

**PERCEPTION OF UNDERGRADUATE MATHEMATICS STUDENTS OF  
NATIONAL OPEN UNIVERSITY OF NIGERIA ON E-LEARNING  
(A Case Study of Minna Study Centre).**

**BY**

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**DEPARTMENT OF SCIENCE EDUCATION  
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**

**NOVEMBER, 2019**

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## ABSTRACT

This study focused on the perception of undergraduate mathematics students of National Open University of Nigeria on e-learning. The purpose of this research work is to discover students' opinions of e-learning, which is an alternative to traditional classroom teaching and learning. The research was done because, with the advancement in technology there are tools provided to make e-learning possible, hence the need to know what students make of the idea of e-learning, as they are the target and the main beneficiaries of this technology enabled learning. The study is based upon two theories which are; facilitation theory and constructivist theory of online learning and how learners gain knowledge differently. A survey design was adopted for the research. Three research questions were formulated to guide the study. The instrument for data collection was the questionnaire containing 17 items on the perception on e-learning in which the student was asked to indicate their opinion on each. The data collected were analyzed using simple frequency count and percentage methods (descriptive statistics) for answering the research questions. Results of data analysis clearly shows that majority of the student in National Open university are male and most of the students are within the age range of 21-40, which shows that most of the students are adult. 53.8% of the students are married and 65% are employed. Also Majority of the student in National Open University spent less than 5hours online doing things related to their course. Varied attitudes towards e-learning have been shown in this study, these includes students liking the idea of e-learning, whether it is easy to use for learning and also considering it to be an innovative concept which needs to be encouraged and enhanced. The research also shows that most of the respondent's view e-learning as an appropriate medium to study courses from distance. Based on the findings in the study, it was recommended that, Internet facilities should be provided by the university authority for all undergraduates, University lecturers should motivate the student on the use of e-learning by giving them assignment through their e-mail and receive it back via e-mail and finally Electricity problem should be addressed for effective use of instructional technologies.



## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Background to the Study**

Education is a key factor for sustainable development (Chimombo 2005). The significance of education, especially in developing countries, is increasing because of progressing pressure to catch up with the developed world regarding, for example, global competitiveness (Hawkins 2002). Predictably, educational settings are different in developing countries than in developed countries, such as low quality of education and narrow possibilities in attending schools in rural areas because of far distances and high opportunity costs (Ibid 2005). According to (Chimombo 2005) He states that country-specific circumstances have to be improved regarding compulsory and free education to foster general access to education.

Every year, more of the world's people become connected to the internet, its bandwidth increases and its use becomes more integrated to all that happens in the globe. Connectivity to this network has become key to opportunity, success and fulfillment for individuals. In general, E-learning is the expression broadly used to describe "instructional content or learning experience delivered or enabled by electronic technologies". With the increase in internet use and availability of personal computers the basic concept of education has undergone fundamental changes (Zhang and Nunmaker, 2003).

The Information and communications technology (ICT) revolution has led to many radical changes across communities such that ICT is today a very expensive but as an urgent necessity. Schofield et al. (1997) predict that the real impact of the ICT revolution is to be seen not behind, but ahead of us. E-learning is possibly the most important development in the educational world

today. E-learning is a new dimension in education, which helps to guide decision makers, educators, learners and the wider society so that they can step beyond simple opinions about e-learning's usefulness and base their judgments on systematic assessments of its effectiveness. The theory and application of ICT attracts systematic methods through inter-related theories in technology, psychology and education to develop its bases, principles, and applications for higher education.

Recent universities can be open, virtual, and electronic by using the internet and can consider it as the main tool for communication with learners (Hamdi, 2003), principally by providing an interactive environment between the learners and the educational material (Alkateeb, 2003). The production of materials and software for e-learning in education and training by schools and universities now increases daily. The internet is acceptable in workplaces for both learning and training, justifying the assumption that e-learning is a key part of the future of learning.

Growing demands for e-learning require a combination of methodologies, tools, and technologies to effectively scale by e-learning development throughout the organization. As e-learning is definitely a growing field in the educational and training market and e-learning standard is a new emerging area, there are many challenges in implementation of undergoing technological changes and developments. The security of services, the encryption of messages and the common taxonomies to describe services and service access points in e-learning systems environments are all in need of consideration. However, Supporters of e-learning are always looking forward some new developments. Technology advancements will continue to reshape learning over the Internet with increasing use of advanced tools and techniques.

A broad range of learning approaches exists already, for example, e-learning, blended learning, and distance learning which utilize information and communication technology (ICT) (Maier, 2007). The use of ICT can benefit, for example, students from both rural and urban areas by having them attend classes as distance learners and motivating them to learn like the Group Learning Sets initiative offers. Regarding this, the potential of e-learning seems very assuring, but because of gaps between developed and developing countries knowledge transfer is not only difficult but also costly.

E-learning denotes the use of ICT by teachers and learners. (Schmidt 2005) holds that e-learning consists of conventional training, such as courses, ad-hoc training, selected learning objects, formalization through document collections and community formation which can be achieved via social software. The growth of e-learning programs according to Lockwood and Gooley, (2002) is driven by the need for and potential of providing education in less expensive ways, increased access to information, effective learning and greater flexibility.

Stephenson, 2001 posits that there is little systematic research into the overall effectiveness of e-learning as a learning medium despite the great interest in it. He acknowledges that while there is much more work to be done, a variety of e-learning courses aimed at making sustainable development a reality have been developed and demonstrate how e-learning can reach thousands if not millions of minds and potentially plant the seeds of change.

The National Open University of Nigeria (NOUN) which was established in 1983 was closed down a few months later in 1984 by the federal military government that overthrew the civilian government of Alhaji Shehu Shagari (Jegade 2006). Many years after the closure, the compelling reasons that informed the earlier establishment of the University were still confronting the

country. Several other reasons had also emerged, like: the need to fill the vacuum created by the profit oriented outreach programmes of many conventional Universities in the country; the necessitating needs for economic funding of education; and the need to take advantage of emerging developments in the field of information communication technologies which have revolutionized the techniques and method of instructional deliveries in the distance learning mode. Thus, in 2002, the National Open University Act of 1983 which was suspended in 1984 was re-enabled. This paved way for the resuscitation of the National Open University of Nigeria as we have it today by President Olusegun Obasanjo. This re-birth according to Peters (2006) has renewed the focus to make education available to as many people as have the ability and are willing and ready to benefit from the quality education provided through flexible and affordable distance learning. The programmes available under the National Open University of Nigeria are essentially designed to widen the access to education and to ensure equity and equality of opportunities for all and sundry; to be used as instrument for poverty alleviation especially in rural communities, by providing opportunities that support “Education For All” (EFA) and lifelong learning; to equip the Nigerian population for the emerging global culture of technological literacy through its programmes and the use of information and communication technology.

The National Open University of Nigeria is a form of distance education, and Denga (1993), refers to distance education as the transmission of Knowledge through various media such as programmed instructions, multi-media packages, home experiment kits, prepared lectures and notes. It enables students living in remote or isolated parts, or who are employees in a full-time job or suffer from some physical handicaps to carry on their education at home by lessons through the post, radio, television or telephone. Distance Education is defined by FRN (2004) as

an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learners; it involves the use of a range of media such as print, written correspondence, audio, video, computer based media and networks as well as multi-media facilities for presentation of information and for communication between the University and her student.

## **1.2 Statement of the Problem**

Before the introduction of e-learning many people who wanted to obtain university degree had to compete for the few places that were offered by the public universities. Those offered places had to apply for study leave as they had to go through the traditional learning system. This kind of further education system was characterized by limited number of students that could be absorbed per academic year and consequent removal from their places of work for the duration of their study.

From the reviewed literature, it can be deduced that there seems to be no research studies on the joint contributions of e-learners' socio-demographic, hours spent online/offline and prior computer skills variables to their perception to e-learning.

Several studies have been carried out on perception of undergraduate student especially on conventional students, but not much on e-learning students within the Nigeria educational system. The need to sever this ground so as to extend the frontier of knowledge in order to help improve the unimpressive e-learners' in National Open University necessitates and serves as the motivating factor for undertaking the present piece of research so as to fill the existing important research gap.

#### **1.4 Aim and Objectives of the Study**

The aim of this study was to determine the perception of undergraduate mathematics students of National Open University of Nigeria on e-learning, Minna Study centre Niger State, Nigeria.

The specific objectives of the study are as follow;

- i. To determine the perception of undergraduate mathematics students on e-learning
- ii. To determine the perception of undergraduate's socio-demographic characteristics on e-learning.
- iii. To determine the perception of undergraduate on the number of hours spent online/offline (Time management) on e-learning.

