

**A SOCIOLOGICAL ANALYSIS OF FACTORS  
INFLUENCING THE USE OF EDUCATIONAL  
TECHNOLOGY IN SELECTED UNIVERSITIES IN  
OGUN STATE, NIGERIA**

**BY**

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### **CERTIFICATION**

We certify that the thesis titled “A Sociological Analysis of Factors Influencing the Use of Educational Technology in Selected Universities in Ogun State, Nigeria” is an original work carried out by NICHOLAS-OMOREGBE, Olanike Sharon, (13PBG00586), in the Department of Sociology, College of Business and Social Sciences, Covenant University, Ota, Ogun State, Nigeria, under the supervision of Professor Alaba Simpson and Dr. Idowu Chiazor. We have examined and found the work acceptable for the award of a degree of Doctor of Philosophy in Sociology.

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## **DEDICATION**

I dedicate the totality of this research work without any reservation to my Almighty Father and God; indeed you are real, too faithful to fail. Thank You oh my Father for giving us Your Son (Jesus Christ) and leaving Your Spirit (Holy Spirit) with us till Your work on earth is done.

Who is like unto Thee my Father, King, Saviour, Redeemer, the lover of my soul, the One who has helped me to complete this research work; TO YOU ALONE BE ALL THE PRAISE IN JESUS NAME – AMEN.

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## ABSTRACT

The integration of technology into the learning process has become critical in contemporary times; this is because virtually every segment of society has been influenced by technology. A comprehension of the factors of the use of technology ought to assist in ensuring the effective utilisation of the facilities in organizations. This usage is a necessary condition for ensuring output efficiency from investments in technology. Technology usage and acceptance is a dynamic area of research in which several models and theories have been propounded to understand the drivers of technology integration, adoption and usage. However, the factors of Power (electricity) and Technology Culturation that are peculiar to developing nations are missing in these models. Consequently, this study was undertaken with the aim of investigating factors that influence Educational Technology usage in selected universities in Ogun State, Nigeria. Drawing from the Social Learning Theory (SLT) and Unified Theory of Acceptance and Use of Technology (UTAUT) model, and two other key factors/variables which are Technology Culturation and Power, a conceptual framework was developed to explain predictors of educational technology usage in universities in Ogun State and by extension Nigeria and other developing nations. The study used regression analysis, correlation coefficient and descriptive statistics to examine the pattern of inter-correlation among the constructs as well as the level of significance. Cross-sectional Survey research method of 800 respondents who were undergraduate students from three selected universities in Ogun State, Nigeria named University A, University B and University C was used. Five research questions, objectives and hypotheses were put forward. These centered around six major constructs (factors); Performance Expectancy, Social Influence, Attitude, Skill, Technology Culturation and Power. The geographical scope of the study was limited to undergraduate students, lecturers and Directors of ICT Centres of the selected universities, from which samples were drawn through the purposive sampling technique. The findings reveal that attitude, skill, social influence, performance expectancy, technology culturation and power are strong determinants of educational technology usage and that using educational technology tools would enhance learning. The work recommends that Nigerian government should explore renewable energy (power) sources such as solar, wind, etc. as alternative ways out of the power problems in Nigeria. In other words, government should invest massively in power generation; Tertiary Institutions in developing nations should have their own independent power projects as backup plans in case of power outages in order to ensure sustainable technology utilisation in their respective institutions. Children should be exposed early to the use of basic technologies by their parents/wards and schools (Technology Culturation) with adequate monitoring. The National Universities Commission should drive educational technology usage in Nigerian universities. There should be regular training and re-training of students and lecturers alike on the use of e-learning facilities and tools. The model derived in this study which combines some SLT and UTAUT factors and incorporates Power and Technology Culturation factors, no doubt, contributes significantly to the body of literature in the area of Sociology of Education and Sociology of Technology.

**Keywords:** educational technology, SLT, UTAUT, technology culturation, power, Nigeria.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Technology can be defined as the methodology or the knowledge of better and more effective applications of human sciences. It consists of the tools with which we deliver content and implement practices in better ways (Harris & Hofer, 2011). Technology is playing a huge role in the way we learn particularly in schools and universities such that the approach, method and form of learning have now globally turned out to be very dynamic (Omeruo, 2013). Educational technology comprises whichever tool, electronic or mechanical equipment or device which could be used to assist students achieve stated learning goals (Davies, Sprague & New, 2008b). Educational technology is the modern times move and a future trend. According to Randall (2011), the reasons for the utilisation of educational technologies could comprise saving of time and improving the effectiveness of students' learning efforts (Kazley, Annan, Carson, Freeland, Hodge, Seif, & Zoller, 2013).

From the global perspective, since the turn of the century, even from the time of industrial revolution in Europe and the U.S., there has been an explosion of technological changes generally (in transportation, communication, textile industries and education). Before the end of the 20<sup>th</sup> century, technological changes that appeared to have aided learning centred largely on white board, markers and others. However, at the turn of the 21<sup>st</sup> century, the use of laptops, palm tops, projectors and others came as technological aids for learning. Today, the use of technology tools for teaching and learning is becoming prevalent in the educational system (Deitch, 2001).

The integration of technology into the learning process has become critical in contemporary times. This is because virtually every segment of society has been influenced by technology (Fouts, 2000). Corroborating Fout, Koç (2005) argued that technology is really having an impact on every aspect of modern life. Technology can be said to be very profound in its established form in advanced countries, with its tentacles spreading at an alarming rate across the world (Simpson & Ikhu-Omoregbe, 2007). The influence of information technology on virtually every aspect of society across the global terrain is specifically reflected in the educational domain of societies. Therefore, schools which represent society in miniature forms must be a part of the social changes brought about by the effect of information technology and research should proceed with the assumption that technology is and will continue to be a growing part of the educational system (Parsons, 1961; Durkheim, 1961; Fouts, 2000).

According to Dockstader (1999), technology integration in education means using technology tools efficiently and effectively in the overall content areas so as to enable students apply computer as well as technology skills to learning and problem-solving. Liu (2011) said that the use of technology can improve student learning. According to Fouts (2000), it has been revealed that technology integration into learning programmes could help in creating the right learning environments where the students are further inspired to attend, have a better opportunity of communication, collaboration and have greater likelihoods of using higher order thinking and problem-solving skills. Technology could be used as a cognitive tool in the classroom for effective teaching and learning (Bruce & Levin, 2001; Bransford, Brown & Cocking, 2000). Therefore, teachers need to go beyond the traditional view of teaching (like the use of chalkboard and chalks) as being the only means of the delivery of information. Educational institutions are investing in technologies envisioned to offer learning values to students. However, the integration of particular forms of technology into educational curriculum will be a mirage if students do not accept and use the technology (Akbar, 2013). Different kinds of technology that are



used for learning are E-learning tools, Social Media, Multimedia, and others (Bolotaeva & Cata, 2010; Jenkins, 2006; Livingstone & Brake, 2010).

There is the recognition that technology shapes society in certain ways and that include social practices like learning (Oliver, 2011 citing Jones, 2001). Learning is an essential part of the socialisation process which takes place in the schools (Gracey, 1975). Haralambos & Holborn (2008) expressed the opinion that the modern industrial society is more and more on achievement and in this context, academic achievement. Citing Barone (2003), Merwe maintained that the use of technology on campus is ultimately for academic teaching and learning decisions.

Within the purview of information technology, e-learning has come to take a very dynamic position in educational institutions. E-learning is an extremely significant subsection of educational technology (Moore, Dickson-Deane & Galyen, 2011). A technological uprising is now taking place in institutions of higher learning globally due to the speedy growth of e-learning (Sihar, Aziz & Suleiman, 2011). E-learning (or eLearning) is the use of electronic educational technology in learning and teaching to enhance and support the process (Oye, Salleh & Lahad, 2011). It is entirely about learning with the use of technologies, such as computer systems as well as other modern day tools (Ahmad, 2012). E-learning brings about effective teaching and the implementation of curriculum in the computer age (Ajadi, Salawu & Adeoye, 2008). E-Learning tools and facilities include Interactive White/Smart Boards, Moodle, Blackboard, Electronic Boards, Multimedia projectors, overhead projectors and others.

An understanding of technology usage is becoming of growing interest to researchers. Also, it is becoming of increasing importance as technology usage turns out to be more prevalent. A comprehension of the factors of the use of technology ought to assist in ensuring the effective utilisation of IT facilities in organisations. This usage is a necessary condition for ensuring output efficiency from investments on technology (Taylor & Todd, 1995; Mathieson, 1991). Technology usage and

acceptance is a dynamic area of research in which several models and theories have been propounded to understand the drivers of technology integration and usage (Lin, Lu & Liu, 2013). The Unified Theory of Acceptance and Use of Technology (UTAUT) and Social Learning Theory (SLT) propounded by Venkatesh, Morris, Davis and Davis (2003) and Bandura (1989) respectively are prominent theories that can be used in this respect. The UTAUT model is made up of ten constructs namely Performance Expectancy, Social Influence, Facilitating Conditions, Behavioural Intention, Use Behaviour, Gender, Age, Experience and Voluntariness of Use. While the social learning theory is made up of nine constructs, namely: Attitude, Knowledge, Expectations, Practice, Self-Efficacy, Skill, Social Norms, Access in Community, and Influence on Others. It is against this background that this research seeks to investigate the factors that influence the use of educational technology, using e-learning tools and facilities as bases for its measurement in selected universities in Ogun State, Nigeria.

## **1.2 Statement of the Research Problem**

Higher institutions of learning in developed nations are largely known to have integrated educational technology into their learning processes because the use of technology for learning has the potential to improve the effectiveness of students' learning efforts and enhance learning (Fouts, 2000; Randall, 2011; Liu, 2011; Alkhateeb & Aljawarneh, n.d.; Edewor, Imhonopi & Urim, 2014). Also, the increasing growth in Nigeria's population with the attendant growing demand for education at all levels makes learning with technology imperative (Adu, Eze, Salako, & Nyangechi, 2013). However, despite the many benefits of the use of educational technology (e-learning tools and facilities), a large number of individuals in higher institutions of learning in the developing nations are still far behind in its usage. According to Okojie, Olinzock & Okojie-Boulder (2011), the problem of integrating technology which affects its usage for learning has become a recurring one. Some of these problems include lack of access to ICT tools/resources, non-availability of internet services, inadequate technology proficiency, among others (Tapscott, 2000; Subramony, 2011). Also, the attitudes of individuals toward technology usage have

been found to be a serious social issue (Kafyulilo, 2011, Okojie, Olinzock & Okojie-Boulder, 2011).

Social Learning Theory (SLT) has been used in diverse contexts such as crime, health, education and so on. For instance, the work of Akers (1973) is directed towards specific forms of deviant behaviour (crime, delinquency, drug addiction, suicide, etc.). Similarly, Burgess and Akers (1966) as well as Sutherland and Cressey (1974) viewed human behaviour as resulting from social forces. In the area of health, Okuboyejo, Mbarika, & Omoregbe (2014) used SLT to examine social factors that influence medication non-adherence. Okuboyejo (2013) also used the Self-Efficacy factor of SLT to examine Mobile Technology and outpatient's adherence in Nigeria; while Braungart & Braungart (2007) applied Learning Theories to healthcare practice. In the area of education, Engler (2009) used SLT to examine the behaviour of students in the classroom; Fehrenbach (2013) looked at how SLT can be applied to the classroom while El-Gayar & Moran (2006), Chiu & Wang (2008), and Luarn & Lin (2005) conveyed Self-Efficacy factor of SLT as directly affecting the actual use of new technologies and intention of using information systems. Additionally, Schreiner (2015) has used SLT to look at how employees' behaviour can be improved in work organisations. However, none of these works used Attitude and Skill factors to measure the use of educational technology and particularly in the selected schools for this study.

In a similar vein, UTAUT propounded by Venkatesh *et al* (2003) has been popularly used in diverse contexts by diverse authors. For example, Attuquayefio (2014) used the UTAUT model to analyse students' ICT adoption in Ghana; Chiemeké & Ewwiekpaefe (2011) used UTAUT to analyse the Nigerian factors in e-commerce adoption while Young, Sunyoung, Eui, Lim & Choi (2014) have used UTAUT to examine the factors influencing the actual use of Mobile Learning. The discourse on the factors affecting the usage of technology in learning is not conclusive in the sense that diverse factors have been identified in various contexts. It therefore became vital to analyse how the combination of selected factors of SLT namely Attitude and Skill

and UTAUT factors namely Social Influence and Performance Expectancy affect the use of educational technology in universities in Ogun State, Nigeria.

Furthermore, in terms of methods, although the Unified Theory of Acceptance and Use of Technology model and Social Learning Theory have been widely used to examine technology usage, acceptance, integration and adoption, however, Power (Electricity) is not considered in any of these two theories because it is not a critical issue in the developed world. Additionally, people who grew up in developed nations are already acculturated to the use of technology (Technology Culturation). Therefore, this study attempted to fill this gap by investigating the role that Power (Electricity) and Technology Culturation play in the utilisation of educational technology in selected schools in Nigeria being a developing country.

Lastly, more pronounced in Nigeria is the dearth in literature on factors that influence the use of educational technology (eLearning tools and facilities) especially one that is based on UTAUT and SLT theories and based on the researcher's study area. This therefore became another compelling issue for carrying out this study.

## **1.2 Research Questions**

Based on the background and the statement of the problem, the following research questions became imperative:

1. To what extent do UTAUT factors (Social Influence and Performance Expectancy) affect the use of Educational technology?
2. To what extent do SLT factors (Skill and Attitude) influence the use of educational technology?
3. To what extent does Power supply (Electricity) affect the use of educational technology?
4. Does Technology Culturation influence the use of educational technology?
5. Does the use of educational technology tools enhance learning?

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

This study investigated the factors that influence the use of educational technology in selected universities in Ogun State, Nigeria.

The specific objectives of this study are therefore to:

1. examine the effect of UTAUT factors (Social Influence and Performance Expectancy) on the use of Educational technology;
2. investigate how SLT factors (Skill and attitude) affect educational technology usage;
3. evaluate the relationship between Power (Electricity) supply and the use of educational technology;
4. examine the effect of Technology Culturation on the use of educational technology; and
5. examine the place of educational technology usage on learning outcomes.

### **1.4 Research Hypotheses**

In order to achieve the objectives of this study, the following hypotheses stated in alternative forms were tested:

1. H<sub>1</sub>-There is a significant relationship between UTAUT factors of (Social Influence and Performance Expectancy) and the use of Educational technology.
2. H<sub>1</sub>-There is a significant relationship between SLT factors (Skill and Attitude to technology) and the use of educational technology.
3. H<sub>1</sub>-There is a significant relationship between Power (Electricity) supply and the use of educational technology.
4. H<sub>1</sub>-There is a significant relationship between Technology Culturation and the use of educational technology.
5. H<sub>1</sub>-There is a significant relationship between the use of educational technology and effective learning outcomes.

### **1.5 Scope of the Study**

This research focused on the study of factors that influence the usage of educational technology in selected universities in Ogun State, Nigeria. The universities consisted of a private, a federal, and a state university named as University A, University B and University C in this study. Appropriate samples were drawn from undergraduate students, lecturers, and Directors of ICT Centres of the selected institutions.

E-learning tools and facilities (such as Moodle, Projectors, Blackboard, Interactive Whiteboards/Smart-boards, and others) were used as the educational technology tools for this study.

Additionally, Social Learning Theory (SLT) and Unified Theory of Acceptance and Use of Technology (UTAUT) model were used as theories on which this study is anchored.

### **1.6 Significance of the Study**

Although there is a growing adoption and use of technology tools across Nigerian universities, there are no adequate empirical data (evidence) to validate the factors that influence this practice. This study therefore became significant in the following ways:

This study significantly provides empirical evidence on the factors that affect the utilisation of educational technology in the learning process in Nigeria. The study is within the purview of Sociology of Education and Sociology of Technology. Therefore, researchers would find useful information from the result generated in advancing subsequent researches in related areas.

In addition, the study serves as a reference that would guide other universities on the need to implement same. Also, this study sets a baseline for future research on educational technology integration and usage in higher institutions in Nigeria.

The framework provided in this study is relevant in enhancing the understanding and explanation of technology usage in education contexts in Nigeria and other developing nations.

Furthermore, the study is relevant to school managers in determining the choice of educational technology to invest in for their institutions. Lastly, the result obtained from the study is of benefit to Educational planners/policy makers when formulating state and national educational Policies and goals.

### **1.7 Operational Definition of Terms**

Below are the definitions of some concepts used in this study.

**Behavioural Intention (BI):** This is an individual's determination to act in a certain way. It could be viewed as a person's perceived possibility that he or she will likely take part in certain behaviour or an individual's deliberate or conscious intention to involve in certain behaviour. In this context, it is the deliberate determination of a person to be engaged in technology usage.

**Blackboard:** This is e-learning software that is commercially developed, which implies that the software is not free unlike Moodle. It is likewise well-known as a Course Management System (CMS), or Learning Management System (LMS). Blackboard makes use of the word "modules" inside the page to be moved about and set by the user as preferred. Blackboard provides instant messaging as well as lecture audio-visual recording functionality as part of the usual package. It can be accessed from mobiles and via Facebook.

**Computer-mediated communication (CMC):** This is any human communication that happens as a result of the utilisation of two or more electronic devices. However, it traditionally refers to the communications that takes place through computer-mediated formats like email, instant messaging, chat rooms, text messaging, and others.

**Educational Technology Integration:** Technology integration in education means using technology tools efficiently and effectively in the overall content areas so as to enable students apply computer as well as technology skills to learning and problem-solving.

**E-Learning:** E-learning is the use of electronic technology in learning and teaching. It is entirely about learning with the use of technologies so as to enhance the process. E-learning tools will be used for measuring the use of educational technology tools in this study.

**Instruction:** This is the act of teaching. Instruction is important for education because it is the transfer of learning from one person to another. Whenever you are given directions or you are being told how to do a thing, you are getting instruction. The word refers to the act of teaching and the job of a teacher. Effective classroom instruction is offered in an orderly and well-structured way.

**Interactive Whiteboard (IWB):** This is a big interactive display which is connected onto a computer. The desktop of a computer is projected to the surface of the board with a projector where users could control the computer with the use of a stylus, finger, pen, or some other device. The interactive whiteboard is usually fixed either on floor stand or a wall. It is often used in diverse settings including all levels of classroom education, in-training rooms for professional sports coaching, work groups and corporate board rooms, in broadcasting studios, among others. In some classrooms, the traditional whiteboards, flipcharts and video/media systems like DVD players as well as TV combination have been exchanged with the interactive whiteboards.

**Moodle:** MOODLE is an abbreviation for *Modular Object-Oriented Dynamic Learning Environment*. Its purpose is to create an environment that enables for collaborative interaction among students either on its own or complementing traditional classroom instruction. Moodle could as well denote a Virtual Learning Environment (VLE), or Learning Management System (LMS) or Course



Management System (CMS). Moodle is used to host online/offline classes. The software is free.

**Pedagogy:** This is the art, work or function of a teacher. It is often used interchangeably with the word teaching. It could also be viewed as the study of teaching methods.

**Performance Expectancy (PE):** This is the extent to which a person believes that the use of a particular technology will aid him or her accomplish gains in task performance. In this context, it is the extent to which a student trusts that the use of a technology will assist him or her to achieve the diverse academic assignments in the university.

**Power:** This is the energy that is generated through electrical, mechanical or further means and used for operating a machine or device. Power, electricity and energy are often used interchangeably.

**Socialization:** This is a process whereby persons acquire the knowledge, language, social skills, as well as values that allow them conform and integrate into a group or community. Simply put, it is a way of becoming a member of a society.

**Social Influence (SI):** Social influence is the degree to which a person recognises that important others (such as friends, colleagues, parents, teachers, leaders, and others) believe that he or she ought to use a particular technology. In this context, social influence measures the extent to which a student observes that important others (such as superiors, faculty as well as peers of students) believe that he or she should use technology.

**Social learning:** Social learning is an active social involvement in the practices of a community; it emphasises the active interaction amongst people and the environment in the construction of meaning and identity. As a process, social learning must:

- show that an alteration in comprehension has taken place in the persons involved;
- show that this alteration goes further than the person and becomes situated in the broader social units or communities of practice; and also
- takes place via social interactions and processes between the actors in a social network.

**Society:** This can be defined as a group of people involved in persistent social interaction, or a large social grouping sharing the same geographical or social territory, typically subject to the same political authority and dominant cultural expectations.

**Technology Culturation (TC):** This concept represents a person's prior exposure to relative technologies like television, cable satellites, video games, radio, amongst others. It assumes that in a given society, this can affect an individual's acceptance of other ICTs or other advanced technologies subsequently.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Preamble**

This chapter provides a review of relevant literature on factors influencing educational technology utilisation. Specifically, it looks at educational technology and society and provides the background history of technology utilisation in the Nigerian education system. It also discusses the concepts of Educational technology and instructional technology and further describes the goals of educational technology. The advantages of educational technology utilisation and levels of technology adoption are presented and the social factors influencing educational technology utilisation are also discussed. Additionally, it attempts to explain the concepts of e-learning and technology culture amongst others. Lastly, the chapter addresses the theoretical framework adopted for this study as well as the conceptual framework.

##### **2.1.2 Educational Technology and Society**

Education is the key to Africa's future and technology is expected to enable it achieve its goals. When the pace of technological change is moving at an ever unstable and alarming speed, gradual change in a society (in line with the Structural Functionalist Theory) begins to look not merely outdated but dangerous. Technology is generally driving change in Africa and fuelling the economic growth of African economies. There is now an urgent need for radical change (in line with the Conflict Theory ideology) and e-learning has to be put at the fore-front of that radical change that Africa needs (Elletson & Burgess, 2015).

Jal (2015) noted that the biggest battle young people need to fight now is how to educate themselves and technology is the biggest aid to that process. He also asserted that education is the first step towards peaceful societies. Sociologists (classical and contemporary), define education as an institution which serves society by socializing people into it through a formalized, standardized procedure (Gracey, 1975). Durkheim (1956) opines that education comprised a methodical socialization of the younger generation. Haralambos & Holborn (2008, P.599) asserted that “education is one aspect of socialization: it involves the acquisition of knowledge and the learning of skills”. Learning is a social process (Brown, 2001). The eruption of Information and Communication Technologies (ICT) has brought about a shift in education from the traditional form of education to new methods of teaching and learning (Anene, Imam, & Odumuh, 2014). There is a belief that society is shaped by technology in several ways which consists of social practices like learning (Jones, 2001; Oliver, 2011). According to Kumar & Kaur (2005), technologies have modernized the learning process in several universities. Studies have shown that once the learning environment is technologically rich, it could give rise to self-esteem and enthusiasm for learning. It could as well lead to more positive attitudes for learning, and lower absentee and dropout rates. The utilisation of technology could help fortify students’ learning and improve pedagogy (Dede, 2000). Contextually, Information and Communication Technology (ICT) has the possibility and capability to overcome barriers like equity barriers, and others especially in developing countries (Department of Education, 2003).

Technology enables faculty to serve the various learning styles of our students in a better way and educate them for a broader range of intelligence. It is worthy of note that everyone has diverse learning styles for significant learning. Nonetheless, teachers will not be able to represent all the styles in the traditional classroom environment. On the contrary, due to the flexibility and aid of the e-learning technologies, learning environments could now be designed in such a way that students could be able to construct their own representations of knowledge in their minds (Koç, 2005). Tan (2013) opines that e-learning is altering how education is

perceived and implemented and recommended that schools that could take advantage of the technology will make learning less expensive, quicker as well as more effective. Technology enhanced learning could be referred to as ways in which technology is utilised in one way or the other to support and also make learning accessible, possible and available (Omeruo, 2013). Koç (2005) argues that now is the time to further fully integrate technology into the learning process as the skillful utilisation of technology supports the improvement of process skills like, adaptability, higher order skills, as well as collaboration that are crucial to achievement in this fast changing information age. If done properly, technology integration can really aid in the process of creating further authentic learning environments and even more. This was confirmed by studies which argued that in the long run, a learning environment more technologically rich leads to a greater rate of class attendance as well as scholarships in the university (Stratham & Torell, 1996; Fouts, 2000).

### **2.1.2 Background History to Technology Utilisation in the Nigerian Educational System**

In order to properly situate the study under investigation, this section presents a background history of technology usage in the Nigerian education system.

The use of technology in Nigeria dates back to the pre-missionary period which could be regarded as part of the pre-modern age in the Nigerian context. This period is before the introduction of Qur'anic Schools and advent of missionaries. It was the period when the Nigerian society educated its citizens in an informal manner (informal education), before the establishment of formal schools. During the period, efforts were made by family members and other adult members of the community to make opportunities available for the younger ones to be nurtured and obtain the fundamental and needed knowledge, skills as well as education that would in turn make them to become responsible adults that would contribute positively towards the development of their societies. Concrete objects such as stones, sticks, and others were utilized in teaching young children so as to be able to count and solve arithmetical or mathematical difficulties. Using symbols to disseminate information

was an effective strategy as well. Regurgitation, initiation or role-learning, acronyms, modeling, and others were also used in ensuring that the teaching-learning process was effective. Although the methods as well as materials used to effect learning could be said to be substandard, at that time they were effective. The arrival of Islamic Clerics and Christian Missionaries referred to as the “Era of Missionary Activities” altered this method with a “corresponding technology for learning” (Aniemeka, 2005).

Christian missions established the first school in Nigeria in 1842, in Badagry. Qur’anic schools were established in the North. Western education seemed to support the introduction and integration of technology into the curriculum than that of the Islamic education. At that time, western education which was supported by the Christian missionaries laid emphasis on lesson notes preparation, statement of aims of lessons, the use of teaching aids, preparation of teaching apparatus, chalkboards which were then well-known as blackboards because they normally used to come in “black” colours, slates, pencils, ink wells using fountain pens, charts, books, penholders, amongst other things. It is noteworthy that the creation of Teacher Training Colleges that got teachers ready for the primary school system, particularly Wesley College, Ibadan, St. Andrew’s Teacher Training College, Oyo, amongst the others were real sources of advancement for the establishment of educational technology. Student teachers were prepared to appreciate the need to make use of “teaching aids” (instructional materials) in the teaching process in those colleges (Salawu & Hezekhiah, n.d.).

With regard to higher institutions of learning, as at 1970, which is obviously the period after the missionary era (post missionary era), the Alvan Ikoku College of Education had come to be well-known for micro-teaching with the use of videotapes recordings, television monitors as well as cameras. Scarcity of professionals in certain disciplines together with a rise in students’ enrolment for courses particularly the setting up of general studies programmes forced some universities from the mid 1970’s to catch on the utilisation of educational technology means to solve the

problems. Consequently, the University of Ife which is now called Obafemi Awolowo University, Ile-Ife created an Audiovisual Centre as well as a Closed-Circuit Television (CCTV) in 1974. The University of Lagos created its own Audio-Visual Aid Centre which metamorphosed into a Centre for Educational Technology. Similarly, the Ahmadu Bello University (ABU), Zaria also instituted an Educational Technology Centre. However, a centre called Curriculum and Instructional Materials Centre (CUDIMAC) was instituted at the University of Nigeria, Nsukka (Aniemeka, 2005; Salawu & Hezekhiah, n.d.).

The emergence of private universities in Nigeria has been on the increase in recent times due partly to infrastructural problems faced by public universities such as poor internet access, irregular power supply, and inadequate lecture facilities. The barriers that affect the adequate use of technology in public universities could be as a result of poor funding of the universities which depend largely on the subvention from their government (Anene, *et al*, 2014; Iruonagbe, 2013; Ojeniyi & Adetimirin, 2013). Technology adoption in public universities has been largely for administrative purposes like clerical or administrative tasks, students' admission, enrollment, registration, and results processing than for instructional purposes (Pfeffermann, 2015; Sahin & Thompson, 2006). Nevertheless, some of them are presently making use of technology to support distance education (DE) as well as lifelong learning (Ajadi, *et al*, 2008; Adu, Eze, Salako, & Nyangechi, 2013).

### **2.1.3 Aims of Educational Technology**

Periathiruvadi and Rinn (2012) opined that educational technology has played a very vital as well as innovatory part in the educational system all over the world. According to them, it has enhanced and influenced the teaching and learning processes. The core goals of educational technology in education according to Sharma and Sharma (2006) are to:

1. Enhance the instructional process with the aid of educational technology thereby making it more effective and purposive.

2. Improve and preserve the standard of education which has been on the decline through the application of educational technology.
3. Make distance or correspondence education more effective with the use of educational technology.
4. Utilize Educational technology in resolving classroom teaching and training problems.
5. Help to understand the nature as well as structure of the teaching process.
6. Help in handling and solving the problem of individual differences in an effective manner in teaching-learning process.
7. Help in the formulation of theories for teaching and instruction.

#### **2.1.4 Educational Technology and Instructional Technology**

Although, the words educational technology and instructional technology are commonly interchangeably used, there is noteworthy distinction between them. Educational technology as a subject matter is broader than instructional technology. Educational technology can be viewed as the study and proper practice of aiding learning and improving performance through the creation, usage and management of appropriate technological processes and resources. They are procedures, materials, organisations, devices, ideas, machines or instruments that make the teaching and learning process further effective, impressive and successful (Periathiruvadi & Rinn, 2012). Sharma and Sharma (2006) pointed out that the word technology originates from the Greek word 'Technic' meaning art or skills and logia which means science or study. Hence, technology implies the study or science of a skill or an art. Educational technology is crucial in making teaching and learning processes further effective and successful (Periathiruvadi & Rinn, 2012). Educational technology can be viewed as making use of diverse techniques as well as processes to plan a learning experience methodically (Venkataia, 1996). Galbraith (1967) asserts that educational technology is the organised usability of scientific or other planned knowledge to hands-on tasks. Sharma and Sharma (2006) also define educational technology as the field of study that aids human learning by systematically identifying, organising, developing and utilising learning resources by managing procedures. They, however,



said that educational technology is not only limited to these procedures but it also refers to the people who implement the process. Educational technology is broad and covering it as a single subject will be impossible. Consequently, it is, therefore, separated into four classifications i.e. instructional technology, teaching technology, management technology, instruction design and behavioural technology (Sharma & Sharma, 2006).

Instruction is the method in which curriculum is learnt whereas instructional technologies are designed to have empirical and practical applications in the learning-teaching process (Periathiruvadi & Rinn, 2012). The term educational technology is often linked with, and comprises, instructional theory and learning theory whereas instructional technology can be viewed as the theory as well as practice of design, development, use, management, and assessment of procedures and learning resources (Seels & Richey, 1994). Sharma & Sharma (2006) contend that instructional technology is applying sociological, scientific, as well as psychological knowledge, principles and rules in the instructional process so as to achieve learning objectives. It is the system, instruments, network devices, techniques and methods used to accomplish definite set of learning objectives. Instructional technology is part of educational technology. Seels & Richey (1994) view educational technology as being wider than instructional technology for the reason that the word “educational” denotes all the aspects of education whereas the word “instructional” is limited to teaching and learning issues (Isman, 2002; Smith & Regan, 2005).

#### **2.1.5 Benefits of Educational Technology Utilization**

Technology usage is becoming a necessity in university classrooms. An appraisal of its benefits is necessary because when people are not cognizant of the benefits of educational technology, it would lead to reluctance in embracing them. eLearning Africa Report (2015) showed that the utilisation of technology in education enhances efficiency; learning; helps to better demonstrate a concept; and equips students with the digital skills required to prepare them for the workforce.

Other advantages of the use of educational technology include: Learning process is more suitable and effective; The attention of students to course content is more; It makes learning more interesting; There is decrease of learning time; More active learning is made possible; Teaching as well as progress are managed in the context of an institution's web portal; Diversified teaching methods is made possible; More information can be displayed to students; Educational pursuit can be achieved; Interest and assimilation is stimulated in the teaching process; There is visual stimulation; Better retention by users as well as improved hands-on application when compared with traditional teaching methods; Improved educational curriculum can be developed; Beginners or slow learners could decide their own pace and progress, thereby removing discouragement with the subject matter, themselves and/or their colleagues; The educational programmes of a country become more productive and effective; Hands-on exercises provide practice as well as assessment activities aimed at ensuring that learners master the performance objectives of a course; Anytime and anywhere, learning could really increase knowledge retention (Uwaifo & Uddin, 2009; Salawudeen, 2006; Alkhateeb & Aljawarneh, n.d.). The list is inexhaustible.

Despite these huge benefits or advantages of technology in the teaching-learning process, some scholars have identified a few weaknesses with regard to the use of technology for teaching and learning. The weaknesses enumerated include the amount and length of time expended on learning new technologies and new skills; the necessity for backup plans and guidelines in case of crashes or errors; creation of anxiety for students as well as lecturers, the failure of equipment, and others (Alkhateeb & Aljawarneh, n.d.). However, in spite of these weaknesses, a lot of the aforementioned problems with the use of technology and learning materials could be overcome by testing equipment ahead of time and learning what ways to make use of each technology appropriately via sufficient training.

### **2.1.6 Levels of Technology Adoption**

Rogers (2003) noted that in learning, there are three stages of information technology adoption. He said that the first is the “Personal Productivity Aids” level which is centred on the use of applications such as word processing, spreadsheet, and others to aid in the performance of tasks more efficiently and proficiently. This is the primary level of technology and higher institutions have adopted this level. The second is the “enrichment add-ins” level. CMC (Computer-mediated communication) technologies such as email, video, video conferencing, computer conferencing websites as well as other multimedia tools are added to traditional learning and instruction at this level. At the third level of information technology adoption in learning, there is a “paradigm shift” (Massy & Zemsky, 1995) which entails instructors redesigning learning content and reconfiguring or restructuring teaching and learning tasks so as to take complete advantage of new technologies. Although, majority of the higher education institutions have presently gotten to the first and second level, they are however endeavoring to get to the third which brings about a major change in the instructional paradigm (Rogers, 2000).

### **2.1.7 Social Factors Influencing Educational Technology Utilisation**

The use of educational technology in different contexts can be largely influenced by social factors. This section discusses previous works on social factors influencing the use of educational technology. Today, education is one of the key institutions of social life in society. The school system is a unit in the total social structure which is acknowledged by the members of the society as a different social institution. Within the school system structure, a lot of the socialisation process happens which implies that education is synonymous with socialisation (Brookover, 1957). Although Brown (2001) considers learning to be a social process, he is also of the opinion that learning does not just occur as a response to teaching, but to a certain extent as a product of a social basis that encourages learning. Learning is a complex process by which knowledge, skills, habits, facts, ideas, and principles are acquired, retained and

utilised in order to adapt to one's environment and also to modify the existing behaviours when necessary (Nwadinigwe, 2006).

#### **2.1.7a Attitude and Culture**

Rosenberg (1960) defines attitude as the tendencies to react in a specific way to a specific thing or class of objects in a steadily positive or negative manner. From the perspective of technology, attitude is as a result of the strength of the beliefs of a user that continuing to use or adopting the technology would lead to definite consequences (Ajzen *et al.* 1980). Attitudes toward educational technology built varied acceptance and usage profiles for Germans and Romanians (Nistor, Nicolae, Lerche, Thomas, Weinberger, Armin, Ceobanu, Ciprian, Heymann, & Oliver, 2014).

Park, Cha, Lim and Jung (2014) said that attitude is an essential variable in the explanation of technology acceptance and the intention to use new technology. This is corroborated by Adewole-Odeshi (2014) who reported a positive attitude towards the use of e-learning systems of students in some selected universities in South-West, Nigeria. Park (2009) also accepted that the attitudes of university students toward e-learning with regard to perceived usefulness and perceived ease of use are closely connected to the acceptance of e-learning. In the same way, Wilson, Baranczyk & Adams (2011) maintained that a trainee's attitude to training, perceived behavioural control, and perceived social norms could be used to predict the intention of a trainee to transfer competent skills as well as knowledge. University students with positive attitudes express less negative opinions of educational factors in educational settings (Berg & Anders, 2005). Peng, Tsai & Wu (2006) discovered that Internet attitude of students was influenced by gender, perceived Internet effectiveness and self-efficacy. Furthermore, the beliefs and values that persons have in-built in them through their cultural background impact their perspective and thinking significantly, and hereafter their attitude to technology usage (Ingold, 1996; Kransberg & Davenport, 1972). Hew and Brush (2007), Nyaumwe (2006), and Albion (2001) have recognised that the attitudes and beliefs of teachers constitute barriers to their technology usage for instruction. Park *et al* (2014) citing Na (2002) opined that the attitudes of university

distance learners to online coursework were found to be connected to their learning outcomes also. Positive attitudes to university experiences could increase the learning outcomes of the student. According to a respondent working in administration in Kenya, there are major challenges or barriers that hinder the integration of ICT in organisations in developing nations; but lack of awareness and mind-set is by far the greatest barrier and should be the first to be dealt with before an organisation can start moving forward (eLearning Africa Report, 2015). In relation to attitude, Ogburn, the proponent of Cultural Lag theory posits that behaviour, skill, knowledge, and ideas (*non-material culture*) necessary to operate technology usually takes time to catch up with technology (*material culture*) which changes more rapidly. Educational technology is progressively used in culturally diverse situations and across national cultures. Users of educational technology who have diverse national and professional backgrounds might, on the other hand, show differing attitudes towards technology. Prior research offers substantiation of the correlation between learning, technology acceptance and culture (Nistor, *et al*, 2014).

