICT usage and learners' achievements: The relationship of ICTs tools usage with learners' achievements is complex as there is no general agreement as to what constitutes learners' achievements. In most studies, learners' achievement refer to learners' scores in their standardized tests (Wenglinsky, M.Moila Mini-dissertation M.Ed. (CIE), Faculty of Education, University of Pretoria The use of educational technology in Mathematics teaching and learning: An investigation of Federal university of technology Minna, Niger State. Kmitta and Davis (2004) define learners' achievements as their performance measured against standardized tests.

The standardized tests are more on basic Mathematics skills and mere application of Mathematical rules (Cassady, 2012). Cassady indicated that standardized tests are mainly use to show proficiency at a particular grade or skill level, and they have very little provision of demonstration of high order thinking skills. Howeve,r in this study learners' achievements is not measured against their performance on the standardized tests, but on how they respond to different Mathematics problems demonstrating their deep understanding and high order thinking skills in Mathematics.

Most of the studies conducted on the relationships of the ICT tools and the learners' achievements are meta-analysis and quantitative studies and thus their results could be generalized for most instances. Most of the studies are also of empirical nature. The studies were carried out mostly in the USA and Britain and have indicated that the ICTs tools have an influence on learners' achievements (Wenglinsky, 2018;). The USA studies have shown little significance positive effect as compared to British studies. The study conducted by the British Educational Communication and Technology Agency (Becta, 2012) reported that schools that had very good ICT resources and were making good use of those resources better results than schools with poor ICT tools. Becta further indicated that good ICT learning is dependent on the following:

a. Availability of appropriate ICT resources;
b. Supporting school leadership;
c. Appropriate teaching appropriate;
d. Management of ICT resources; and
e. Effective usage of ICT tools to complement existing educator pedagogical practices.

However, Clark (2019) came up with an argument that media will never influence learning. He believes that the use of adequate instructional learning will influence learning. That is, if there are more than one media or media attributes that give the expected goals, they do not influence the learning. The instructional methods are the ones that have an influence on learning. Therefore, the ICT tools alone will never influence learning.

2.4 Summary of the literature review

ICT usage in Mathematics teaching and learning is not consistent in different countries even though there are high expectations. Usage in Mathematics teaching and learning can benefit both the educators and learners provide tools are used appropriately irrespective of the frequency of their usage. Appropriate use of ICT tools implies that different tools foster different mathematical skills.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

In this chapter, information provided on research design, population and sample, research instrument, reliability of instrument, administration of questionnaire and method of data analysis.

3.1 Research Design

The research design adopted for the study was a survey approach. A well-structured questionnaire was a tool used as instrument for data collection. The survey approach was appropriate for the study on the usage of educational resource for teaching and learning of mathematics in Futminna.

3.2 Population of the study

The population of the study was 612 delimited to science education department mathematics option (200 ,300 and 500level). As shown in the table below

Table 3.1 Population of the study

Level	**M**ale	**Fem**ale	**Population**
200	134	112	246
300	160	56	216
500	95	55	150
Total population of the study			612

Source: Field Survey, 2021.

3.3 Sample and Sampling Techniques

The sampling size of the study includes mathematics student which comprises of male and female from a population of 612 students. Students were selected at random in various Levels (200L, 300L and 500L) to answer the questionnaires.

The sample adopted for the study is multi-stage sampling techniques which involved stratified and random sampling techniques. The choice of the Random sampling technique was justified on the grounds that, it enabled the researcher to administer questionnaires to the respondents who were available and willing to participate in the study at the time of data collection.

3.4 Research Instrument for Data Collection

The main research instrument used for this study is questionnaire while oral interviews of some of those included in the sample was also supportive. The interview method was inevitable as some questions required narrative answer and the respondents were perceived as too busy to go into the task of lengthy writing. The responses obtained through these techniques were considered in the appropriate areas of this study. The research instrument adopted were quantitative techniques of data analysis.