#### **1.5 Research Questions**

- i. What is the perception of undergraduate mathematics students on e-learning?
- ii. What is the perception of undergraduate socio-demographic characteristics on e-learning?
- iii. What is the perception of undergraduate on the number of hours spent online/offline (Time management) on e-learning?

## **1.6 Significance of the Study**

The present study has great significance. First of all, the study findings provide an idea about the e-learning aspects in order to provide key information to further research work in such areas. In the same way, the study provides knowledge and guidelines to that may be of help to policymakers. The research is therefore of importance for planners, and other social scientists. Finally, this study tends to provides an input to the students, teachers and researchers in the areas of e-learning.

Research works are embarked upon with a view to extending the frontier of knowledge. The present study was therefore carried out with this same objective, especially in the field of e-learning. It has therefore, contributed to the extension of the frontier of knowledge in the following ways. First, the study has shown the predictive power of the selected factors, especially socio-demographic factors, prior computer skills and time management status in the teaching and learning process using e-learning.

## **1.7 Scope of the Study**

This study focused on perception of undergraduate mathematics students of National Open University of Nigeria on e-learning. The study was carried out in geographical location of Niger State, Minna study centre. The research method adopted for this study is descriptive research method of descriptive survey type. The undergraduates were selected at various faculties in the university using random sampling technique.

This study considered the perception of undergraduate students which is their understanding of the benefits in e-learning. The study did not also consider all students studying through the e-

learning mode but only focused on the National Open University students and specifically those in Minna Study centre.

## **1.8 Definition of Term**

**E-learning:** denote the use of ICT by students and teachers which contain instructional content or learning experience delivered or enabled by electronic technologies in Tertiary Institute.

**Mathematics:** A abstract representational system used in the study of numbers, shapes, structure and changes and the relationships between these concepts.

**Undergraduate Student:** An undergraduate student is primarily a person enrolled in a tertiary institution who attends classes in a course to attain the appropriate level of mastery of a subject under the guidance of an instructor using e-learning.



## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

This research work was carried out to investigate the perception of undergraduate students of National Open University of Nigeria on e-learning (A case study of Minna study centre). In this regards, the review of related literature was done to focus on the following:

- i. Conceptual Framework
- ii. Theoretical Framework

#### **2.1 Concept of E-Learning**

E-learning networked information and communications technology is a modern process in the teaching and learning of undergraduate students. There are a number of terms that are used for the purpose of describing this online mode of teaching and learning. The method most widely uses online activities, virtual learning, web based learning network, computer based learning, digital collaboration and distributed teaching (Naidu, 2006). In this type of educational delivery, information and communications technology are followed in synchronous and asynchronous modes.

E-Learning means a lot of different things and it is understood differently by players with very different roles. The E-Content Report (2004) describes e-learning "as an umbrella term describing any type of learning that depends on or is enhanced by electronic communication using the latest information and communication technologies (ICT)".

It is also defined as "a generic term covering a wide set of ICT technology-based applications and processes, including computer-based learning, web-based learning, virtual classrooms, digital collaboration and networking" (Hambrecht, 2000). Simplifying, others refer to e-learning as teaching and learning process that is web-enabled. Building on the above descriptions the "e-Europe: Promoting Digital Literacy initiative" describes e-learning as the use of new multimedia technologies and internet for improving the quality of learning by means of access to resources and services, and long distance collaborations and exchanges. Further, the Commonwealth of Learning in 1998 described e-learning in two ways:

- i) The application of information and communication technologies (ICT) to core institutional functions such as administration, materials development and distribution, course delivery and tuition, and the provision of learner services such as advising, prior learning assessment and programme planning.
- ii) As an organization that has been created through alliances and partnerships to facilitate teaching and learning to occur without itself being involved as a direct provider of instruction.

The rapid technological and social change puts forward need for lifelong learning. Conventional classroom learning is not able to satisfy such need. E-learning is an increasingly preferable alternative to conventional classroom learning. The move to conduct teaching and learning over the Internet is rapidly gaining momentum along with the advance of computing technology and the deep researches into the pedagogical methodology on the Internet. Web based learning has become an important part of the routine landscape of education and training. It has been recognized that Web based learning can enable more learners to have access to the learning materials and provide students and teachers with unprecedented flexibility and convenience.

However many current instructional Web sites just simply deliver course materials over the Internet and do not provide effective and efficient supports for using these materials to construct knowledge. As a result, learners only passively receive the presented materials.

Educational systems are thus looking to e-learning programs to help address these challenges and to substantially improve the quality and content of their education. Integrating e-learning into existing secondary educational system can, however, be a major challenge. Secondary educational systems in developing countries are undergoing rapid change, particularly an increase in the number of schools and rise of student enrollment related to the recent emphasis of universal primary education.

Investment in e-learning is, however, not an alternative to investment in education generally; the two should be seen as being complementary. Integrating e-learning programs into existing educational systems can promote, however, a transformation.

Implementing a comprehensive e-learning program would mean changes to the curriculum, infrastructure, teacher professional development, textbooks, and examinations. A major benefit of integrating e-learning into governmental educational systems would be, however, a long-term commitment to growing and maintaining the program. The concept of e-learning integration into an educational system begins with the teacher and the ways in which teachers teach. The academic approach to this subject discusses the theoretical perspectives of behaviorism versus constructivism and, for the purposes of this paper, how they apply to tertiary education level. A simplistic description of the view is that of “chalk and talk” and the teacher as the ultimate authority and purveyor of knowledge – the “sage on the stage”. This compares to the constructivist model or method where students work collaboratively and socially construct new

knowledge. In a technological classroom there will most likely be elements of both perspectives blended in a way that makes teaching comfortable for the teacher and takes advantage of new tools and opportunities.

### **2.1.1 E-Learning: A New Way of Learning**

Education today has evolved considerably because of advances in Web technology. The Internet enables the ordinary person to have access to never-ending quantities of information and knowledge efficiently and conveniently. The growth of the World Wide Web, high-capacity corporate networks, high-speed desktop computers and all kinds of mobile devices will make learning available to people 24 hours a day, seven days a week around the globe. Since many traditional education organizations are using Web technology to deliver educational content, it is possible now for a high school student to seek assistance with mathematics questions at any time of the day or a graduate student at home to take some courses through long distance education. Web-based learning not only improves the achievement of students from kindergarten to university, but also enhances the productivity of the corporate workforce. Turbulent corporate environments, caused by market dynamics, have made knowledge and skills indispensable for effective performance in the workplace. Knowledge in the workplace is no longer implied but required at different times and different quantities. Traditionally, corporate training has existed in organizations to impart knowledge to individual workers as off-the shelf learning packages. In this model, learning takes a reactive approach to problem solving encountered by organizations, and learning programs take place in a specific location. However, recent advances in the fields of distributed and ubiquitous computing, artificial intelligence, cognitive learning theory, and multimedia have converged to provide more distributed learning systems over the Internet and World Wide Web (WWW). A requirement for knowledge and skills distribution across different

systems, space, and time is pertinent to unique learning requirements of individual learners within all kinds of organizations. The infrastructure to support such knowledge distribution is in the form of electronic learning, normally referred to as e-Learning. Commonly, e-Learning is defined as Internet-enabled learning, or convergence of learning and the Internet, including any use of computers and the Internet to facilitate education (Odiambo, 2013). The components of e-Learning can include content delivery in multiple formats through the Internet, management of the learning experience, and a networked community of learners, content developers and experts. E-Learning covers a wide set of applications and processes such as Web-based learning systems, computer-based learning systems, virtual classrooms, and digital collaborative learning GroupWare packages. E-Learning content is mainly delivered via Internet, intranet/extranet (LAN/WAN), audio- and videotape; satellite broadcast, interactive TV, DVD and CD-ROM, and the still to emerge wireless application protocols (WAP) (Obiambo 2013). It is estimated that the e-Learning market will grow substantially over the next five years. Moreover, with the improvement of bandwidth, video, and storage technology, the demand for e-Learning products and service will increase exponentially (Wiley 2013).

### **2.1.2 The Features of E-Learning**

E-Learning has the potential to revolutionize traditional education, because it could provide faster learning at reduced costs, increased access to learning, and clear accountability for all participants in the learning process. It enables businesses or schools to distribute training and critical information to multiple locations easily. Employees and students can then access training when it is convenient for them, at home or in the office.