Stone (1998) opines that teachers could at times keep away from using technologies because of their feelings of uneasiness, hatred or perhaps fear of technology. Leh (2005) found that teachers acknowledged that they did not repel technology as such but that they cannot completely incorporate it into their own practices due to administrative, pedagogical, organisational, or personal restraints. According to Leh, the teachers accepted that to them, they see technology more of a problem with manifold faces rather than a solution. Delcourt & Kinzie (1993) carried out a study in the USA to assess pre-service teachers' comfort level with and perceived usefulness of specific computer technologies by administering instruments to 328 students who were enrolled in teacher education programmes and they discovered that there was a significant relationship between the time spent on computers usage and students' attitudes and self-efficacy (Koç, 2005).

### **2.1.7b Social Influence and Belief**

Chiemeké & Ewuekpae (2011) defined social influence factor as the extent to which a person perceives that important others namely bosses, peers, subordinates, and others believe that he or she should use technology. Social influence could take many forms which could be seen in peer pressure, leadership, socialization, persuasion, and others (Turban, *et al*, 2016). Hao (n.d.) argues that on the learning process, social influence reduces the uncertainty about the new technology's quality and then results in the adoption behaviour. Venkatesh *et al* (2003) affirm that social Influence in every model encompasses the implicit and explicit view that the behaviour of individuals is influenced by the manner in which they believe others will look at them because they have used a technology. The continuous usage intentions and actual usage of web-based learning system were predicted by social influence amongst others (Lwoga & Komba, 2014).

According to Albion (1996), the disbelief of teachers with respect to their capability to use technology for teaching (self-confidence and self-efficacy) has been revealed to influence the levels of technology usage. Problems could arise when teachers' beliefs are disregarded, because the beliefs as well as values that teachers uphold motivate a lot of the adoptions they make in the classroom (Cuban, 2001). Cuban therefore reasons that beliefs effect on how and what teachers decide to teach as well as what innovations they support or discard. Munby (1984) opines that teachers' beliefs and principles are contextually important in carrying out innovations. Ryba & Brown (2000) found that the belief of teachers about themselves, their classroom roles as well as their philosophy of education had a significant place in the shaping of the nature of their computer usage. They also said that the teachers that saw learner-centred classrooms and authentic learning tasks as vital to the achievement of their students were more to be expected to use the technology regularly. Before using or adopting a new technology, after a user is introduced to it, such persons would have some general expectations, or an assumption, about the value or "the quality" of this new technology, which is called a prior belief. However, as time goes on, the user may learn more about the new technology through diverse information sources, or

signals, and would update their prior belief about the technology's quality to another level based on those signals (Hao, n.d.).

### **2.1.7c Access and Educational Technology Usage**

Folorunso, Awe, Sharma & Jeff (2006) defined access as the extent to which the required technologies are available for persons to use and how easy and frequently Nigerians have access to all the needed technology such as internet amongst others. Subramony (2011) opined that inequitable access to ICT tools/resources is a great social justice issue in this century and that ICT has great potential to liberate those who have access together with related skills and knowledge. She warns that those who lack ICT access, knowledge and skills could consequently remain caught in a bad downward curve of disempowerment and isolation. Tapscott (2000) contends that the concern is not only access to ICT, but it is rather that of technology expressiveness, availability of services, opportunities to learn as well as motivation. He cautioned that unequal access to ICT and proficiency would divide the "society into a race of information haves and have-nots, knowers and know-nots, doers and do-nots" (p. 127). Bucci, Copenhaver, Lehman, & O'Brien (2003) opined that students discuss technology integration as it concerns issues of access and equity. They asked their students to assess the fitting amongst the "haves" and "have-nots" and their access to technological developments, and also consider their roles in generating enhanced access for the students who are not being kept up-to-date. They also have students assess programmes and websites for serious investigation of the cultural accuracy and sensitivity of programmes and websites and also for learning more on problems of social diversity that the students are not aware of themselves and they discovered that people would often find it far safer to explore questions on certain delicate social issues online more than they would do in a more public forum.

Kvasny (2005) asserts that accessibility impacts the ways in which ICTs are utilised. His assertion is based on findings made when he did a comparative study on the use of ICTs amid the poorer inner city groups in the USA to the wealthier suburban groups or communities. His findings showed that lower levels of access increased

illiteracy in ICTs and later strengthened low levels of the use of ICT. Another instance is in the study by Musa, Meso & Mbarika (2005), where accessibility was found to be a factor that impacts the degree to which mobile ICTs are utilised for business significantly (Meso & Musa, 2008).

### **2.1.7d Skill and Educational Technology Usage**

Lack of digital skills would eventually lead to reluctance in embracing them. Morino (2000) affirms that the issue of equitable ICT proficiency is even a much more serious social issue. He said that the main worry is connected to unequal learning and engagement opportunities for technologically deprived groups rising from a lack of major opportunities to effectively apply ICT in a manner that could empower and emancipate the users toward the accomplishment of significant educational as well as professional outcomes. The skills needed for Technology usage and adoption in the classroom continue to be a challenge (Gulbahar & Guven, 2008; Thanuskodi, 2013). Lwoga & Komba (2014) explored the factors that could predict the continuous usage intention of web-based learning management systems (LMS) by students in Tanzania by specifically focusing on the School of Business of Mzumbe University (MU). The results revealed that limited skill was one of the challenges for using web-based LMS. Similarly, teachers' limited technological knowledge in integrating technology into teaching and learning (ICT push), will make it difficult for them to establish the relationship between technology and pedagogy (Kafyulilo, 2011, Okojie, Olinzock & Okojie-Boulder, 2011).

Contemporarily, Computer-Mediated Communication (CMC) technologies have transformed the teaching and learning process through their capabilities to spread interactions and communications over distance and time with the aid of various media like graphics, text, as well as voice (Garrison, 2009). The foremost belief is that the regular utilisation of technologies daily suggests that skilled users are capable of transferring their digital competences to learning activities and learning happens best in a community of learning or practice (Doak, n.d.). The utilisation of Internet technology in the classroom reveals that students are interested in using Internet for



learning and information (Lundgren & Nantz, 2003). It could also boost research skills as well as culturally diverse learning by offering an enhanced understanding of cultural variances and foreign countries (Greene & Zimmer, 2003). Hannafin & Land (2000) reported a number of likely reasons for teachers' resistance to the use of computers which includes: uncertainty about the ability of computers to improve learning outcomes; dislike of the computer as a contender for the attention of students; uncooperative administrators; greater time and effort needed of the teacher and the apprehension of losing control of focus stage, as well as uneasiness of looking stupid before the class.

Once teachers are skillful in technology usage, they compel students to use computer technology and to search for curricular materials as well as resources that equally complement and transform the curriculum to encourage socially-sensitive, transformational and more well-rounded curricula. They opined that certain programs could have content courses where technology is utilized in the course of learning the content. This would be a very good instance of modeling. The technology connection should match the programme demands, resources, as well as theoretical structure because once the use of technology does not fit in the theoretical beliefs of a programme, then it would not assist to meet the goal of the programmes for technology integration (Bucci, *et al*, 2003).

### **2.1.8 Technology Culturation**

In order to undertake a good sociological analysis of factors influencing the use of educational technology in Nigerian universities, it is necessary to discuss the concept of *Technology Culturation* as used in this study.

Technology culturation is hinged on the base theory of anthropological writings as embraced and adopted in Ingold (1996); Hakken, (1991), and on the marketing theories of familiarity. Technology Culturation could be viewed as the influence of cultures that are technologically-advanced on the attitude of individuals to technology

(Okoli, 2003). Current research on Diffusion of ICTs contends that the extent of technological culturation of a society influences the use of technology in that society (Loch, Straub & Kamel, 2003). This opinion emphasises that societies that are technologically cultured, i.e., societies where technology is a usual aspect of daily life will use technology more heavily than societies that are less technology cultured (Loch *et al.*, 2003; Straub, Loch & Hill, 2001; Rose, Evaristo & Straub, 2003). Studies have established that accessibility influences the usage of ICTs (Meso & Musa, 2008). From previous studies of ICT diffusion in Arab nations, it has been discovered that Technology Culturation did provide a consistently positive influence on ICT outcomes (Ricardo, Sevcik, Loch & Straub, 2002; Straub, Loch, Evaristo, Karahanna, & Srite, 2002; Straub, Loch and Hill, 2001). In the selected study of Meso & Musa (2008), it was reported that Technology culturation influences the extent of usage of technology in Nigeria, Kenya, and Gambia.

Another simple way of relating the concept of technology culturation is that people who have prior exposure to or who have access to the use of technologies like video games, cable satellite, television, and others particularly those who grew up in the city or who lived in developed countries have already tuned in their minds towards technology which enhances their interest and ability to use other higher technologies or ICTs unlike those who grew up in the village or in developing nations. This implies that the opportunity to use or familiarise oneself with a technology subsequently enhances the potential and chances for being acculturated to ICT (Nicholas-Omoregbe, Chiazor, Azeta & George, 2016).

Loch *et al.* (2003) defined technological culturation, as the end result of on-going experience or exposure to technology, which consecutively, reinforces the familiarisation of an individual with technology. In other words, it is the cultural experiences and exposure that persons have with technology (Meso & Musa, 2008). The concept of technology culturation which was first defined by Straub, Loch and Hill (2001), and later used in the study by Loch *et al.*, (2003) and others have shown to influence the use of ICTs. Straub, Loch, Evaristo, Karahanna, & Srite (2002)

conceptualized technology culturation as demonstrating an individual's exposure to a somewhat technology-concentrated culture. Similarly, Loch, Nelson & Straub (2000) submitted that there is strong relationship between culture and/or Technology Culturation and Information Technology Transfer. For instance, they said that training could be much more effective when learners have been technologically culturated, or have been earlier exposed to related technologies (Okoli, 2002). In corroboration, Loch *et al* (2003) argues that the extent of technological culturation is viewed as influencing the degree of ICTs usage in a particular society.

### **2.1.9 Power (Electricity) and Technology Utilization**

Nigeria has been facing an extreme Power shortage for several years (Kennedy-Darling, Hoyt, Murao, & Ross, 2008). Power can be defined as the energy that is generated through electrical, mechanical or other means and used for operating a machine or device. Power, electricity and energy are often used interchangeably. Power is a strong instrument for social development and it determines the location of industries. Power is also the lifeline of a growing economy (Sadiq, 2015). Virtually all African countries lack electricity to power ICT materials thereby making basic ICT infrastructures inadequate (Ololube, Eke, Uzorka, Ekpenyong & Nte, 2009). Electricity is needed to power both the working as well as the living environment. It is also needed for transportation, for maintaining temperature, for use in heating and cooling of buildings, and for industrial processes (Sadiq, 2015).

Major among the problems affecting technology utilisation in Nigerian universities is the unsteady power supply (Chigbu & Dim, 2012). The implication of this is that Nigerian students will experience difficulty in the effective use of ICT (Anene, *et al*, 2014). In line with Anene, *et al*'s assertion, Ololube, *et al* (2009) opines that fluctuations in the supply of electrical energy, poor telecommunication services as well as the lack of electricity to drive the use of ICT materials makes the application of technology in the education system very challenging. Furthermore, Onyema (2011) notes that inadequate power supply has contributed to underdevelopment in Nigeria.

In spite of the large oil and natural reserves in Nigeria, the electrification rate is still less than fifty percent of its population which leaves about seventy-six million people without any access to power (electricity). Although, the government is aware of this problem, however, it is having difficulty in the funding as well as organisation of the sector. Aside from inadequate power generation, currently, the infrastructure of the hydro power (which is the main source of power generation now used in Nigeria) plants is not renewable and it has gone much out of repairs and requires serious rehabilitation. Besides, the real output of the hydro power plants is extremely less than the capacity projected. The grid structure is also vulnerable to sabotage due to its instability and it is obviously inadequate for modern times. The Nigerian NEP Report of 2003 showed that only forty percent of the country's population is actually linked to the national grid system and these persons do experience blackouts almost sixty percent of the time (Sadiq, 2015; Kennedy-Darlington, *et al*, 2008).

There is growing awareness of the role that renewable energies (powers) play in the energy system worldwide, particularly in the generation and supply of power at the grassroots level (Benchikh, 2004). The exploration of sustainable and alternative sources of energy will minimise the heavy dependence of electricity generation on petroleum products in Nigeria. Renewable energy or power sources such as solar, wind power, and others are alternative ways out of the power crisis in Nigeria (Sadiq, 2015).

### **2.1.10 The Concept of E-Learning**

At the commencement of the third millennium, a different method of learning known as e-learning was introduced. E-learning as an industry has developed tremendously and it is becoming very much part and parcel of education throughout the world (Opoku-Mensah, 2015). E-learning is used in certain parts of the world in promoting education. E-learning reduces the cost of education and it is a more effective learning method when compared to traditional learning because amongst other reasons, it enables new techniques as well as processes to be disseminated in a fast manner

worldwide (Alkhateeb & Aljawarneh, n.d.). Through e-learning, learning is currently presented in diverse methods, across diverse platforms, using a number of media and at all times supported by technology (Omeruo, 2013). A number of studies have reported the rapid utilisation of e-learning systems and technologies (Ramim & Levy, 2006).

E-learning has more widely spread in the United States of America than in the rest of the world, even though it tends to be more intense in some other countries such as the UK, Germany and France. The report of Gartner Group predicted that e-learning makes up a number of billions with regard to spread; however, they expect this to grow sharply. Since the time that technology was first used in education, e-learning has advanced considerably. There is a growing tendency to move in the direction of blended learning services; that is, a situation whereby computer-based activities are combined with face-to-face, hands-on, or classroom-based situations (Omeruo, 2013).

As a growing and developing nation, if Nigeria's educational structure is developed to embrace ICT and e-learning is a tool used to meet international standards and also properly respond to the needs of the society to quicken her economic development then by the year 2020, Nigeria can endeavour to join with other globalized economies (eLearning Africa Report, 2015). E-Learning is anticipated to redefine education; for instance, the classroom will no longer be demarcated by walls (Owenvbiugie, Ekhovbiye, & Iyamu, 2011). Some institutions in Nigeria are also presently making use of it to boost distance education (DE) and lifelong learning (Ajadi, *et al*, 2008; Adu, *et al*, 2013).

E-learning is particularly about learning with technologies, most probably computers as well as other modern day tools (Ahmad, 2012). In agreement, Oye, Salleh & Iahad (2011) support that e-learning is the utilization of ICTs to improve and support the teaching-learning process. Sale (2002) asserts that e-learning entails using electronic technology for educational delivery as well as training applications, monitoring the performance of learners and reporting progress made by them. E-learning is a new

method for delivering well-designed, electronically mediated, learner-centred and interactive learning environments to anybody, anywhere, at any time, with the use of the internet as well as digital technologies in relation to the principles of instructional design (Hedge & Hayward, 2004). It could also be viewed as the acquisition of knowledge plus skill using electronic technologies like internet and computer-based courseware as well as local and wide area networks. E-learning is an innovative form of teaching method by which students, more particularly the distant learners are given access to learning materials. It is generally linked with the utilisation of computers but largely, it is a method of instructional delivery that could be conveyed via any suitable electronic media like the television, mobile phone, radio, and so on (Adu, *et al*, 2013). E-learning is basically learner-centred (Rosenberg, 2001) and today; it is becoming a key part in academia. Therefore, there is a need to come up with formal guidelines that instruct the course instructor on what way to design, maintain, as well as manage a course in e-learning. This is supported by Resnick (2001), and Twigg (2001) who affirmed that before one can make full use of the transformative potentials of technologies, there has to be a rethink on the approaches to learning and education as well as how technology can support them. They argue that the focus should not only be on technology, but a redesign of the whole process of teaching and learning, focusing on a learner-centred technique. E-learning tools could be used to provide education to a great number of students with varied cultural upbringings and educational levels (Jayanthy, Srivatsa, & Ramesh, 2007).

### **2.1.11 E-Learning Tools and Facilities**

The following section presents a review of some e-learning tools and facilities that can be used for educational technology utilization in Nigerian universities.

E-learning utilizes several technologies; some of them have been developed specially for that purpose whereas others just fitly complement the learning process. The following are some of the recent e-learning tools/facilities used for instructional purposes:

### **2.1.11a Moodle**

Moodle is an open source or a free source e-learning software platform, which implies that the software is free (Logan & Neumann, 2010). It stands effective in the e-learning development (Alkhateeb & Aljawarneh, n.d.). MOODLE is an abbreviation for *Modular Object-Oriented Dynamic Learning Environment*. Its purpose is to create an environment that enables for collaborative interaction among students either on its own or complementing traditional classroom instruction. Moodle could as well be referred to as a Learning Management System (LMS), Virtual Learning Environment (VLE), or Course Management System (CMS). It can be used to host online/offline classes. Moodle software package is designed to assist educators in creating quality instructions. It is a popular eLMS which gives teachers an avenue to create dynamic online learning portal for students. Contemporarily, Moodle is well-known amongst educators worldwide because of its robustness and economy. According to Ellis (2009), a robust LMS must contain a number of functions such as automated administration, self-guided services, rapid delivery of learning content, a scalable web-based platform, portability and standard support, as well as knowledge re-use. Moodle has the aforementioned features.

### **2.1.11b Blackboard**

Blackboard in contrast to Moodle is commercially developed which implies that the software is not free; it has to be paid for. Blackboard could also be referred to as a Virtual Learning Environment (VLE), Course Management System (CMS), or Learning Management System (LMS). In its 9.0 version, there was an addition of a more flexible interface to the portal page. Version 9.0 of Blackboard makes use of the term “modules” and it provides instant messaging as well as lecture audio-visual recording functionality as component of the standard package. The technical infrastructure feature of Blackboard 9.1 allows it to be accessed from mobiles and through Facebook (Logan & Neumann, 2010). Blackboard is a web-based e-learning tool which is becoming a popular and significant course management software application in institutions of higher learning. It offers a reasonable number of learning tools which includes an online discussion board, reviews, course content

management, a course calendar, electronic mail, navigation tools, information announcement, automarked quizzes and exams, student progress tracking, access control, grading/maintenance and distribution, and a lot more (Marchewka, Liu, & Kostiwa, 2007).

### **2.1.11c      Difference between Moodle and Blackboard**

MOODLE and Blackboard are two common web-based learning management systems (LMS) commonly used in education (Alkhateeb & Aljawarneh, n.d.). There is basically slight distinction in the features available amongst them. Although there are many similarities in the functionality and capability to present materials, there are variations in the way materials in the two VLEs are organized and in the social elements. For instance, students are allowed to create their personal profile and include a picture just as it can be done in social spaces such as Facebook do. The image is fitted as a personal proof of identity in communications within Moodle (Logan & Neumann, 2010).

Moodle says that it makes effort to support a *Social Constructionist view* but Blackboard has not said anything about supporting any underlying pedagogy (Dougiamas, 2010, Logan & Neumann, 2010). The support of Moodle for Social Constructionist pedagogy can thus be seen as a learning environment that is supportive of constructionist pedagogy and offers a social experience as well. This is made manifest in the way that the VLE enables students to create a profile with a picture (which normally accompanies every posts or comments made by them) and who else from their course is online and recent activity. Teachers as well as students say they appreciate the social aspect of Moodle which made them to prefer it. Blackboard has however added some social aspects to its functionality in Blackboard 9.1 (Alkhateeb & Aljawarneh, n.d.; Logan & Neumann, 2010).

In conclusion, teachers who are familiar with Blackboard and Moodle (v 1.9.8) are of the opinion that when you know your way around them, you will realise that the difference between the two VLEs is not much. However, they have a feeling that



Moodle is easier and more intuitive for a beginner to get started with than Blackboard 8.0. Nevertheless, Blackboard 9.1 version is also being said to be intuitive in nature, which has likely rendered the previous claim about usability differences null and void (Logan & Neumann, 2010).

#### **2.1.11d      Interactive Whiteboard (IWB)**

This is a big interactive display which is connected onto a computer. The desktop of a computer is projected to the surface of the board with a projector where users could control the computer with the use of a stylus, finger, pen, or some other device. The interactive whiteboard is usually fixed either on floor stand or a wall. It is often used in diverse settings including all levels of classroom education, in-training rooms for professional sports coaching, work groups and corporate board rooms, in broadcasting studios, and others. In some classrooms, the traditional whiteboards, flipcharts and video/media systems like DVD players as well as TV combination have been exchanged with the interactive whiteboards. In cases where traditional boards are even utilised, the IWBs usually complement them.

Furthermore, several communication technologies are usually used for e-learning. Internet users could use a number of tools including email and instant messaging, social networks message forums. Usually, E-learning uses database as well as Content Management System (CMS) technologies which both work together to keep student records, store course content and test results. A good Learning Management System (LMS) usually provides reporting tools for generating and storing progress reports.

Additionally, technologies like Flash and PowerPoint software could be used to improve the quality of content thereby helping to make presentations smooth, more attention-grabbing, with high quality and rich graphical content. Some Word processing packages and HTML editors also exist nowadays that make text or web pages formatting easy. Also, there are several online services that are accessible and could be used to generate interactive components for courses like quizzes and games.

Other e-learning facilities in use include: projectors, laptops, tablets, smartphones, and others.

#### **2.1.12 Factors Militating Against the Successful Integration of Educational Technology in Nigerian Public Universities**

Anene, *et al* (2014) argued that although the challenges for the integration of technology in learning are numerous, the demand for its use is growing. In corroboration, with Anene, *et al*, Ololube, *et al* (2009) opined that although there is much work left to be done in terms of the use of technology in teaching and learning in Nigeria's higher education, the prospects are positive. Aduwa-Ogiegbaen & Iyamu (2005) perceived that generally, ICT improves educational efficiency. Through greater ICT capabilities, it will be likely to make use of well-prepared ICT programmes to make sure that learners are further correctly and thoroughly taught with the use of effective instructional technology (Anene, Imam, & Odumuh, 2014). The most significant of e-learning integration challenge is poor ICT usage (Ololube, *et al*, 2009). It has been observed that poor state of ICT in education is due to IT infrastructure, curriculum, teachers' intensive training and capacity building issues (Uwaje, 2015). Highlighted and elaborated below are some of the critical factors that affect the effective implementation of ICT in Nigeria:

- 1. Poor Technical Infrastructure:** Iruonagbe (2012, 2013) noted that one of the major problems facing Nigerian public universities is infrastructural decay. Also, Olakulehin (2007) has observed that the infrastructures necessary for deploying an effective ICT platform is lacking in Nigeria. In line with these views, Aduwa-Ogiegbaen, & Iyamu (2005) emphasised that a formidable obstacle to the use of technology in Nigeria is infrastructure deficit. For instance, there is low bandwidth to sustain smooth Internet connectivity (Chigbu, & Dim, 2012). Most users access the Internet in cyber cafes, with shared bandwidth, thus slowing down Internet connections. The problem of Nigeria is worsened by lack of adequate power (eLearning Africa Report, 2015). Mac-Ikemenjima (2005) also observed that there are inadequate ICT infrastructure including computer

hardware and software, as well as bandwidth access; lack of skilled manpower to manage available systems and insufficient training facilities in Nigerian universities. Research evidence reveals that Nigerian Universities are still lagging behind in information technology age because the required environment for the achievement and development of ICT in Higher Institutions are not existing (Anene, *et al*, 2014).

**2. The Role of Government:** The key to the successful integration of ICT in education and training relies on a solid framework, which includes government's commitment to improving ICT infrastructure and investing in schools' ICT plans. Although many countries have ICT policies in place, the effects are not always seen in the education system, as the policies do not always match the actual practice (eLearning Africa Report, 2015).

**3. Financial Constraints:** Financial constraint is one of the major problems facing Nigerian universities ICT utilization (Olaniyan, 2001; Iruonagbe, 2012, 2013). Insufficient funds cause lack of access to ICT (Ololube, Ubogu & Egbezor, 2007). Akpotu & Akpochafo (2009) said that funding issues loom very high when considering African higher education. Resources for university education have continuously been in a state of acute shortage in Nigeria (Nwadiani 1993; Utulu 2001; Akpotu & Nwadiani, 2003; NUC, 2005). As much as the federal government has been struggling to increase statutory allocations to Nigerian universities, the subventions have continually being insufficient to cope with the increase in the rate of enrolment. Indeed, there has been the consensus that the demand for higher education in Nigeria has been growing faster than the willingness of government to supply it (Akpotu & Akpochafo, 2009).

**4. Power-Related Problems:** Major among the problems affecting technology utilization in Nigerian universities is unsteady power supply (Chigbu, & Dim, 2012). Frequent and irregular power supply in Nigeria has been a persistent problem affecting virtually all aspects of the economy, including education

(Anene, *et al*, 2014). Ajadi, *et al* (2008) observed that it has been a main setback for technological advancement in Nigeria. The consequence of this is that students find it difficult to use ICT effectively (Anene, *et al*, 2014). In line with Anene, *et al*'s assertion, Ololube, *et al* (2009) have noted that lack of electricity to power the ICT materials and poor telecommunication facilities fluctuation in their supply of electricity makes the implementation of technology in education most difficult. Furthermore, Onyema (2011) notes that power supply has contributed to underdevelopment in Nigeria.

**5. ICT Literacy Issues:** Problems of literacy which have led to inefficient Internet surfing is a critical factor affecting the use of e-learning tools and facilities (Chigbu & Dim, 2012). In this assertion, Anene (2014) observed that low computer literacy level is a critical factor that affects the acceptability and use of e-learning by students and teachers in educational institutions. For instance, a large number of lecturers and students in Nigeria's higher institutions are still not knowledgeable in the use of computer. In Nigerian universities, low computer literacy level has been identified as a critical factor affecting the acceptability of e-learning by students and lecturers alike (Folorunso, Ogunseye & Sharma, 2006). The Commonwealth of Learning International (2001) also mentioned that the need for the integration of new ICT literacy knowledge into academic programmes and courses remained a serious problem confronting Nigeria's higher education.

**6. Internet and Bandwidth Issues:** In Nigeria, access to Internet is relatively low and connectivity is slow (Chigbu & Dim, 2012). In line with the views of Chigbu & Dim, Oye *et al*. (2011) adds that there are poor or non-availability of internet access as well as limited bandwidth in some tertiary institutions. The cost of accessing the internet in Nigeria is still high; hence, some students find it a challenge to pay for it. Aduke (2008) advised that the Nigerian government should make Internet connectivity a priority for higher education so as to be able to leverage on the promises as well as opportunities that ICTs present. Other

problems still hampering the efficient performance of the Internet in the University are: virus contaminations, space constraints at laboratories/cyber cafes in addition to insufficient hands to attend to users in the cafes, and others (Chigbu & Dim, 2012). One of the constraints that led to poor Internet development in Africa is that of the initial capital outlay to install Internet facilities (Olabude, 2007). Additionally, there is no effective and efficient telecommunication and power supply base to serve as spring board for the development of Internet services. Another problem that discourages Internet services is that of the number of reliable Internet Service Providers (ISPs). Even the ones that are available experience low bandwidth issues which make the Internet slow as well as frustrating (Chigbu & Dim, 2012).

**7. Limited Skilled Personnel:** Dearth of skilled manpower to handle existing systems as well as insufficient training facilities for ICT based education at the tertiary level is a serious issue in Nigeria. There is a serious lack of trained personnel who can implement the use of software, network administration, operating systems, and others (Anene, *et al*, 2014). Insufficient trained people are a challenge to ICT usage in higher institutions in Nigeria; the available technical staff in most Universities to maintain the existing systems are few (Mac-Ikemenjima, 2005). Many African universities lack IT skills for the development and use of Internet facilities and services.

**8. Inadequate Training for Teachers:** Due to improper teacher training programmes teachers were not engaged in ICT usage for lesson preparation. Times have been altered and a teacher's deficiency of new knowledge and material would have a huge effect on the learning of students. There are inadequate human skills as well as knowledge to completely incorporate ICT into education. And the truth is that the quality and depth of the 'knowledge content' of a society, defines its strength, its prospects as well as its future (Omuta, 2010).

### **2.1.13 The Advent of Private Universities in Nigeria**

Having discussed the factors militating against the successful integration of educational technology in Nigerian Universities, this section presents the rationales for the emergence of private universities in Nigeria.

#### **1. Funding Issues:**

There has been a consensus on the fact the demands for higher education has been growing faster than the willingness of government to supply it (Olaniyan, 2001). The financial straits of the central government to provide adequate educational funding for the entire country has been very burdensome and therefore, transferring the fiscal burden from the central government to individuals (Lai-Ngok, 2004). This then made the private sector to become the plausible solution to extricate the whole system from its plight. Pressure of demand for education against severe funding constraints has led governments, starting from the 1990s, to make space for greater private participation in higher education. Today, in many countries, private higher education institutions range in proportion of the total from 15% in Ghana and Ethiopia through to 20% in Kenya, to one-third in Nigeria and Senegal. In the area of business education, with the exception of South Africa, most of the highest-quality schools are private, including a number of faith-based universities (Pfeffermann, 2015).

#### **2. Failure of Public Tertiary Institutions**

The failure of public tertiary institutions in Nigeria manifests in the form of enlarged teacher-student ratio; overcrowded classes; poor quality teaching and research; examination malpractice; cultism and incessant strikes of staff (NUC, 2005). The public failure theory points out the progressive decay of public institutions on the continent since independence. This failure has been the cause for the calls for transformational governance by African nations (Ogbulogo, George & Olukanni, 2014; Omuta, 2010).

### **3. Intake Capacity Issues Due to the Growing Demand for University Education**

In the absence of improved facilities to cope with increased demand in public universities, many of them had to exceed their carrying capacities, which can be defined as the maximum number of students that the institutions can sustain for qualitative education based on available human and material resources (NUC, 2005). Private universities increase access to university education (Oyebade, 2005). The demand absorption theory explains the failure of public higher education institutions to absorb the increasing number of applicants. It also shows the shortfall in quality. It has been observed that the admission capacity of public universities in Nigeria has not exceeded 30% of all qualified candidates (Ogbulogo, *et al*, 2014). Funding has not kept pace with enrolment growth, it is therefore not surprising that quality is a huge challenge (Pfeffmann, 2015).

4. **Another Means of Funding University Education:** Another way of funding university education in the country is the involvement of private hands (Ajayi & Ekundayo, 2008).

5. **Alignment with Some Global Practices:** Private educational institutions exist, parallel with government institutions at all levels in most developed and, in recent times developing countries (Ajayi & Ekundayo, 2008; Akpotu, *et al*, 2009).

6. **Irregular academic calendar:** This is as a result of strikes caused by union activities and shut down of campuses due to cult activities on the campus of public universities (Ajayi & Ekundayo, 2008).

7. **Cultism:** The menace of cultism is a serious issue plaguing Nigeria's higher education system (NUC, 2005). The lives of staff and students are usually under serious threat such that they are usually scared of either staying late in the office and reading late into the night for fear of being waylaid by the cultists. The entire functionality of the university system is threatened thereby making campuses of public universities unfit for effective learning and research.

**8. Improvement of the quality of university education:** A number of public universities are traditional and find it hard to change and adjust their curriculum to meet global challenges at the international level. However, universities that are privately-owned strive to study emerging happenings and develop their curriculum in consonance with contemporary global needs. Private sector participation in the provision and ownership of universities would ensure the production of quality graduates and likewise have a closer contact between privately owned universities and industries. This way, universities would be made to be more relevant to the needs of society. For education to serve truly as the primary agent for achieving sustainable development, democratisation, liberalization, decentralization and privatization must be taken as essential policy precursors for improvement of standards and quality. No doubt, private universities such as Harvard in the developed world exemplify vibrant promising institutions of providers of higher education. By way of ascertaining that standards as well as quality are upheld, sustainable and policies that are enduring for quality control and adequate monitoring should be put in place with parameters that are well-defined which meet with international standards and at the same time guaranteeing increased access to education (Ajayi & Ekundayo, 2008; Ibadin, Shofoyeke & Ilusanya, 2005).

Recognizing that the foundation of education in Nigeria was laid by private organisations, particularly the mission agencies before government took over and hence, the fall in standard, one does expect that emerging private universities will make a marked departure in the general operation of higher institutions of learning in Nigeria especially with regard to technology usage. This study will ascertain whether this expectation will be met or not.

#### **2.1.14 Social Media**

One of the benefits of technology is Social networking (Bowers-Campbell, 2008). To a greater extent, Facebook as well as other social networking tools are becoming a thing of intellectual research. In several fields, scholars have started



investigating the influence of social networking sites, examining how these sites could play into subjects of education, identity, youth culture, social capital, as well as privacy (Danah, 2007). Graber (2012) affirms that there are claims that media does not just impact our culture anymore but they are in actual fact our culture. Today's youth are living in a whole new world such that those who died many years ago would not believe that there could be such a new culture of technology that could emerge and engulf the youths so much. Social media which is becoming a dominant language amongst the youth is the hub of this emerging culture and it is comprised of Facebook, Twitter, Skype, and many others. In fact, the youth of today will deem one to be old-fashioned if one is not using one of these (Mthawangi, 2012).

For a better understanding of the definition of social media, it is essential to first define media. Media is a communication tool, such as a radio or a newspaper, while social media is a social communication tool or instrument. Regular media could be conceived as a one-way path where although one can listen to a report on television or read a newspaper, one has very insufficient capacity to contribute one's views on the subject. Conversely, social media gives one the ability as well as opportunity to communicate (Daniel, n.d.). A social media network platform offers a medium for interaction by sets of individuals thereby making information sharing easy (such as ideas, lecture materials, pictures, and others.) across a set of persons or groups. Social networking websites are virtual communities that enable individuals to connect as well as interact with one another on specific matters or to just virtually "hang out" together (Ikhu-Omoregbe, Ayo & Azeta, 2012). Statistics show that social network usage like Twitter, LinkedIn, Facebook, among others is increasing particularly among young people, the crop of which are students of tertiary institutions (Ikhu-Omoregbe, *et al*). According Ikhu-Omoregbe and others, the expansion and appreciation of online social networks have produced a whole new world of communication and collaboration.

E-learning lays real emphasis on social learning and utilization of social software like podcasts, wikis, blogs, virtual worlds, social networks, among others.

Technologies such as blogs, virtual classrooms, collaborative software, e-Portfolios, video, audio, and other tools like computers, laptops, tablets, are progressively used to support e-learning (Omeruo, 2013). Countless students are deeply engrossed in Web 2.0 technologies such as blogs, Facebook, wikis, twitter, chats, podcasts, photo sharing, video sharing, and virtual worlds, such that they are carving on-line niches for themselves which seem to blend with their world off-line. The internet is undeniably playing a more and more significant role in both the social and academic life of students. Instructors are now moving to Web 2.0 tools, drawing on their capability to help in creating, collaborating on as well as content sharing. Consequently, the usage of social sharing sites is increasing on a daily basis. In terms of Web 2.0, this would not just be a website that would only provide one with information, but it would also interact with one while giving one the information. The interaction could be as simple as requesting for personal comments or allowing persons vote on an article, otherwise, it could be as complex as Flixster suggesting movies to you based on the assessment of other individuals with related interests (Daniel, n.d.).

Social network sites could be viewed as an open relationship of persons who interact via websites (Burke, 2006). Social networking sites are virtual online sites where users create profiles in order to connect with other users and enable unrestricted number of adolescents to participate (Bowers-Campbell, 2008). The web allows users to create numerous numbers of relationships with other people, irrespective of geographical distance. Social network sites are tools for building virtual communities amongst individuals with education, lifestyles, interests, and activities that are similar (Bolotaeva & Cata, 2010). Social networking sites inspire students to learn in an environment that is safe. A teacher's Facebook profile can be used as a teaching tool for communication purpose and for tackling concerns in student learning in an environment where the students are the 'professionals' (Bowers-Campbell, 2008).