3.5 Validity of the Research Instrument

To ascertain the face and content validity of the instrument, the test item was submitted to departmental lecturers in FUTMINNA in person of Dr. R. W. Gimba, and Mrs Saratu who are research expert for critique. After making the necessary correction, the instrument was submitted to the supervisor for further scrutiny. The comments and observations of the supervisors were taken care and then the final draft submitted.

3.6 Reliability of the Research Instrument

Reliability of instrument can be based on the statistical roll employed as used for data analysis. Questionnaires were tested by a lecturer of mathematics who makes it reliable and they assist the researcher in achieving the aims and objective of the research questions and hypothesis which are also to be tested. The result of the test was analyzed using Pearson Product Moment Correlation (PPMC), the reliability coefficient of the instrument was found to be 0.89

3.7 Administration of Research Instrument(s)

After the pilot testing and all necessary modifications, the questionnaire was administered directly to the chosen sample for the study. one hundred and fifty copies of the questionnaire given out were successfully completed and returned. The possibility of retrieving back the entire questionnaire was a result of the researchers' colleagues who offered a helping hand. The opposite could have been the case if the research had taken the lonely task of going round the schools to collect the questionnaire.

3.8 Procedure for Data Collection

In carrying out this study, the researcher made uses of both primary and secondary sources of data. Thus, primary data was collected through the use of questionnaires and interviews. Data collected for this study was taken from FUTMINNA students and may however, not represent the true views of the other students and lecturers nationwide.

3.9 Method of Data Analysis

Mean analysis method was used to analyze the question items in the questionnaire.

The purpose of using mean score point value to determine the yard stick for evaluating the responses to the question items posed to the respondent.

Decision Rule

The decision rule was that any mean up to 2.5 and above was accepted as "Agreed" while a mean score below 2.5 was rejected as "Disagreed.

CHAPTER FOUR

DATA AND RESULTS

4.0 Introduction

This section of the study details the results analyzed from responses of the respondents. This includes; the background of respondents (Socio-Demographic Characteristics). It must, however, be noted that the analysis of data was solely a statistical summary and therefore inferences and Interpretation has been drawn grounded on the analysis. It is presented largely descriptively in the form of tables and organized according to the objectives of the study.

4.1 Demographic Characteristics

Proctor (2002) posits that demographic data are essential to acquire fundamental information about the respondents. It provides identification material about the respondents such as age, gender, educational levels etc. This information is very significant as it shows the respondents' capacity and credibility to answer the questions in relation to the objectives of this study.

4.1.1 Gender Distribution of Respondents

Wilson and Howcroft (2002) highlighted in their study that, technology and gender mutually construct one another through social shaping, thereby paving the way for gender attitudes towards adoption of new technology.

Table 4.1.1 *Distribution of Respondents by gender*

SEX	FREQUENCY	PERCENTAGE (%)
Female	55	36.7%
Male	95	63.3%
Total	150	100%

Source: Field Survey, 2021.

Table 4.1.1 above shows that 36.7% of the respondents were females whiles 63.3% being the majority were males. Irrespective of the fact that there are fewer females sampled compared to the males, the result of the study was not affected because Wilson and Howcroft cited that the gender of the respondents did not have any direct bearing on the responses provided.

4.1.2 Academic Qualifications of Respondents

Studies have indicated that more educated individuals may require less training in response to technological change if their general skills enable them to learn the new technology. These individuals have better productivity levels than less educated individuals because they can achieve better results with smaller inputs and time.

Table 4.1.2 *Distribution of Respondents by academic qualifications*

ACADEMIC QUALIFICATION	**FREQUENCY**	**PERCENTAGE (%)**
SSCE/WASSCE	00	00%
N.C.E	10	6.67%
B.Sc, B.Ed, B.Tech	125	83.3%
PhD	15	10%
Total	**150**	**100%**

Source: Field Survey, 2021.