In today's fast-paced culture, organizations that implement e-Learning will provide their work force with the ability to turn change into an advantage. However, e-Learning is just now in its infancy (Zulaika, 2016). As pioneers struggle with new technologies and new practices, the discipline evolves almost daily. Despite the rapid change, some significant features of future e-Learning can be identified as the following:

(i) **Personalization:** The education of the future will become deeply personalized. The learning topics will be selected based on student interest, student aptitude and educational level, and societal need. The menu of available courses presented to any given student will be determined dynamically by the student's prior learning assessment, by the prerequisite for the new course, and by the learning management system. A student's daily menu will be varied and constantly changing, building on each day's achievement.

(ii) **Interoperability and Reusability:** E-Learning systems with different environments and contents from multiple authors must have the ability to work together. There must be a semantic relationship between different e-Learning systems. Learning content may be reused in multiple applications and environments regardless of the tools used to create them. This requires that content be separated from context-specific runtime constraints so that it can be incorporated into other applications. For reuse to be possible, content must also have common interfaces and data.

(iii) **Flexibility:** Courses could be generated in a variety of forms based on standard style sheets. Different forms of layout could be available depending on the purpose of the course and the preferences of the learner. A student can use various kinds of devices with different processor speeds and memory capacity, from desktop computers, laptop computers, and mobile devices such as Palm computers, to access the learning content.

### **2.1.3 E-Learning Types – Internet Based Mode**

- (i) **Online Learning** - In this type of learning the learner can access the all study material online in form of word documents, visuals, pictures, videos with audio.
- (iv) **Video Conferencing**- In this type of learning the learner can communicate face to face with teacher or instructor who is seating somewhere else. In video conferencing instructor can communicate with multiple learners. As compare to other e-learning technologies this technology is costlier.
- (v) **Webinars/ Web based Learning**- This type of learning is like online seminar so it is called as Web-seminar/webinar. In this type of learning the instructor uses the audio, video to instruct multiple learners online as seminar. After whole presentation participants can ask related queries or questions. Generally this form of webinars are industry focus and very beneficial because it saves time of participants and also helps in reducing cost of travelling and other expenditure.
- (vi) **Remote Access**- This form of method is very exceptional. In this method the instructor can access the device of learner and instructor performs all activities on that device instead of learner. Instructor can guides how to perform various tasks on devices for better understanding of learner.

### **2.1.4 The Historical Background of E-Learning Techniques**

- (i) **Correspondence teaching**- This dates back to 1728, when Caleb Philipps, professor of short hand, published an advertisement in the Boston Gazette offering teaching materials and tutorials. However, the first testimony of an organized correspondence course in which there was bidirectional communication comes from England, in 1840, when Isaac Pitman initiated a short

hand course. From those early stages, correspondence institutions appeared in the United States and other European countries.

(ii) **Multimedia teaching-** This stage is a product of the 1960s, when the British Open University was founded (Aretio, 2001 cited by Alcalá, n.d). Here the use of printed materials was joined by audiotapes, videotapes, radio, TV broadcasts, telephone, etc.

(iii) **Telematic teaching-** This dates to the dates the 1980s. This decade marks the arrival of modern telecommunications in the education scene.

(iv) **Teaching through the Internet-** It is the Internet age and e-learning was described as fourth generation distance teaching, virtual campus, virtual teaching, flexible learning model, etc. It involved the application of two-way communication. Added to all these developments ICT supported education quickly became the hot topic in the 1990's due to spreading use of the World Wide Web and its fast developing applications. Rieber, & Welliver, (1989) defined e-learning as "web-delivered and/or web-supported teaching and learning using computer, multimedia, and internet technologies." E-learning is a means of education that incorporates self-motivation, communication, efficiency, and technology. E-learning is also called Web-based learning, online learning, distributed learning, computer-assisted instruction, or Internet- based learning. E-learning instructional techniques encompass all the instructional approach involving the use of electronic medium for instruction. This will includes Computer Assisted Instruction (CAI) and web/online/mobile and also learning through radio, tapes, video tape, internet and television. E-learning literally means electronic learning. The use of e- learning in instruction adopts in its main the principles of artificial intelligence. E-learning in the delivery blend enables teachers to cater to a wide range of learning styles such as auditory learning, visual learning and self-testing through puzzles and quizzes, and kinetic learning through workplace simulations.



Technology is developed to solve problems associated with human need in more productive ways. If there is no problem to solve, the technology is not developed and/or not adopted. Applying this principle to educational technology would mean that educators should create and adopt technologies that address educational problems, of which there are many. Further, a technology will not be adopted by educators where there is no perceived need or productivity gain. This is what Lankshear and Snyder (2000) refer to as the 'workability' principle, therefore when discussing applications of computer technology to education the question must always be asked as to what educational problem(s) needs to be addressed. This question needs to be asked at all levels of decision-making, from the teacher planning a programme, to a school administrator purchasing hardware and software, to an educational system officer developing policy and strategic plans. E-learning is beneficial to education, corporations and to all types of learners. It is affordable, saves time, and produces measurable results. E-learning is more cost effective than traditional learning because less time and money is spent traveling. Since e-learning can be done in any geographic location and there are no travel expenses, this type of learning is much less costly than doing learning at a traditional institute. Flexibility is a major benefit of e-learning. E-learning has the advantage of taking class anytime anywhere. Education is available when and where it is needed. E-learning can be done at the office, at home, on the road, 24 hours a day, and seven days a week. E-learning also has measurable assessments which can be created so the both the instructors and students will know what the students have learned, when they've completed courses, and how they have performed.

### **2.1.5 E-learning Technological Up gradation in Classroom**

There are many e-learning settings and technologies available to use in schools, each with their own advantages and applications. Often the best solution is a combination of technologies depending on the particular need and learning environment.

#### **(i) Multimedia Classroom**

In a multi-media classroom, educational content is delivered to students in a one-to-many approach. This is cost efficient per pupil, and can provide a large amount of educational resources to students. Classrooms would be equipped with a projector, screen (or large LCD), speakers and a classroom computer. The teacher could display various types of content that is housed either on the classroom computer or on the teacher's laptop or other device. The teacher would be able to adapt and project various content (e.g., videos, PowerPoint slides, augmented reality, multimedia presentations, the teacher drawing a graph, etc.). A connected classroom would have wireless or wired communications to a "cloud" of resources. The teacher would thus have access to a wide range of content from the library on the cloud. The computer housing the content could be locally based at the school (which would obviate the need for inter-school communications, and be reliable), at a district or national educational headquarters, or elsewhere.

Connected multi-media classrooms would permit distant classroom teaching, in which a teacher in one school or from a studio could deliver live, interactive lectures to classrooms in other schools. The distant classrooms would need to be outfitted with video cameras and microphones, as well as projectors and speakers, to communicate with the distant teacher.

## (ii) **Computer Laboratory**

A computer lab is among the most recognizable form of e-learning technologies. A computer lab usually consists of many single personal computer stations. This is a common arrangement found in schools throughout the world. There are many educational software packages available that could be installed for student use. Separate stations permit individual students to move at their own pace through material. Teachers can also lead students or student teams through guided exercises, with each following on their own station. Free computer time itself is a valuable educational resource. Installing separate computers is an easy to set up, since it is simply single stations behaving independently. Computer labs can be, however, more expensive per student due to the individual computers and software licenses. They may also have higher power consumption demands, depending on the computer or device, necessitating low-cost power solutions. Multi-seat computing consists of using one powerful personal computer with extra video cards to support up to eight independent “seats” (each with its own monitor, keyboard and mouse running separately). They can be put in a computer lab for students or teachers to use, or in classrooms. There are several commercially available multi-seat operating system software options including by Microsoft and Linux. This system has the advantage of using much less power than other options. It is usually the least expensive per user as well.

### **Single Station, Personal Computers**

A variety of types of single station devices are available.

- (i) **Personal computer (PC).** A PC is a common approach for using computers in homes and offices. It consists minimally of a computer, one or two monitors, a keyboard and mouse. Each computer has its own operating system and software programs. From a setup and

maintenance standpoint this type of system is advantageous. It is easy to maintain and does not generally require a specially trained computer technician to fix most hardware and software problems. However, if each student were to have a computer, this would be among the more costly options to implement, particularly in rural areas reliant on solar power. This would be useful particularly for teacher stations or single stations in the back of classrooms.

(ii) **Micro Computer.** A microcomputer is similar to a standard single station except that it uses a small form factor case with a generally slower processor. Power consumption can be much lower than a single station, and thus suitable when power is limited. The computers are, however, difficult to repair and may be prone to theft and overheating; the lifespan of these devices is not yet known. Software maintenance is similar to a standard single station.