Baker (2013) opines that although, there are several criticisms regarding the use of social media and its effect on how students process as well as retain

information, and the way it distracts, social media provides abundant opportunities for learning and interactivity, students are presently experiencing the world other than just through books and assignments but they are learning as well as adapting to the world through the use of a somewhat different form of communication. Both Educators as well as supporters of new digital literacies are self-assured that social networking inspires the advancement of transferable, social and technical skills of value both in formal as well as informal learning (Livingstone & Brake, 2010). Blogging, tweeting, or instant messaging increases student involvement. In fact, students who may not have participated in class normally are more enthusiastic to participate via social network services. Networking gives users the chance for just-in-time learning as well as greater levels of engagement (Jenkins, 2006). Once learning practices are introduced into a website, it allows students to have everyday fun which is the reason why tutors are gradually using social networks to enhance teaching as well as learning in traditional classroom settings in response to the acceptance of social networking services amongst today's students so that they could offer new chances for enriching present curriculum via authentic, creative, as well as non-linear, flexible learning experiences (Buzzetto-More & Nicole, 2010). The new Web 2.0 technology which was built into majority of social networking services encourage interaction, creation, conferencing and research on an international level, thus, allowing teachers to repurpose, remix, as well as share curriculum resources. In a nutshell, social networking services could turn out to be research networks and learning networks (Mason & Rennie, 2008).

According to Jenkins (2006), social networking services foster learning through what he calls "Participatory Culture". A participatory culture comprises of a space that gives the opportunity for social interaction and permits mentoring, sharing and engagement. Livingstone & Brake (2010) said that informal learning entails the learner setting the goals and objectives. They also opined that informal learning is a tremendous tool for lecturers to put in materials as well as ideas by ways of social and participatory learning online where students can relate with

them thereby learning skills that usually will be taught in a formal setting even in a more attention-grabbing as well as engaging environment of social learning in a secondary manner. The ability to interact as well as engage in a communal way with each other just via a Web presence, perhaps without ever even meeting yourselves is one of the most thrilling things about social media. Students engage, going further than only social interaction purposes even when they can make comments on somebody's post, share personal pictures or even links to other sites. They use social media to interact with their peers and teachers as well about subjects that are class-related daily. The ability of social media users to assess, analyze, share, and retain information is increasing rapidly even without them realising that they are developing these skills. It is only those that were born before the advent of Internet that would likely appreciate the magnitude of this new method of communication (Baker, 2013).

#### **2.1.15 Learning Outcomes and Technology Usage**

Learning involves mental activity whether by an individual's conscious effort or not. It is a complex process by which knowledge, skills, habits, facts ideas, and principles are acquired, retained and utilised in order to adapt to one's environment and also to modify the existing behaviours when necessary (Nwadinigwe, 2006). Learning could be defined as the change in the behavior of a subject to a certain situation which occurs by reason of his repeated experiences in that situation (Hilgard & Bower, 1975). This implies that learning involves activity which produces a change in behaviour in order to solve a given problem. Park, *et al* (2014) asserted that Bloom has divided whatever and exactly the way people learn into three distinct domains: that is, cognitive, affective as well as psychomotor domains. In agreement with Bloom's categorization, therefore, a learning outcome can be defined as the: (i) particular knowledge (i.e. cognitive); (ii) attitude or value (i.e. affective); and (iii) behaviour or skill (i.e. psychomotor) that a student is anticipated to demonstrate after a particular period of study (World Bank, 2011). Learning outcomes could also be defined as the knowledge, application of the acquired knowledge or skills, as well as their verified usage.

This proven or verified usage means the conditions wherein the knowledge as well as skills are used (Dzelalija & Balkovic, 2014). The European Qualifications Framework for lifelong learning has recommended that all learning outcomes ought to be defined as knowledge, competence and skills, to simplify their description, their complexity level, as well as their later recognition (EFQ, 2008).

The discourse on indicators of student learning usually centres on students' performance on standardized tests. Indeed, performance on standardized tests is one measurement, but not the sole measure of what students know and can do. This is why there should be an assessment of student learning using multiple measures (Barry, 2010). EQF (2) describes learning outcomes as reports of what a learner understands, knows, and is capable of doing upon completion of a learning process, that are defined in relation to knowledge, competence and skills. This implies that the learning outcomes mean the positive evaluation of knowledge and skills by a competent body, in line with the competence (that is, objectivity as well as responsibility), that a learner has achieved as a result of learning and demonstrates after a learning process (Dzelalija & Balkovic, 2014).

Actually, a complex association between the social task system of students and the instruction task system should be viewed as opportunities to learn (Doyle, 1977). Similar to every teaching tool, technology should be integrated to enhance learning. Whenever technology is used, whether it is in classroom instruction or related to a classroom assignment, the teacher should ask if it improves the learning of a particular content or concept. For effective teaching, teachers should not only exhibit the knowledge of what ways to incorporate content or concepts within a particular discipline, they should be able to justify that this method is actually having a positive outcome or impact in their classrooms as proven through students' learning. There can only be justification for integration when students' comprehension of the content and concept is improved (Bucci *et al*, 2003). A basic fact with technology integration issue is that the utilization of technology by students ought to improve their learning. From time to time,

students make use of technology just for the reason that it is available. Students at times discover that a certain lesson may perhaps have actually been more effective without technology usage. These insights provide students with the opportunities to evaluate the suitability of certain technology usage in their teaching. However, several times, students discover that technology usage improves their lessons and enhances their learning. For instance, it was discovered that whenever teachers create Microsoft Excel charts to show mathematical graphs, it enables students to immediately see the differences in between the values of those specific values (Bucci *et al*, 2003).

#### **2.1.16 Educational Policies, Planning and Educational Technology Usage**

Currently, we are living in an era of fast change when the world continues to flatten and become more and more connected. Students today are already living and learning in this globally connected world and it is the responsibility of educators to get them ready for that connected future. All over the world including Nigeria, countries have begun formulating policies that include technology utilisation in education in response to social and economic changes (Vanderlinde, van Braak & Hermans, 2009; Fasae & Aladeniyi, 2012). Bults of these nations have established national goals that recognize the important role technology would play in the improvement of the educational system all together (Kozma, 2003). This is why technology usage in education is now becoming a significant part of educational policy making which has presently led to considerable expenditure (Mulkeen, 2003). Thus far, the principal purpose of almost every educational policy is to make resources available in order to address the needs of schools for equipment, network infrastructure, and to an extent for teachers' professional development (Jones, 2001; Owston, 2007; Vanderlinde, *et al*, 2009). The administrative structure of learning ought to be constant with knowledge management practices in universities. Above and beyond social interaction amongst teachers, it is crucial to speed up resource management like time and space sharing which contributes to the process of teaching and learning because it

creates an environment where knowledge management activities occur. Schools for instance must think through what forms of IT resources are vital to develop online and physical environments for sharing and ascertain that teachers would be capable of using them effectively (Leung, 2010). A number of universities in Nigeria are beginning to make emphatic moves towards improving on their information and communication policies (Fasae & Aladeniyi, 2012).

Planning is a problem solving activity. The worst course is to fail to plan at all (Solis, 2011). Formulating policies on technology integration is planning for it. Also, when a faculty plans the particular technology he or she wants to use for teaching, it enables him or her to prepare well in advance. This culminates in more effective teaching and learning. Planning techniques would also enable faculty or the administrator to foresee obstacles and make provision for possible ways of overcoming them. This implies that planning calls for a constant evaluation and modification by administrators and faculty to ascertain the effectiveness of the use of particular technology on students' learning. Using Nigeria as a case study, Ayanniyi (2006) is of the opinion that effective planning techniques would enable the educational administrator and planner to see that the economic use of educational resources is intelligently planned. Furthermore, Ayanniyi opined that effective planning enables the educational administrator and planner to be futuristic, drawing enlightenment from the past and taking into consideration the integration of formal and non-formal education as well as training facilities available.

Technology integration is said to be successful when it is first and foremost rooted in curriculum content as well as content-related learning processes; and secondly in the ability to make use of educational technologies (Harris, Mishra, & Koehler, 2009). Bryderup & Kowalski (2002) contend that the creation of a technology plan is a vital stride to the practical application of the integrated educational technology utilization. Furthermore, Baylor & Ritchie (2002) assert that schools that are successful in integrating educational technology are usually led by a technology plan. In the same way, Tondeur, Van Keer, van Braak & Valcke (2008)

established that schools that have a clear technology plan that lays emphasis on shared goals have teachers who are more inclined to educational technology usage more frequently in their classrooms.

#### **2.1.17 Educational Technology Utilisation by Faculty and Students**

The Internet has now made research, teaching and learning easier (Fasae & Aladeniyi, 2012). Randall (2011) suggests that if technology would be used as an effective learning tool, then teachers as well as students would need to first become familiar with its use and operation. Fuegen (2012) citing Shim & Shim (2001) adds that although technology is existent in certain form, many lecturers in most modern classrooms have been cautious in embracing it and changing their instructional practices to keep up with it. He asserts that many factors contribute to this and they includes self-efficacy, attitude, competency with computers, risk aversion, anxiety, time commitments, and whether they feel technology is significant to their teaching or not. According to Cuban (2001), to explain teachers' behaviour in terms of using or not using technology ought to go further than general explanations that are inclined towards blaming teachers. Venkatesh, *et al* (2003) claim that study reveals how and why persons adopt new information technologies, but not what influences technology usage by teachers in their classrooms. We require more understanding of the factors and views that inform these decisions. Fasae & Aladeniyi (2012) said that the students in Nigerian universities will need an interactive, stress-free and reliable means of accessing and retrieving information without wasting much time so as to encourage its usage. They are of the opinion that Internet utilization is greatly dependent on a number of factors like availability of services and facilities, purposes, locations, students' experience, amongst others.

For instructional effectiveness and efficiency to be achieved, guided practice may be rather better than self-discovery because guided practice exercises have a tendency to reduce the volume of time needed to get familiar with tools and enable groups to get started on their primary learning activities faster (Davies, Sprague &



New, 2008b). Teachers as well as students should anticipate a learning curve connected with the use of new technology, as well as practice. The use of the tools decreases frustration and difficulties at meeting expectations. Many lecturers use technology for administrative and research purposes than for instruction (Sahin & Thompson, 2006). Students at the undergraduate level reported that their highest and primary uses of technology comprise accessing music and videos, using presentation and spreadsheet software, accessing college and university library websites, accessing a course or learning management system (Smith, Salaway, & Caruso, 2009). Furthermore, the use of computer hardware devices by students has changed over the previous years. Students reported that they use laptops more than desktop computers, as well as handheld devices and cell phones are now prevalent (Smith *et al.*, 2009).

The most conventional use of technology by faculty includes accessing Internet resources, word processing and email (Kazley, *etal*, 2013). With the advent of the Internet, it is now possible for lecturers and students to work together without having physical interactions and still accomplish the same teaching-learning objectives with that of the traditional method of studying (Fasae & Aladeniyi, 2012). There could be differences in the type and what way students and lecturers use particular tools (Jones & Madden, 2002). Generally, students are more dynamic in the use of technology than faculty. Faculty use email more often than not to interconnect with colleagues and students whereas students frequently use texting messaging, wikis, blogs, as well as other social networking tools (Jones & Madden, 2002). The gap in the use of technology between faculty and students could result in unmet expectations eventually.

Students' expectation of faculty's instructional technology usage is usually less than what they see them use in the actual sense (Kyei-Blankson, Keengwe, & Blankson, 2009). This observation is also true for the use of course management systems, multimedia, social media, word processing, spreadsheets and asynchronous communication (Kyei-Blankson *et al.*, 2009, Kazley *etal*, 2013).

Faculty and students must be literate technologically before they can optimize technology usage in the teaching-learning processes. Eisenberg & Johnson (2002) are of the opinion that someone who is technologically literate could use technology as a tool for communication, research, organization, as well as problem solving. Technology literacy in educational conditions can be viewed as the capability to effectively make use of any piece of equipment, tool, electronic or mechanical device (i.e. technology) to achieve expected learning tasks. People who are technologically literate are aware of the capability of technology and they are able to use the technology skillfully, and they also know what type of technology to use per time (Randall, 2011).

Oliver & Shapiro (1993) opine that the observation of models has the capacity to increase someone's feelings of confidence. Nevertheless, it was discovered that teachers have not succeeded in modeling instructional technology usage and they did not call for students' technology usage in their classrooms as well as field-based projects (Faison, 1996). In addition, at times, teachers could be resistant to technology usage because they dislike, fear or feel uncomfortable with technology usage (Stone, 1998). Hannafin & Land (2000) stated a number of likely reasons that could explain teachers' resistance to computer usage which comprised uncertainty about computers' capacity to improve students' learning outcomes, dislike of the computer as a contender for the attention of students, more effort and time needed by the teacher and fright of losing grip of the stage, unsupportive administrators, as well as fear of looking silly before the students. They are also of the opinion that for effective technology integration to take place there has to be a major change in the role of teacher so as to gain from the collaborative nature of the technology as well as its capability to support student centered study. Hannafin & Savenye opined that teachers cannot just be dispensers of information to somewhat passive learners. According to them, technology-oriented teacher's new role is defined in the literature as information manager, organizer, guide, coach, diagnostician as well as initiator. They placed the role of the traditional lecturer as the role of facilitator, coach, and observer at one end and someone who imparts

knowledge at the other end of a continuum, and established that the first end would perhaps embrace constructivism while the other end embraces behaviourist learning theory.

#### **2.1.18 Moderating Factors of Gender, Age and Experience on Technology Usage**

Other factors such as gender, age as well as experience with technology usage could have a moderating influence on how an individual's opinion of a certain technology could lead to its subsequent acceptance and usage (Heerink, 2011).

An aspect of the general cultural differences which occur amongst humans is gender differences. Gender difference is one of the socio-cultural factors that influence perceptions as well as behaviours. Gender differences which are seen across several disciplines are also applicable to emergent technologies that are computer-based (Efuwape & Aremu (2013). For instance, recent evidence from real-life situations shows that women have more tendencies to have higher anxiety than men in terms of computer usage (Ahuja & Thatcher, 2005). The results from the finding of Efuwape & Aremu (2013) submit that differences amongst sexes occur in computer technologies situations which could affect technology acceptance and usage in workplaces and learning environments.

Furthermore, grounded on the UTAUT model and earlier literature, Wang, Wu, & Wang (2009) examined the factors of m-learning usage intention by exploring in what way gender and age differences could moderate the effect of these factors on usage intention for the Taiwan m-learning. The results showed that the effect of performance expectancy on behavioural intention was significant. However, gender and age differences were not discovered to be present. Secondly, the effect of effort expectancy on intention was established to be moderated by age, to the extent that it was significant for older users. Conversely, it was not significant for younger users. Also, the influence of social influence on usage intention was discovered to be moderated by age and gender, so much so that it was significant for men and

older users; nonetheless, it was not significant for women as well as younger users. Efuwape & Aremu (2013) found that males in general have more interest in information technology which suggests that there is a connection between gender and technology usage.

Similar to the findings of other studies, it was established that the middle-aged and older adults had lower self-efficacy regarding computer usage and greater computer anxiety than did younger adults (Czaja, Charness, Fisk, Hertzog, Nair, Rogers, and Sharit, 2006). In corroboration, Wang, *et al*, (2009) found that differences in age moderate the effects of m-learning on the intention to use technology. This result offers a number of significant suggestions for the acceptance of m-learning with regard to research as well as practice. They also found that Social influence influences the behavioural intention of an individual to use m-learning in a stronger way for the older persons than for those who are younger.

In terms of experience, Venkatesh & Morris (2000) assert that technology acceptance and usage could depend on previous experience with computers in general. Czaja, *et al*, (2006) carried out a study to see if experience on its own with technology predicted computer usage i.e. without attitude and skill factors. They stated technology usage as an influence on computer self-efficacy and computer anxiety and assessed if it had a direct influence on level of computer usage and extent of Web use with the exception of attitude factors and discovered that the effects of computer self-efficacy are obstructed by computer anxiety that was exactly associated with extent of computer experience and Web experience. This finding is quite interesting seeing that 90% of middle-aged and 84% of older people in the sample recounted that they have experience with computer usage. The variation could be as a product of the nature of their experience. For instance, experience could differ with respect to ease of system used, the nature of applications used and general success of the interaction.

### **2.1.19 Other Technology Acceptance Related Works**

The literature on the individual acceptance and use of information systems recognises different technologies acceptance frameworks and models of factors influencing user's adoption behaviour. Out of all the quoted models in the literature, the following four are the most common: (i) Technology Acceptance Model (TAM) (Davis, 1993); (ii) TAM2 (Venkatesh & Davis, 2000); (iii) The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*, 2003); as well as (iv) Diffusion of Innovation (DOI: Rogers, 1983).

The survey by Claar, Dias & Shields (2014), was carried out to measure several technology acceptance factors based on the technology acceptance model (TAM). The outcomes supported the following relationships between the variables: Perceived Ease of Use (PE), has a significant positive influence on perceived usefulness (PU); Perceived usefulness (PU) has a significant positive influence on attitude toward using (AT); Perceived Ease of Use (PE) has a significant positive influence on attitude toward using (AT); Perceived Usefulness (PU) has a significant positive influence on Behavioural Intentions to use (BI); Attitude toward using has a positive and significant influence on behavioural intentions to use.

Nanayakkara (2007) carried out a research in New Zealand and investigated the factors that influence or restrain the adoption of e-learning systems in higher institutions including universities and polytechnics. The results revealed that while different factors contribute significantly to the adoption of LMS, the systems as well as organizational factor are the most important for the acceptance of users in e-learning platforms.

Lin, Lu and Liu (2013) reviewed and assessed models of behavioural intention which includes TAM, TAM2, TPB and UTAUT. A new conceptual model was generated through this research to explain the influence of teaching styles as well as learning styles on the extent of acceptance of e-learning systems. The proposed model incorporates the aforementioned constructs to further understand system adoption in a

comprehensive manner and assesses e-learning management systems in higher learning. In the study, the Education Behavioural Intention Model (EduBIM) was proposed as a new technology acceptance model.

Utilizing some factors involving system enjoyment, system interactivity and flexibility of web based training system, Alrawashdeh, Muhairat & Alqatawnah (2012) carried out a research and extended the Unified Theory of Acceptance and Use Technology (UTAUT) for the explanation of employees' intention to use web based training system. Similarly, by way of extending UTAUT and in the context of m-learning acceptance, Abu-Al-Aish & Love (2013) added quality of service and personal innovativeness to the configuration of UTAUT. The results offer general practitioners and teachers with valuable guiding principle for the design of an effective m-learning system.

Furthermore, based on UTAUT, the study by Maina & Nzuki (2015) investigated the influence of performance expectancy, social influence, effort expectancy and facilitating conditions on the acceptance of E-learning Management System (EMS) in higher institutions in Kenya. They discovered that expected performance, institutional policies, enabling infrastructures and ease of effort use, training support and leadership have great influence on the adoption of EMS in higher institutions.

AlQudah (2014) applied Technology Acceptance Model's (TAM) extension to discover the attitude of staff towards Moodle. The results show that the perceived ease of use (PEOU) is a greater significant obstacle in the adoption of Moodle. This implies that teachers are inclined to use Moodle if they have the feeling that Moodle is easy to use. PEOU means the extent to which teachers believe the utilization of Moodle will be effort free and its handling will be stress-free. The study by Raman, Don, Khalid & Rizuan (2014) reported that performance expectancy, facilitating conditions and social influence all have significant influence on the users' behavioural intention to adopt Moodle.

The study by Marchewka, Liu & Kostiwa (2007) describes student perception in terms of applying the UTAUT model. The UTAUT model combines earlier TAM related researches. Nevertheless, in the study, there were mixed reaction for the model with regard to the reliability of the scale items that represent the UTAUT constructs and the assumed relationships. Though students are inclined to agree that Blackboard is good and they make use of it regularly, most of the software's features are not being utilised to their fullest capacity.

Lwoga & Komba (2014) explored the factors that predicted the continued usage intention of web-based learning management systems (LMS) by students in Tanzania and paid particular attention on the School of Business of Mzumbe University (MU). The results reveal that self-efficacy determined actual usage of web-based LMS, whereas performance expectancy, social influence, effort expectancy, self-efficacy and actual usage predicted the continuous usage intentions of web-based learning system. Discovered challenges for the utilization of web-based LMS were associated with weak ICT policies, limited skills, lack of time to prepare e-content and use the e-learning system, ICT infrastructure barrier, lack of awareness, LMS user interface was not user friendly, resistance to change, management and technical support.

### **2.1.20 Summary and Gaps in Literature**

It is quite evident from available literature that the adoption of educational technology would impact on learning outcomes. The factors that affect the use, acceptance and adoption of technology have been discussed by various authors/researchers. However, peculiar factors such as power and technology culture associated with developing nations have not been widely investigated.

Furthermore, though, theories such as SLT, UTAUT, TAM, and so on have been widely used independently to examine technology usage in institutions, not much has been done in combining peculiar factors from one or more of these theories in studying the usage and acceptance of education technology tools in Nigeria. In addition, to the best of the knowledge of the researcher, no study has attempted to

integrate power and technology culturation factors into any technology acceptance and usage model. Also, there is no known study that has presented the predictors of technology adoption in hierarchical order from the hybrid of UTAUT and SLT model to study educational technology usage.

This study attempted to fill this gap by investigating the role that Power (Electricity) and Technology Culturation play in the utilisation of educational technology in selected schools in Nigeria in addition to factors drawn from SLT and UTAUT model. The new model derived would be more appropriate for studying technology utilisation in Nigeria and by extension, other developing nations of the world. The study also analysed the factors that determine technology usage in hierarchical order (from the strongest to the least). This is unique and would impact on policies that affect educational technology usage in developing nations.



## **2.2 Theoretical Framework**

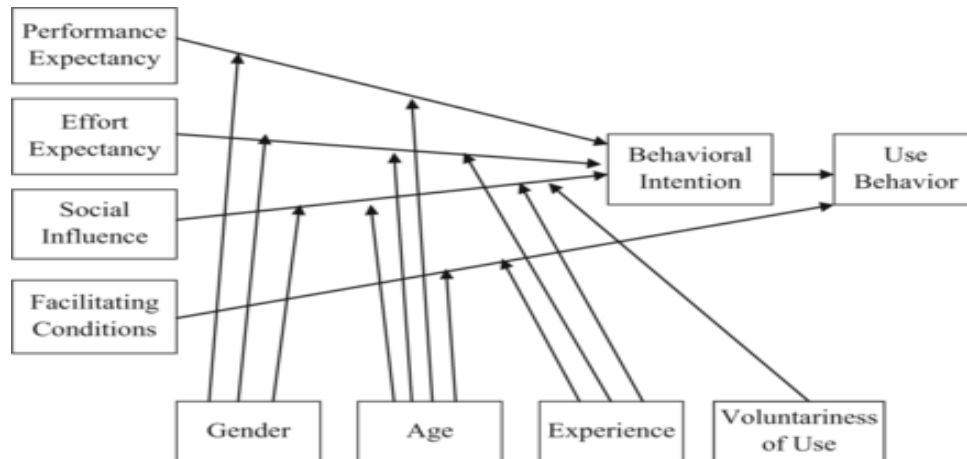
### **2.2.1 Preamble**

This section seeks to provide an explanation for user's behaviour with respect to the use of educational technology. In explaining why human beings act the way they do, it is vital to understand the reason for their action. To understand any given behaviour or act therefore, it is necessary to study the factors that could lead to that particular human behaviour (Alalade, 1997). In this work, the Social Learning Theory and the Unified Theory of Acceptance and Use of Technology model factors will be engaged to examine the factors that could influence the use behaviour of educational technology.

### **2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)**

Comprehending the acceptance and use of information technology by individuals is a major aspect of information systems study (Benbasat & Barki 2007). Many theoretical models have been primarily developed from theories in sociology as well as psychology, engaged for explaining technology acceptance and use (Venkatesh, *et al*, 2003; Venkatesh, Thong, & Xu, 2012). A review and combination or blend of eight models/theories of the use of technology gave rise to the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh *et al*. 2003).

One major emphasis of information systems research is the need to study individual acceptance and use of technology. This need has been widely addressed by using some theories from disciplines such as sociology and psychology to develop models that are used to explain technology acceptance and use (Venkatesh, Thong, & Xu, 2012). Consequently, the combination of eight of the theories / models which emerged over time on the use technology gave rise to the Unified Theory of Acceptance and Use of Technology (UTAUT) by (Venkatesh, Morris, Davis & Davis, 2003).



**Figure 2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)**

(Venkatesh, Morris, Davis, & Davis, 2003)

Venkatesh *et al.* (2003) combined the eight theories/models of technology use (i.e. user acceptance and motivation models and theories) to propose the Unified Theory of Acceptance and Use of Technology. The following are the eight theories/models: (1) Social Cognitive Theory (SCT); (2) The Technology Acceptance Model (TAM); (3) The Theory of Reasoned Action (TRA); (4) The Motivational Model (MM); (5) The Theory of Planned Behaviour (TPB); (6) The Model of PC Utilization (MPCU); (7) A combined theory of Planned Behaviour/Technology Acceptance Model (C-TPB-TAM); and (8) Innovation Diffusion Theory (IDT). As a result, UTAUT submits that four primary constructs directly determine technology acceptance (behavioural intention) and use (behaviour): they are: *Performance Expectancy*, *Effort Expectancy*, *Social Influence*, and *Facilitating Conditions*. The theory further submits that the effect of these four constructs is moderated by *variables of age, gender, experience and voluntariness of use* (four other variables).

UTAUT has been employed for intention-based models that used behavioural intention to predict technology usage (Taylor & Todd, 1995). It is used as the latest model for analysing intention to use new technology and the actual Use (Young, *et al.*, 2014). When compared to prior usage intention (acceptance) models with all their extensions, Venkatesh, *et al.* (2003) revealed that UTAUT explains 70 percent of

individuals differences in the use intention of technology and this is more than every of the eight prior models as well as their extensions. According to Venkatesh, *et al*, (2012), UTAUT has advanced the essential factors and likelihoods that could predict behavioural intention to use a technology and technology usage.

### **Factors/Constructs of UTAUT**

**Performance Expectancy (PE)** is the extent to which a person believes that the use of a particular technology will aid him or her to accomplish gains in task performance. **Effort Expectancy (EE)** is the extent of ease connected with technology usage. **Social Influence (SI)** is the extent to which someone perceives that important others believe he or she should make use of a particular technology. While **Facilitating Conditions (FC)** is the extent to which a person believes that an organizational (in terms of financial support, availability of and access to technology, and others.) and technical infrastructure is present to support technology usage (Brown & Venkatesh, 2005; Venkatesh *et al*. 2003). Performance expectancy, effort expectancy, as well as social influence have been hypothesized to influence behavioural intention to use a technology, while behavioural intention and facilitating conditions are held to determine the use of technology. While individual difference variables of age, gender, as well as experience are theorized to moderate several UTAUT relations (Venkatesh, Thong, & Xu, 2012).

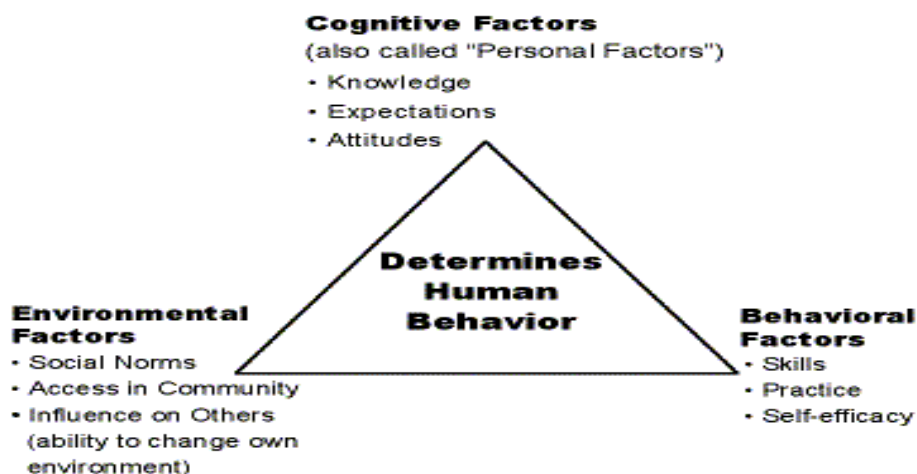
Based on UTAUT, Young, *et al* (2014) and Venkatesh, *et al*. (2003) assert that the intention to use technology affects the actual use of technology. Performance expectancy of UTAUT is the greatest predictor of the intention to use technology (Agarwal & Prasad, 1998). Current research results show that the factor of performance expectancy had significant indirect effects on actual use. For instance, it was discovered that when mobile performance expectancy is high, then the intention of using mobile learning services will also be high. This implies that performance expectancy improved the intention of mobile learning. Also, mobile learning services connected with e-learning enhanced learning outcomes, lowered expenditure as well as time, and improved the efficiency as well as learning effectiveness (Young, *et al*,

2014). Venkatesh, *et al* (2003) assert that the social Influence of UTAUT contains the obvious or implied view that the behaviour of individual's is influenced by just how they believe others will look at them for the reason that they have used a technology. Although, it has been proved that social influence has a positive effect on technology usage (Chiemeké & Ewuekpae, 2011; Hao, n.d.), in the studies by Young, *et al* (2014) and Attuquayefio (2014), it was discovered that the influence of the factor of social influence on Use Behaviour was not statistically significant.

Although UTAUT has been successfully used in diverse contexts especially organizational contexts amongst others, the validity will be further supported if its investigation continues particularly in new contexts. To explain behaviour (in this context, Use Behaviour of Educational Technology), it is clearly important to examine individuals in their immediate social context in relation to the use of educational technology. This study therefore used the Social Influence and Performance Expectancy variables of UTAUT model to discover the factors that influence the acceptance (Behavioural Intention) and use of educational technology (e-learning tools and facilities) in selected universities in Ogun State, Nigeria.

### **2.2.3 Social Learning Theory (SLT)**

Social learning is an active social involvement within community practices. It lays emphasis on the dynamic interaction amongst persons and the environment in the shaping of meaning as well as identity. This theory which can likewise be referred to as social cognitive theory has been applied several times with diverse success to problems of influencing, explaining and predicting human behaviour (Irwin, Victor, and Marshall, 2014). It is one of the theories used in literature to explain the factors that account for the use of technology. The theory can be used to investigate social factors affecting technology usage by learners (Zhang & Zhao, 2011).



**Figure 3.2 Social Learning Theory (Albert Bandura, 1989)**

According to the Social Learning Theory, Behavioral, Cognitive and Environmental factors all influence learning behaviour. Learning is not achieved through independent factors but by a mixture of all these influences (Park *et al*, 2014). This implies that learning can be best understood within a model which is a collection of the aforementioned factors (Bandura, 1989). **Environmental factors** comprise *social norms*, *Access in community*, and *Influence on others*; **Behavioural factors** consist of *Skills*, *Practice* and *Self-efficacy* as inherent variables; while **Cognitive factors** comprise a person's *Knowledge*, *Expectations*, and *Attitude*. These three factors are believed to determine a person's behaviour (Park *et al*, 2014).

Social learning theory centres on the learning that takes place in a social context. It posits that learning is a cognitive process that takes place in a social context and could happen purely through observation or direct instruction. Social learning theory explicitly puts forward that people learn from each other and includes concepts such as observational modeling, imitation, learning and vicarious/displaced reinforcement (Ormrod, 2008). The principles of human functioning associated with student learning comprise the process of self-efficacy (self-confidence) and self-regulation (i.e. goals, plans, perseverance). Through self-efficacy a person can believe what they can accomplish. Without self-efficacy success is very difficult. It is the result of

someone's capability in using a technology to get a specific task or job done (Huitt, 2006). A major aspect of the social learning theory is modeling. When people learn from the effects or result of actions of others, it could influence their own choices directly (Bandura, 2008). Olivier & Shapiro (1993) opine that the observation of models has the capacity to increase the feelings of confidence of someone. On the other hand, Faison (1996) discovered that instructors have been unsuccessful in modeling instructional technology usage. Besides, they did not oblige students to use technology during classes and for assignments that are field-based. Students are always surrounded by social influences (Bandura, 2008).

There is presently greater emphasis on social learning as well as the usage of social software like virtual worlds, wikis, blogs, social networks and podcasts. Technologies like virtual classrooms, blogs, collaborative software, audio, ePortfolios, video and tools such as computers and laptops are progressively utilised to support e-learning (Omeruo, 2013). Social interactions and learning happen through online communities with students-to-professionals or students-to-students. Depth of understanding could be facilitated when technologies are integrated into the context of teaching by way of intellectual tools that students use for learning, studying and communicating with others in classrooms as well as with others in diverse settings (Sherman & Kurshan, 2005). Social interactions create learning whereby students are capable of applying meaning and comprehensively grasping what they are learning. Social influence is closely associated with social learning (Park *et al.*, 2014).

Based on the Social Learning Theory, Akers, Krohn, Lanza-Kaduce, & Radosevich (1979) argued that research has consistently found that it is much more likely for those holding positive attitudes toward a substance to use it than those holding negative attitudes toward it. Previous research has discovered that positive attitudes toward technology could really increase its actual use (Klobas, 1995). In the study by Adewole-Odeshi (2014), it was revealed that the attitude of university students toward using e-learning system has a positive influence on their intention to use the system in Nigeria.

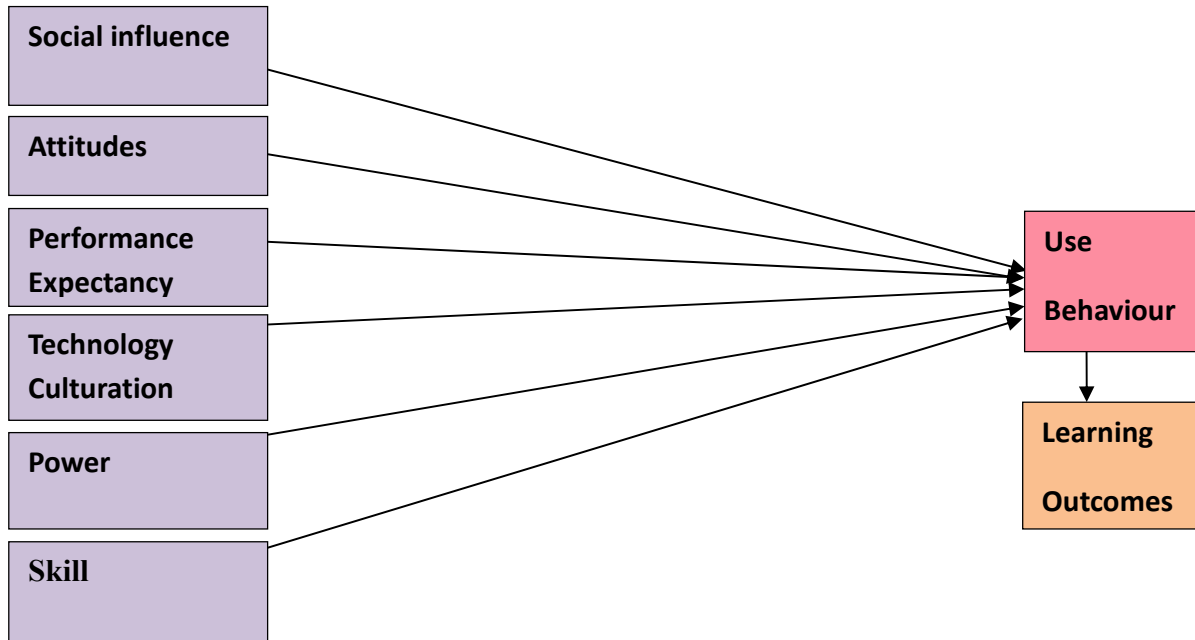
Furthermore, Gulbahar & Guven (2008) opined that skills with regard to technology have been globally acknowledged as a key factor in the achievement of technology integration in education. However, they opined that the skills needed for the use of technology as an aid in the classroom is lacking. Thanuskodi (2013) opined that skills and attitudes (which are variables in SLT) toward ICT continue to be a challenge for them in the efficient adoption and use of technology in the classroom. Corroborating Thanuskodi, Gulbahar & Guven (2008) said that one of the obstacles to technology usage is insufficient professional development opportunities for knowledge and skill acquisition.

Lwoga & Komba (2014) explored the factors which predicted the continued usage intention of web-based learning management systems (LMS) by students in Tanzania, and it was realised that one of the challenges of web-based LMS usage is associated with limited skills. Also, recent empirical studies have shown that self-efficacy based on SLT directly affects the actual use of new technologies (Chiu & Wang, 2008; El-Gayar & Moran, 2006; Luarn & Lin, 2005; Lwoga & Komba, 2014).

SLT has been used in diverse contexts successfully; the continued examination in new contexts will support its validity further. To explain the use behaviour of Educational Technology, it is clearly important to examine individuals in their immediate social context (universities). This study therefore used the Attitude and Skill variables of SLT to explore some of the factors that influence the acceptance and use of educational technology in selected universities in Ogun State, Nigeria.

## 2.3 Conceptual Framework

Below is the researcher's conceptual framework.