Table 4.1.2 shows that, 83.3% of the respondents were first degree holders and 10% being fifteen of the respondents are PhD and 6.67% of the respondents is an N.C.E holder and none of the respondents is an SSCE/WASSCE holder. This implies that the respondents are educated which

means they could read, understand and interpret questionnaires reliably. The high level of education of the majority of the respondents makes it easier for them to understand and use the internet without causing any challenges.

4.1.3 Experience Level of Employees

Table 4.1.3: *Working Experience of employees*

WORKING EXPERIENCE	FREQUENCY	PERCENTAGE (%)
1-5years	55	36.7%
6-10years	65	43.3%
11 years and above	30	20%
Total	**150**	**100**

Source: Field Survey, 2021.

Table 4.1.3 shows that 55 respondents which represent 36.7% have their working experience within 1-5 years, 65 respondents which represent 43.3% also have their working experience within 6-10 years while 30 respondents which represent 20% have 11 years and above as working experience.

4.2 Data Analysis

TABLE 4.2.1

Research Question One: What is the students' perception on the use of the Internet as alternative means to teaching and learning mathematics in Federal University of Technology Minna?

S/N	Items	SA	A	D	SD	N	EFX	$\bar{x}$	DECISION
1.	It is a good idea using internet as a means of lecturing and teaching mathematics?	55	42	38	15	150	437	2.91	Agreed
2.	Concept of mathematics is better understood when using internet to teach mathematics	70	33	45	2	150	427	2.84	Agreed
3.	Learning mathematics with the use of Internet helps learning mathematics faster?	90	20	25	15	150	505	3.36	Agreed
4.	Lecturing mathematics with the Internet makes mathematics more real.	33	50	34	33	150	383	2.55	Agreed
5.	There is quick feedback with the interactive exercises when lecturing mathematics with internet.	65	45	23	17	150	458	3.05	Agreed
	Grand mean							**2.94**	**Agreed**

Table 4.2.1 above shows that various responses given by the respondents on the research question seeking to explain students' perception on the use of the Internet as alternative means to teaching and learning mathematics in Federal University of Technology Minna. The mean scores responses for question items 1, 2 and 3 were above the threshold of 2.5 (that is 2.91, 2.84 and

3.36). This indicates that: it is a good idea using internet as a means of lecturing and teaching mathematics; Concept of mathematics is better understood when using internet to teach mathematics; learning mathematics with the use of Internet helps learning mathematics faster. The mean scores from question items 4 and 5 (2.55 and 3.05) were also above the cut off mean of 2.5. This implies that the respondents also agreed that lecturing mathematics with the Internet makes mathematics more real and there is quick feedback with the interactive exercises when lecturing mathematics with internet.

TABLE 4.2.2

Research Question Two: What are the challenges facing the use of internet in teaching and learning mathematics in Federal University of Technology Minna?

S/N	Items	SA	A	D	SD	N	EFX	$\bar{x}$	DECISION
6.	Lack of IT expertise is a great obstacle in using internet in teaching and learning mathematics in Futminna.	101	29	20	0	150	531	3.54	Agreed
7.	High cost of purchase and implementation of instruments like projectors, modems, data etc.	78	44	13	15	150	480	3.23	Agreed
8.	Instability of power supply in Futminna	90	15	20	25	150	470	3.13	Agreed
9.	Time in setting up the connections	55	35	40	20	150	425	2. 8 3	Agreed
10.	Loss of data due to system and power failure is a risk in using internet as a means of teaching and learning mathematics	45	66	23	16	150	520	3.46	Agreed
	Grand mean							**3.23**	**Agreed**

4.3 Discussion of Findings

In the cause of this study the researcher analyzed the questionnaire given the respondents having analyzed it, the data obtained from questionnaires leads to some useful information that will enable the use of internet as in teaching and learning mathematics in Federal University of Technology Minna.