(iii) **Laptop or Notebook.** Laptops and notebooks are among the easiest educational solutions to set up. They usually come with software preinstalled and only a power outlet is needed to begin using the system. The power consumption is low compared to a personal computer. Hardware maintenance can be difficult, but software maintenance is standard. One of the disadvantages is product lifespan; they are easy to steal and are prone to accidents (a spill on the keyboard can easily destroy it; new rugged laptops reduce this risk). New design and battery technologies are lengthening battery life in some machines. Laptops may be an excellent solution for teachers. Teachers could bring a laptop to work from home, and then connect it to the classroom projector.

(iv) **Small, Personal Devices-** Small, personal devices such as tablets, smart phones and e-readers are similar in that they are all relatively new technologies. They are rapidly gaining popularity due to their declining price, large number of web-based software applications, powerful graphics, and enjoyment of use. Educational uses could include listening to audio

lessons or audio books, gaming, watching videos, and reading. Writing is more difficult if the device doesn't have a keyboard. Schools and teachers can develop teaching material applications for mobile devices using existing software.

Nevertheless, the maintenance requirements and lifespan of smart phone and other small devices in difficult environments are not yet known. Similar to laptops, they can be easily lost or stolen, and are prone to accidents. A difficulty in adapting educational software is that the various brands and styles have different operating systems and screens, and each may require separate configuration. Their batteries need to be frequently recharged, but individual external solar panels could be used. The cost of Internet or telecommunications time for teachers, students or schools may also be a limiting factor. Some of these challenges are being addressed by private companies and others who are designing engineering solutions and new software for the devices

## **2.2 Perception of Undergraduates on E-learning**

Students find it difficult to switch from the traditional learning mode to the new e-learning mode when they are not confident of handling the new learning mode (Datuk & Alliy, 2009). Institutions implementing e-learning must be aware that students will react differently to the changing paradigm of learning and rather than implement changes across the board, should aim to offer courses tailored specifically towards the different learning styles. In failing to take such action, schools run the risk of low success rates or failures during e-learning implementation as e-learning requires a very high degree of self-motivation which is found to be lacking among most learners. Government, industry,

education, and society are identified as the key components in the first level of e-learning readiness.

In the second level, readiness is evaluated based on the connectivity, the capability – a country's ability to deliver and consume e-learning, literacy rates, and trends in training and education – content and culture. Rosenberg focused on the concept of sustainability and proposed the components of business readiness, changing nature of learning and e-learning, value of instruction and information, role of change management, reinvention of training organizations to support e-learning efforts, e-learning industry, and personal commitment ,(Dowling et al 2010).

(Stephen, 2007), proposed the components of psychology, sociology, environment, human resource, finance, technology, equipment, and content readiness. Overall e-learning readiness is defined by seven key components.

- (i) Business Readiness refers to the link between organizational business priorities and characteristics, to e-learning efforts. Organizations operate in a highly competitive environment where strategy, environment, and attention to internal problems affect their viability and profitability.
- (ii) Technology Readiness focuses primarily on the technical infrastructure.
- (iii) Content Readiness studies issues concerning e-learning content material such as interactivity, reusability, interoperability, etc.
- (iv) Training Process Readiness refers to the ability of organizations to organize, analyze, design, develop, implement and evaluate a concrete training program.

(v) Culture Readiness determines an organization's perceptions and cultural parameters concerning e-learning adoption and use.

(vi) Human Resources Readiness refers to the availability and set-up of the human support system. In this component some parameters such as receptivity and the prerequisites of humans to learn successfully in the new environment are defined.

(vii) Financial Readiness refers to the budget allocation and investment for establishing a robust e-learning setup.

Since online courses are delivered through networks, it would be particularly important to have related assessments concerning individuals' perceptions of using a given technology and individuals' ability to use the technology, that is, assessments concerning computer/network self-efficacy. (Campea & Higgins 2011) developed and validated a 10-item instrument of computer self-efficacy (CSE) and identified that computer self-efficacy had a significant influence on computer-use outcomes, emotional reactions to computers, and actual computer use. The researchers claimed that computer self-efficacy does not reflect simple component skills, such as booting up the M.-L. Hung et al. / Computers & Education 55 (2010) 1080–1090 1082 computer; instead, it represents an individual's perception of his or her ability to use computers to accomplish a task, such as using software to analyze data.

Similarly, in discussing Internet self-efficacy (ISE), (Kearsley 2009) pointed out that ISE does not result merely in performing some Internet-related tasks, such as uploading or downloading files; rather, ISE is one's ability to apply higher-level skills such as

troubleshooting problems. ISE may be different from CSE and may require a set of behaviors for establishing, maintaining, and using the Internet.

In addition, (Tsai & Tsai 2013) showed that students with high Internet self-efficacy learned better than did students with low Internet self-efficacy in a Web-based learning task. (Tsai & Lin 2011) explored adolescents' perceptions and attitudes regarding the Internet among 636 high school students and found that females were more likely than males to perceive the Internet as pragmatic and that males' enjoyment of the Internet was greater than females' corresponding enjoyment. In order to construct the computer and Internet self-efficacy-related items in our proposed OIRS in this study, we newly developed some items and selected other items from those concerning computer self-efficacy (Compeau & Higgins, 2011) and Internet self-efficacy (Easth & LaRose, 2010) with a shift to the online learning context. An example of these items is "I feel confident in using the Internet (Google, Yahoo) to find or gather information for online learning."

Online learning may also involve computer-mediated communication. Research findings indicate that shy students tend to participate more in online environments than in traditional environments (Waktin, 2011). It reported that it is important to create opportunities for interactions and communications between students and their instructors in Web-based learning. Similarly, (Picciano, 2011) suggested that successful students should make the most of online discussions, which may provide opportunities for richer discourse and thoughtful questions as a technique to engage both fellow students and instructors. Asking questions is a way to go deeper into the subject, and going deeper



makes the subject matter more understandable. In addition, to prevent burn-out or loss of interest when studying online, students should take advantage of opportunities to work with other online students, using encouragement and feedback to stay motivated.

The effectiveness of e-learning has been demonstrated primarily by studies of higher education, government, corporate, and military environments. However, these studies have limitations, especially because of the variability in their scientific design, (Johnson, 2009). Often they have failed to define the content quality, technological characteristics, and type of specific e-learning intervention being analyzed. In addition, most have included several different instructional and delivery methodologies, which complicate the analysis. Most of these studies compared e-learning with traditional instructor-led approaches. Yet three aspects of e-learning have been consistently explored: product utility, cost-effectiveness, and learner satisfaction. Utility refers to the usefulness of the method of e-learning. Several studies outside of health care have revealed that most often e-learning is at least as good as, if not better than, traditional instructor-led methods such as lectures in contributing to demonstrated learning, (Gosh, 2008). Gibbons and Fair weather cite several studies from the pre-Internet era, including two meta analyses that compared the utility of computer-based instruction to traditional teaching methods. The studies used a variety of designs in both training and academic environments, with inconsistent results for many outcomes. Yet learners' knowledge, measured by pre-post test scores, was shown

to improve. Moreover, learners using computer-based instruction learned more efficiently and demonstrated better retention.

### **2.3 Utilization of E-Learning among Undergraduates**

E-learning is progressively being utilized by students who may not want to go to traditional brick and mortar schools due to severe allergies or other medical issues, fear of school violence and school discrimination and students whose parents would like to home school but do not feel qualified. Online schools create a safe haven for students to receive a quality education while almost completely avoiding these common problems, (Guglielmino, 2010). Online charter schools also often are not limited by location, income level or class size in the way brick and mortar charter schools are.

E-learning also has been rising as a supplement to the traditional classroom. Students with special talents or interests outside of the available curricula use e-learning to advance their skills or exceed grade restrictions. Some online institutions connect students with instructors via web conference technology to form a digital classroom. These institutions borrow many of the technologies that have popularized online courses at the university level. National private schools are also available online. These provide the benefits of e-learning to students in states where charter online schools are not available. They may also allow students greater elasticity and exemption from state testing.

One of the most relevant barriers to the effective diffusion of e-learning concerns the cultural and personal attitudes of teachers towards e-learning (2010). It is important to understand the degree to which a teacher believes that e-learning would be free of effort and enhance his or her teaching. As there is a high rate of failure of ICT initiatives for the creation of development opportunities, a solid understanding of the determinants of user acceptance of particular ICT is crucial not only for theory building but also for effective practice (Park, 2009). Research has shown that teachers' perceptions and attitudes towards technologies influenced the effective use of these technologies in teaching and learning. As schools incorporate elements of e-Learning, they must look at factors that affect the performance of students. Studies reveal that students who have prior experience of using information technology will generally be more successful in e-learning environment than those who do not (Triaca et, al.2010).