**Figure 3.3 Framework for Educational Technology Usage**

Methodologically, Unified Theory of Acceptance and Use of Technology model and Social Learning Theory propounded by Venkatesh, Morris, Davis & Davis (2003) and Bandura (1989) respectively have been widely used to examine technology usage, integration and adoption. However, Power (Electricity) is not considered in either of these theories because it is not a critical issue in the developed world. Additionally, people who grew up in developed nations are already acculturated with the use of technology.

The researcher's conceptual framework in figure 2.3 is an adaptation of factors/constructs drawn from UTAUT and SLT. However, by way of extension, Power and Technology Culturation factors which were not considered in both the SLT and UTAUT model are integrated into this model.



### **Explanation of Conceptual Framework and Relationship between Its Variables**

The conceptual framework (model) in figure 2.3 suggests that six essential factors (*Performance Expectancy, Social Influence, Skill, Attitudes, Technology Culturation* and *Power*) are direct determinants of technology usage (use behaviour). The model would help in explaining variations in educational technology acceptance and usage in Nigeria being a developing nation.

The six essential factors are the independent variables while the Use Behaviour which leads to effective learning is the dependent or outcome variable.

### **Meanings of Variables in Conceptual Framework**

#### **Independent Variables**

**Performance Expectancy (PE):** This is the extent to which an individual believes that the use of a particular technology will aid him or her accomplish gains in task performance.

**Social Influence (SI):** Social influence is the degree to which a person recognizes that important others (such as friends, colleagues, parents, teachers, leaders, among others) believe that he or she ought to use a particular technology. In this context, social influence measures the extent to which a student observes that important others (such as superiors, faculty as well as peers of students) believe that he or she should use technology.

**Attitudes toward using technology (ATT):** This could be viewed as the tendencies to react in a specific way to a specific thing or class of objects in a steadily positive or negative manner. It is the affective reaction of persons to technology usage.

**Technology Culturation (TC):** This concept represents a person's prior exposure to relative technologies such as television, cable satellites, video games, radio, and others. It assumes that in a given society, this can affect an individual's acceptance of other ICTs or other advanced technologies subsequently. It could also be viewed as the influence of technologically-advanced cultures on the attitude of an individual to technology (Okoli, 2003).

**Skill:** Skill is the ability to use one's knowledge effectively in doing something.

**Power:** This is the energy that is generated through electrical, mechanical or other means and used for operating a machine or device. Power, electricity and energy are often used interchangeably.

### **Dependent/Outcome Variable**

**Use Behaviour:** This is the actual usage act.

**Learning Outcome:** This is what a learner understands, knows, and is capable of doing upon completion of a learning process, that are defined in relation to knowledge, competence and skills.

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter describes the research method that was employed in this study. Therefore the chapter describes the research design, study population, sample size, sampling technique, sources of data, description of questionnaire, validity and reliability of instruments, and data analysis method.

#### **3.1 Research Design**

This study focuses on the analysis of factors influencing educational technology usage in selected universities in Ogun State, Nigeria. In order to narrow down the scope of educational technology, e-learning tools and facilities were used as educational technology tools in this study. The study adopted the cross sectional survey research method because of the following fundamental reasons: firstly, it is an effective technique in describing attitudes, opinions and characteristics (Mathiyazhaga & Nandan, 2010). Secondly, it gives room for information to be generally collected from a fraction (sample) of the population (Pinsonneault & Kraemer, 1993). Thirdly, the survey research design allows inferences to be drawn on the population from the data collected from the sample (Gable, 1994).

The framework at which the study describes the attitudes, opinions, characteristics of the study population in solving the research problem is through the research instruments of Questionnaire and Personal Interviews.

#### **3.2 Study Population**

Going by records, Ogun state has the highest concentration of universities in Nigeria (public and private). It has 14 (fourteen) universities in all. The universities include one Federal university, two state universities and eleven private universities.

Therefore, the choice of Ogun State in the South-Western part of Nigeria is adequate for this study. Table 3.1 shows the list of universities in Ogun State as at May, 2016.

**Table 3.1 List of Universities in Ogun State, Nigeria**

S/N	UNIVERSITY	YEAR OF ESTABLISHMENT	TYPE
1	Federal University of Agriculture, Abeokuta,	1988	Federal
2	Olabisi Onabanjo University, Ago-Iwoye	1982	State
3	Tai Solarin University of Education, Ijebu-Ode	2005	State
4	Babcock University, Ilisan-Remo	1999	Private
5	Bells University of Technology, Ota	2005	Private
6	Crawford University, Igbesa	2005	Private
7	Crescent University, Abeokuta	2005	Private
8	Chrisland University, Owode	2015	Private
9	Christopher University, Mowe	2015	Private
10	Covenant University, Ota	2002	Private
11	Hall University, Ijebu-Itele	2015	Private
12	McPherson University, Lagos-Ibadan, Seriki-Sotayo	2012	Private
13	Mountain Top University, Lagos-Ibadan Expressway	2015	Private
14	Southwestern University, Okun-Owa	2012	Private

The purposively selected universities from the aforementioned table for this study are categorized into private, federal and state universities and name University A,

University B and University C respectively. This enabled the researcher to ascertain the factors influencing educational technology usage in the institutions as well as the extent of educational technology usage and provided a basis for comparisons so as to know what obtains at the private, federal, and state levels (universities) in term of educational technology usage.

The population for this study is made up of undergraduate students from these universities, their lecturers and theirs Director of ICT Centres.

**Table 3.2 Distribution of Students across Selected Universities by Categories**

<b>Institution</b>	<b>Population / Source</b>	<b>Type</b>	<b>Category</b>
University A	8,052 (Academic Planning Unit, 2015)	Private	Private
University B	15,480 (Academic Planning Unit, 2015)	Federal	Public
University C	19,132 (Academic Affairs, 2015)	State	Public

**Source:** Compilation (2015)

### **3.3 Brief Background of Sampled Universities**

#### **i. University A**

University A is a Christian mission based (private) university founded in 2002 by Dr. David Oyedepo, the President of the Living Faith Church Worldwide.

The university presently has four (4) colleges, namely; College of Business and Social Sciences (CBSS); College of Science and Technology (CST); College of Leadership Development Studies (CLDS); and College of Engineering (CoE).

The University was ranked 2nd in Nigeria in the July, 2016 edition of Webometrics ranking by Cybermetrics Lab.

## **ii. University B**

University B was founded on the 1<sup>st</sup> of January, 1988, at the time that four universities of technology (previously combined in 1984) were separated by the Federal Government, which led to the establishment of the first two universities of agriculture in Nigeria (i.e. in Abeokuta and Makurdi).

The university consists of the following colleges:

- The College of Management Sciences;
- College of Engineering;
- College of Veterinary Medicine
- College of Food Sciences and Human Ecology;
- The College of Environmental Resources Management;
- The College of Animal Science and Livestock Production;
- The College of Agricultural Management and Rural Development;
- The College of Plant Science and Crop Production;
- The College of Biosciences.

The University was ranked 7<sup>th</sup> in Nigeria in the July, 2016 edition of Webometrics ranking by Cybermetrics Lab.

## **iii. University C**

University C was established on the 7<sup>th</sup> of July, 1982 as Ogun State University but was rechristened Olabisi Onabanjo University on the 29<sup>th</sup> of May, 2001 in respect of Chief (Dr.) Olabisi Onabanjo, who brought forth the university through his efforts as the then civilian governor of the State.

The university has many campuses spread all over Ogun State. The main campus which is referred to as the permanent site by students is located in Ago-Iwoye and a mini campus that houses the science department. The Faculty of Agriculture of the university is at Aiyetoro; the Faculty of

Engineering is at Ibogun; the College of Medicine is at Shagamu; while the Faculty of Pharmacy and Department of Biochemistry are in Ikenne.

The University was ranked 28th in Nigeria in the July, 2016 edition of Webometrics ranking by Cybermetrics Lab.

### **3.4 Sampling Technique and Sample Size Determination**

#### **3.4.1 Sampling Technique**

This research focused on the analysis of factors influencing the use of educational technology in selected universities in Ogun State, Nigeria. It adopted the purposive sampling technique. “In purposive sampling, some specific elements which usually satisfy some pre-determined criteria are selected” (Nworgu, 1991, p.78). Hence, the researcher had to ensure that those who constituted the sample size for the study were bona-fide students of the selected universities, they were under-graduate students and from 200 level and above. Postgraduate students were not included in the study.

#### **3.4.2 Sample Size Determination**

The sample size for this study is 800. In the determination of sample size from a given population, there are different models employed in the literature. This study utilized Raosoft online sample size calculator and the formulae postulated by Guilford and Fruchter (1973). This study aims at sampling undergraduate students of the selected universities in a way to have confidence level of 95%. This means that the probability of committing error will not exceed 5%.

The Guilford and Fruchter formula is expressed as:

$$n = N / \{1 + N (e^2)\} \quad \text{-----Equation 3.1}$$

Where

n = Sample size

N = Total Population size

e = Significance level

Using the Guilford and Fruchter formula, the determined sample size from the total population across the three institutions is as presented:

**Table 3.3 Sample Size Determination Using Guilford and Fruchter Formula**

<b>Total Population</b>	<b>Guilford and Fruchter Formula Calculation</b>	<b>Minimum Sample Size</b>	<b>Total Sample Size Used</b>
42,664	$\frac{42,664}{1+42,644 (.05)^2}$	396.28	800

**Source:** Computation (2015)

**Table 3.4 Sample Size Distribution**

Institutions	Total Population	Sample Size
University A	8,052	218
University B	15,480	261
University C	19,132	321
800		

**Source:** Researcher's computation (2015)

### **3.5 Sources of Data**

The primary and secondary sources of data were used for this study. Primary data were obtained through the use of structured questionnaire, while the secondary data were obtained from journals, text books, university handbooks, bulletins, and others. Personal Interviews were also used to adequately elicit information from respondents where necessary and applicable to compliment the questionnaire so as to enrich the study.



### 3.5.1 Questionnaire

A questionnaire-based survey was conducted in the selected universities in Ogun State, Nigeria. The respondents were undergraduate students of the selected universities. The questionnaire for undergraduate students was divided into four sections to specifically address the hypotheses formulated in the study as well as the objectives of the study. The first section (Section A) contains items capturing the respondents' demographic information such as age, gender, and so on. Section B comprises items that express the extent of usage and integration of e-learning tools/facilities in learning. Section C comprises questions on factors from Unified Theory of Acceptance and Use of Technology (UTAUT), Social Learning Theory (SLT), Power, Technology Culturation, Use Behaviour and Learning Outcomes that influence the use of E-learning Tools/facilities; while Section D is made up of questions on Obstacles/Challenges to the use and integration of educational technology tools and facilities. All the items in the tables in sections B to D were measured using a five-point Likert scale. The Statistical Package for Social Sciences (SPSS) software, version 20 was used for data analysis.

The questionnaire was designed based on the following variables (factors) from UTAUT and SLT as basis for measuring users' Behavioral intentions for using technology:

- Social influence
- Performance expectancy
- Attitude
- Skill

Additionally, questions were asked on the two new factors (variables) that the researcher identified and integrated into the proposed new model as *a priori tests* for determining educational technology usage/acceptance in Nigeria, viz:

- Technology Culturation, and
- Power (electricity).

### **3.5.2 Personal Interviews**

To enrich the investigation, this study made use of Personal Interviews to adequately elicit information from respondents where necessary and applicable. In particular, personal interview was used to elicit information from 24 lecturers across the selected institutions as well as Directors of the ICT Centres. The interviews were transcribed and interpreted. This method afforded the researcher the opportunity to get an in-depth understanding of the factors influencing the use of educational technology in the selected institutions in Ogun, State, Nigeria. The personal interview guides were divided into two sections. The first section (Section A) contains items capturing the respondents' demographic information such as age, gender, etc.; while Section B consists of questions regarding ICT policies, funding, management support, technical support, power supply, training opportunities, internet access, etc.

## **3.6 Validity and Reliability Checks**

In order to improve the quality of the research instrument, the study conducted validity and reliability checks. The Validity checks disclosed the extent to which the measures used accurately capture the specific concept intended to be measured. To this end, the validity check pre-tests and pilot tests the research instrument (questionnaire). Cronbach Alpha was used to verify the reliability of the research instruments.

### **3.6.1 Pre-Test**

The pre-test was aimed at clarifying the wordings and structure of each of the questions in the questionnaire. The pre-test was conducted by giving the questionnaire to academics in Sociology, Computer Science, Mathematic/Statistics departments to ascertain face and content validity. The choice of academics in Sociology is due to their wealth of knowledge in Sociology while the choice of academics in Computer science is due to their wealth of knowledge on technology

and the choice of academics in Mathematics/Statistics department is based on their knowledge in questionnaire structure.

### 3.6.2 Pilot Test

The pilot test was conducted by administering the questionnaire to fifty undergraduate students in the Colleges of Business and Social Sciences and Science and Technology, University A. The pilot test was aimed at ensuring that the respondents understood, could interpret and easily answer the questions. From the responses of the students, it was obvious that there were no ambiguities in the questionnaire because the questions were well answered which implied that they were well understood.

### 3.6.3 Reliability Test (Cronbach's $\alpha$ )

The Cronbach's  $\alpha$  being the most commonly used measure of reliability was used to check individual item on the questionnaire. The table below shows the Cronbach's Alpha result as computed by SPSS (Statistical Package for Social Sciences) software, version 20.

**Table 3.5 Reliability Test (Cronbach Alpha)**

Questions/Items	Cronbach's Alpha's Result	Decision
<b>EXTENT OF USAGE OF EDUCATIONAL TECHNOLOGY TOOLS</b>		
My lecturers present their lectures in electronic form	.833	High
I use data bases, internet and e-books to enhance my learning	.835	
I have a user account for e-learning	.843	
I collaborate with other students on e-learning platform	.834	
I interact with lecturers on e-learning platform	.842	
I use social media for e-learning	.829	
<b>PERFORMANCE EXPECTANCY</b>		
e-learning facilities are useful for learning	.832	
e-learning tools help me to accomplish tasks quickly	.830	

e-learning tools increase my productivity	.831	High
e-learning enhances getting better grades	.832	
SOCIAL INFLUENCE		
People who influence my behaviour support e-learning usage	.834	High
People who are important to me support e-learning usage	.835	
Management provides and encourage the e-learning usage	.838	
e-learning usage improves my prestige//image	.832	
ATTITUDE		
I like using e-learning technology tools	.827	High
e-learning tools makes learning interesting	.825	
Using e-learning facilities is fun/exciting	.825	
Using e-learning tools is a good idea	.830	
SKILL		
I use e-learning tools with little or no assistance	.835	High
I am competent in the use of e-learning tools	.836	
I have enough knowledge on how to use e-learning tools	.832	
I am confident when I use e-learning tools	.832	
TECHNOLOGY CULTURATION		
I have previous access to technology	.835	High
my prior exposure to technology affects my acceptance of e-learning	.834	
I use internet to download learning materials	.830	
I have attended training on the use of e-learning tools and facilities	.837	
POWER		
Power is very stable for e-learning tools usage in my school	.845	High
Power will not deter me from using e-learning tools	.842	
Power supply is not at extra cost in my institution	.849	
The use of e-learning tools require stable power supply	.837	
USE BEHAVIOUR		
I regularly use e-learning facilities	.830	
I regularly use internet for information search	.834	

I regularly use the internet for communication	.832	High
I regularly use the internet to download learning materials	.833	
<b>LEARNING OUTCOMES</b>		
My academic performance has improved with the use of e-learning tools	.828	High
I comprehend faster with the use of e-learning tools	.828	
Using e-learning tools enhances my understanding of concepts	.830	
E-learning tools facilitate collaborative learning	.826	
<b>OTHER OBSTACLES/CHALLENGES</b>		
Poor and unreliable internet access	.842	High
Limited availability of e-learning facilities	.843	
Lack of technical support	.849	
Lack of access to e-learning facilities	.837	
Institutional policy on e-learning adoption and usage	.843	

*Source: Analysis of Field Survey (2016)*

Nunnally (1987) advocates a minimum of 70% as adequate level of Cronbach Alpha. Consequently from table 3.5, all the items captured under Performance Expectancy, Social Influence, Attitude, Skill Technology Culturation and Power report above the threshold of 70% or 0.7 which indicates high interrelatedness of items measured and it also shows that the research instrument is reliable.

### **3.7 Data Collection Procedure**

A Research Assistant was recruited and trained to assist the Researcher in the data collection process who in turn trained another assistant. Additionally, twelve (12) lecturers were contacted across the three institutions for administration of questionnaire during class sessions. Consequently, virtually all the questionnaire administration and retrievals were done during class sessions (i.e. in a controlled environment). The questionnaire administration and interviews were done from the latter part of the month of February, 2016 to April, 2016.

The challenge encountered on the field was with University C respondents who had just resumed from a strike and were preparing for examinations. This affected their attention; however, class room administration of the questionnaire was still made possible on the long run because of the previous contacts of the lecturers who still made rooms for it.

Data collected were sorted, coded and analysed. Consequently, serial number was given to each questionnaire for identification purposes. Eight hundred and thirty copies of the questionnaire (830) were administered out of which 800 that were properly filled and returned were used for this study. This consists of 220 from university A, 260 from university B, and 320 from university C. Over 800 copies of the questionnaire forms were deliberately administered in order to give room for incomplete and unreturned questionnaire so that the researcher could still be able to use up to 800 copies of the questionnaire for this study.

### **3.8 Method of Data Analyses**

Descriptive statistics using frequency count, percentages and histograms were used to describe the nature of the respondents' response. Multiple and linear regression analyses were used to test the hypotheses by determining the relationship between the variables and Correlation coefficient was used to justify the interrelationship of the variables in the hypotheses.

All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS), version 20 software. Personal interviews that were used to support the quantitative data analyses were transcribed and interpreted accordingly.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSES

This chapter presents the analysis and interpretation of the data that were utilized in the study. To begin, the descriptive analyses of major classification of data used across the three institutions under study are presented both in tabular and pictorial forms which help to answer the research questions. Next, the descriptive analyses for the variables under study (i.e. the factors influencing educational technology usage) are interpreted. After this, the results from the statistics are presented. Lastly, the research hypotheses are tested using regression analysis and correlation coefficient to check for the significance of the variables and the level of relationship that exists between them.

**Table 4.1 Distribution of Respondents by Gender**

	Frequency	Percent (%)
Female	445	55.6
Male	355	44.4
Total	800	100.0

**Source:** Field Survey, 2016

The sex distribution of respondents is presented in Table 4.1 with female (55.6 %), and 44.4% male.

**Table 4.2 Distribution of Respondents by Age**

Age	Frequency	Percent (%)
16-20	388	48.5
21-25	370	46.3
26-30	36	4.5
31-35	5	0.6
36-40	1	0.1

**Source:** Field Survey, 2016.

The age distribution of respondents is presented in Table 4.2. The table depicts that the ages of undergraduate students across the three institutions mostly range from 16 to 25 constituting 94.8% of the respondents. People within this age group are expected to be users of or familiar with technology.

#### **4.1 Descriptive Analysis of Research Questions**

The following section discusses the five research questions of this study by presenting the questions, a tabular representation of the responses of the respondents and the interpretation of the findings. For all the interpretations, Strongly Disagree and Disagree were combined into Disagree while Strongly Agree and Agree were combined into Agree. Similarly, all the figures, i.e. (Figure 4.1 – Figure 4.43) presented as histograms are plotted with frequency values against the Likert Scale (i.e. Strongly Agree (1), Disagree (2), Undecided (3), Agree (4) and Strongly Agree (5)).



#### 4.1.1 Research Question One

To what extent do UTAUT factors (Performance Expectancy and Social Influence) affect the use of Educational Technology?

Table 4.3 contains analyses of respondents' responses on Performance Expectancy and Social Influence factors of UTAUT. It is comprised of eight questions.

**Table 4.3 Distribution of responses on Performance Expectancy and Social Influence Factors**

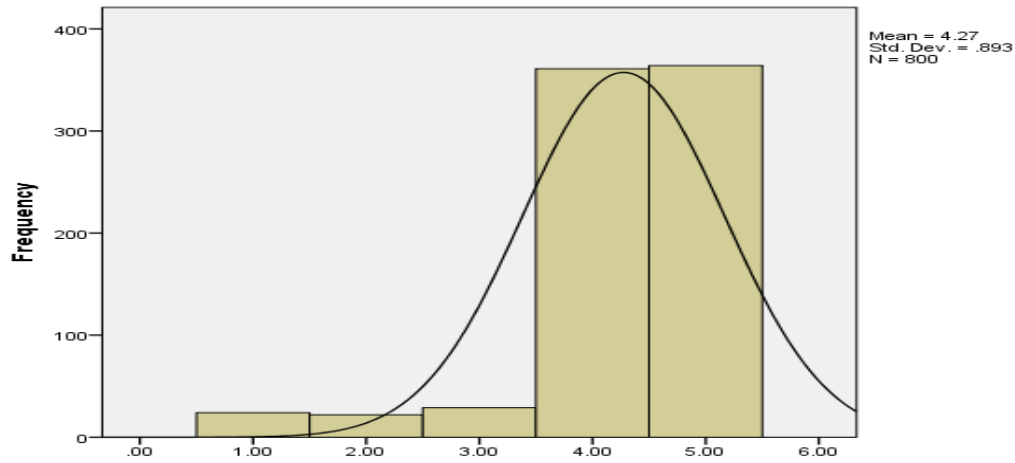
Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
e-learning tools and facilities are useful for learning	24 (3%)	22 (2.8%)	29 (3.6%)	261 (45.1%)	364 (45.5%)	800
e-learning tools help me to accomplish tasks quickly	14 (1.8%)	42 (5.3%)	48 (6%)	405 (50.6%)	291 (36.4%)	800
e-learning tools increases my productivity	12 (1.5%)	27 (3.4%)	47 (5.9%)	453 (56.6%)	261 (32.6%)	800
e-learning enhances getting better grades	14 (1.8%)	51 (6.4%)	82 (10.4%)	383 (47.9%)	270 (33.8%)	800
People who influence my behaviour support e-learning tools usage	54 (6.8%)	151 (18.9%)	198 (24.8%)	308 (38.5%)	88 (11%)	800
People who are important to me support e-learning usage	34 (4.3%)	98 (12.3%)	134 (16.8%)	407 (50.9%)	127 (15.9%)	800
Management provides and encourages e-learning tools usage	110 (13.8%)	153 (19.1%)	91 (11.4%)	301 (37.6%)	145 (18.1%)	800
e-learning usage improves my prestige//image	46 (5.8%)	91 (11.4%)	154 (19.3%)	364 (45.5%)	145 (18.1%)	800

**source:** Field Survey, 2016.

#### Perception on usefulness of E-learning Facilities

With respect to the first question on table 4.3 which is on perception of e-learning facilities, 5.8% of the respondents mentioned that they do not find e-learning facilities useful for their

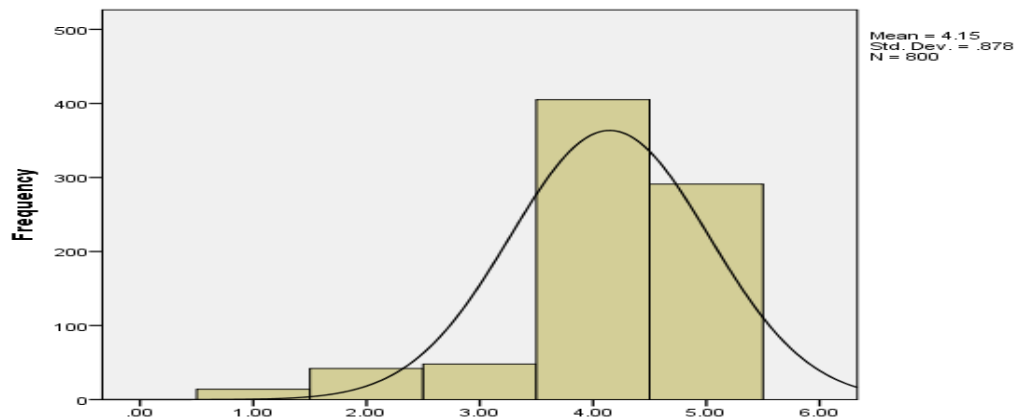
learning, while 90.63% claimed that they find e-learning facilities useful for their learning. The result is represented by the graph in figure 4.1.



**Figure 4.1 Distribution of responses by perception on usefulness of e-learning tools**

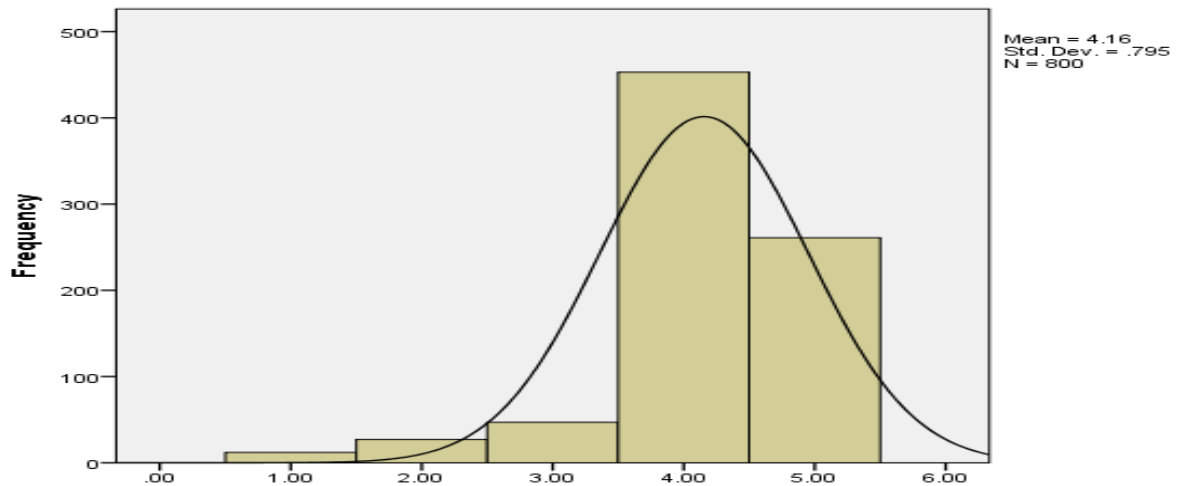
### **E-learning Tools Effectiveness**

With regard to the second question on opinion on e-learning tools effectiveness in table 4.3, 87% of the respondents said using e-learning would help accomplish given tasks more quickly while 7.0% said it would not help. The result is presented in the graph in figure 4.2.



**Figure 4.2 Distribution of responses by opinions on E-learning tools efficiency**

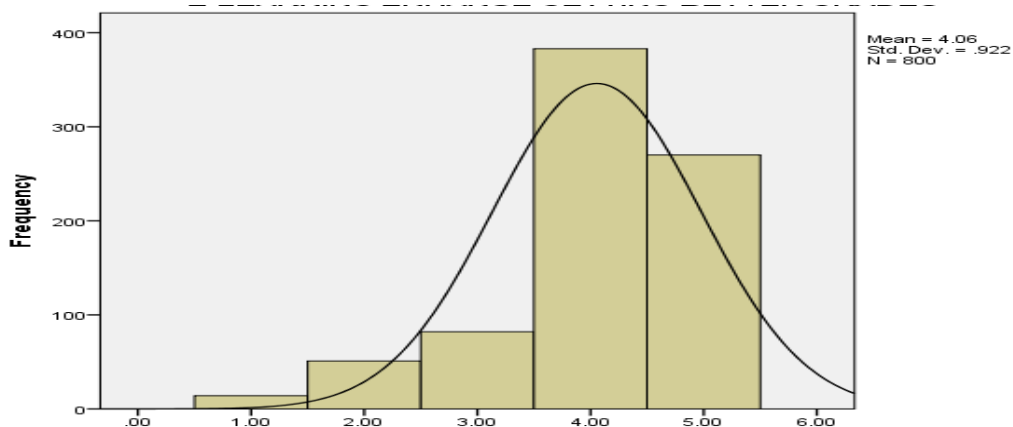
With respect to the third question on perception of the effect of e-learning tools on productivity level in table 4.3, 89% of the respondents agreed that e-learning increases productivity while only 4.9% disagreed. The result is shown in the graph in figure 4.3.



**Figure 4.3** Distribution of responses on perception on effect of E-learning tools on productivity

#### **Possibility of getting better grades using e-learning tools**

Regarding the fourth question in table 4.3 on possibility of improving grades by using e-learning facilities, 81% of the respondents agreed that e-learning will increase their chances of getting better academic grades while just 8.1% of the respondents disagreed. The result is presented in the graph in figure 4.4.



**Figure 4.4** Distribution of responses on the possibility of getting better grades using e-learning tools

### Behavioural influences on the use of e-learning tools

With respect to the fifth question in table 4.3 on behavioural influencers, 49.5% of the respondents agreed that people who influence their behavior think that they should use e-learning facilities as a tool while 25.7% disagreed with it. The result is shown in the graph in figure 4.5.

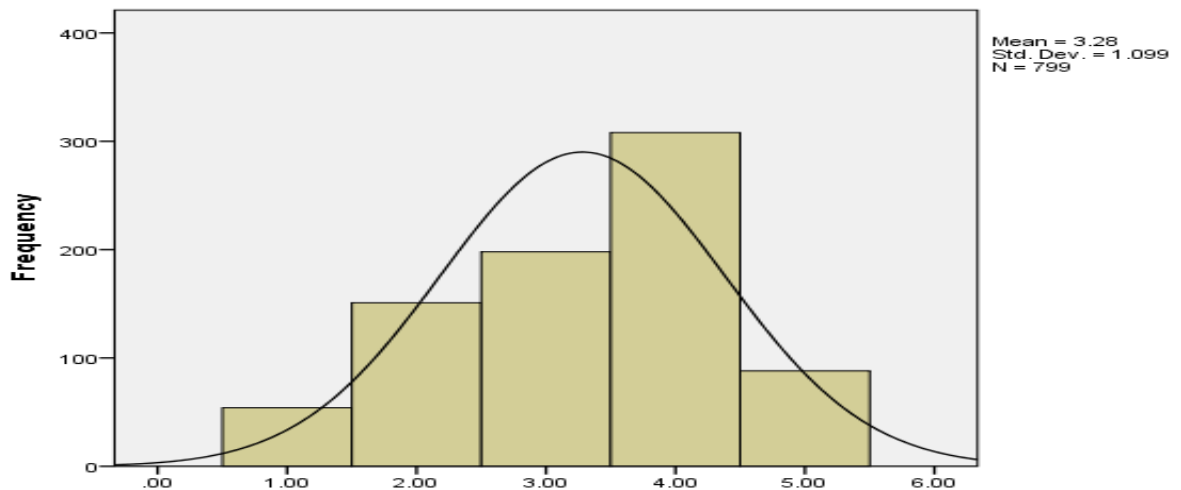
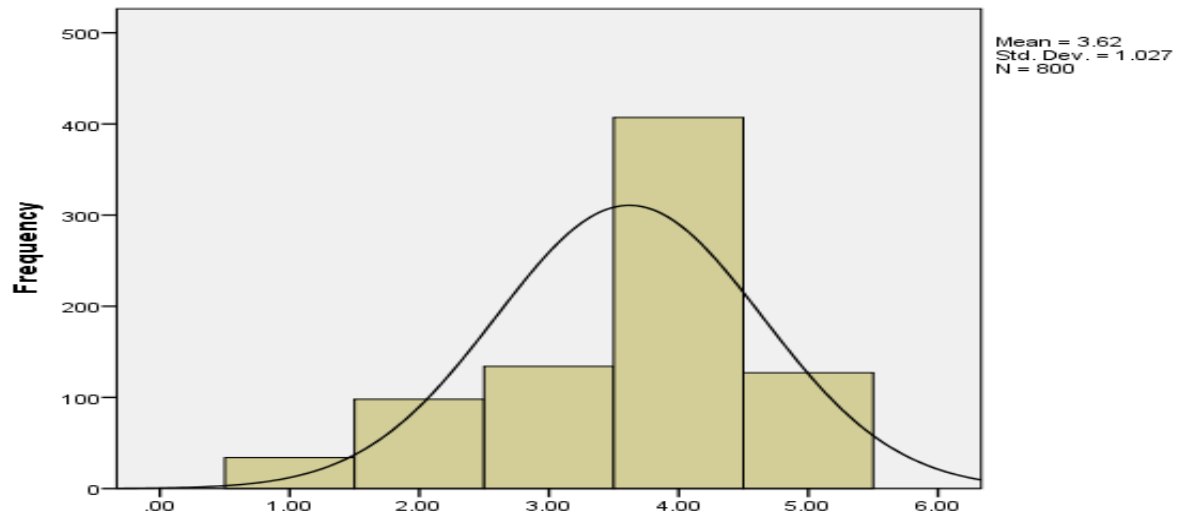


Figure 4.5 Distribution of responses on those who influence behaviour to use e-learning tools

### Effect of decision influencers to use e-learning tools

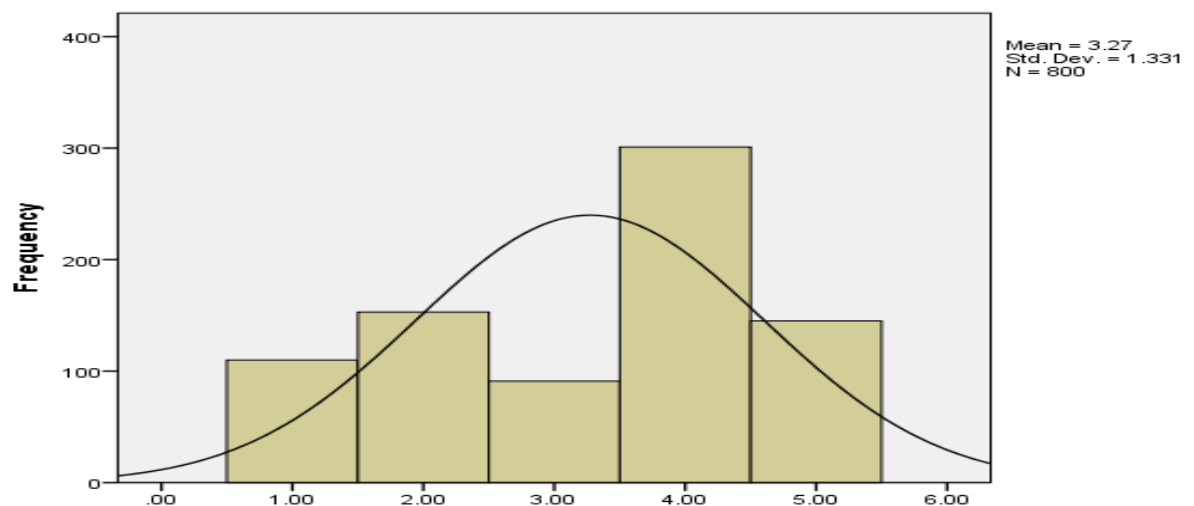
With respect to the sixth question on table 4.3 which is on the effect of decision influencers on the use of e-learning tools, 66.8% of the respondents agreed that people who are important to them encourage them to use e-learning facilities while 16.5% disagreed with it. The result is depicted in the graph in figure 4.6.



**Figure 4.6 Distribution of responses on the effect of decision influencers to use e-learning tools**

#### **Management's support for e-learning facilities utilization**

With regards to the seventh question on table 4.3 which is on the assessment of management in the provision and encouragement of e-learning tools usage, 55.7% of the respondents agreed that the management in their universities have been helpful in providing e-learning facilities while 32.9% disagreed with it. The result is shown in the graph in figure 4.7.



**Figure 4.7 Distribution of responses on management's support for e-learning facilities utilization**

#### **Perceived effect of e-learning usage on respondents' prestige and image**

With respect to the eighth question on the perceived effect of e-learning usage on respondents' prestige and image in table 4.3, 63.6% of the respondents agreed that e-learning

usage improves their prestige while 17.1% thought otherwise. The result is depicted in the graph in figure 4.8.