Based on the responses provided by the respondents in the study, the following findings emerged while using a 4-point mean likert scale. The first research question findings indicate that it is a good idea using internet as a means of lecturing and teaching mathematics; Concept of mathematics is better understood when using internet to teach mathematics; learning mathematics with the use of Internet helps learning mathematics faster; lecturing mathematics with the Internet makes mathematics more real and there is quick feedback with the interactive exercises when lecturing mathematics with internet.This finding coincides with Vernadakis *et al.,* (2012), which found that the internet learning environment enables students to be more involved in their learning process, thus improving their learning.

This finding is also in agreement with the study conducted by Ugur, *et al.,* (2011) on university students' perceptions on internet learning showing that the students gave highly positive opinions.

Secondly, lecturers' perception indicates that lecturing mathematic with internet encourage students to practice more mathematics, learning mathematics questions on the Internet is more fun and easy than doing from the textbooks,students can easily find more relevant materials on a particular topic through the use of Internet in teaching and learning of mathematics, relevant links for questions given to students by the lecturers makes mathematics more easy and

comfortable to learn using internet, andlearning mathematics with the Internet is never a waste of time**.** The finding of this study is in line with the of Ugur *et al.,* (2011), that students found internet learning is an easy and effective way to understand the lessons, provides them with opportunities to participate in forum discussions and enable them to remember most of the lesson contents without memorization.

Further revelation by the study showed that there was a similarity in the finding of that of Dell, Law & Wilker (2010) that internet learning activities provide students with opportunities to communicate effectively with their instructor, and promote active learning, and allow application of knowledge and effective student interaction.

Thirdly, challenges facing the use of internet in teaching and learning mathematics in Federal University of Technology Minna indicate; that lack of IT expertise is a great obstacle in using internet in teaching and learning mathematics in Futminna, High cost of purchase and implementation of instruments like projectors, modems, data etc., Instability of power supply in Futminna, Loss of data due to system and power failure is a risk in using internet as a means of teaching and learning mathematics, and Time in setting up the connections. In support of the present finding, Vernadakis *et al.,* (2012) who conducted a study on comparison of student satisfaction between traditional and blended technology course offerings in physical education. The study established that Internet learning have negative perceptions.

CHAPTER FIVE

SUMMRY, CONCLUSION AND RECOMMENDATIONS

5.0 Summary

Based on the data analyzed, the summary of the findings of study were summarized below:

It is noted in the research that internet learning environment enables students to be more involved in their learning process, thus improving their learning.

Also, further finding of the study revealed that internet encourage students to practice more mathematics, learning mathematics questions on the Internet is more fun and easy than doing from the textbooks, students can easily find more relevant materials on a particular topic through the use of Internet in teaching and learning of mathematics, relevant links for questions given to students by the lecturers makes mathematics more easy and comfortable to learn using internet, and learning mathematics with the Internet is never a waste of time**.**

The study findings indicate that internet learning activities provide students with opportunities to communicate effectively with their instructor, and promote active learning, and allow application of knowledge and effective student interaction.

5.1 Conclusion

Based on the findings of the study, Learning does not occur in isolation; the context of learning, related to the student, the instructor, and the situation in which the learning takes place, influences learning. Therefore, it can be concluded that internet learning environment enables students to be more involved in their learning process, thus improving their learning. Also, internet encourage students to practice more mathematics, learning mathematics questions on the Internet is more fun and easy than doing from the textbooks, students can easily find more

relevant materials on a particular topic through the use of Internet in teaching and learning of mathematics, relevant links for questions given to students by the lecturers makes mathematics more easy and comfortable to learn using internet, and learning mathematics with the Internet is never a waste of time**.** Internet learning activities provide students with opportunities to communicate effectively with their instructor, and promote active learning, and allow application of knowledge and effective student interaction.