For new e-learning providers it is important then to accommodate students with little prior experience by offering help. Wepaverila (2011) asserted that students' prior experience in using information technology is important in e-learning though not mandatory. However it was necessary to ascertain the existing level of students' prior experience of using Information Technology (IT) to help schools plan, design and execute basic IT courses, and to help students interact seamlessly with e-learning environment.

For number of years, simulations have played an important role in the training activities of certain sectors, like the defense, aviation and aeronautical industries in several

countries. They were not adopted until now on a large scale as learning tools due to some factors like the cost of development and the lack of tools for developing high-quality simulations. These days we are in a different situation and simulations are being adopted in other industries and for a broad range of skills and competence development. Technology and cost barriers are continuing to shrink, opening up the potential for wider adoption of simulation technology.

Today, computer technologies, such as Macromedia Flash, have become ubiquitous and e-learning vendors with simulation-development expertise are trying to offer more industry- and topic-specific simulation templates. There are still barriers to be overcome, particularly in terms of design innovation, but computer mediated simulations are expected to gain a larger share of education and training activities. Simulations may offer advantages over handbooks and they can complement lectures, demonstrations and real world practice opportunities. The market for these kinds of learning services will probably continue to grow as simulation technologies become more sophisticated and more cost effective to build.

#### **2.4 Perception of Undergraduates Socio-demographical characteristics on E-learning**

Currently, literature on perception on the effectiveness of e-learning as an educational intervention already abounds. Aside from educational institutions, many corporations and even non-profit organizations had been adopting this modern tool. Yet, despite this preponderance of data, little inquiry was done as to the demographic factors that could determine the strength of its

differential impact on people from diverse backgrounds. This limitation is evident in this brief literature review. Given this context, the following could be reviewed as a humble attempt to contribute to the enlightenment of this subject matter.

There was a study providing a correlation between gender and level of learning (Schodt 2005). It was supposed that males, generally, have higher levels of affect than female students in classroom scenarios where instructors used no technology, whereas female students reported higher levels initial affect than male students in classroom scenarios where instructors used moderate amounts of technology (Schrodts 2005). Nonetheless, it was also observed that across genders, continued incremental use of technology would eventually lead to a point to diminishing returns, whereby technology becomes a distraction and students' initial motivation to learn course material suffers (Schrodts 2005). A recent survey of the demographic picture of e-learners also indicated that males have the upper hand, garnering around 62% (Mungania, p.3).

Older people have relatively slower perceptual learning than younger ones (Gilbert 1996). This input could be factored in the designing materials for audiences of varying ages. Mungania (2003), in his description of the e-learning users, asserted that middle-aged people account for the great part of the educational approach's audience, with 80% of the polled respondents belonging to the lower than 45 years age bracket.

An implication of student status in e-learning is that full-time students who spend more time acquainting with the system naturally have the edge over its part-time students. Other relevant variables include the student's learning profile, such as his study styles and habits preferred learning (whether he is included more on actual interactive classroom discussion or his welcome IT-based educational interventions).

There was no study that directly correlates program of study with the perception of undergraduate on the effectiveness of e-learning. However, it could be logically surmised that e-learning would be more useful in the field of IT and engineering subjects. In the corporate set-up, e-learning is finding great use in employee training (Pantazis 2001, p.21).

In his presentation, Mungania (2003) suggested that e-learning caters to people who have a relatively high degree of academic and professional education. In his backdrop of e-learners, he maintained that 37% are bachelor's degree holders, 56% continue studying while in the office, 80% have been enrolled in no less than ten online courses and that 96% are intermediate and advanced users of computer training exposure and that 87% registered warm acceptance of the modern learning approach.

In this case study, Dimitrov (1999) posited that gender differences in science achievement did not depend on ethnicity (p.445). These ideas have noteworthy value in drafting of an e-learning module, especially for science classes. The conception that racial discrimination, based on socio-economic stratification, could be extended in the realm of e-learning was never substantiated by research. However, Mungania (2003) pointed that 49% of e-learners are generally of European descent, meaning "Caucasian" or "white". To circumvent the so-called digital divide, between those who have access to the technology and those segments of society who cannot, governments of industrialized countries had enacted laws to strengthen their over-all Information and Communication technology (ICT) frameworks and with respect to e-learning, had provided for state-run schools to have these facilities (Eklund, Kay, Lynch 2003).

Information on the effect of this variable to the effectiveness of e-learning is also non-existent and that any linkages that could be thought of are, at best, assumed and lacked academic groundings. Mungania (2003) agreed that it is not a major determinant for e-learning's success.

There was an absence in the literature concerning the bond between this demographic factor and the effectiveness of e-learning. One of the finding highlighted by Mungania (2003) in his doctoral dissertation was that 76% of e-learners had participated in e-learning exercises three years prior. He found out that 34% of most e-learners did have previous e-learning know-how from a previous company or employer. One could therefore conjecture that the level of effectiveness of e-learning would rest much on how the steering and leading and leading functions would be handled by senior firm executives.

## **2.5 Student Engagement (Hours Spent Online/Offline)**

Research suggests that student academic performance may be affected by both engagement effects and learning-style effects. Carini et al (2006) found that, although in general, the relationship between engagement and performance is complex, engagement is positively correlated with student performance. Their conclusion is supported by a number of empirical studies: Rodgers and Ghosh (2001) identified that 'effort' (or engagement) levels were highly significant in determining student examination performance. Although, another study made in an e-learning context (Davies and Graff, 2005) found that online engagement had no statistically-significant impact on examination performance. Additional studies in this area have examined the issue of what determines the amount of time that a student spends on e-learning. Arbaugh (2000) argues that this will depend on the student's attitude to the perceived usefulness, and also the ease of use, of this delivery medium. It is suggested that students who spend more time on

internet-based courses tend to be the ones who take more ownership of the learning process, and as a consequence receive the greatest learning benefit (good performance as measured by grades). From this it can be inferred that we might expect to find a significant, and positive, relationship between the level of e-learning engagement and academic performance.

The ability to effectively manage learning time is an important element in of electronic learner success (Kearsley, 2000). Palloff and Pratt (1999) hinted that interacting in a Web-based course can require two to three times the amount of time investment than in a face-to-face course. Roblyer (1999) pointed that students who have difficulty managing time are more likely to achieve less in a distance course or drop out altogether. Gibson (1998) pointed out that a key construct relating to distance learners' persistence is their self-efficacy for learning at a distance and that personal perceptions of competence (self-efficacy) are related to learners' perceptions of their ability to manage time effectively.

Students who use their time efficiently are more likely to learn and/or perform better than students who do not have good time management skills. Zimmerman and Risemberg, (1997) opine that self-regulated learners know how to manage their time because they are aware of deadlines and how long it will take to complete each assignment. They prioritize learning tasks, evaluating more difficult from easier tasks in terms of the time required to complete them. They are aware of the need to evaluate how their study time is spent and to reprioritize as necessary.

The other key performance-influencing issue relates to differences in student learning styles. These may result in differences in the effectiveness of e-learning delivery methods for individual sub-groups within the student body. Within the learning-styles literature the notion that different learners have different cognitive styles has been widely examined (Klob, 2000). In addition to be



general indication, there is a considerable support in the literatures for the suggestion that there are identifiable variations in the learning styles of sub-groups within the student population.

## **2.6 Theoretical Framework**

The focus of this study is based upon the various learning styles theories of online learning, and how learners gain knowledge differently. Facilitation theory and constructivist theory are two popular learning theory concepts which are used as a representation as a taxonomy for learning (Etmer & Newby, 1993). According Eccles (1999) developing a system of best practices built around these learning theories can assist teachers in encouraging improved student preparedness and instruction presented within an online learning environment of higher education.

### **2.6.1 Constructivism Theory**

Constructivism is the theory that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When learners encounter something new, they reconcile it with previous knowledge and experience. They may change what they believe, or they may discard the new information as irrelevant. To be active creators of their knowledge however, they must be able to ask questions, explore and assess what they know. In the classroom, the constructivist view of learning means encouraging students to use active techniques such as experiments and real-world problem solving using authentic data if possible, and to create knowledge and reflect on their understanding.

Constructivism modifies the role of the teacher so that teachers help students to construct knowledge rather than reproduce a series of facts. The constructivist teacher provides tools such as problem-solving and inquiry-based learning activities like in e-learning setup so that students

can formulate and test their ideas, draw conclusions and inferences, and convey their knowledge in a collaborative learning environment. The teacher must understand the students' preexisting conceptions and guide the activities to address this knowledge and then build on it. Constructivist teachers encourage students to assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students become expert learners as they learn how to learn, with the use of computers online and/or offline. The students then have the tools necessary to become life-long learners.