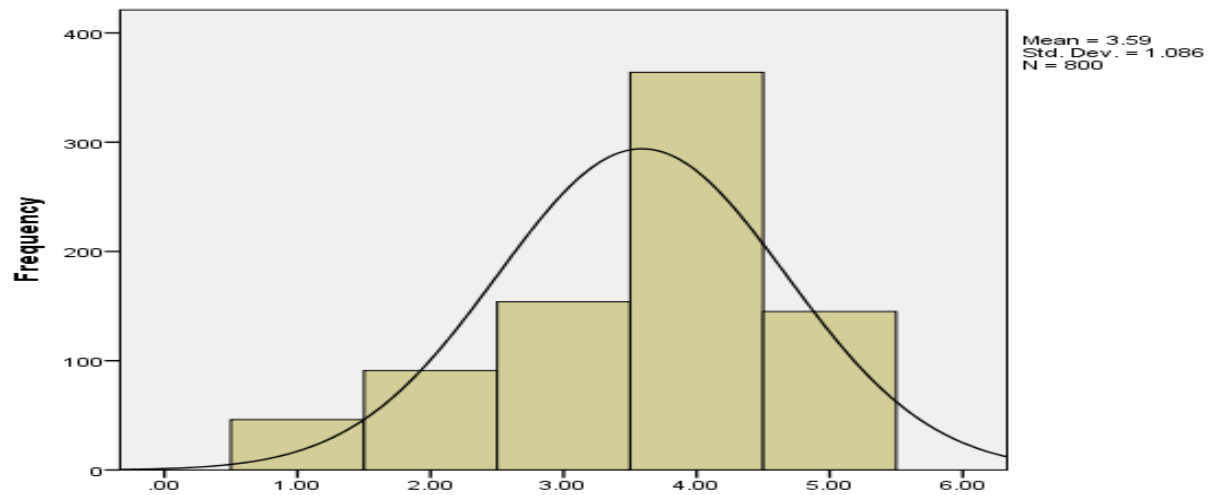


Figure 4.8 Distribution of responses on perceived effect of e-learning usage on respondents' prestige and image

#### 4.1.2 Research Question Two

To what extent do SLT factors (attitude and skill) affect the use of educational technology tools?

Table 4.4 contains analyses of respondents' responses on Attitude and Skill factors of SLT. It consists of eight questions.

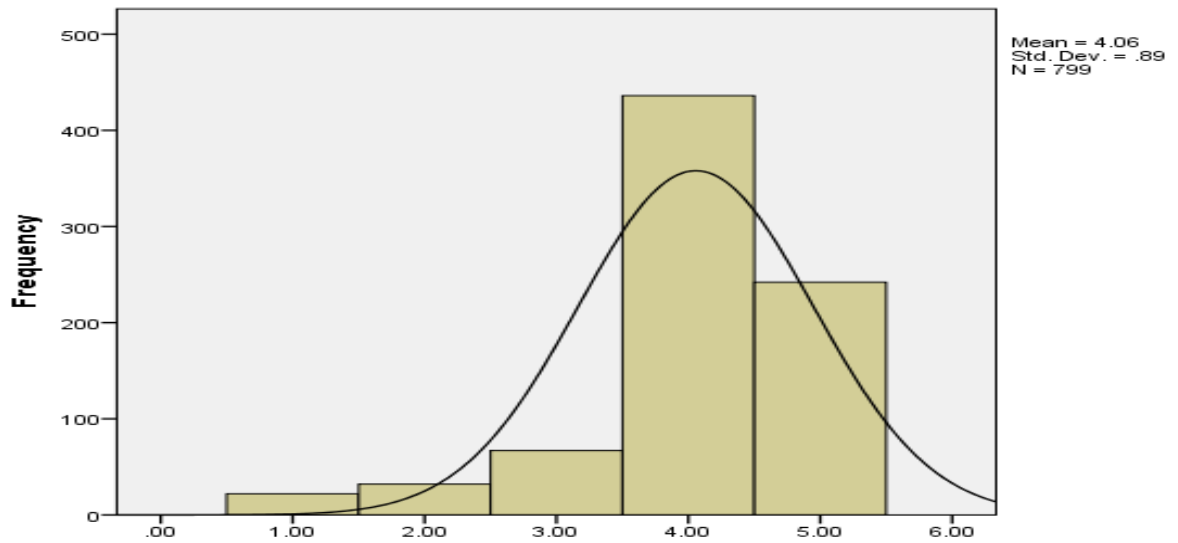
**Table 4.4 Distribution of responses on Attitude and Skill factors**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
I like using e-learning technology tools	22 (2.8%)	32 (4%)	67 (8.4%)	436 (54.5%)	242 (30.3%)	800
E-learning tools makes learning interesting	8 (1%)	27 (3.4%)	65 (8.1%)	403 (50.4%)	297 (37.1%)	800
Using e-learning tools is fun/exciting	17 (2.1%)	36 (4.5%)	77 (9.6%)	403 (50.4%)	267 (33.4%)	800
Using e-learning tools is a good idea	11 (1.4%)	15 (1.9%)	31 (3.9%)	407 (50.9%)	336 (42%)	800
I use e-learning tools with little or no assistance	21 (2.6%)	52 (6.5%)	46 (5.8%)	409 (51.1%)	272 (34%)	800
I am competent in the use of e-learning tools	17 (2.1%)	39 9(4.9%)	63 (7.9%)	413 (51.6%)	268 (33.5%)	800
I have enough knowledge on how to use e-learning tools	27 (3.4%)	64 (8%)	66 (8.3%)	422 (52.8%)	221 (27.6%)	800
I am confident when I use e-learning tools	13 (1.6%)	57 (7.1%)	78 (9.6%)	420 (52.5%)	232 (29%)	800

**Source:** Field Survey, 2016.

#### **Likeness for e-learning tools usage**

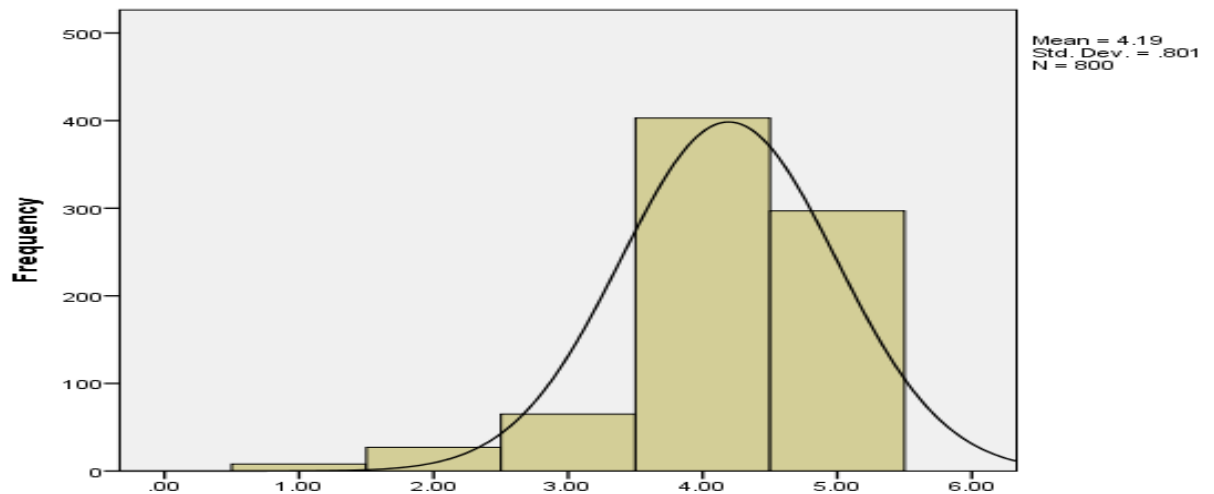
Regarding the first question on table 4.4 which is on positive disposition to the use of e-learning tools, 84.8% of the respondents agreed that they like using e-learning tools while 6.8% disagreed with it. The result is presented in the graph in figure 4.9.



**Figure 4.9** Distribution of responses on respondents' likeness for e-learning tools usage

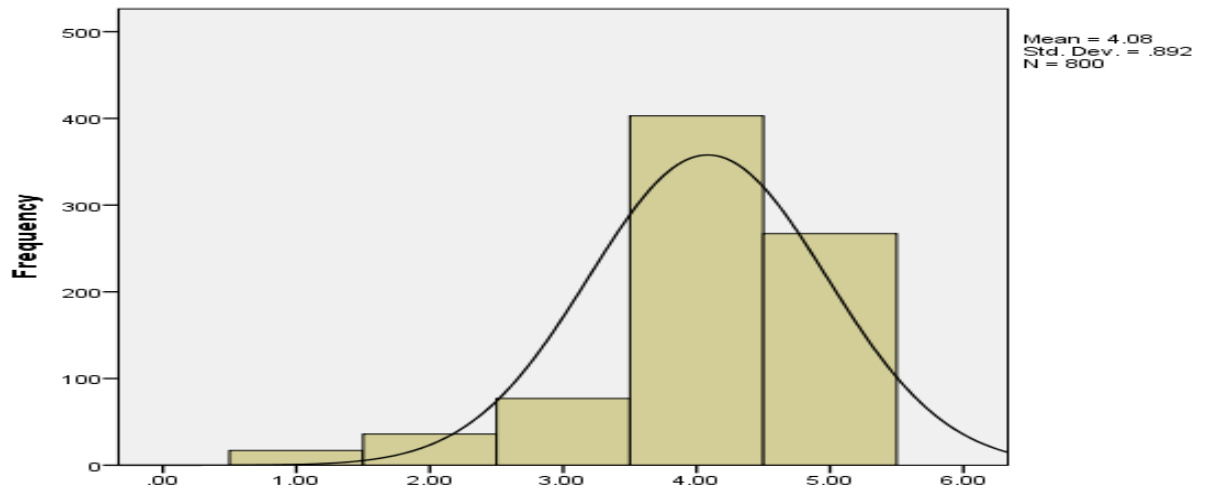
#### **Views that e-learning makes learning more interesting**

With respect to the second question on table 4.4 which is on positive reaction to the view that e-learning makes learning interesting, 87.5% of the respondents agreed that e-learning makes learning interesting while 4.4% disagreed. The result is presented by the graph in figure 4.10.



**Figure 4.10** Distribution of responses on the views that e-learning makes learning more interesting

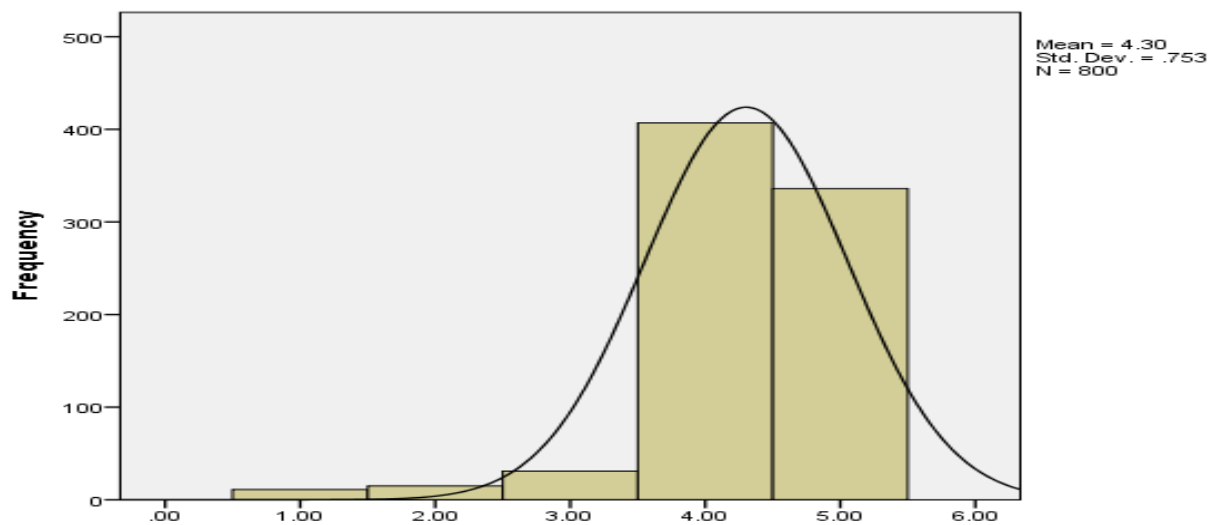




**Figure 4.11** Distribution of responses on whether Using E-Learning tools is perceived as fun/exciting

#### **Views on whether E-Learning tools usage is a good idea**

With respect to the fourth question on table 4.4 which is on belief that the use of e-learning tools is a good idea, 92.9% of the respondents agreed that using e-learning tools is a good idea while 3.3% disagreed with it. The result is depicted on the graph in figure 4.12.



**Figure 4.12** Distribution of responses on the view that E-Learning tools usage is a good idea

#### **Ability to use E-Learning tools with little or no assistance**

Regarding the fifth question in table 4.4 which is on ability to use e-learning tools easily, 85.1% of the respondents agreed that they use e-learning tools with little or no assistance while 9.1% disagreed with it. The result is depicted on the graph in figure 4.13.

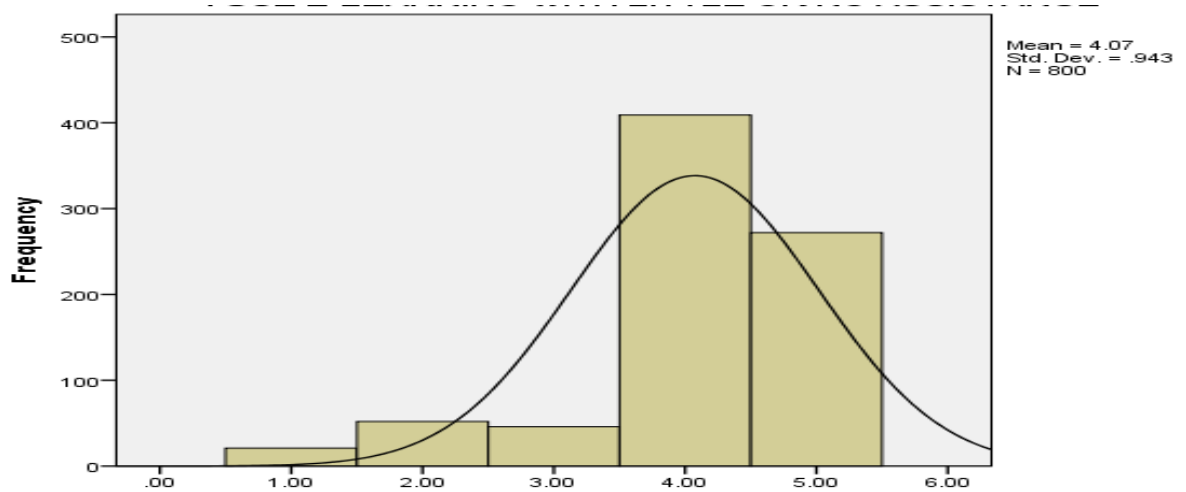


Figure 4.13 Distribution of responses on the ability to use E-Learning tools with little or no assistance

### Competence level of E-Learning tools usage

With respect to the sixth question in table 4.4 which is on competence level in the use of e-learning tools, 85.1% of the respondents agreed that they are competent in the use of e-learning tools while 7.0% disagreed with it. The result is presented on the graph in figure 4.14.

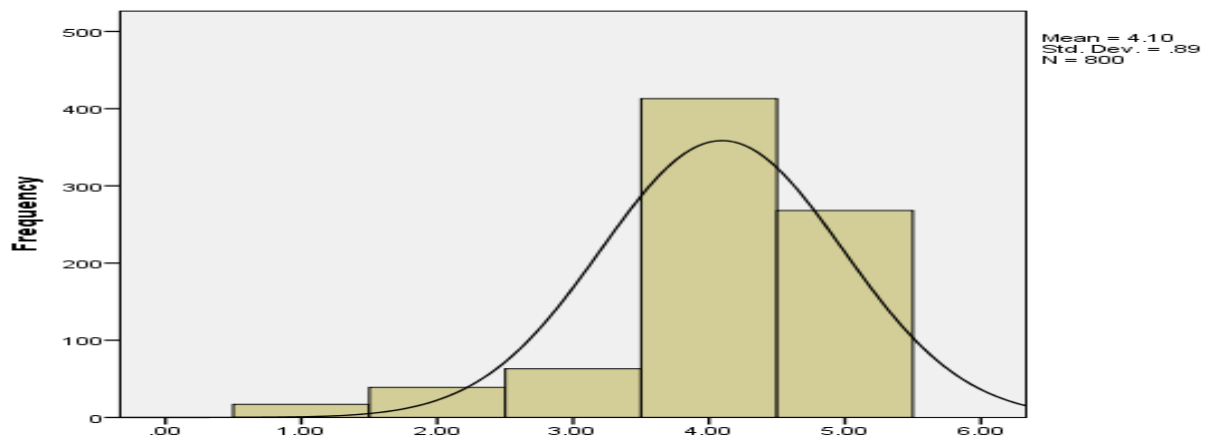
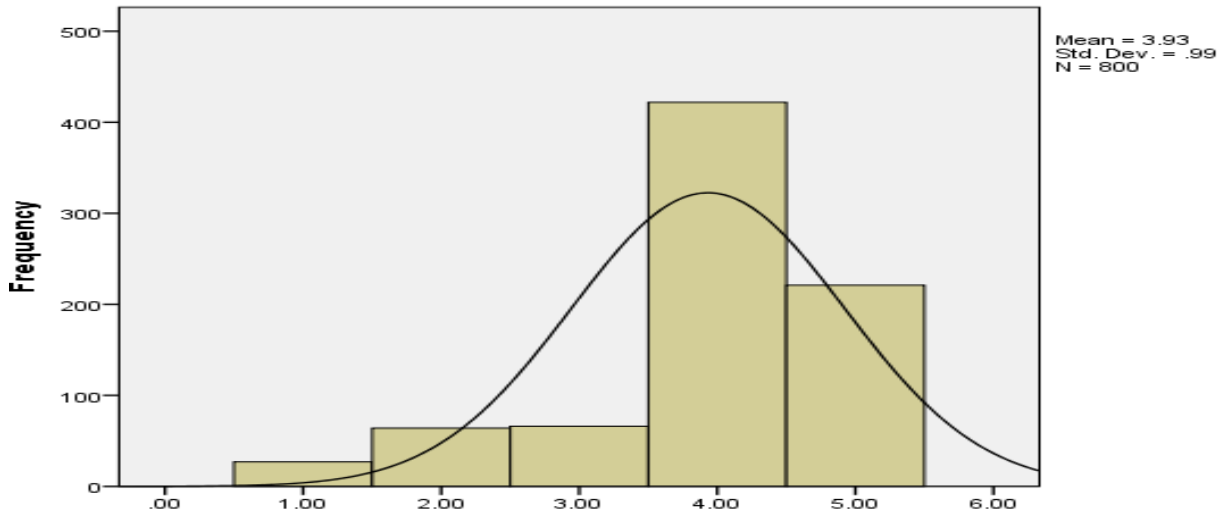


Figure 4.14 Distribution of responses on competence level of E-Learning tools usage

### Adequate knowledge on usage of E-Learning tools

Regarding the seventh question on table 4.4 which is on claim to having adequate knowledge on e-learning tools usage, 80.4% of the respondents agreed that they have enough knowledge

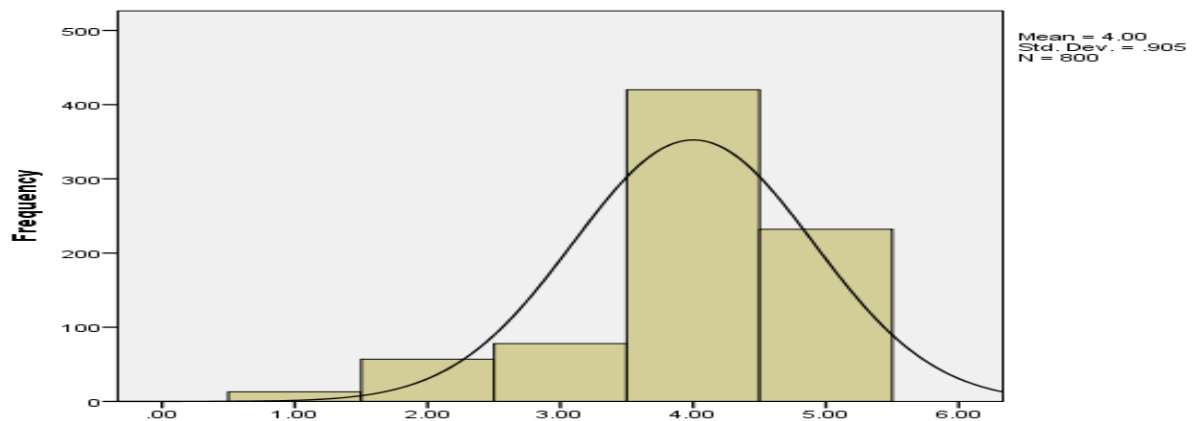
on how to use e-learning tools while 11.4% claimed they do not. The result is presented on the graph in figure 4.15.



**Figure 4.15 Distribution of responses on having adequate knowledge on usage of E-Learning tools**

#### **Level of confidence in the use of E-Learning tools**

With respect to the eighth question on table 4.4 which is on confidence level, 81.5% of the respondents agreed that they are confident when using e-learning tools while 8.8% disagreed with it. The result is presented on the graph in figure 4.16.



**Figure 4.16 Distribution of responses on level of confidence in the use of E-Learning tools**

### 4.1.3 Research Question Three

To What extent does Technology Culturation affect the use Educational Technology Tools?

Table 4.5 contains analyses of respondents' responses on Technology Culturation factor. It consists of four questions.

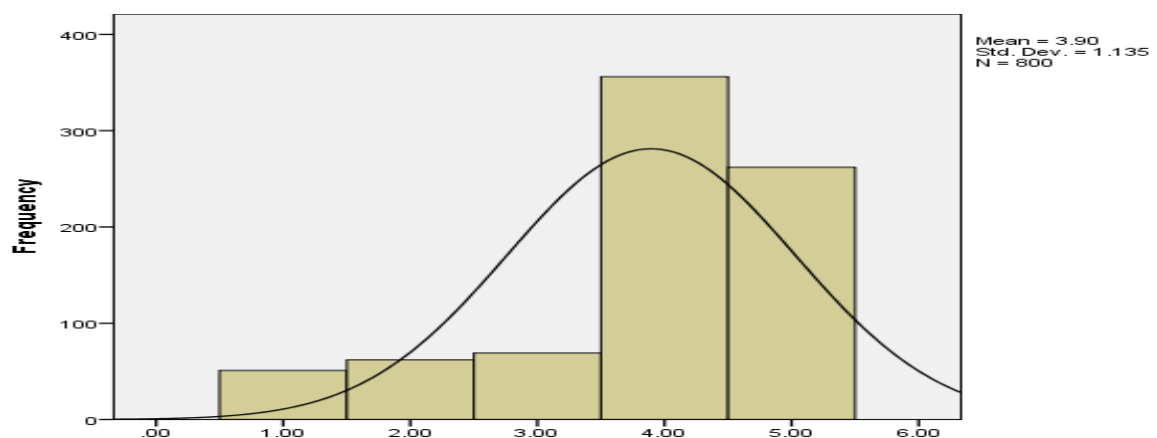
**Table 4.5 Distribution of responses on Technology Culturation factor**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
I have previous access to technology	51 (6.4%)	62 (7.8%)	69 (8.6%)	356 (44.5%)	262 (32.8%)	800
My prior exposure to technology affects my acceptance of e-learning	76 (9.5%)	101 (12.6%)	97 (12.1%)	317 (39.6%)	209 (26.1%)	800
I use internet to download learning materials	24 (3%)	31 (3.9%)	40 (5%)	324 (40.5%)	381 (47.6%)	800
I have attended training on the use of e-learning tools and facilities	106 (13.5%)	189 (23.9%)	92 (11.5%)	261 (32.6%)	152 (19%)	800

**Source:** Field Survey, 2016.

#### Previous access to technology

With respect to the first question on table 4.5 which is on previous access to technology, 77.3% of the respondents agreed that they had previous access to technology usage while 14.1% disagreed with it. The result is shown on the graph in figure 4.17.



**Figure 4.17** Distribution of responses on whether they had previous access to technology

### Prior exposure to technology on acceptance of e-learning tools

Regarding the second question on table 4.5 which is on effect of prior exposure to technology on usage, 65.7% of the respondents agreed that their previous experience of other technologies will affect their subsequent acceptance and usage of e-learning tools while 22.1% disagreed with it. The result is presented on the graph in figure 4.18.

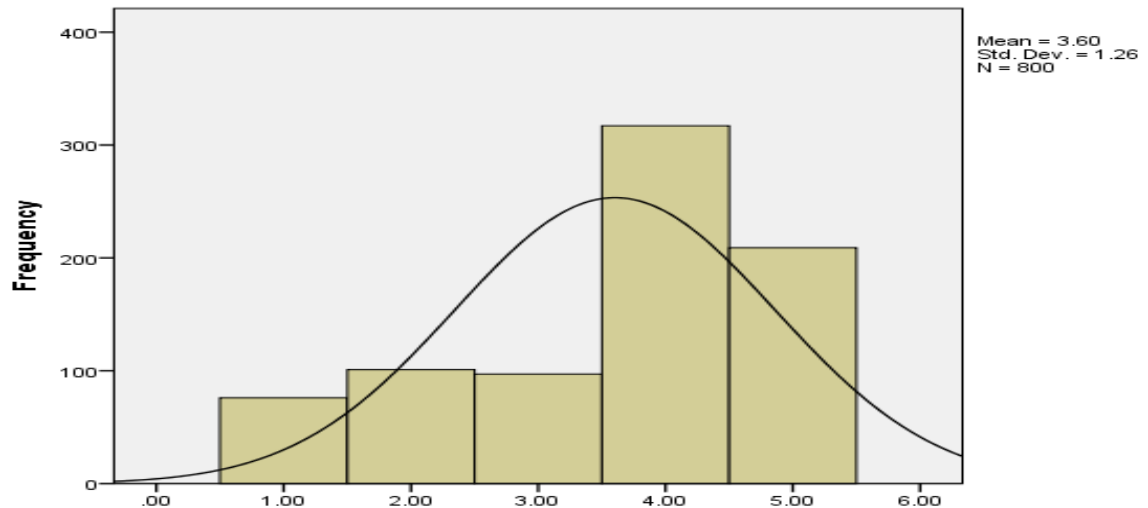


Figure 4.18 Responses on the influence of prior exposure to technology on acceptance of e-learning tools

### Using Internet to download learning materials

With respect to the third question in table 4.5 which is on Internet usage in downloading learning materials, 88.1% of the respondents said that they use Internet to download learning materials while 6.9% said they do not. The result is illustrated on the graph in figure 4.19.

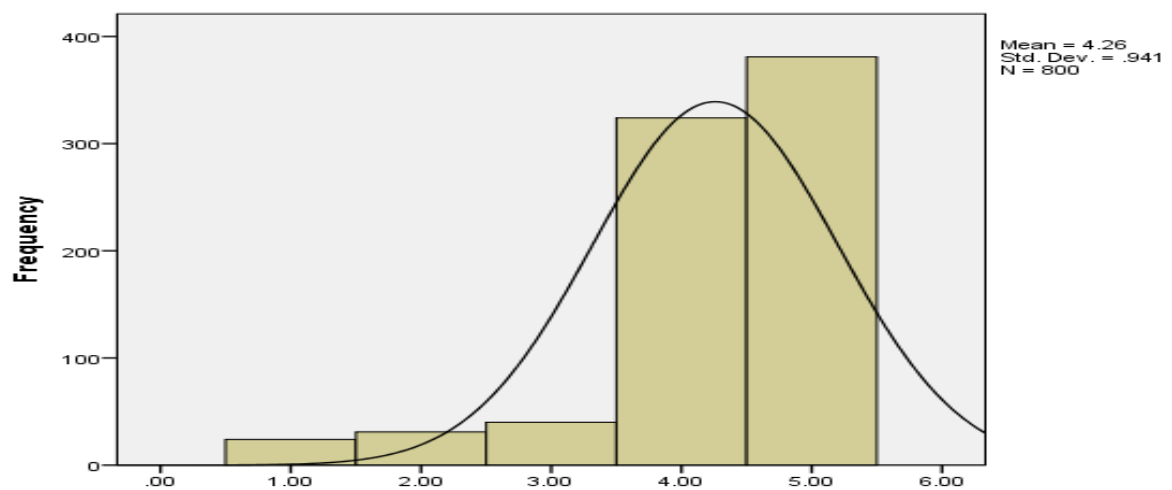


Figure 4.19 Distribution of responses on using Internet to download learning materials

### Training and E-Learning tools usage

Regarding the fourth question in table 4.5 which is on training attendance, 51.6% of the respondents said that they have attended training on e-learning tools while 36.9% said they have not. The result is presented on the graph in figure 4.20.

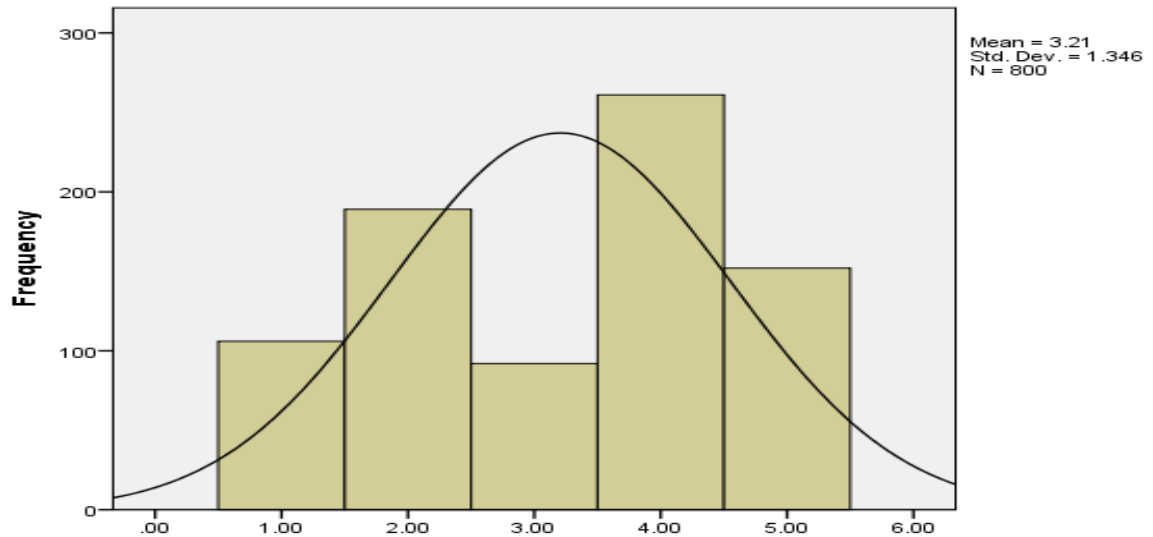


Figure 4.20 Distribution of responses on training attendance on E-Learning tools usage

#### 4.1.4 Research Question Four

To What extent Does Power supply affect the use Educational Technology Tools?

Table 4.6 contains analyses of respondents' responses on Power supply. It consists of four questions.

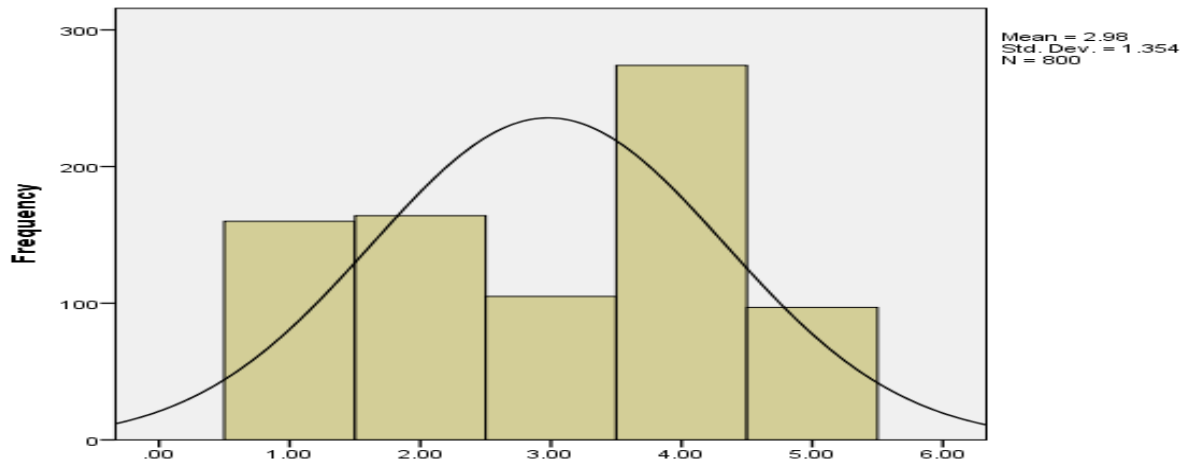
**Table 4.6 Distribution of responses on Power (Electricity) factor**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
Power is very stable for e-learning tools usage in my school	60 (20%)	164 (20.5%)	105 (13.1%)	274 (34.3%)	97 (12.1%)	800
Power will not deter me from using e-learning tools	164 (20.4%)	210 (26.3%)	109 (13.6%)	244 (30.5%)	73 (9.1%)	800
Power supply is not at extra cost in my institution	138 (17.3%)	156 (19.5%)	123 (15.4%)	264 (33%)	119 (14.9%)	800
The use of e-learning tools require stable power supply	38 (4.8%)	61 (7.6%)	60 (7.5%)	294 (36.8%)	347 (43.4%)	800

**Source:** Field Survey, 2016.

#### **The place of stable Power supply in E-Learning tools utilization**

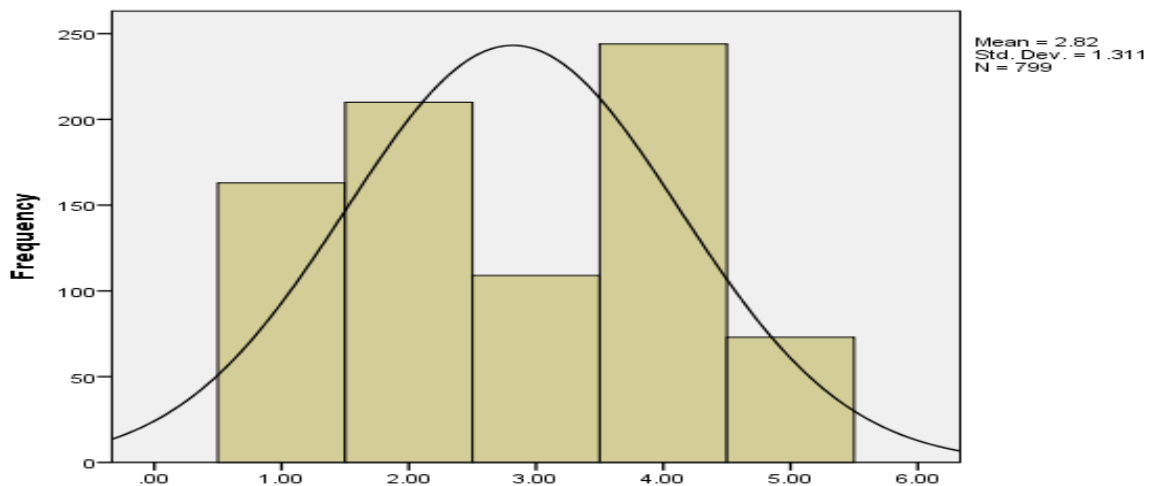
Regarding the first question in table 4.6 which is on perception on the place of Power stability for e-learning usage in the institutions under study, 46.4% of the respondents agreed that power is very stable for e-learning usage while 40.5% disagreed. The result is depicted in figure 4.21.



**Figure 4.21 Responses on the place of stable Power supply in E-Learning tools utilization**

### **Willingness to use E-Learning tools despite Power issues**

With respect to the second question on table 4.6 which is on indifference to Power (electricity) in relation to e-learning tools usage, 46.7% of the respondents are of the opinion that power will deter them from using e-learning tools while 39.6% disagreed with it. The result is presented on the graph in figure 4.22.