5.2 Recommendations

In view of the findings and conclusion, there is need to take of the instability of power supply in Futminna as it may lead to loss of data during the course of learning.

The study established that there is lack of IT expert; hence, it is necessary for the school to employment people who are well experienced and have better IT knowledge by doing this it will help to fast track and aid smooth use of internet in teaching and learning of mathematics

Federal Government should also provide necessary learning aids that suitable for study such as learning equipment.

5.4 Suggestions for Further Studies

This work is not all in all research work. Therefore, it can replicate in other part of the country. Further study can be carrying out by using larger population and the similar study should carry out on topics like;

1. Communicating Mathematics Through the Internet
2. Student Perceptions of Internet Use in the Mathematics Classroom.
3. E-Learning in the Teaching of Mathematics: An Educational Experience in Adult High School

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Appendix I

PERCEPTIONS OF STUDENTS' ON THE USE OF INTERNET SERVICES AS ALTERNATIVE SOURCE OF TEACHING AND LEARNING MATHEMATICS "A CASE STUDY OF FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE".

Department of Education Mathematics,
School of Science and Science Education,
Federal University of Technology,
Minna,
Niger State, Nigeria.
June, 2021.

Dear Respondent,

REQUEST FOR COMPLETION OF QUESTIONNAIRE

I, **TOYE OLAITAN PETER** with Matriculation no. **2017/3/69337BE** final year students of the above named institution, carrying out research on the topic: "PERCEPTIONS OF STUDENTS ON THE USE OF INTERNET SERVICES AS ALTERNATIVE SOURCE OF LEARNING MATHEMATICS A CASE STUDY OF FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE" in partial fulfillment of Bachelor Degree of Technology in Education Mathematics.

The questions are designed to obtain information in this direction. Your contributions will be very helpful to the successful completion of this work. All information provided shall be considered and used purely for academic purpose.

Thanks for your cooperation.

Yours Faithfully,

Researchers

Appendix II

QUESTIONNAIRE FOR THE RESPONDENTS

SECTION A: PERSONAL DATAS (BIO DATA)

1. Gender: Male ( ) Female ( )
2. Marital Status: Single ( ) Married ( ) Divorced ( )
3. Highest Academic Qualifications:
   (a) SSCE/WASSCE ( )
   (b) NCE/OND/HND ( )
   (c) B.Sc, B.Ed, B.Tech ( )
   (d) PhD ( )
4. Working Experience: 1-5 ( ) 6-10 years ( ) 11years and above ( )
5. Occupation: Student ( ) Lecturer ( )

SECTION B (Questionnaires)

Instruction: Please tick (√) of this option that most appropriately described your opinion

KEY: SA = 4 point likert scale A = 3 point likert scale D = 2 point likert scale SD = 1 point likert scale

SA – Strongly Agree, A – Agree, D- Disagree, SD- Strongly Disagree

Research Question 1:What is the students' perception on the use of the Internet as alternative means to teaching and learning mathematics in Federal University of Technology Minna?

S/N	Items	SA	A	D	SD
1.	Is a bad idea using internet as a means of lecturing and teaching mathematics.				
2.	Concept of mathematics is better understood when using internet to teach mathematics				
3.	Learning mathematics with the use of Internet helps learning mathematics faster.				
4.	Lecturing mathematics with the Internet makes mathematics more real.				
5.	There is quick feedback with the interactive exercises when lecturing mathematics with internet				

Research Question 2: What are the challenges facing the use of internet in teaching and learning mathematics in Federal University of Technology Minna?

S/N	Items	SA	A	D	SD
6.	Lack of IT expertise Is a great obstacle in using internet in teaching and learning mathematics in Futminna				
7.	High cost of purchase and implementation of instruments like projectors, modems, data etc.				
8.	Instability of power supply in Futminna				
9.	Time in setting up the connections				
10.	Loss of data due to system and power failure is a risk in using internet as a means of teaching and learning mathematics				