The teaching-learning method in e-learning is assumed to be self-directed learning (SDL), which is supported by the educational philosophy of constructivism. According to constructivism theory, e-learning is an active information process because knowledge generation is accomplished through individual experience, maturity and interaction with one's environment. Due to this point of view, the educational philosophy of constructivism is distinguished from objectivism in that the learner is regarded as a passive recipient of information (Rovai, 2004).

Learning performance in regards to e-learning is possibly lower than a crammed educational style based on objectivist educational philosophy, with the exception of a strategic approach relating to the efforts and studies for the pleasure of the self-learner. Lee et al., (2007) point that the SDL teacher is available as an assistant and guide for learning, not as a unilateral knowledge source and messenger.

Learners take the lead in self-regulated learning for the development of a total learning process that involves problem perception, adoption, and assessment of alternatives (Lee, 2004). Learners play the same roles that the producers do by organizing or re-organizing knowledge like a consumer, by selecting knowledge and using it practically (Thatcher & Pamela, 2000).

E-learning must be considered as one of many SDL strategies. The reason is that an e-learner attends a lecture only to register the time, place, subject, and to alter the order of attending lectures. Proper monitoring of the learner is difficult in comparison with the off-line education already being used, not only because the learning progress method of evaluation is being altered, but because personal meetings with the teacher are also no longer part of the process. Therefore, it is important to manage one's ability to organize self-learning time, process information, plan data, and control data.

### **2.6.2 Facilitation Theory (The Humanist Approach)**

Learning theory developed by Carl Rogers. One of the basic premises of this theory is that learning is possible because human beings have a "natural eagerness to learn" and they are responsible for and at the center of the learning process (person-centered learning). E-learning is possible only because individuals signed up in it are self-driven and eager to learn despite their location in relation to learning institutions. The role of the teacher is to act as a facilitator- no amount of effort on the part of the teacher can guarantee success, unless the learner has a desire and predisposition to learn.

An interesting contribution of Rogers's Facilitation Theory is the notion that learning involves changing one's self-concept. Such changes may involve discovering one's strengths or weaknesses. Learners in the e-learning setup have to perceive the possibility that there is in the e-learning system for knowledge acquisition. A freshly perceived self-concept has a consolidating impact on learning in that it allows the learner to attack a target skill with confidence or with an adjusted 'updated' approach.

Implicit in the non-direct facilitative approach is the assumption that learners can find the information by themselves (teachers merely *facilitate* that process), an assumption which downplays the role of information transmission and underestimates the contribution of teaching. Such a teaching model is obviously an idealization which is rarely found in its pure form in practice.

## **2.7 Justification of the Study**

Web Based Training and its newer and more general synonymous term e-Learning are two of today's buzz-words in the academic world. Decision-makers associate with its new ways of learning that are more cost efficient than traditional learning strategies and which allow students to better control the process of learning because they can decide when, where and how fast to learn. The emergence of e-learning has enormously transformed information – handling and management in academic environments (Ani and Ahiauzu, 2008). A number of e-learning initiatives have been put in place to assist in the development training and use of electronic resources in a number of academic institutions.

These initiatives notwithstanding, some inadequacies in the development provision and utilization of electronic resources have been identified in a number of academic institutions. A number of studies have been made with a view to proffering solutions to problems encountered in the development of electronic information resources. However, little or no efforts have been recorded in the identification of perception of undergraduate students on e-learning in higher learning institutions. As the use of e-learning is becoming more and more widespread in higher education it has become increasingly important to examine what student understand about the e-learning and also the impact that this teaching style has on student. This study will therefore help

add information on the understanding of undergraduate student on the use of e-learning in tertiary institution.

## **CHAPTER THREE**

### **3.0 RESEARCH METHODOLOGY**

This Chapter presents the method and procedures used in this study to gather and analyze the data that would be collected in this study. It was presented under the following subheadings; Research Type, Population, Sample and Sampling Technique, Research Instrument, Validation of Research Instrument, Procedure for Data Collection and Data Analysis Techniques.

#### **3.1 Research Design**

This study is a descriptive research of the survey type. A researcher designed questionnaire was used to gather relevant information on the Perception of Undergraduate Students of National Open University of Nigeria on E-learning (A Case Study of Minna Study Centre).

#### **3.2 Population Size**

The population of the study is National Open University of Nigeria, Minna Study centre has about 3000 undergraduate students.

#### **3.3 Sample and Sampling Techniques**

The target population consisted of all undergraduates in National Open University of Nigeria, Minna Study Centre. 340 Undergraduate students were selected using simple random sampling for this study.

### **3.3 Research Instrument**

The main instrument of data collection in this study was questionnaires. The questionnaire consists of three sections (A and B). Section A contains respondent demographic (bio-data), Section B contain the Perception of e-learning which lead to a yes or no response.

### **3.4 Validity of Research Instrument**

To ensure the face and content validity of the questionnaire used in this study, the researcher meet two lecturers, who are lecturers from Science Educational Department, Federal University of Technology Minna, whom have vetted on the instrument. Their advice and suggestions were used to modify the items in the instrument and also prepared the final draft.

### **3.5 Method of Data Collection**

The researcher visited and distributed copies of questionnaire to the samples in National Open University of Nigeria, Minna study centre. The researcher collected back the copies of the questionnaire after it had been completed and collated for analysis.

### **3.6 Method of Data Analysis**

After collection of the data, data cleaning will be done to determine inaccurate, incomplete or unreasonable data and then improve the quality through corrections or detected errors and omissions. After cleaning, the data collected will be coded and

entered in the computer for analysis. Data analysis procedure that will be employed shall involve both quantitative and qualitative procedures. Quantitative data derived from the demographic section and other closed questions will be analyzed using descriptive and referential statistics. Qualitative data generated from the open ended questions in research instruments will be organized in themes and patterns, categorized through content analysis. The data analysis required the use of computer spreadsheet and for this reason, the statistical package for social science (SPSS) will be used.



## **CHAPTER FOUR**

### **DATA PRESENTATION, ANALYSIS AND INTERPRETATION**

#### **4.0 Introduction**

This chapter presents the data analysis techniques and interpretation of the findings of the perception of undergraduate student of National Open University of Nigeria on e-learning.

#### **4.1 Presentation and Interpretation of Data**

The data collected were analyzed using the statistical package for social science (SPSS). The data derived from the demographic section were analyzed using descriptive and referential statistics. The qualitative data generated from the open ended questions were organized in themes and patterns, categorized through content analysis. The results of the analysis are presented in tables of frequency and percentage.

##### **4.1.1 Demographics**

The data derived from section A are presented in the tables below followed by interpretation of the tables.

**Table 4.1:** Gender distribution of respondents

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	198	58.2%
Female	142	41.8%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.1 shows that out of hundred undergraduate student who responded 198 (58.2%) are male and 142 (41.8%) are female, this shows that male student partake in e-learning than the female student.

**Table 4.2:** Age of respondents

<b>Age</b>	<b>Frequency</b>	<b>Percentage</b>
15-20	12	3.5%
21-30	157	46.2%
31-40	150	44.1%
40 and above	21	6.2%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.2, it shows that 12 (3.5%) of the respondents are within the age range of 15-20, 157 (46.2%) are within the age range 21-30, 150 (44.1%) are within 31-40years old and 21 (6.2%) of the respondents age is from 40 and above. This shows that majority of the students age is within the interval 21-30 and 31-40 i.e most of the student are adult in National Open University of Nigeria, Minna Study centre.

**Table 4.3: Marital Status**

<b>Marital Status</b>	<b>Frequency</b>	<b>Percentage</b>
Single	155	45.6%
Married	183	53.8%
Divorced	2	0.6%
Widow	-	-
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.3 above shows the marital status of the respondents which state that 155 (45.6%) of the respondents are single, 183 (53.8%) of the respondents are married, and 2 (0.6%) of the respondents are divorced, none of the respondent is a widow. This shows that both married and single individuals prefer e-learning as a means of acquiring academics knowledge and majority of the students are married.

**Table 4.4: Employment Status**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Employed	221	65%
Unemployed	106	31.2%
Retired	13	3.8%
Disabled	-	-
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.4 above shows that among respondent, 221 (65%) are employed, 106 (31.2%) are unemployed, 13 (3.8%) are retired and none of the respondent is disabled. This shows

that majority of the students are employed which lead them to choose distance learning in order to keep up with their job.

**Table 4.5:** Hour spent Online by respondent doing things related to their course

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 5hours	198	58.2%
6-10hours	117	34.4%
11-15hours	13	3.8%
15-20hours	7	2.1%
20hours and above	5	1.5%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.5 above it shows that, 198 (58.2%) of the respondents spent less than 5hours online doing things related to their course, 117 (34.4%) spent 6-10hours, 13 (3.8%) spent 11-15hours, 7 (2.1%) spent 15-20hours, and 5 (1.5%) of the respondents spent above 20hours. According to the table majority of the respondent spent less than 5hours doing things related to their course of student in National Open University of Nigeria.