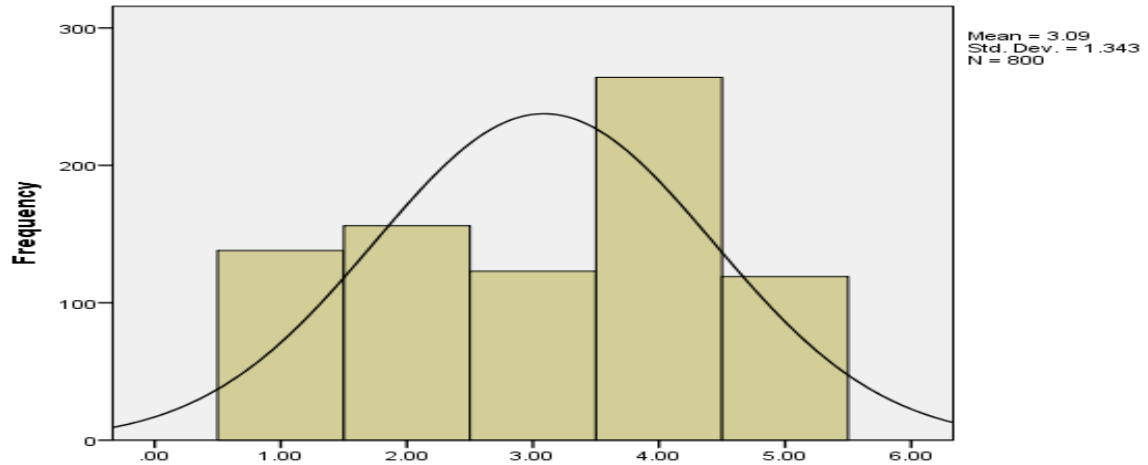
**Figure 4.22 Distribution of responses on willingness to use E-Learning tools despite Power issues**

### **Perception on whether Power supply is at an extra cost**

With regards to the third question on table 4.6 which is on perception on whether extra financial cost is incurred on power generation apart from that paid to government (as provided by national grid) or as budgeted. 47.9% of the respondents said that power supply is

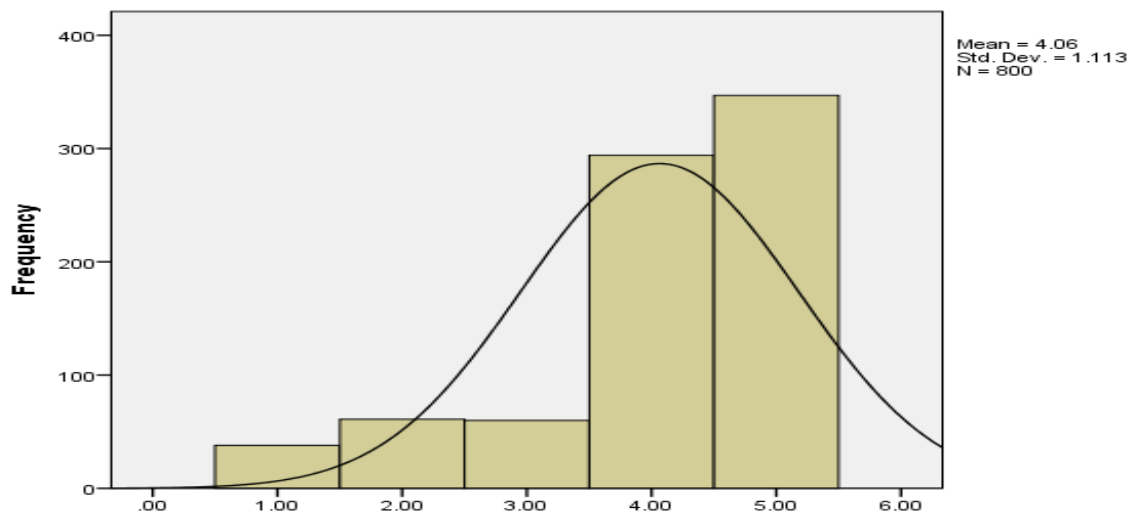


at an extra cost in their institutions while 36.8% said that it is not. The result is presented on the graph in figure 4.23.



**Figure 4.23 Distribution of responses on extra cost of Power supply in institutions**

With respect to the fourth question on table 4.6 on indispensability of Power supply in e-learning facilities usage, 80.2% of the respondents are of the opinion that the use of e-learning tools requires stable power supply while 12.4% said it does not. The result is presented in figure 4.24.



**Figure 4.24 Distribution of responses on the indispensability of stable Power supply in E-Learning tools usage**

#### 4.1.5 Research Question Five

Does the use of Educational Technology Tools Enhance Learning?

Table 4.7 contains analyses of respondents' responses on learning outcomes. It consists of four questions.

**Table 4.7 Distribution of Respondents' Responses on Learning Outcomes**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
My academic performance has improved with the use of e-learning tools	24 (3%)	52 (6.5%)	135 (16.9%)	386 (48.3%)	203 (25.4%)	800
I comprehend faster with the use of e-learning tools	24 (3%)	66 (8.3%)	119 (14.9%)	403 (50.4%)	188 (23.5%)	800
Using e-learning tools enhances my understanding of concepts	19 (2.4%)	38 (4.8%)	94 (11.8%)	464 (58%)	185 (23.1%)	800
E-learning tools facilitate collaborative learning	14 (1.8%)	28 (3.5%)	85 (10.6%)	462 (57.8%)	210 (26.3%)	800

**Source:** Field Survey, 2016.

### Improvement of academic performance through E-Learning tools usage

With respect to the first question on table 4.7 on improved academic performance through the use of e-learning tools and facilities, 73.7% of the respondents agreed that their academic performance has improved with the use of e-learning while 9.5% disagreed with it. The result is presented on the graph in figure 4.25.

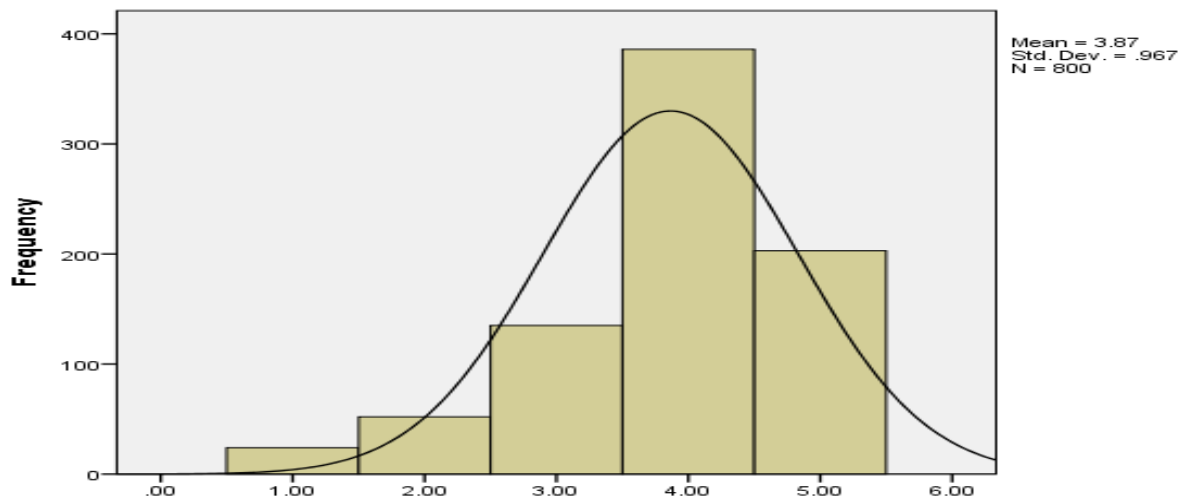


Figure 4.25 Responses on improvement of academic performance through E-Learning tools usage

### Comprehension through using E-Learning tools

With regards to the second question on table 4.7 which is on easier comprehension through the use of e-learning tools, 73.9% of the respondents agreed that they comprehend faster with the use of e-learning tools while 11.3% disagreed. The result is presented on the graph in figure 4.26.

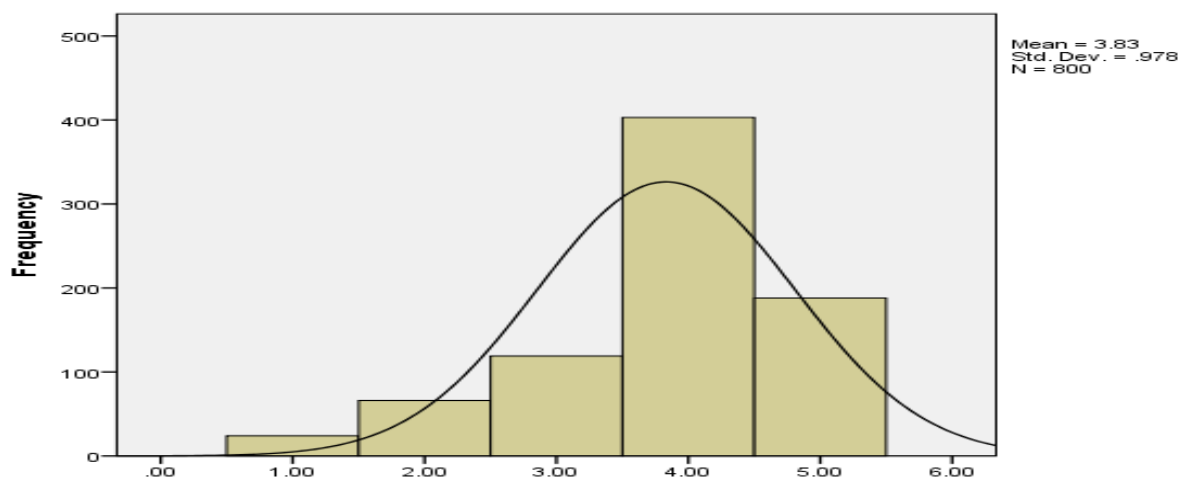


Figure 4.26 Responses on faster comprehension through using E-Learning tools

### Understanding concepts better with the use of E-Learning tools

Regarding the third question on table 4.7 which is on opinion on enhancement of concepts through e-learning tools usage, 81.1% of the respondents agreed that e-learning facilities enhance their understanding of concepts while 7.1% disagreed. The result is depicted by the graph in figure 4.27.

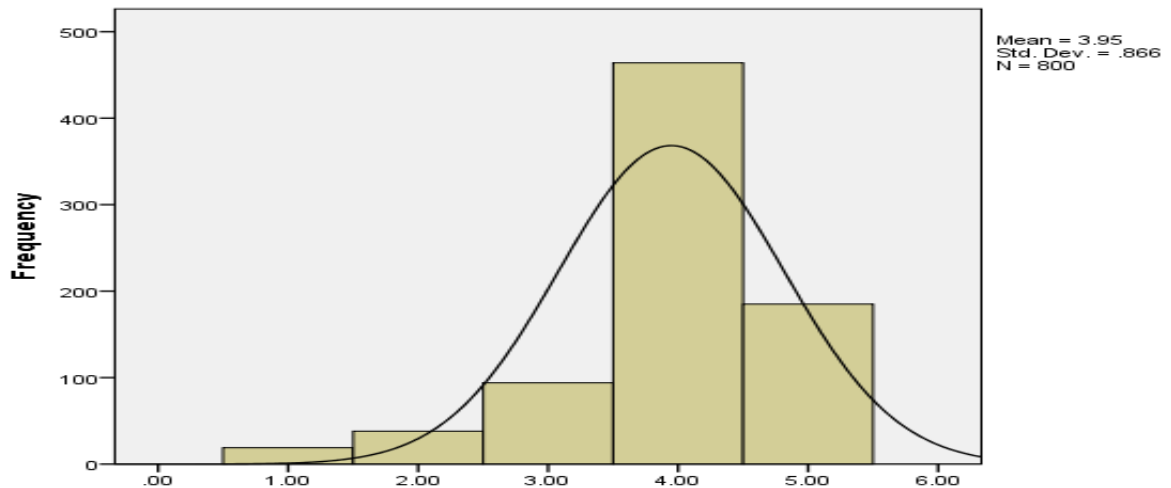


Figure 4.27 Distribution of responses on the enhancement of understanding of concepts using E-Learning tools

### Facilitation of collaborative learning via E-Learning

With respect to the fourth question on table 4.7, 84.1% of the respondents agreed that e-learning facilitates collaborative learning while 5.3% disagreed with it. The result is presented by the graph in figure 4.28.

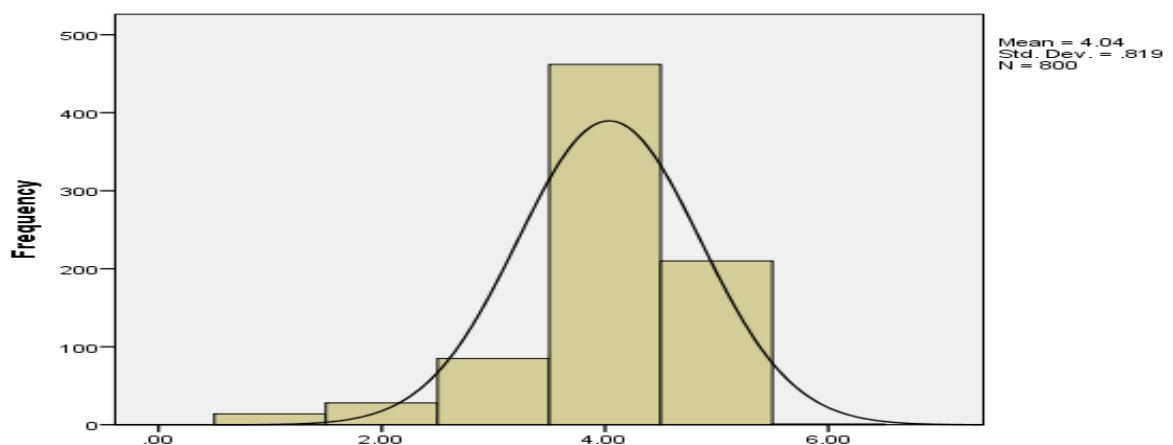


Figure 4.28 Distribution of responses on facilitation of collaborative learning via E-Learning

#### 4.1.6 Descriptive Analysis for Questions on Other Obstacles/Challenges to the Use and Integration of E-Learning Tools and Facilities

In this section, questions were asked concerning other obstacles/challenges impeding the usage of e-learning facilities and findings are presented in the table 4.8. It consists of five questions.

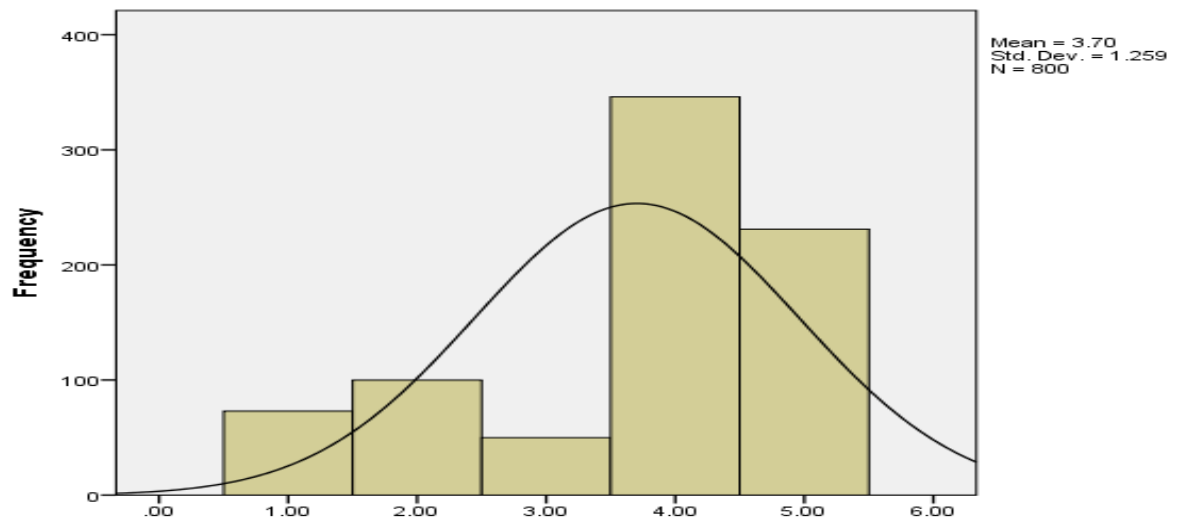
**Table 4.8 Distribution of responses on other Obstacles Impeding Technology Tools Usage**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
Poor and unreliable internet access	73 (9.1%)	100 (12.5%)	50 (6.3%)	346 (43.3%)	231 (28.9%)	800
Limited availability of e-learning facilities	68 (8.5%)	153 (19.1%)	68 (8.5%)	326 (40.8%)	185 (23.1%)	800
Lack of technical support	70 (8.8%)	150 (18.8%)	103 (12.9%)	317 (39.6%)	160 (20%)	800
Lack of access to e-learning facilities	76 (9.5%)	193 (24.1%)	95 (11.9%)	278 (34.8%)	158 (19.8%)	800
Institutional policy on e-learning adoption and usage	70 (8.8%)	135 (16.9%)	152 (19%)	271 (33.9%)	172 (21.5%)	800

**Source:** Field Survey, 2016.

##### **Perception on Poor and unreliable internet access**

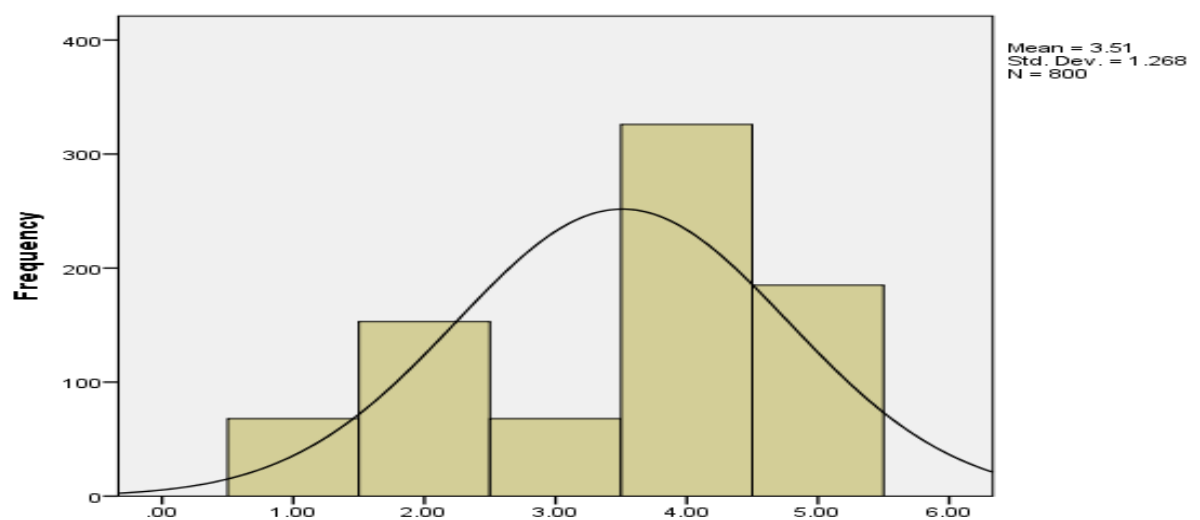
With regard to the first question on table 4.8 which is on perception on poor and unreliable Internet access, 72.2% of the respondents agreed that they experience poor and unreliable internet access while 21.6% disagreed with it. The result is presented on the graph in figure 4.29.



**Figure 4.29 Distribution of respondents' perception on poor and unreliable internet access**

### **Perception on availability of e-learning facilities**

Regarding the second question on table 4.8 which is on perception on limited availability of e-learning facilities, 63.9% of the respondents agreed that there is limited availability of e-learning facilities while 27.6% disagreed with it. The result is shown on the graph in figure 4.30.



**Figure 4.30 Distribution of respondents' perception on availability of e-learning facilities**

### Perception on Technical Support

With respect to the third question on table 4.8, 59.6% of the respondents agreed that they lack adequate technical support while 27.5% disagreed with it. The result is presented on the graph in figure 4.31.

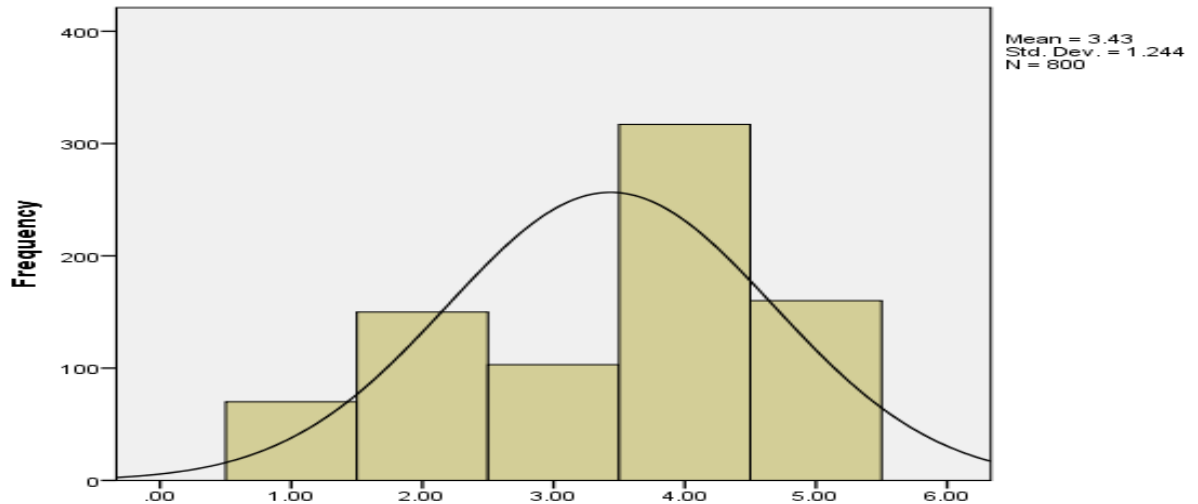


Figure 4.31 Distribution of respondents' perception on technical support

### Access to E-Learning facilities

Regarding the fourth question on table 4.8 which is on perception on lack of access to e-learning facilities, 54.6% of the respondents agreed that they lack access to e-learning facilities while 21.6% disagreed. The result is presented on the graph in figure 4.32.

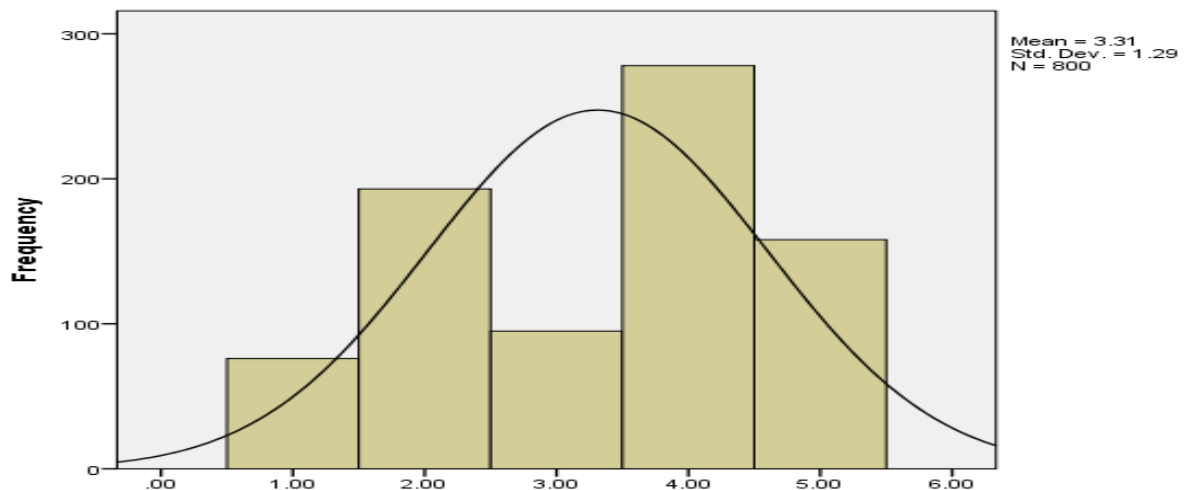


Figure 4.32 Distribution of responses on perception of access to E-Learning facilities

### Institutions' Policy on E-learning Usage and Adoption

With respect to the fifth question on table 4.8, 55.4% of the respondents agreed that institutional policy is an obstacle to the use of e-learning in their institutions while 25.6% disagreed with it. The result is presented on the graph in figure 4.33.

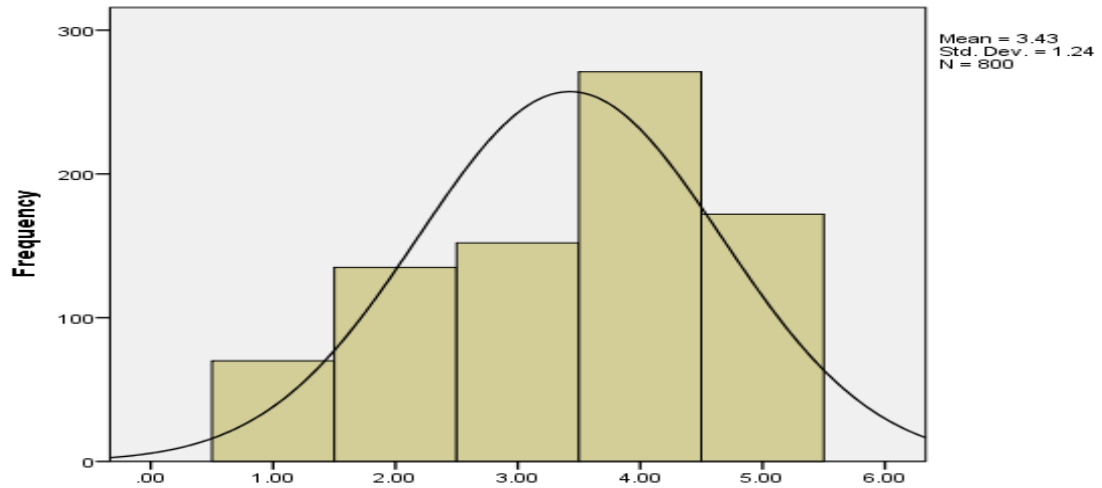


Figure 4.33 Distribution of responses on perception of institutions' policy on E-learning usage and adoption



#### 4.1.7 Descriptive Analysis of Questions on Use Behaviour

Table 4.9 contains analyses of respondents' responses on the behaviour of respondents toward the use of e-learning tools/facilities. It consists of four questions.

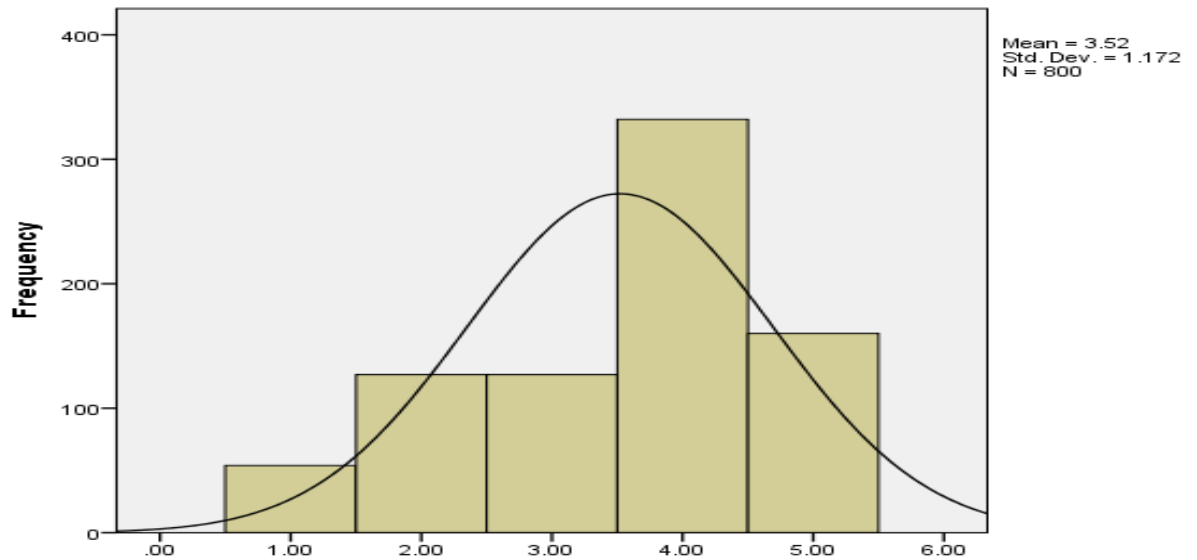
**Table 4.9 Distribution of responses on Use Behaviour**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
I regularly use e-learning facilities/tools	54 (6.8%)	127 (15.9%)	127 (15.9%)	332 (41.5%)	160 (20%)	800
I regularly use internet for information search	18 (2.3%)	37 (4.6%)	48 (6%)	399 (49.9%)	297 (37.1%)	800
I regularly use the internet for communication	24 (3%)	40 (5%)	51 (6.4%)	368 (46%)	317 (39.6%)	800
I regularly use the internet to download learning materials	15 (1.9%)	29 (3.6%)	59 (7.4%)	382 (47.8%)	315 (39.4%)	800

**Source:** Field Survey, 2016.

#### **E-Learning tools usage**

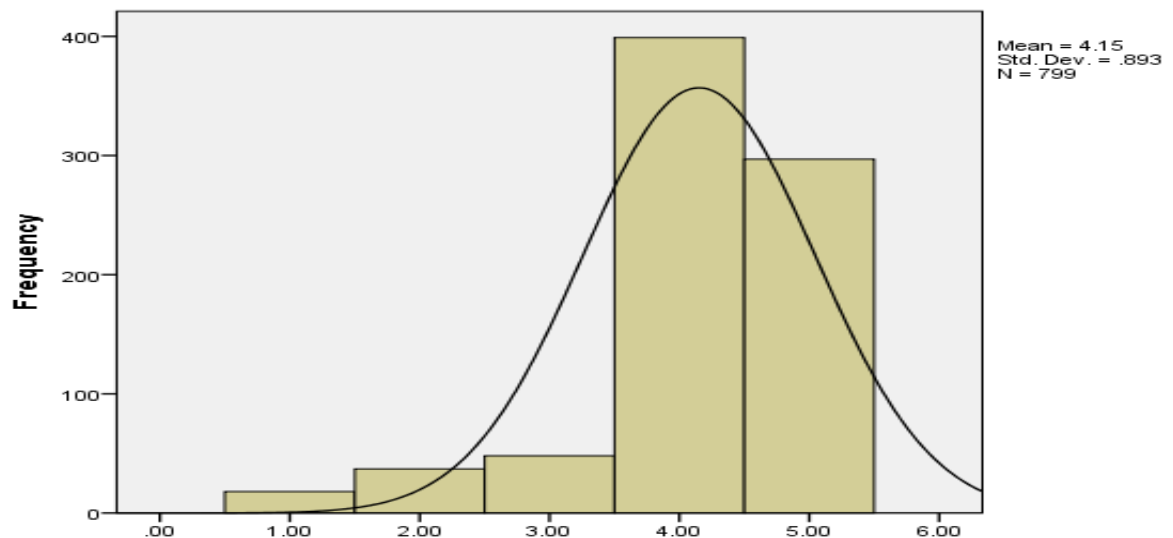
With respect to the first question on table 4.9 which is on regularity of e-learning facilities usage, 57.4% of the respondents agreed that they regularly use e-learning tools while 22.6% disagreed with it. The result is depicted on the graph in figure 4.34.



**Figure 4.34 Distribution of responses on perception of regularity of E-Learning tools usage**

### **Internet usage for information search**

With regards to the second question on table 4.9 which is on the regularity of using the Internet for information search, 87% of the respondents agreed that they regularly use the internet for information search while 6.9 disagreed. The result is presented on the graph in figure 4.35.



**Figure 4.35 Distribution of responses on perception on regularity of Internet usage for information search**

### Internet usage for communication

With respect to the third question on table 4.9 which is on the use of the internet for communication, 85.6% of the respondents agreed that they regularly use the internet for communication while 8.0% disagreed. The result is presented on the graph in figure 4.36.

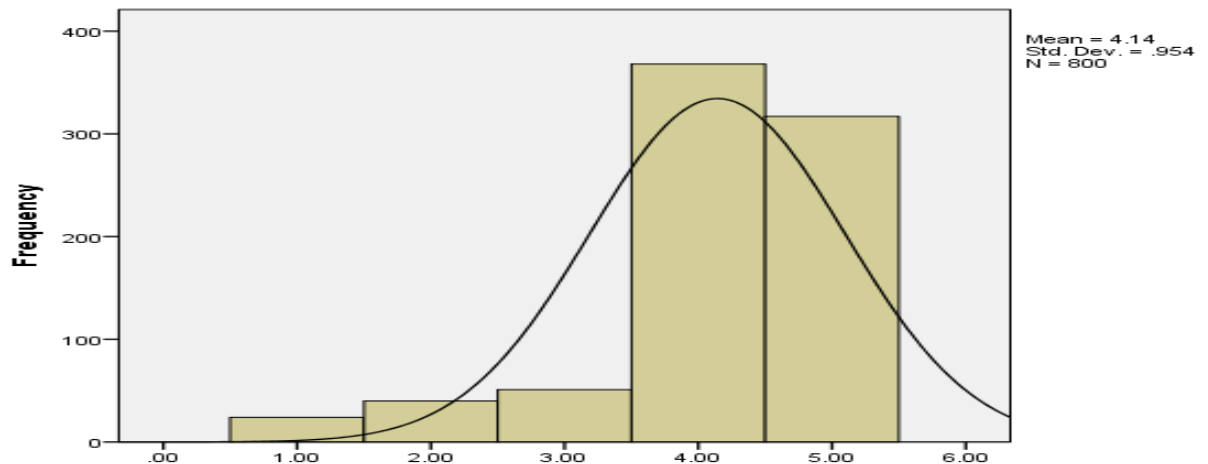


Figure 4.36 Distribution of responses on perception on regularity of Internet usage for communication

### Internet usage for downloading learning materials

With respect to the fourth question on table 4.9, 87.2% of the respondents agreed that they regularly use the internet to download learning materials while 5.5% disagreed with it. The result is presented on the graph in figure 4.37.

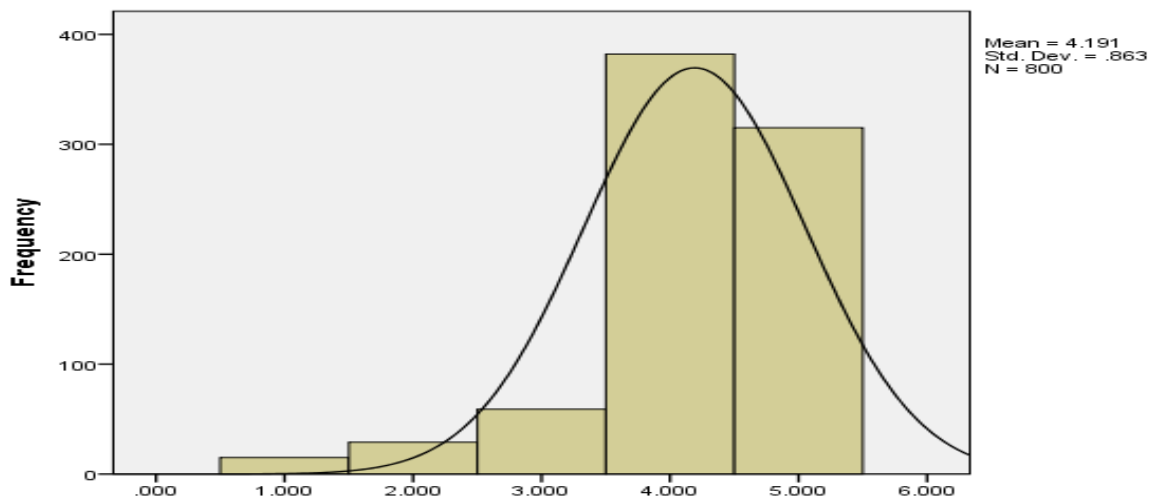


Figure 4.37 Distribution of responses on regularity of Internet usage for downloading learning materials

#### 4.1.8 Descriptive Analyses of Questions on Extent of Usage and Integration of E-learning Facilities and Tools in Learning

In this section, questions were asked on extent of use of e-learning facilities in learning in selected universities and the findings are discussed below.