#### 4.1.2 Section B – Perception on E-Learning

**Table 4.6:** Is it difficult understanding the concept of e-learning

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	82	24.1%
No	258	75.9%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.6 above, it shows that 82 (24.1%) of the respondents find it difficult to understand the concept of e-learning and 258 (75.9%) of the respondents understand the concept of e-learning. This shows that most of the students in National Open University of Nigeria, Minna study center understand the concept of e-learning.

**Table 4.7:** Is it enjoyable studying online

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	286	84.1%
No	54	15.9%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.7 above shows that among all the respondents, 286 (84.1%) enjoy studying online and 54 (15.9%) of the respondents are not enjoying studying online. This shows that most of the students in National Open University of Nigeria enjoy studying online.

**Table 4.8:** Is it difficult using computer for learning

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	51	15%
No	289	85%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.8 shows that 51 (15%) of the respondents find it difficult using the computer for learning and 289 (85%) are not finding it difficult using the computer for learning. It shows that majority of the students in National Open University of Nigeria are not finding it difficult to use the computer for learning.

**Table 4.9:** Is the use of personal computer (PC) or Laptop makes learning easy

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	288	84.7%
No	52	15.3%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.8, it shows that 288 (84.7%) of the respondents agree that the use of personal computer (PC) makes learning easy while 52 (15.3%) oppose that the use of PC makes learning easy

**Table 4.10:** Is it scaring to use the computer for learning

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	55	16.2%
No	285	83.8%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.10, it shows that 55 (16.2%) of the respondents are scared of using computer for learning and 285 (83.8%) are not scared to use the computer for learning. This shows that majority of the students are not scared to use the computer for learning purpose.

**Table 4.11:** Is it easy to use personal computer or laptop in university computer laboratory

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	264	77.6%
No	76	22.4%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.11 above, it shows that 264 (77.6%) of the respondents find it easy to use personal computers or laptop in university computer laboratory and 76 (22.4%) does not find it easy to used their personal computer in the university computer laboratory.

**Table 4.12:** Is it easy to access personal computer (PC) or Laptop in the university classroom

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	255	75%
No	85	25%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.12 shows that 255 (75%) of the respondents find it easy to access their personal computer in the university classroom and 85 (25%) are not able to access their personal computers in the university classroom. This shows that the university allows the students to access their computer in the university classroom.

**Table 4.13:** Is it easy to access personal computer (PC) or Laptop at home

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	286	84.1%
No	54	15.9%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.13, it shows that 286 (84.1%) of the respondent find it easy to access personal computer or laptop at home and 54 (15.9%) are not able to access personal computer at home.



**Table 4.14:** Is the internet facilities accessible for educational use at home and university

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	279	82.1%
No	61	17.9%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.14 above shows that 279 (82.1%) of the respondents have access to internet facilities and use it for educational purpose at home and university and 61 (17.9%) of the respondent does not find it easy to use the internet facilities for educational purpose at home and university.

**Table 4.15:** Electricity is not a problem as regards access to ICT or internet tools

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	76	22.4%
No	264	77.6%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.15, 76 (22.3%) of the respondents agree that electricity is not a problem as regards access to ICT or internet tools and 264 (77.6%) of the respondents disagree that electricity is not a problem as regard access to ICT or internet tools. This shows that electricity is one of the problem as regard access to ICT.

**Table 4.16:** Is it easy to keep up with the reading required for on-line course

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	180	52.9%
No	160	47.1%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.16, it shows that 180 (52.9%) of the respondent find it easy to keep up with reading required for on-line course and 160 (47.1%) does not find it easy to keep up with the reading required for on-line course.

**Table 4.17:** Are the material required for e-learning available for learners

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	259	76.8%
No	79	23.2%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.17 above shows that 259 (76.8%) of the respondents said the materials required for e-learning are available and 79 (23.2%) of respondents said the materials required for e-learning are not available to learners. This shows that majority of the students are able to get materials required for e-learning in the school.

**Table 4.18:** Is the use of e-mail for educational purpose on the internet an easy means to communicate with tutor

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	272	80%
No	68	20%
<b>Total</b>	<b>340</b>	<b>100%</b>

From table 4.18 above, it shows that 272 (80%) of the respondents communicate with their tutors through email for educational purpose and 68 (20%) of the respondents find it difficult to communicate with their tutor by e-mail for educational purpose. This shows that most of the student communicate with their tutor through e-mail.

**Table 4.19:** Is it easy to stay focus on task and not distracted by other internet activities

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	79	23.2%
No	261	76.8
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.19 shows that 79 (23.2%) of the respondents find it difficult to stay focus on task and distracted by other internet activities and 261 (76.8%) of the respondent find it easy to stay focus and distracted by other internet activities when learning online.

**Table 4.20:** Is it easy to maintain self-discipline while using the internet

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	158	46.5%
No	182	53.5%
<b>Total</b>	<b>340</b>	<b>100%</b>

Table 4.20 shows that 158 (46.5%) of the respondent find it easy to maintain self-discipline while using the internet and 182 (53.5%) are not finding it easy to maintain self-discipline while using the internet.

**Table 4.21:** Can learning electronically improve course performance

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	289	85%
No	51	15%
<b>Total</b>	<b>340</b>	<b>100%</b>

From the table above, it shows that 289 (85%) of the respondents agree that learning electronically improves course performance and 51 (15%) of the respondents are against the fact that leaning electronically improve course performance. This shows that e-learning improves the course performance of most student in National Open University of Nigeria, Minna Study center.

## 4.2 Discussion of Findings

This research work was set out to analyze the perception of undergraduate student of National Open University of Nigeria, Minna study center on e-learning, as they are one of the higher institute that uses online base (e-learning) type of learning. Perceptions were sought with regards to how students understand e-learning, their views on it uses and how they think it can help them to acquire their educational qualifications. The study also covers how respondents are able to use or had experienced using the various technologies and tools that enable students to successfully participate in e-learning. The perception also covers how student feels about e-learning, whether or not they like the idea of e-learning and to assume from the finding their decision to pursue further education through e-learning or not. The perceptions from the males and the female respondents on e-learning were also sought and compared with each other. From all the data gathered, it clearly shows that majority of the student in National Open university are male and most of the students are within the age range of 21-40, which shows that most of the students are adult. 53.8% of the students are married and 65% are employed. Also Majority of the student in National Open University spent less than 5hours online doing things related to their course. In this chapter, therefore, discussion is made of the finding to give response to the following three research questions;

- i. What is the perception of undergraduate student on e-learning?
- ii. What is the perception of undergraduate socio-demographic characteristics on e-learning?
- iii. What is the perception of undergraduate on the number of hours spent online/offline (time management) on e-learning?

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.0 Introduction**

This chapter summarizes the whole research process. A brief summary of the whole study is given. It also provides a summary of the main findings of the study, conclusions of the study and recommendations.

#### **5.1 Summary of Findings**

The data obtained from the questionnaire is a source of information from undergraduate students from National Open University of Nigeria, where their reaction and opinion was made known to the researcher about the Perception of undergraduate student of National Open University of Nigeria on e-learning.

From the findings, the results gathered revealed the perception of undergraduate students of National Open University of Nigeria, Minna study center on e-learning and they utilize the resources from the school for learning purpose.

#### **5.2 Conclusion**

This research work was carried out to get the perception student have about e-learning. Perception were sought from undergraduate student of National Open University of Nigeria, Minna Study centre.

The main finding of this research is that e-learning is perceived to be useful. The usefulness includes people being able to study from anywhere in the country without necessarily relocating. The ability to study from anywhere in the world becomes an advantage e-learning provide over any other mode of learning. This research further shows that students believe that when studying through e-learning there is the chance to experience substantially similar or an alternative means being educated, as done in physical classroom setting.

Varied attitudes towards e-learning have been shown in this study. These includes students liking the idea of e-learning and also considering it to be an innovative concept which needs to be encouraged and enhanced. The research also shows that most of the respondent's view e-learning as an appropriate medium to study courses from distance.

It is also discovered in this research that e-learning platform and tools are perceived to be easy to use. The study further concludes that students have very good ability to make use of the various tools and technologies that enable one to participate in e-learning with ease.

### **5.3 Recommendations**

Based on the finding in this study, the following recommendations are made:

1. Internet facilities should be provided by the university authority for all undergraduates.
2. University lecturer's should motivate the student on the use of e-learning by giving them assignment through their e-mail and receive it back via e-mail.
3. Electricity problem should be addressed for effective use of instructional technologies.

4. Authorities in the university should make internet facilities available all the time for the student so as to access the online document.
5. University authority should organize workshop and seminar for the student constantly in order to follow the trend in development of ICT



## REFERENCES

- Al, Kateeb. W. (2003). Mobile school: Face-to-face learning interface for Iraqi students in Malaysia. Fourth International Conference on Digital Information and Communication Technology and it's Applications (DICTAP) - ISBN: 978-1-47993723-3.
- Ani, Okon E. and Ahiauzu, B. (2008). Towards effective development of electronic information resources in Nigerian University Libraries. *Library Management* 29(6/7): 504 – 514.
- Arbaugh, J. B. (2000). How Classroom Environment and Student Engagement Affect Learning in Internet-based MBA Courses. *Business Communication Quarterly*, 63(4), 9-26.
- Campea V. and Hyggins (2011).Scaffolding student learning in open, distance and flexible learning environments.The Global E-Journal of Open and Flexible Learning (GEJOFEL). 1(1) 84-91. Published by the Madhya Pradesh Bhoj (Open) University, Red Cross Building, Shivaji Nagar, hopal 462016 India, rbubpl@mp.nic.in or mpbou@vsnl.com.
- Carini, R.M., Kuh, J.D. & Klein, S.P. (2006). Student Engagement and Student Learning: Testing the Linkages. *Research in Higher Education*, 47, 1-32.
- Chimombo, J.P.G. (2005): Issues in basic education in developing countries: an exploration of policy options for improved delivery. CICE Hiroshima University, Journal of International Cooperation in Education, Vol. 8 (1), pp. 129-152.
- Datuk, A. and Alliy C , (2009). Is your organization ready for e-learning? Seven keyquestions you need to answer. Communication Project Magazine, 3(1), Retrieved July 25, 2009, from, <http://www.comproj.com/Minton.htm>.
- Denga, D. I. (1993), Education at a glance: from cradle to tomb. Calabar: Rapid Educational Publishers.
- Davies, D., & Graff, M. (2005). Performance in e-learning: online participation and student grades. *British Journal of Education Technology*, 36, 657-663.
- Dowling C., Kwok-Wing Lai (2010) Information and Communication technology Md the Teacher of the Future, International Federation for Information Processing Published by Springer 192.
- Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children: When School Is Out*, (9), 30-44.

Etmer, P., & Newby, T., (1993). Behaviorism, cognitivism, and constructivism: Comparing critical features from an instructional perspective. *Performance Improvement Quarterly*, 6(4), pp. 50-70. *Evolution*, Information Science Publishing

Federal Republic of Nigeria (2004). *National Policy on Education*. Abuja

Gibson, C. C. (1998). The distance learner's academic self-concept. In C. C. Gibson (Ed.) *Distance learners in higher education: institutional responses for quality outcomes* (p. 65-76). Madison, WI.: Atwood Publishing.

Ghosh, P.P. (2008) *Modern Educational Technologies*, Aavishkar Publishers, distributors. Jaipur, Rajasthan

Guglielmino, P. J., & Guglielmino, L. M. (2010). Are your learners ready for e-learning? In G. M. Piskurich (Ed.), *The AMA handbook of e-learning: effective design, implementation, and technology solutions*, New York: Johnson, G.M. (2005). Student Alienation, Academic Achievement, and WebCT use. *Educational Technology and Society*, 8, 179-189.

Jegede, O. (2006). *A profile of National Open University of Nigeria, Lagos*: Regent Ltd.

Kearsley, G. (2000). *Online education: learning and teaching in cyberspace*. Belmont, CA.: Wadsworth.

Kearsley (2009) *Online learning today: Strategies that work*, San Francisco, CA: BarrettKoehler.

Klob, D.A. (2000). *Facilitator's Guide to Learning*. Boston: Hay/McBer Training Resources Group.

Lee, J. K., 2004. *The effect of e-Learning environmental quality and self-efficacy on effectiveness of an e-Learning*. Business Administration Doctoral Dissertation, Daegu University.

Lockwood, Fred and Gooley, Anne. (2001) *Innovation in open and distance learning: Successful development of online and web-based learning*. London: Kogan Page Ltd.

Maier, R. (2007): *Knowledge management systems*. 3rd Edition, Springer, Berlin.No.8/9, pp. 506-516. Perth, Western Australia.

Odhiambo S.O., (2013), *The Impact of E-Learning On Academic Performance: A Case Study of Group Learning Sets*.

Palloff, R. M., and Pratt, K. (1999). *Building Learning Communities in Cyberspace: Effective strategies for the online classroom*. San Francisco: Jossey-Bass.

- Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, 12, 150–162.
- Peters, F. (2006). National Open University of Nigeria Student's Handbook Lagos: Regent Ltd.
- Picciano (2010). Designing instruction for e-learning. In M. G. Moore & B. G. Anderson (Eds.), *Handbook of Distance Education* (pp 349-365), London, UK: Lawrence Earlbaum Associates, Publishers.
- Roblyer, M. D. (1999). Is Choice Important in Distance Learning? A study of student motives for taking Internet-based courses at the high school and community college levels. *Journal of Research on Computing Education*, 32(1), 157 – 171.
- Rodgers, T., & Ghosh, D. (2001). Measuring the determinants of quality in UK higher education: A multinomial logit approach. *Quality Assurance in Education*, 9, 121-126.
- Stephenson, John, (2001). *Teaching and learning online: Pedagogies for new technologies*. London: Kogan Page Ltd.
- Thatcher, J. B., and Pamela, L. P., 2002. An empirical examination of individual traits as antecedents to computer anxiety and computer self-efficacy. *MIS Quarterly*, Vol. 26.
- Triaca, B and Tomei G . (2010). Self-beliefs and school success: self-efficacy, self-concept, and school achievement. In R. Riding & S. Rayner (Eds.), *perception* (pp. 239-266). London: Ablex Publishing.
- Tsai, C.-C. and Lin (2009). Conceptions of learning versus conceptions of web-based learning: The differences revealed by college students. *Computers & Education*, 53, 1092-1103.
- Tsai, M.-J., & Tsai, C.-C. (2013). Information searching strategies in web-based Science learning: the role of Internet self-efficacy. *Innovations in Education and Teaching International*, 40, 43–50.
- Waktin H.I (2011). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior*, 22, 816–829.

Wepaverila (2011).Is your organization ready for e-learning? Seven key questions you need to answer. Communication Project Magazine, 3(1), Retrieved July25, 2005, from, <http://www.comproj.com/Minton.htm>.

Zuleika F.H. (2015). “Impact of E- learning on student learning and employability – A study in India”.

**APPENDIX**

**FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE  
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION  
DEPARTMENT OF SCIENCE EDUCATION**

**QUESTIONNAIRE**

Dear Respondent,

This is a survey to determine the Perception of Undergraduate Mathematics Students of National Open University of Nigeria on E-learning, while responding to the item in the questionnaire please ensure that you tick (✓) the option that truly represent your ability or opinions. The data obtained through the questionnaire will be used for research purpose only.

**Section A. Demographics.**

Please mark (✓) the option for each of the statement

1. Gender       Male       Female
2. Age       15-20       21-30       31-40  
 40 and above
3. Marital Status:       Single       Married       Divorced  
 Widow
4. Employment Status:       Employed       Unemployed       Retired  
 Disabled (Unable to work)
5. On average how many hour did you spend on online doing things related to your course  
 Less than 5 hour       6-10hours       11-15 hours  
 15-20 hours       above 20 hours.

**Section A:** Perception of e-learning (Please mark the option for each of the statement)

S/N	Item	Yes	No
1	Is it difficult understanding the concept of e-learning		
2	Is it enjoyable studying online		
3	Is it difficult using computer for learning		
4	Is the use of personal computer (PC) or Laptop makes learning easy		
5	Is it scaring to use the computer for learning		
6	Is it easy to use personal computer or laptop in university computer laboratory		
7	Is it easy to access personal computer (PC) or laptop in the university classroom		
8	Is it easy to access personal computer (PC) or laptop at home		
9	Is the internet facilities accessible for educational use at home and university		
10	Electricity is not a problem as regards access to ICT or internet tools		
11	Is it easy to keep up with the reading required for on-line courses		
12	Is it easy to find time to complete on-line courses		
13	Are the material require for e-learning available for learners		
14	Is the use of email for educational purpose on the internet an easy means to communicate with tutor		
15	Is it easy to stay focus on task and not distracted by other internet activities		
16	Is it easy to maintain self-discipline while using the internet		
17	Can learning electronically improve course performance		