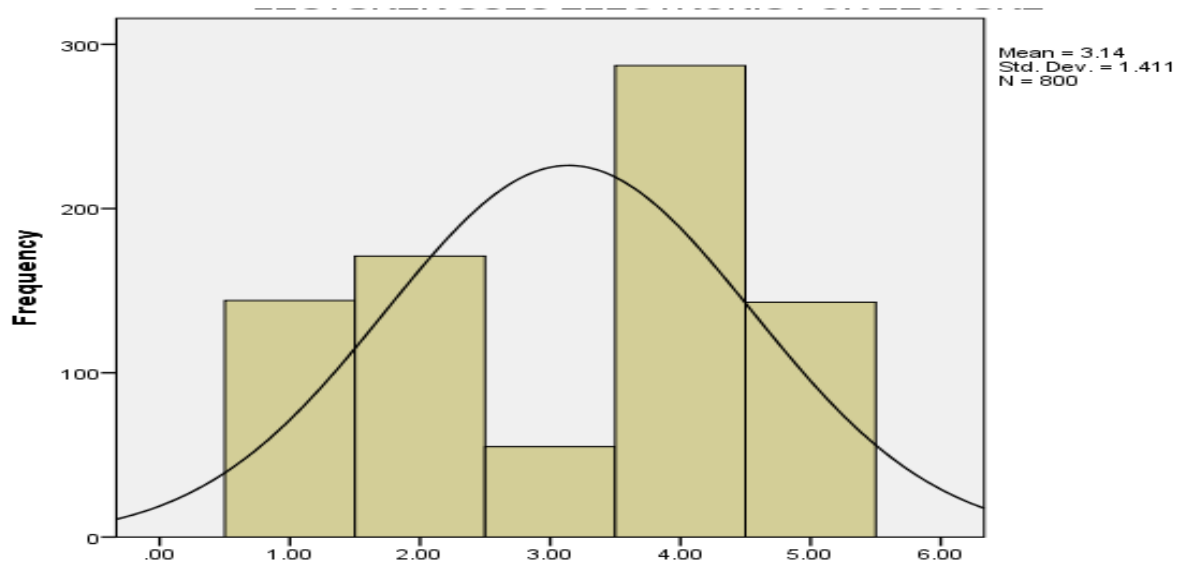
**Table 4.10 Distribution of Respondents' Responses on Extent of Usage**

Questions/Items	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Total
My lecturers present their lectures in electronic form	144 (18%)	171(21.4%)	55 (6.9)	287(39.5%)	143 (17.9%)	800
I use data bases, internet and e-books to enhance my learning	87 (8.4%)	64 (8%)	61 (7.6%)	386 (48.3%)	222 (27.8%)	800
I have a user account for e-learning	155(19.4%)	228(28.5%)	96 (12%)	221(27.6%)	100 (12.5%)	800
I collaborate with other students on e-learning platform	152 (19%)	2 59 (32.4%)	125 (15.6%)	209 (26.1%)	55 (6.9%)	800
I interact with lecturers on e-learning platform	199 (24.9%)	305 (38.1%)	94 (11.9%)	162 (20.3%)	40 (5%)	800
I use social media for e-learning	62 (6.5%)	112 (14%)	62 (7.8%)	359 (44.9%)	215 (26.9%)	800

**Source:** Field Survey, 2016.

#### Lecturers' presentation of lectures in electronic form

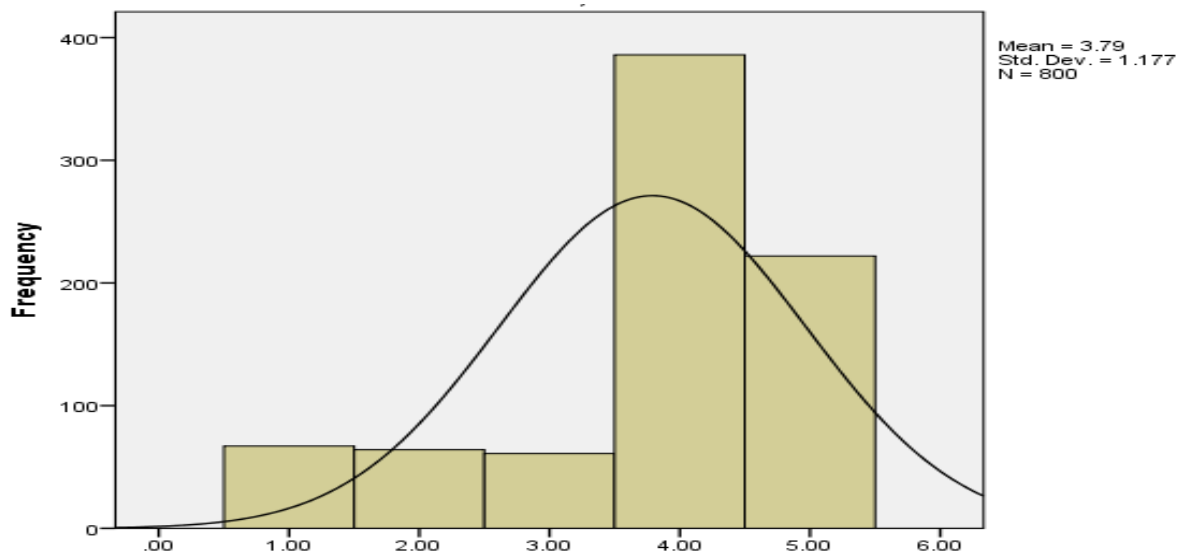
The respondents' responses to the question on the lecturers' use of electronics in delivering their lectures are presented in Table 4.10, 39.4% of the respondent said their lecturers do not present their lectures in electronic form while 53.8% agreed that their lecturers present their lectures in electronic form. The result is depicted in the graph in figure 4.38.



**Figure 4.38** Distribution of responses on lecturers' presentation of lectures in electronic form

### Using databases, internet and e-books for learning enhancement

The respondents' responses to the question on the use of databases, internet and e-books to enhance studies are presented in Table 4.10. 16.4% of the respondents said they do not use them while 76.1% said they use databases, internet and e-books and that it enhances their learning. The result is depicted in the graph in figure 4.39.



**Figure 4.39** Distribution of responses on the use of databases, internet and e-books for learning enhancement

### User accounts for e-learning

The respondents' responses to the third question on having user accounts for e-learning are presented in Table 4.10. 47.9% of the respondents said they do not have user account while 40.1% said they have user account. The result is presented in the graph in figure 4.40.

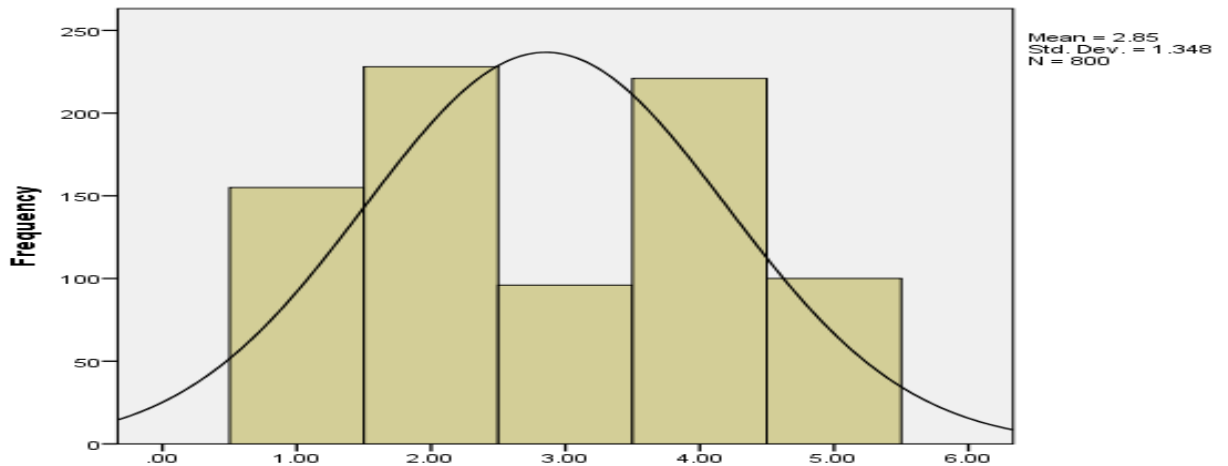


Figure 4.40 Distribution of responses on acquisition of user accounts for e-learning

### Collaboration level through e-learning platform

With respect to the fourth question on table 4.10 on level of collaboration with students on e-learning platform, 51.4% of the respondents said that they do not collaborate with other students on e-learning while 33% said they collaborate with other students. The result is shown in the graph in figure 4.41.

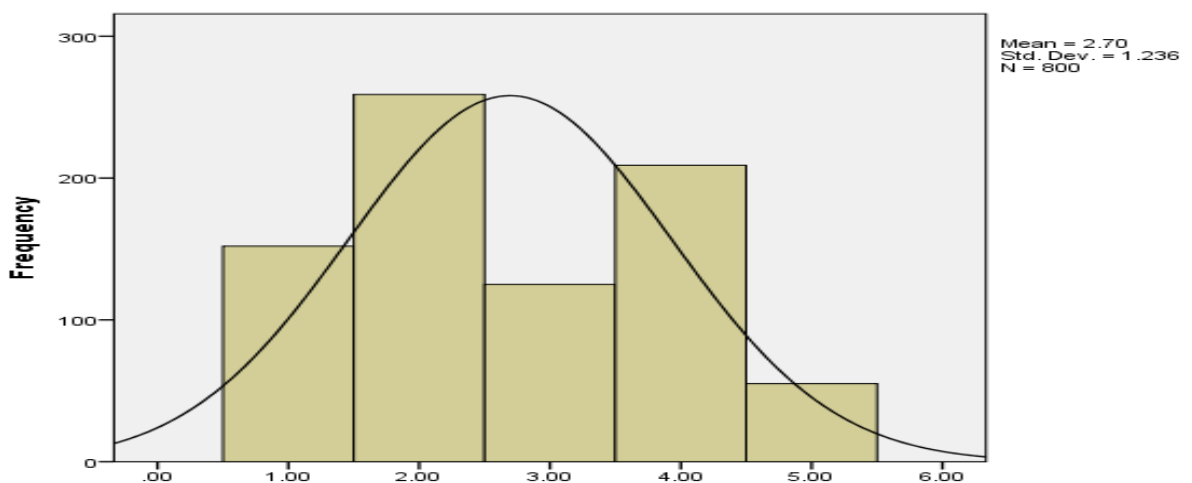


Figure 4.41 Distribution of responses on students' collaboration level through e-learning platform

### Interaction with lecturers on e-learning platform

With respect to the fifth question on table 4.10 which is on level of interaction with lecturers, 63% of the respondents said that they do not keep in touch with their lecturers on e-learning platform. 25.3% said they keep in touch with their lecturers on e-learning platform. The result is presented in the graph in figure 4.42.

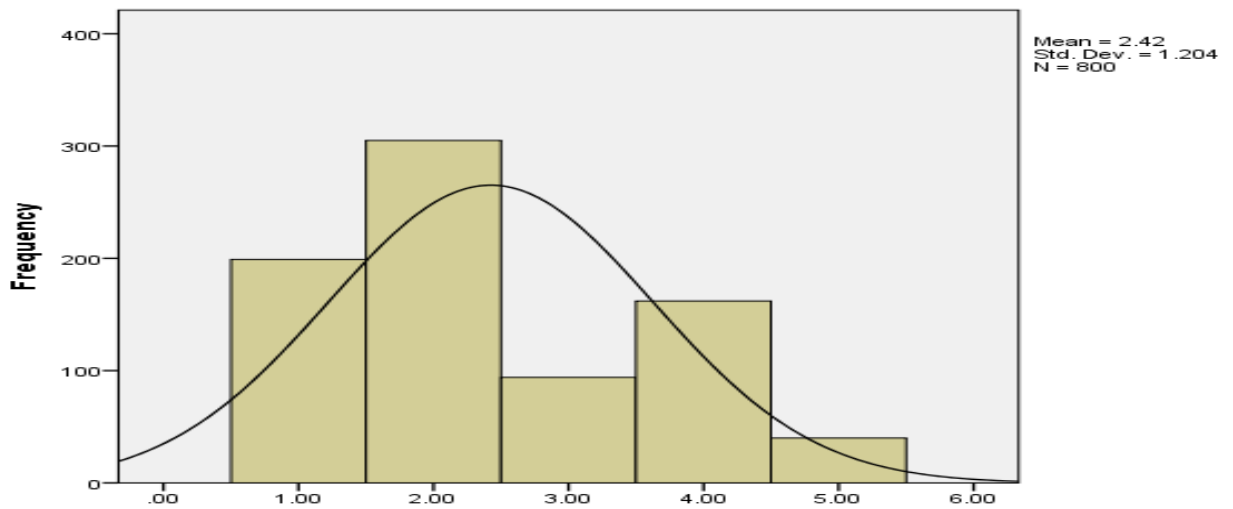


Figure 4.42 Distribution of responses by level of interaction with lecturers on e-learning platform

### Use of social media for e-learning

With regards to the sixth question on table 4.10, 20.5% of the respondents said that they do not use social media for e-learning. 71.8% said that they use social media for e-learning. The result is portrayed in the graph in figure 4.43

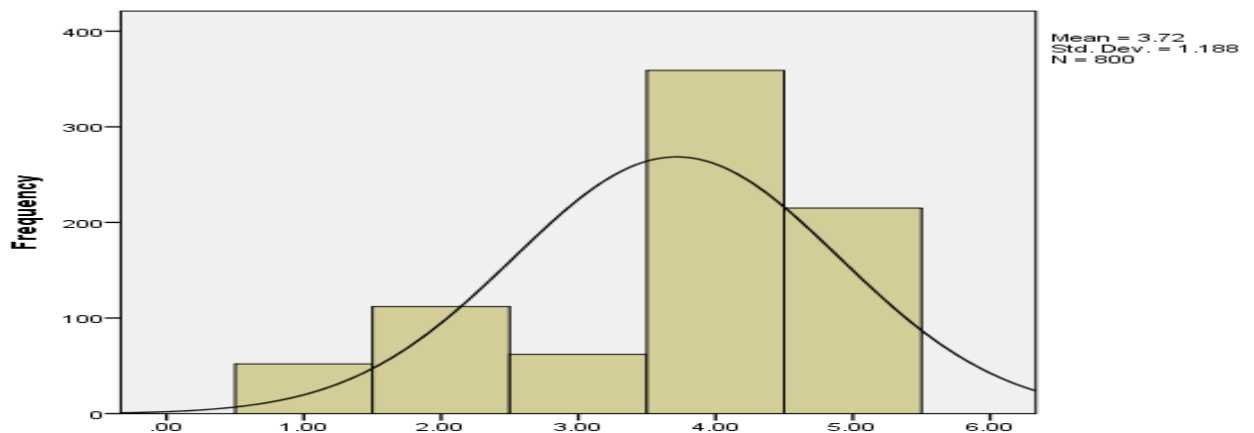


Figure 4.43 Distribution of responses by use of social media for e-learning

## 4.2 Hypotheses Testing

This section addresses the hypotheses that were put forward in this study. In the work, five hypothesis stated in the alternative forms were formulated. Regression analysis and Correlation coefficient were used for the analyses. The results of the hypotheses are discussed below:

### 4.2.1 Hypothesis One

H1-There is a significant relationship between UTAUT factors (social influence and performance expectancy) and the use of Educational technology.

Table 4.11 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.388	.150	.148	.77323

a. Predictors: (Constant), Social Influence and Performance Expectancy factors

Table 4.12 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	84.375	2	42.188	70.561	.000
	Residual	476.520	797	.598		
	Total	560.896	799			

a. Predictors: (Constant), Social Influence and Performance Expectancy factors

b. Dependent Variable: Usage and Integration of Educational Technology Tools

Table 4.13 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.308	.174		7.512	.000
	Performance Expectancy	.128	.043	.109	3.000	.003
	Social Influence Factor	.367	.040	.329	9.079	.000

a. Dependent Variable: Usage and Integration of Educational Technology Tools



From the above analysis, table 4.11 shows the value of correlation coefficient to be 0.388 which means that there is a positive relationship between UTAUT factors and the extent of the usage of e-learning tools.

Carrying out the multiple regression analysis for the data, table 4.12 shows that there is a significant relationship between UTAUT factors of social influence and performance expectancy, and the extent of the usage and integration of e-learning because the p-value (0.000) is less than  $\alpha$ -value (0.05).

Table 4.13 present the values of the regression coefficient which is presented in the model below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \quad \text{-----Equation 4.1}$$

Where:

Y is the dependent variable which is usage of e-learning tools

X<sub>1</sub> is the first independent variable which is performance expectancy

X<sub>2</sub> is the second independent variable which is social influence

Imputing the values obtained from table 4.13 into the model we therefore have:

$$Y = 1.308 + 0.128X_1 + 0.367X_2 \quad \text{-----Equation 4.2}$$

#### 4.2.2 Hypothesis Two

H1-There is a significant relationship between SLT factors (skill and attitude) and the use of educational technology.

Table 4.14 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.283	.080	.078	.80449

a. Predictors: (Constant), Skill and Attitudes Towards Using E Educational Technology Tools Factors

Table 4.15 ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	45.069	2	22.535	34.818	.000
Residual	515.826	797	.647		
Total	560.896	799			

a. Predictors: (Constant), Skill and Attitudes Towards Using E-learning Facilities Factors

b. Dependent Variable: Usage of Educational Technology Tools

Table 4.16 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.745	.192		9.099	.000
	Attitudes Towards Using E-learning Facilities	.051	.046	.042	1.107	.268
	Skill	.285	.041	.263	6.968	.000

a. Dependent Variable: Usage and Integration of E-learning

Table 4.14 shows the value of correlation coefficient to be 0.283 which means that there is a positive relationship between SLT factors, which are attitudes towards using e-learning facilities and skill, and the extent of the usage of e-learning tools.

Carrying out the multiple regression analysis for the data collected, table 4.15 shows that there is a significant relationship between SLT factors, which are attitudes towards using e-learning facilities and skill, and the extent of the usage of e-learning tools because the p-value (0.000) is less than  $\alpha$ -value (0.05). This suggests that both attitude of e-learning user and the level of the skill can influence extent of the usage of e-learning.

Table 4.16 presents the values of the regression coefficient which is presented in the model below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

Where:

Y is the dependent variable which is the usage of e-learning tools

X<sub>1</sub> is the first independent variable which is attitude towards using e-learning facilities

X<sub>2</sub> is the second independent variable which is skill

Imputing the values obtained from table 4.16 into the model we therefore have:

$$Y = 1.745 + 0.051X_1 + 0.285X_2 \quad \text{-----Equation 4.3}$$

### 4.2.3 Hypothesis Three

H1-There is a significant relationship between Power (Electricity) supply and the use of educational technology.

Table 4.17 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.188	.035	.034	.82348

a. Predictors: (Constant), Power

Table 4.18 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.753	1	19.753	29.129	.000
	Residual	541.143	798	.678		
	Total	560.896	799			

a. Predictors: (Constant), Power

b. Dependent Variable: Usage of Educational Technology Tools

Table 4.19 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.508	.114		21.958	.000
	Power	.184	.034	.188	5.397	.000

a. Dependent Variable: Usage of Educational Technology Tools

Table 4.17 gives the value of correlation coefficient between power supply and usage of e-learning to be 0.188 which means that there is a positive relationship between power supply and the extent of the usage of e-learning.

The simple regression analysis for the data collected is presented in table 4.18. It shows that there is a significant relationship between power supply and the extent of the usage and integration of e-learning tools because the p-value (0.000) is less than  $\alpha$ -value (0.05) which means inadequate power supply will hinder the of usage of e-learning tools and facilities.

Table 4.19 present the values of the regression coefficient which is presented in the model below:

$$Y = \beta_0 + \beta_1 X_1 \quad \text{-----Equation 4.4}$$

Where:

Y is the dependent variable which is the usage of e-learning tools

$X_1$  is the independent variable which is the power supply

Imputing the values obtained from table 4.19 into the model we have:

$$Y = 2.508 + 0.184X_1$$

#### 4.2.4 Hypothesis Four

H1-There is a significant relationship between Technology Culturation and the use of educational technology.

Table 4.20 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157	.025	.023	.82795

a. Predictors: (Constant), Technology Culturation

Table 4.21 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.863	1	13.863	20.223	.000
	Residual	547.033	798	.686		
	Total	560.896	799			

a. Predictors: (Constant), Technology Culturation

b. Dependent Variable: Usage and Integration of Educational Technology Tools

**Table 4.22 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.468	.144		17.113	.000
	Technology Culturation	.170	.038	.157	4.497	.000
a. Dependent Variable: Usage of Educational Technology Tools						

Table 4.20 gives the value of correlation coefficient between technology culturation and usage of e-learning tools to be 0.157 which means that there is a positive relationship between technology culturation and the extent of the usage of e-learning tools.

Simple regression analysis for the data collected is presented in table 4.21, it shows that there is a significant relationship between technology culturation and the extent of the usage e-learning tools at  $\alpha = 0.05$ .

Table 4.22 present the values of the regression coefficient which is represented in the model below:

$$Y = \beta_0 + \beta_1 X_1$$

Where:

Y is the dependent variable which is the usage of e-learning tools

$X_1$  is the independent variable which is the technology culturation

Imputing the values obtained from table 4.22 into the model we have:

$$Y = 2.468 + 0.170X_1 \quad \text{-----Equation 4.5}$$

#### 4.2.5 Hypothesis Five

H1-There is a significant relationship between the use of technology and effective learning outcomes.

Table 4.23 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.292	.085	.084	.80185

a. Predictors: (Constant), Learning Outcomes

Table 4.24 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	47.810	1	47.810	74.358	.000 <sup>a</sup>
	Residual	513.086	798	.643		
	Total	560.896	799			

a. Predictors: (Constant), Learning Outcomes

b. Dependent Variable: Usage of Educational Technology Tools

Table 4.25 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.785	.155		11.482	.000
	Learning Outcomes	.336	.039	.292	8.623	.000

a. Dependent Variable: Usage of Educational Technology Tools

Table 4.23 presents the value of correlation coefficient between learning outcomes and usage of e-learning tools to be 0.292 which means that there is a positive relationship between learning outcomes and the extent of the usage of e-learning tools.

Simple regression analysis for the two variables is as presented in table 4.24. It shows that there is a significant relationship between learning outcomes and the extent of the usage of e-learning tools at  $\alpha = 0.05$ .

Table 4.25 presents the values of the regression coefficient which is presented in the model below:

$$Y = \beta_0 + \beta_1 X_1$$

Where:

Y is the dependent variable which is the usage of e-learning tools

$X_1$  is the independent variable which is the learning outcomes

Imputing the values obtained from table 4.25 into the model we have:

$$Y = 1.785 + 0.336X_1 \quad \text{-----Equation 4.6}$$

### 4.3 Comparative Analysis of the Three Institutions

#### Item 1: Extent of Usage and Integration of E-Learning Facilities/Tools in Learning

**Table 4.26 Respondents' responses on lecturers' presentation of lectures in electronic form**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly Disagree	3	(1.4)	55	(21.1)	86	(26.8)
Disagree	9	(4.1)	63	(24.1)	99	(30.8)
Undecided	6	(2.7)	17	(6.9)	30	(9.7)
Agree	119	(54.1)	88	(34.1)	80	(25.2)
Strongly Agree	83	(37.7)	36	(13.8)	24	(7.5)
Total	220	(100.0)	260	(100.0)	320	(100.0)

Table 4.26 results above shows that University A lecturers present their lectures in electronic form much more than the lecturers of University B and University C because according to the result it has 91.8% while that of University B is 47.9% and University C is the least with 32.7%. The reason for this is because University A lecturers are required to upload their lecture notes to the Moodle platforms and teach with Smart-boards/Interactive White-Boards and projectors. These facilities are installed in virtually all the class rooms.

**Table 4.27 Respondents' responses on the use of databases, Internet, and e-books**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	4	(1.8)	14	(5.4)	49	(15.3)
Disagree	5	(2.3)	24	(9.2)	35	(10.9)
Undecided	10	(4.5)	21	(8.4)	28	(9.0)
Agree	126	(57.3)	137	(52.5)	124	(38.6)
Strongly Agree	75	(34.1)	64	(24.5)	84	(26.2)
Total	220	(100)	260	(100.0)	320	(100.0)

Table 4.27 shows that University A students use database, internet and e-book more than the students from University B and University C because University A is having 91.4% while University B is 77% and University C is 64.8%. University A uses online databases such as EBSCO, Ebrary, JSTOR, SAGE, Virtual Library, Science Direct, Web of Science Master



Journal List, etc. which are accessible online through the Centre for Learning Resources (University Library) ICT infrastructure.

**Table 4.28 Respondents' responses on whether they have a user account for e-learning**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	12	(5.5)	60	(23.0)	83	(25.9)
Disagree	31	(14.1)	95	(36.4)	102	(31.8)
Undecided	11	(5.0)	37	(14.6)	47	(15.0)
Agree	99	(45.0)	54	(20.7)	68	(21.2)
Strongly Agree	67	(30.5)	14	(5.4)	20	(6.2)
Total	220	(100)	260	(100.0)	320	(100.0)

Table 4.28 shows that 75.5% of University A students have user accounts while only 26.1% of the students of University B and 27.4% of University C students have user accounts. The reason why University A has the highest positive response is because the students are given user's account for e-learning access but from the analysis, not all of them use it.

**Table 4.29 Respondents' responses on whether they collaborate with other students on e-learning platform**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	30	(13.6)	51	(19.5)	72	(22.4)
Disagree	81	(36.8)	72	(29.5)	102	(31.8)
Undecided	35	(15.9)	31	(12.3)	57	(18.1)
Agree	54	(24.5)	83	(31.5)	72	(22.4)
Strongly Agree	204	(9.1)	18	(6.9)	17	(5.3)
Total	220	(100)	260	(100.0)	320	(100.0)

From the table 4.29, it shows that most of the students from the three institutions do not collaborate on the e-learning platform. This result is not surprising because in order to collaborate, extra skills, internet access, power and time are required.

**Table 4.30 Respondents' responses on whether they interact with lecturers on e-learning platform**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	35	(15.9)	75	(28.7)	89	(27.7)
Disagree	85	(38.6)	110	(42.1)	112	(34.9)
Undecided	17	(7.7)	24	(9.6)	51	(16.2)
Agree	69	(31.4)	40	(15.3)	53	(16.5)
Strongly Agree	14	(6.4)	11	(4.2)	15	(4.7)
Total	220	100	260	100.0	320	100.0

Table 4.30 shows that most of the students from the three institutions do not keep in touch with their lecturers on the e-learning platform. Since lecturers and students of the three universities have not fully integrated e-learning (even though University A has integrated more), using the platform to keep in touch would not be too feasible.

**Table 4.31 Respondents' responses on whether they use social media for e-learning**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	16	(7.3)	14	(5.4)	23	(7.2)
Disagree	42	(19.1)	28	(10.7)	42	(13.1)
Undecided	15	(6.8)	17	(6.9)	28	(9.0)
Agree	96	(43.6)	120	(46.0)	144	(44.9)
Strongly Agree	51	(23.2)	81	(31.0)	83	(25.9)
Total	220	(100)	260	(100.0)	320	(100.0)

The result above shows that most of the students from the three institutions use social media for e-learning. The level of social media usage amongst the youths in Nigeria is quite high (Uzuegbunam, 2015). This is fast impacting e-learning as reported in table 4.31.

## Item 2: Performance Expectancy

**Table 4.32 Respondents' responses on whether e-learning tools are useful for learning**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(0.9)	5	(1.9)	17	(5.3)
Disagree	2	(0.9)	5	(1.9)	15	(4.7)
Undecided	5	(2.3)	8	(3.4)	16	(4.7)
Agree	128	(58.2)	101	(38.7)	134	(41.7)
Strongly Agree	83	(37.7)	141	(54.0)	140	(43.6)
Total	220	(100)	260	(100.0)	320	(100.0)

Table 4.32 shows that most of the students from the three institutions agreed that they have found e-learning facilities useful for their learning. E-learning offers a lot of opportunities. It is expected that students would find it useful for learning.

**Table 4.33 Respondents' responses on whether using e-learning tools help accomplish tasks quickly**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(0.9)	2	(0.8)	10	(3.1)
Disagree	5	(2.3)	10	(3.8)	27	(8.4)
Undecided	15	(6.8)	8	(3.4)	23	(7.5)
Agree	122	(55.5)	132	(50.6)	153	(47.7)
Strongly Agree	76	(34.5)	108	(41.4)	107	(33.3)
Total	220	(100)	260	(100.0)	320	(100.0)

Table 4.33 shows that most of the students from the three institutions agreed that using e-learning facilities as a learning tool enables them to accomplish tasks more quickly. Computers are generally fast. Using them should help users to complete tasks quickly.

**Table 4.34 Respondents' responses on whether using e-learning tools increase their productivity**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	1	(.5)	2	(.8)	9	(2.8)
Disagree	6	(2.7)	6	(2.3)	15	(4.7)
Undecided	17	(7.7)	7	(3.1)	21	(6.9)
Agree	128	(58.2)	143	(54.8)	184	(57.3)
Strongly Agree	68	(30.9)	102	(39.1)	91	(28.3)
Total	220	(100.0)	260	(100.0)	320	(100.0)

The result from the three institutions shows that using e-learning facilities increase productivity.

Computers are designed to improve productivity. The result in table 4.34 validates this expectation as 89.1% of the respondents from University A, 93.9% from University B and 85.6 from University C agreed that e-learning tools increase their productivity.

**Table 4.35 Respondents' responses on whether using e-learning tools enhances getting better grades**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(.9)	4	(1.5)	8	(2.5)
Disagree	16	(7.3)	13	(5.0)	22	(6.9)
Undecided	33	(15.0)	23	(9.2)	24	(7.8)
Agree	109	(49.5)	118	(45.2)	158	(49.2)
Strongly Agree	60	(27.3)	102	(39.1)	108	(33.6)
Total	220	(100.0)	260	(100.0)	320	(100.0)

Table 4.35 shows that using e-learning tools and facilities increase the chances of getting better grades for students in the three institutions as 76.8% of the respondents from University A, 84.3% from University B and 82.8% from University C attested to this fact.

### Item 3: Social Influence

**Table 4.36 Respondents' responses on whether people who influence their behaviour support e-learning tools usage**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	14	(6.4)	19	(7.3)	21	(6.5)
Disagree	39	(17.7)	56	(21.5)	56	(17.4)
Undecided	63	(28.6)	54	(20.7)	82	(25.9)
Agree	83	(37.7)	98	(37.5)	127	(39.6)
Strongly Agree	21	(9.5)	33	(12.6)	34	(10.6)
Total	220	(100)	260	(100)	320	(100.0)

Table 4.36 reveals that there is greater percentage of undecided responses across the three institutions because the students felt that the people that influence their behavior do not necessarily affect their usage of e-learning tools.

**Table 4.37 Respondents' responses on whether people who are important support e-learning tools usage**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	6	(2.7)	8	(3.1)	20	(6.2)
Disagree	23	(10.5)	40	(15.3)	35	(10.9)
Undecided	33	(15.0)	35	(13.8)	64	(20.2)
Agree	128	(58.2)	126	(48.3)	155	(48.3)
Strongly Agree	30	(13.6)	51	(19.5)	46	(14.3)
Total	220	(100)	260	(100.0)	320	(100.0)

The results in table 4.37 for the three institutions show that students feel that people who are important to them support the use of e-learning as 71.8% of University A respondents, 67.8% from University B and 62.6% from University C attested to this.

**Table 4.38 Respondents' responses on whether management provides and encourages e-learning usage**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	4	(1.8)	49	(18.8)	57	(17.8)
Disagree	7	(3.2)	65	(24.9)	81	(25.2)
Undecided	17	(7.7)	22	(8.8)	50	(15.9)
Agree	121	(55.0)	82	(31.4)	100	(31.2)
Strongly Agree	71	(32.3)	42	(16.1)	32	(10.0)
Total	220	(100)	260	(100.0)	320	(100.0)

The result above show that University A is having greater percentage (87%) of management provision and encouragement of the usage of the e-learning while that of the University B is 47.5% and that of University B is 42.2%. this result is not surprising as University C is currently managed by crop of leaders who are ICT savvy. It is not surprising that the support for ICT is higher.

**Table 4.39 Respondents' responses on whether e-learning tools usage improves their prestige/image**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	10	(4.5)	17	(6.5)	19	(5.9)
Disagree	35	(15.9)	26	(10.0)	30	(9.3)
Undecided	45	(20.5)	39	(15.3)	68	(21.5)
Agree	94	(42.7)	122	(46.7)	150	(46.7)
Strongly Agree	36	(16.4)	56	(21.5)	53	(16.50)
Total	220	(100)	260	(100.0)	320	(100.0)

The result in table 4.39 shows that students in the three institutions attested to the fact that using e-learning improves their prestige.

**Item 4: Attitude****Table 4.40 Respondents' responses on whether they like using e-learning technology tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	3	(1.4)	4	(1.5)	15	(4.7)
Disagree	9	(4.1)	7	(2.7)	18	(5.6)
Undecided	27	(12.3)	14	(5.4)	25	(8.1)
Agree	125	(56.8)	148	(56.7)	163	(50.8)
Strongly Agree	56	(25.5)	87	(33.3)	99	(30.8)
Total	220	(100)	260	(100)	320	(100.0)

The results in Table 4.40 show almost the same response from the three institutions. This implies that students like to use e-learning tools with 82.3% of University A respondents, 90% from University B and 81.6% from University C agreeing to this fact.

**Table 4.41 : Respondents' responses on whether e-learning tool makes learning interesting**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(0.9)	2	(.8)	4	(1.2)
Disagree	11	(5.0)	7	(2.7)	11	(3.4)
Undecided	23	(10.5)	8	(3.4)	32	(10.3)
Agree	122	(55.5)	134	(51.3)	147	(45.8)
Strongly Agree	62	(28.2)	109	(41.8)	126	(39.3)
Total	220	(100)	260	(100.0)	320	(100.0)

Respondents across the three institutions agreed to the fact that e-learning makes learning more interesting.

**Table 4.42 Respondents' responses on whether using e-learning tools is fun/exciting**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(0.9)	6	(2.7)	7	(2.5)
Disagree	16	(7.3)	4	(1.5)	18	(5.6)
Undecided	29	(13.2)	15	(5.7)	33	(10.3)
Agree	116	(52.7)	134	(51.3)	153	(47.7)
Strongly Agree	57	(25.9)	101	(38.7)	109	(34.0)
Total	220	(100)	260	(100.0)	320	(100.0)

The result from the three institutions as depicted in table 4.42 shows that working with e-learning tools and facilities is exciting.

**Table 4.43 Respondents' responses on whether using e-learning tools is a good idea**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	1	(.5)	2	(.8)	8	(2.5)
Disagree	2	(.9)	2	(.8)	11	(3.4)
Undecided	6	(2.7)	5	(2.3)	18	(5.9)
Agree	136	(61.8)	121	(46.4)	152	(47.4)
Strongly Agree	75	(34.1)	130	(49.8)	131	(40.8)
Total	220	(100)	260	(100.0)	320	(100.0)

Respondents across the three institutions agreed that using e-learning tools is a good idea. This is depicted in table 4.43 as 95.9% of University A respondents, 96.2% students from University B and 88.2% respondents from University C agreed to that fact.

#### **Item 5: Skill**

**Table 4.44 Respondents' responses on whether they use e-learning tools with little or no assistance**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(.9)	3	(1.1)	16	(5.0)
Disagree	4	(1.8)	14	(5.7)	32	(10.3)
Undecided	6	(2.7)	9	(3.4)	31	(9.7)
Agree	129	(58.6)	146	(55.9)	136	(42.4)
Strongly Agree	79	(35.9)	88	(33.7)	105	(32.7)
Total	220	(100)	260	(100.0)	320	(100.0)

Based on the analysis in table 4.44, almost all the students that responded across the three institutions said they use e-learning facilities and tools with little or no assistance but the percentage of University A students (94.5%) and University B (89.6%) is higher than that of University C (75.1%).

**Table 4.45 Respondents' responses on whether they are competent in the use of e-learning tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	3	(1.4)	5	(1.9)	9	(2.8)
Disagree	4	(1.8)	13	(5.0)	22	(6.9)
Undecided	11	(5.0)	19	(7.3)	34	(10.6)
Agree	124	(56.4)	128	(49.0)	162	(50.5)
Strongly Agree	78	(35.5)	96	(36.8)	94	(29.3)
Total	220	(100)	260	(100.0)	320	(100.0)

University A is also having higher percentage of competency when it comes to the use of e-learning with 91.9% while that of University B is 85.88% and University C 79.8%.this implies that University A students are more confident in the use of e-learning tools.

**Table 4.46 Respondents' responses on whether they have adequate knowledge on how to use e-learning tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(.9)	5	(.4)	20	(6.2)
Disagree	10	(4.5)	22	(7.7)	32	(10.0)
Undecided	10	(4.5)	19	(6.1)	37	(11.5)
Agree	127	(57.7)	142	(54.4)	155	(48.3)
Strongly Agree	71	(32.3)	73	(31.4)	77	(24.0)
Total	220	(100)	260	(100.0)	320	(100.0)

Table 4.6 shows that 90% of the respondents from University A agreed that they have enough knowledge on how to use e-learning tools while that of University B and University C is 85% and 72.3% respectively. This shows that University A students have more knowledge than that of University B and University C.



**Table 4.47 Respondents' responses on whether they are confident when using e-learning tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	1	(.5)	1	(4)	11	(3.4)
Disagree	4	(1.8)	20	(7.7)	33	(10.3)
Undecided	13	(5.9)	16	(6.1)	50	(15.6)
Agree	127	(57.7)	142	(54.4)	152	(47.4)
Strongly Agree	75	(34.1)	82	(31.4)	75	(23.4)
Total	220	(100)	260	(100.0)	320	(100.0)

91.8% of the respondents from University A said they are confident when using e-learning tools; while we have 85.8% from University B and 80.8% from University C that are of the same opinion. This implies that University A students are more confident in educational technology usage followed by University B students and then University C students. This is depicted in table 4.47.

#### **Item 6: Technology Culturation**

**Table 4.48 Respondents' responses on whether they had access to technology previously**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	21	(9.5)	6	(2.3)	24	(7.5)
Disagree	18	(8.2)	17	(6.5)	27	(8.4)
Undecided	17	(7.7)	17	(6.5)	35	(10.9)
Agree	104	(47.3)	122	(46.7)	131	(40.8)
Strongly Agree	60	(27.3)	99	(37.9)	104	(32.4)
Total	220	(100)	260	(100.0)	320	(100.0)

The result in table 4.48 shows that 74.6% of the University A respondents have previous access to technology while that of University B and University C is 84.6% and 73.2% respectively.

**Table 4.49 Respondents' responses on whether prior exposure to technology affected their acceptance of e-learning**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	26	(11.8)	23	(8.8)	27	(8.4)
Disagree	25	(11.4)	22	(8.4)	55	(17.1)
Undecided	27	(12.3)	26	(10.0)	45	(14.0)
Agree	95	(43.2)	107	(41.0)	115	(35.8)
Strongly Agree	47	(21.4)	83	(31.8)	79	(24.6)
Total	220	(100)	260	(100.0)	320	(100.0)

From University A respondents, 64.6% agreed that their prior exposure to technology affected their acceptance of e-learning. We have 72.8% from University B and 60.4% from University C.

**Table 4.50 Respondents' responses on whether they use internet to download learning materials**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	3	(1.4)	7	(2.7)	14	(4.4)
Disagree	11	(5.0)	6	(2.3)	14	(4.4)
Undecided	6	(2.7)	7	(3.1)	26	(8.1)
Agree	105	(47.7)	102	(39.1)	118	(36.8)
Strongly Agree	95	(43.2)	138	(52.9)	149	(46.4)
Total	220	(100)	260	(100.0)	320	(100.0)

In University A, lecturers upload learning materials on e-learning platforms amongst many other platforms for download by students. The result in the table 4.50 validates this. This is so because of the institutional policy that supports this.

**Table 4.51 Respondents' responses on whether they have attended training on the use of e-learning tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	43	(19.5)	19	(7.3)	45	(14.0)
Disagree	72	(32.7)	36	(13.8)	81	(25.2)
Undecided	22	(10.0)	25	(9.6)	45	(14.0)
Agree	57	(25.9)	110	(42.1)	95	(29.6)
Strongly Agree	26	(11.8)	71	(27.2)	55	(17.1)
Total	220	(100)	260	(100.0)	320	(100.0)

From table 4.51, just 37.7% of the University A respondents said they had attended training on the use of e-learning tool while we have 69.3% from University B and 46.7% from University C. The average age of students entering government institutions is higher than that of private institutions. It is expected that the students entering government institutions may have taken some computer based courses before entering the university.

#### Item 7: Power (Electricity)

**Table 4.52 Respondents' responses on whether power is very stable for e-learning tools and facilities usage**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	35	(15.9)	45	(17.2)	81	(25.2)
Disagree	54	(24.5)	50	(19.2)	61	(19.0)
Undecided	29	(13.2)	32	(12.3)	44	(13.7)
Agree	80	(36.4)	106	(40.6)	88	(27.4)
Strongly Agree	22	(10.0)	28	(10.7)	47	(14.6)
Total	220	(100)	260	(100.0)	320	(100.0)

The result from table 4.52 shows that power supply was not very stable for e-learning usage across the three institutions. This is so because the national grid that supplies power in Nigeria is inadequate and calls for a need for these institutions to have their independent power supply.

**Table 4.53 Responses of respondents on whether poor power supply will not deter from e-learning tools usage**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	41	(18.6)	45	(17.2)	78	(24.3)
Disagree	59	(26.8)	67	(25.7)	85	(26.5)
Undecided	29	(13.2)	40	(15.3)	40	(12.5)
Agree	71	(32.3)	84	(32.2)	89	(27.7)
Strongly Agree	20	(9.1)	24	(9.2)	29	(9.0)
Total	220	(100)	260	(100)	320	(100.0)

The result from table 4.53 shows that availability of power will have a positive impact on the usage of educational technology because more than half of the respondents said lack of power supply will deter them from using e-learning tools.

**Table 4.54 Responses of respondents on whether the use of e-learning tools require stable power supply**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	10	(4.5)	10	(3.8)	18	(5.6)
Disagree	23	(10.5)	11	(4.2)	27	(8.4)
Undecided	21	(9.5)	10	(3.8)	30	(9.3)
Agree	94	(42.7)	90	(34.5)	111	(34.6)
Strongly Agree	72	(32.7)	140	(53.6)	135	(42.1)
Total	220	(100)	260	(100.0)	320	(100.0)

The result in table 4.54 reveals that a greater percentage of the respondent across the three institutions agreed that the use of e-learning tool required stable power supply. E-learning tools and facilities run on availability of stable power supply.

#### **Item 8: Use Behaviour**

**Table 4.55 Responses of respondents on whether they regularly use e-learning facilities/tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	4	(1.8)	13	(5.0)	37	(11.5)
Disagree	20	(9.1)	50	(19.2)	58	(18.1)
Undecided	20	(9.1)	37	(14.2)	70	(21.8)
Agree	121	(55.0)	107	(41.0)	105	(32.7)
Strongly Agree	55	(25)	54	(20.7)	51	(15.9)
Total	220	(100)	260	(100.0)	320	(100.0)

The result in table 4.55 shows that 80% of the University A respondents regularly use e-learning facilities. 61.7% of the University B respondents and just 48.6% of the University C use them. University A is highly ICT driven. E-learning tools are made available in virtually all the classrooms. This is not same with University B and University C.

**Table 4.56 Responses of respondents on whether they regularly use the internet for information search**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(9)	3	(1.1)	13	(4.0)
Disagree	5	(2.3)	12	(5.0)	19	(5.9)
Undecided	4	(1.8)	18	(6.9)	26	(8.1)
Agree	113	(51.4)	134	(51.3)	152	(47.4)
Strongly Agree	96	(43.6)	93	(35.6)	110	(34.3)
Total	220	(100)	260	(100.0)	320	(99.7)

From table 4.56, 95% of the University A respondents regularly use internet for information search while 86.9% of the University B respondents regularly use internet for information search and that of University C is 81.7%. This means that students in the three schools regularly use the internet to search for information.

**Table 4.57 Responses of respondents on whether they regularly use the internet for communication**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(.9)	7	(3.1)	13	(4.4)
Disagree	3	(1.4)	11	(4.2)	26	(8.1)
Undecided	5	(2.3)	17	(6.5)	29	(9.0)
Agree	108	(49.1)	122	(46.7)	138	(43.0)
Strongly Agree	102	(46.4)	103	(39.5)	114	(35.5)
Total	220	(1000)	260	(100.0)	320	(100.0)

The result above shows that University A (94.5%) regularly uses the internet for communication than University B (86.5%) and University C (78.5%) which implies that a higher percentage of students across the three selected universities.

**Table 4.58 Respondents' responses on whether they regularly use internet to download learning materials**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Disagree	2	(1)	15	(6.1)	15	(4.7)
Undecided	4	(2)	20	(7.7)	35	(10.9)
Agree	118	(53.6)	120	(46.0)	145	(45.2)
Strongly Agree	96	(43.6)	105	(40.2)	115	(35.8)
Total	220	(100)	260	(100.0)	320	(100.0)

The result across the three institutions shows that they all regularly use internet to download learning materials.

### Item 9: Learning Outcomes

**Table 4.59 Responses of respondents on whether their academic performance had improved with the use of e-learning facilities**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	3	(1.4)	8	(3.1)	13	(4.0)
Disagree	10	(4.5)	11	(4.6)	30	(9.7)
Undecided	34	(15.5)	38	(14.6)	64	(19.9)
Agree	117	(53.2)	129	(49.4)	140	(43.6)
Strongly Agree	56	(25.5)	74	(28.4)	73	(22.7)
Total	220	(100)	260	(100.0)	320	(100.0)

The result across the three institutions in table 4.59 shows that the academic performance of students has improved with the use of e-learning facilities. As 78.7% of University A respondents agreed that their academic performance has improved with the use of e-learning tools, 77.8% from University B and 66.3% from University C.

**Table 4.60 Responses of respondents on whether they comprehend faster with the use of e-learning tools**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	3	(1.4)	4	(1.5)	17	(5.3)
Disagree	16	(7.3)	22	(8.4)	28	(8.7)
Undecided	34	(15.5)	42	(16.1)	44	(13.7)
Agree	119	(54.1)	126	(48.3)	159	(49.5)
Strongly Agree	48	(21.8)	67	(25.7)	73	(22.7)
Total	220	(100)	260	(100.0)	320	(100.0)

From table 4.60, 75.9% of the respondents from University A are of the opinion that they comprehend faster with the use of e-learning tools, 74% from University B and 70.2% from University C. Greater percentage of the respondents from the three institutions agreed that they comprehend faster with the use of e-learning facilities.

**Table 4.61 Respondents' responses on whether e-learning facilities enhances understanding of concepts**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Strongly disagree	2	(.9)	4	(1.5)	13	(4.0)
Disagree	8	(3.6)	6	(2.30)	24	(7.5)
Undecided	28	(12.7)	28	(10.7)	39	(12.1)
Agree	126	(57.3)	157	(60.2)	182	(56.7)
Strongly Agree	56	(25.5)	66	(25.3)	63	(19.6)
Total	220	(100)	261	(100.0)	321	(100.0)

The result from the three institutions show that e-learning enhances understanding of concepts of what they are taught as 82.8% of the respondents from University A, 85.3% from University B and 76.3% from University C agreed that e-learning tools enhance the understanding of concepts.

**Table 4.62 Respondents' responses on whether e-learning facilitates collaborative learning**

	Universities					
	A		B		C	
	N	%	N	%	N	%
Disagree	9	(4.1)	9	(2.3)	23	(4.4)
Undecided	23	(10.5)	26	(10.3)	36	(11.2)
Agree	132	(60.0)	147	(56.3)	183	(57.0)
Strongly Agree	56	(25.0)	77	(29.5)	78	(24.3)
Total	220	(100)	260	(100.0)	320	(100.0)

The respondents from the three institutions agreed that e-learning facilitates collaborative learning.

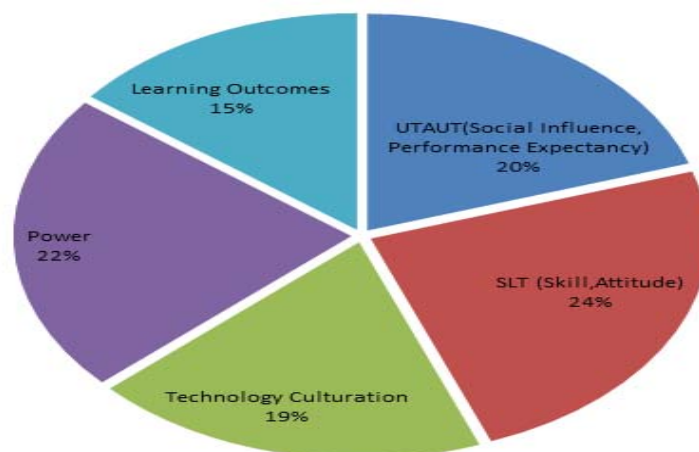
#### 4.4 Analysis of Factors Influencing the Use of Educational Technology Tools and Facilities in Hierarchical Order

Table 4.63 itemizes each factor together with the corresponding percentage of the respondents that agree to the effect of each of the factor on educational technology usage.

**Table 4.63 Hierarchical Itemization of Factors**

Factors	Frequency
SLT	93.2
Power	86
UTAUT	76.9
Technology Culturation	73.1
Learning Outcomes	55.6

Table 4.63 reveals that in the three selected institutions used for this study, SLT factors (Skill and Attitude) are the most potent/important factors that contributed significantly to the use of educational technology with frequency of 93.2 (i.e. 24%) followed by Power with 86 (i.e. 22%) as presented in the Pie Chart in Figure 4.44. This implies that although other factors as shown on the table particularly Power are imperative determining factors for technology usage, users must have acquired the pre-requisite skill and possess a good attitude towards its usage before other factors can follow. The result is further depicted in Figure 4.44.



**Figure 4.44 Degree of Influence of Factors in Percentages**



## **4.5 Interpretation of Lecturers' Views**

Lecturers from the three institutions were asked a few questions in order to corroborate the responses from the students on the usage of e-learning tools and facilities in their institutions. The questions centered on whether there is stable electricity supply, technology culturation, availability of adequate e-learning facilities and access to it, availability of reliable internet services, management support with regards to the use of e-learning tools, and others.

The results show that University A being a private university embraces and use educational technology tools most because majority of the respondents gave a positive response towards the questions that were asked on availability, access, usage, support from management and Power supply. Although from the responses, more still needs to be done on the aspect of regular training and re-training of their staff and students on the provided facilities.

University B being a federal university has the next positive response from the respondents ranking second when it comes to the adoption and usage of the e-learning facilities from the selected institutions (even though projectors are the basic e-learning tools used). From the responses gotten, there is need to do more about the provision of electricity, provision of educational technology tools and facilities as well as training of lecturers and students on the use of educational technology tools and facilities.

University C being a state university has the least positive response from among the selected institutions. The areas where more still needs to be done in this institution includes: provision of adequate and steady electricity (Power supply), provision of e-learning tools and facilities, support from technical staff, encouraging policy for e-learning facilities' usage, availability and access to reliable internet services as well as training of lecturers and students on the use of educational technology tools and equipment.

Virtually all lecturers across the three schools are of the opinion that previous exposure to other technology (i.e. Technology Culturation) could influence the acceptance and use of educational technology subsequently. Also, they affirmed that the use of educational technology tools and facilities would enhance learning across the three institutions.

#### **4.6 Interpretation of ICT Directors' Views**

ICT Directors from the three institutions were also interviewed in order to have a balanced research because of their strategic roles in the implementation, adoption and use of e-learning facilities in the universities. Their responses corroborate and validate already stated findings discovered from students and lecturers' responses.

The ICT interviewee in University C said that they have epileptic power supply and funding issues and that they lack sufficient educational technology tools for effective teaching and learning. He also said that they do not have adequate policies that support; neither do they have adequate management support for the effective use of educational technology and they do not have adequate available internet access.

In University B, the scenario was slightly different as the Director said that although Power supply by the national grid is not very steady, however, they run more on the university's alternative internally-powered source. He also confirmed that although internet access is available, it is not reliable. According to the response, it was also discovered that university B does not have adequate support from management for the effective use of educational technology and there are inadequate educational technology tools for effective usage and integration.

However, in University A, it was a clearly different response as the ICT Director said that they have policies that encourage the use of Educational Technology tools. He also said that funding is not an issue and that Power is quite adequate for effective use of Educational technology tools and facilities, in fact, University A has a Gas Plant Station for Power generation in addition to the supply by the national grid. Additionally, he affirmed that his Centre gives support to lecturers on Educational Technology tools usage when technical attention is required and there is reliable internet access and adequate management support in terms of funding and training.

## **CHAPTER FIVE**

### **DISCUSSION**

This study examined the factors that influence educational technology usage in selected universities in Ogun State, Nigeria. In the first chapter of this work, the background to the study was presented and the guiding problem was formulated in line with the research questions and hypotheses in order to achieve the objectives of this study. The second chapter contains the literature review and theoretical framework of earlier studies as well as the researcher's conceptual framework. This is followed by the third chapter which contains the methods designed for carrying out the study. The fourth chapter presents the data collected and interpretation. Based on the above, a summary of the results of the research questions and hypotheses tested are presented and discussed below.

#### **5.1. Summary of Key Findings – Research Questions**

The following section presents the summary of key findings with respect to the research questions and hypotheses tested.

This research aimed at ascertaining the factors that influence the use of educational technology in selected universities in Ogun State, Nigeria; it examined the extent to which Attitude, Skill, Social Influence, Performance Expectancy, Technology Culturation and Power affect Educational Technology usage. The summary of the research findings are presented below:

1. In assessing the Performance Expectancy factor, the general conclusion from the respondents revealed that the use of educational technology tools could increase students' performance because the results show that 90.63% of the respondents said that e-learning tools are useful to them for learning and will increase their productivity.

2. There is a general belief that other people's opinion (social influence) on technology usage could influence the usage of educational technology tools. From the analysis, 66% of the respondents held this view.
3. The attitude of the user was found to be of great importance in the adoption and usage of educational technology tools. For instance, 84.8% of the students like to use e-learning tools, 87.5% believe e-learning tools make learning interesting, while 92.9% said using e-learning tools is a good idea and this explains why an individual's attitude had a significant effect on the usage of educational technology tools.
4. There are generally a high number of respondents with skills on the usage of educational technology tools because 85.1% said they use e-learning tools without assistance, 85.1% are competent on it and 80.4% have knowledge on the usage.
5. Findings from this study revealed that having previous exposure and access to technology i.e. Technology Culturation is important in the adoption and usage of educational technology tools; 77.3% said the previous access they had helped greatly. While 65.7% reported that prior exposure to technology usage affects its acceptance.
6. One of the major factors identified by the respondents as limiting the usage of educational technology tools in Nigerian universities is power. Only 46.4% indicated that power was stable in their institutions and 39.6% said power will not deter them from making use of educational technology.
7. Findings from this study revealed that the utilization of educational tools has greatly influenced the learning outcomes of students positively as 73.7% reported that their performance have improved with the use of e-learning tools, 73.9% indicated that they comprehend faster with e-learning tools and 81.1% reported that the use of e-learning tools enhances their understanding of concepts.
8. Having positive behaviour towards the usage of the educational technology tools was found to be on the increase. From the analysis, 60.5% of the respondents said they regularly use e-learning tools, 87% use internet for information search while 85.6% use the internet for communication.

9. Generally, the result on the extent of usage of e-learning tools shows that the awareness and use of educational technology tools is relatively on the increase in tertiary institutions in Nigeria. This research discovered that more than half of the lecturers interviewed (53.8%) use educational technology tools to teach and 76.1% of students use databases, internet and e-books to enhance their studies. This implies that the awareness and use of educational technology tools in tertiary institutions in Nigeria is relatively on the increase.

## **5.2 Discussion of Findings – Hypotheses**

The study aimed at ascertaining the factors that influence the use of educational technology in selected universities in Ogun State, Nigeria; it examined the extent to which attitude, Skill, Social Influence, Performance Expectancy, Technology Culturation and Power affect Educational Technology usage. The research findings will be explained in this section with respect to each of the five hypotheses.

### **5.2.1 Hypothesis One (Social Influence and Performance Expectancy Factors)**

Hypothesis one addressed the extent to which social influence and performance expectancy affect the use of educational technology. The alternative hypothesis states that there is a significant relationship between UTAUT factors (social influence and performance expectancy) and the use of Educational technology. The result reveals that there is a positive and significant relationship between UTAUT factors of social influence and performance expectancy and the usage of educational technology tools. The alternative hypothesis is therefore accepted in its stated form.

This implies that when students, teachers, peers or someone important to them expects or suggests that they use e-learning tools, they are more inclined to use them. Also, when students expect the use of educational technology to increase their performance, they are more encouraged to use it (Tan, 2013). Hao (n.d.) argues that on the learning process, social influence reduces the uncertainty about the new

technology's quality and then results in the adoption behavior. Venkatesh *et al* (2003) asserts that social Influence in every model contains the explicit or implicit view that the individual's behaviour is influenced by the way in which they believe others will look at them as a result of having used the technology. The continuous usage intentions and actual usage of web-based learning system was predicted by social influence amongst others (Lwoga & Komba, 2014). In corroboration, Wang, *et al*, (2009) found that Social influence influences the behavioural intention of an individual to use m-learning in stronger ways.

Also, the studies by Maina & Nzuki (2015) and Raman, *et al* (2014) reported that performance expectancy consistently had a positive influence on the acceptance and adoption of educational technologies in higher institutions.

Wang, Wu & Wang (2009) examined the factors of m-learning usage intention. The results showed that the effect of performance expectancy on behavioural intention was significant. However, Wang, *et al*, (2009) found that Social influence affects the behavioural intention of an individual to use m-learning in a stronger way for the older persons than for those who are younger.

### **5.2.2 Hypothesis Two (Attitude and Skill Factors)**

Hypothesis two addressed the extent to which attitude and skill affects educational technology usage. The alternative hypothesis states that there is a significant relationship between SLT factors (skill and attitude) and the use of educational technology.

The result from the analysis shows that there is a positive and significant relationship between SLT factors (skill and attitudes towards using e-learning facilities), and the usage of e-learning tools. This suggests that both the attitude of e-learning user and their level of skill could influence the usage of educational technology tools. Therefore, the alternative hypothesis is hereby accepted in its stated form.

This result corroborates the assertion of Adewole-Odeshi (2014) who said that good technical skill impacts on students' attitude towards e-learning. This is also consistent with the findings of Nistor, *et al* (2014) which showed that attitudes toward educational technology built varied acceptance and usage profiles for Germans and Romanians. Also, the study of Lwoga & Komba (2014), explored the factors that could predict the continuous usage intention of web-based learning management systems (LMS) by students in Tanzania, with particular concentration on the School of Business of Mzumbe University (MU) found that limited skill was one of the factors affecting the use of web-based LMS.

The attitude of individuals toward technology usage has been found to be a serious social issue (Kafyulilo, 2011, Okojie, Olinzock & Okojie-Boulder, 2011). Park *et al* (2014) said that attitude is an essential variable in the explanation of technology acceptance and the intention to use new technology. This is corroborated by Adewole-Odeshi (2014) who reported a positive attitude towards the use of e-learning systems by students in some selected universities in South-West, Nigeria. Park (2009) also accepted that the attitudes of university students toward e-learning with regards to perceived usefulness and perceived ease of use are closely connected to the acceptance of e-learning. In the same way, Wilson, Baranczyk & Adams (2011) maintained that a trainee's attitude to training, perceived behavioural control, and perceived social norms could be used to predict the intention of a trainee to transfer competent skills as well as knowledge. University students with positive attitudes express less negative opinions of educational factors in educational settings (Berg & Anders, 2005).

Furthermore, the beliefs and values that persons have in-built in them through their cultural background, impact their perspective and thinking significantly, and this affect their attitude to technology usage (Ingold, 1996; Kransberg & Davenport, 1972). Hew and Brush (2007), Nyaumwe (2006), and Albion (2001) recognised that the attitudes and beliefs of teachers constitute barriers to their use of technology for instruction. Furthermore, Park *et al* (2014) citing Na (2002) opined that there is a relationship between attitudes of university distancelearners to online coursework and

their learning outcomes. Positive attitudes to university experiences could increase the learning outcomes of the student. Although, there are major challenges or barriers that hinder the integration of ICT in organisations in developing nations; however, lack of awareness and people's mind-set is by far the greatest barriers and should be the first to be dealt with, before an organisation can move forward (eLearning Africa Report, 2015).

Koç (2005) discovered that there was a significant relationship between the time spent on computers usage and students' attitudes and self-efficacy.

### **5.2.3 Hypothesis Three (Power Factor)**

Hypothesis three addressed the influence of Power (electricity) on educational technology usage. The alternative hypothesis states that there is a significant relationship between Power (Electricity) supply and the use of educational technology.

The result reveals that there is a positive and significant relationship between power supply and the extent of the usage of educational technology tools. This then means that inadequate power supply will hinder the usage of educational technology tools. The alternative hypothesis is therefore accepted in its stated form.

This confirms the assertion of (Anene, *et al*, 2014) who opined that due to inadequate power supply, Nigerian students experience difficulty in the effective use of ICT. This view is corroborated by Chigbu and Dim (2012), who said that major among the problems affecting technology utilisation in Nigerian universities is unsteady power supply. Ololube, *et al* (2009) is also of the opinion that lack of electricity to power the ICT materials; fluctuations in its supply and poor telecommunication facilities make the application of technology in the education system very challenging.

Electricity is needed to power both the working as well as the living environment (Sadiq, 2015).



#### **5.2.4 Hypothesis Four (Technology Culturation Factor)**

Hypothesis four addressed the influence of Technology Culturation on educational technology usage. The alternative hypothesis states that there is a significant relationship between Technology Culturation and the use of educational technology.

The result from the data analysis shows that there is a positive and significant relationship between technology culturation and the usage of educational technology tools. This implies that prior exposure to technology usage affects the subsequent acceptance and usage of other higher technologies. The alternative hypothesis is therefore accepted in its stated form.

The concept of technological culturation which was first defined by Straub, Loch and Hill (2001), and later used in the study of Loch *et al.*, (2003) and others have shown to influence the use of ICTs. Straub, Loch, Evaristo, Karahanna, & Srite (2002) conceptualized technology culturation as demonstrating an individual's exposure to a somewhat technology-concentrated culture. Similarly, Loch, Nelson & Straub (2000) submitted that there is a strong relationship between culture and/or Technology Culturation and Information Technology Transfer. For instance, they said that training could be much more effective when learners have been technologically culturated, or have been earlier exposed to related technologies (Okoli, 2002).

In terms of experience, Venkatesh & Morris (2003) asserted that technology acceptance and usage could depend on previous experience with computers in general. Czaja, et al, (2006) carried out a study to see if experience on its own with technology predicted computer usage and discovered that there was a direct relationship between computer usage and extent of computer experience and Web experience.

This finding is in line with that of Meso & Musa (2008) who reported that Technology culturation influenced the extent of usage of technology in Nigeria, Kenya, and Gambia. This is also corroborated by Loch *et al* (2003)'s argument that the degree of technological culturation is seen as influencing the extent of ICTs usage within a given society.

#### **5.2.5 Hypothesis Five (Learning Outcomes Factor)**

Hypothesis five addressed the effect of educational technology usage on learning effectiveness. The alternative hypothesis states that there is a significant relationship between

the use of technology and effective learning outcomes. The result shows that there is a positive and significant relationship between learning outcomes and the usage of educational technology tools. The alternative hypothesis is therefore accepted in its stated form.

This is in consonance with the work of Bucci, *et al* (2003) who opined that like any teaching tool, technology should be integrated to improve learning. He said that whenever technology is used, whether in classroom instruction or related to a classroom assignment, the teacher should ask if it improves the learning of a particular content or concept. Integration could only be justified when students' understanding of the content and concept is enhanced (Bucci *et al*, 2003).

### **5.3 Achievement of Objectives**

Based on the findings from the research questions and hypotheses testing, the five objectives of this study which are to:

1. Examine the effect of UTAUT factors (Social Influence and Performance Expectancy) on the use of Educational technology has been achieved in sections 4.2.1 and 4.1.1 of this research work.
2. Investigate how SLT factors (Skill and attitude) affect educational technology usage has been achieved in sections 4.2.2 and 4.1.2 of this research work.
3. Evaluate the relationship between Power (Electricity) supply and the use of educational technology has been achieved in sections 4.2.3 and 4.1.3 of this research work.
4. Examine the effect of Technology Culturation on the use of educational technology has been achieved in sections 4.2.4 and 4.1.4 of this research work.
5. Examine the place of educational technology usage on learning outcomes has been achieved in sections 4.2.5 and 4.1.5 of this research work.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

This chapter is structured into the following sections: Conclusion, recommendations, contributions to knowledge and suggestions for further study.

#### **6.1 Conclusion**

The main thrust of this research was to ascertain the factors that influence the use of educational technology in Universities in Nigeria. This was done by collecting and analysing the data collected. The results obtained were presented and discussed accordingly.

This study combined SLT factors (Attitude and Skill) and UTAUT factors (Social Influence and Performance Expectancy) to evolve a model which was empirically validated through the data collected from three universities in Ogun State, Nigeria. By way of extension, Power (electricity) and Technology Culturation factors were incorporated by the researcher in producing a new model/framework for educational technology utilization.

The study revealed that the use of educational technology depends on the factors of social influence, performance expectancy, skill, attitude, Technology Culturation and Power supply. This implies that there is a significant relationship between the independent variables of social influence, performance expectancy, skill, attitude, Technology Culturation and Power and the dependent variable of extent of the usage. Additionally, from the result of this study, it has been revealed that the use of educational technology has the capacity to bring about improved learning.

Respondents from the three institutions were asked to indicate which of the e-learning facilities and tools is available in their institutions. The result shows that University A makes use of e-learning tools such as Moodle, Smart-boards/Interactive White-Boards and projectors. This according to the findings could

be attributed to the fact that Universities A enjoys adequate funding and institutional policies that support educational technology usage, while University B and University C use only projectors as e-learning tools.

Comparing the result from the three institutions, University A scored highest on the issue of adoption, provision and the usage of educational technology tools. University B ranked second and University C ranked third. The implication here is that University B and University C need more funding in order to provide up-to-date educational technology tools, power generation, better internet connectivity and policies that support their utilisation should be put in place in these institutions. The poor funding of public institutions ultimately affects the quality of graduates produced in these institutions.

Furthermore, power was found to be a major issue hindering educational technology usage across the three selected universities considered. However, there is more adequate provision of power in University A being a private university. Additionally, the findings from this work show that prior exposure to basic technology usage would enhance the use of more complex technologies later on.

Finally, the findings of this research are expected to impart on the adoption of educational technology in Ogun State and by extension, Nigeria and other developing countries of the world.

## **6.2 Recommendations**

Based on the findings from this study, the following recommendations which the researcher considered useful for policy formulation by the government and other stakeholders in the educational sector, which would in-turn encourage the effective utilisation of technology in the teaching-learning process are presented below:

1. This work draws attention to the crucial role that Power (Electricity) plays in the utilisation of technology tools in the teaching and learning processes in universities in Ogun State, Nigeria. In light of this, this work recommends that Tertiary Institutions in developing nations should have their own independent power

projects as backup plans that will eliminate power outages and thus entrench sustainable technology utilisation in their respective institutions.

2. In line with the first recommendation, since power generation by the hydro power means is obviously inadequate to meet the demands for electricity supply in Nigeria today, and the grid structure is equally vulnerable to sabotage, it is definitely obsolete for use in modern times. The exploration of sustainable and alternative sources of energy would minimize the current heavy dependence on hydro electricity generation in Nigeria. It is therefore recommended that the Nigerian government explores renewable sources of power (energy) such as solar, wind power, etc. In other words, the government should invest massively in alternative sources of power generation.

3. Children should be exposed to the use of basic technologies by their parents/wards (Technology Culturation) with adequate monitoring early in life, in order to make adaptation/usage of more complex technologies easier for them.

4. NUC (i.e. the body that regulates the activities of all universities in Nigeria) should drive educational technology usage especially in the public (state and federal) higher institutions since they appear to be lagging behind in technology usage based on the findings of this study.

5. This study reveals that there is technology infrastructural deficit (such as inadequate educational technology tools, Internet access, etc.) in state and federal universities used for this study. It is therefore suggested that the Nigerian government should give university funding a priority, so as to enhance e-learning usage and integration. This is crucial because there cannot be an all-round development in any country without adequate education of the citizens and a high crop of them technologically sound in this age and time.

6. Universities should provide adequate and reliable e-learning platforms and tools to interconnect all students' and lecturers' for better learning outcomes. They should be exposed to a variety of co-curricular practical tasks on e-learning technologies by organizing workshops, seminars and conferences regularly as a way

of training and re-training them. This way, they will get to know more on the benefits and operations of educational technology facilities. Having been so exposed, they will become more knowledgeable and interested in the use of educational technology tools.

7. In order to provide adequate technical support for users of educational technology tools, e-learning support Centres should be set up in every University to help in meeting the needs of students and lecturers alike.

8. Management of universities should make educational technology tools available and accessible to students and lecturers and also come up with institutional policies that support and encourage the use of educational technology. This step, if taken, will no doubt make the use of educational technology tools and facilities to be optimized by students and lecturers for curriculum enrichment, especially in this information age.

### **6.3 Contributions to Knowledge**

1. The study has succeeded in identifying Power supply and Technology Culturation as part of the crucial factors that drive educational technology usage in Nigerian higher institutions. The identified factors were combined with those adapted from UTAUT model and Social Learning Theory to develop a novel model (framework) for the explanation of technology utilization in developing countries.

2. The study provided a comprehensive and empirical analysis of the factors of Social Influence, Attitude, Skill, Performance Expectancy, Technology Culturation and Power (Electricity) that affect the use of educational technology usage in Nigerian universities.

3. Out of all the factors considered in this study (Attitude, Skill, Performance Expectancy, Technology Culturation and Power) it was discovered in hierarchical order that SLT factor (Skill and Attitude) is the strongest predictor of technology

usage followed by Power (Electricity) while the least predictor is Technology Culturation.

4. Based on the framework and empirical validation, this study has been able to make significant contributions to the body of literature in the area of Sociology of Education and Sociology of Technology.

5. Also, the study provides useful information (from findings) to educational policy makers and proprietors on the need to integrate technology usage into their schools' curriculum because in this 21<sup>st</sup> century, increased technology usage is a necessity in order to keep pace with current trends globally.

6. Since this study used the Unified Theory of Acceptance and Use of Technology model combined with Social Learning theory to study Educational technology usage in the Nigerian context, the findings are unique and also informative.

#### **6.4 Suggestions for Further Study**

It is suggested by the Researcher that future studies should consider the following areas but not limited to:

1. Other research strategies like case studies, in-depth interviews can be adopted in future on related areas.
2. Further researches could be carried out on the benefits and challenges facing educational technology usage and learning outcomes.
3. Future researches could also enlarge their scope to cover other geographical areas, such as other states, regions, countries, and so on.

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## MY PUBLICATIONS FROM THIS PhD WORK

### Journals

- i. Predicting the Adoption of E-Learning Management System: A Case of Selected Private Universities in Nigeria. *The Turkish Online Journal of Distance Education (TOJDE)* Accepted.
- ii. University Education in Nigeria: Problems and Prospects. *Educational Research and Reviews*. (Accepted)

### Conferences

- iii. Extending the Unified Theory of Acceptance and Use of Technology (UTAUT) Model: The Role of technology Culturation. *INTED2016* (10<sup>th</sup> annual International Technology, Education and Development Conference), 9<sup>th</sup> of March, 2016, Valencia, Spain.
- iv. Intake Capacity Issues In Nigerian Universities: The Ways Forward. *EDULEARN16* (8<sup>th</sup> annual Conference on Education and New Learning Technologies), 4<sup>th</sup> – 6<sup>th</sup> July, Barcelona, Spain.
- v. Modification of Unified Theory of Acceptance and Use of Technology (UTAUT) Model with Power Factor in E-Learning Adoption: A Conceptual Framework. *9<sup>th</sup> Annual International Conference of Education, Research and Innovation, 14<sup>th</sup>-16<sup>th</sup> November, ICERI2016*, Seville, Spain.

**APPENDIX 1**  
**Sample of Research Questionnaire**  
**(FOR STUDENTS)**

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Covenant University,  
Canaanland, Ota.

Dear Respondent,

**INVITATION TO PARTICIPATE IN A SURVEY**

I am carrying out a study on “**A Sociological Analysis of Factors Influencing the Use of Educational Technology in Selected Universities in Ogun State, Nigeria**”. This study is purely an academic exercise undertaken by me as a requirement for my PhD programme in Sociology.

You are kindly requested to answer all the questions to the best of your ability. Be rest assured that the information will be treated as confidential. Thank you for participating in this exercise.

Nicholas-Omoregbe, S. O.

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**SECTION A: Personal Data of Respondents**

1. State your Gender
  - a. Male
  - b. Female
2. How old were you (as at last birthday)?.....
3. What Institution do you belong to?.....
4. What Faculty/College do you belong to?.....
5. What is your Department?.....
6. What Programme are you on?.....
7. What level are you?.....

**SECTION B:** Below are statements that express the extent of usage and integration of e-learning tools/facilities in learning. Please tick (✓) on the appropriate answer from the alternatives given as it applies to you.

*Strongly Disagree (SD) Disagree (D) Undecided (U) Agree (A) Strongly Agree (SA)*

	<b>Item 2: Extent of Usage and integration of e-learning facilities/tools in learning</b>	<b>SD</b>	<b>D</b>	<b>U</b>	<b>A</b>	<b>SA</b>
C1	My lecturers present their lectures in electronic form and this enhances my independent learning.					
C2	I use databases, internet and e-books to enhance my learning/studies.					
C3	I have a user's account that I use for e-learning.					
C4	I collaborate with other students on e-learning platform.					
C5	I keep in touch with my lecturers on e-learning platform.					
C6	I use social media for e-learning (Facebook, Twitter, Youtube, Google+, etc)					

1. Which of these e-learning tools and facilities is used by your school (You can pick one or more)? Moodle ( )  
 Blackboard ( ) Interactive Whiteboards/Smartboards ( ) Others  
 (specify).....

### **SECTION C: Factors Influencing the Use and Integration of E-learning Tools/facilities**

Please tick (✓) on the appropriate answer from the alternatives given as they best describe your opinion.

*Strongly Disagree (SD) Disagree (D) Undecided (U) Agree (A) Strongly Agree (SA)*

<b>NO</b>	<b>QUESTIONS</b>	<b>SD</b>	<b>D</b>	<b>U</b>	<b>A</b>	<b>SA</b>
	<b>(UTAUT: UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY)</b>  <b>PERFORMANCE EXPECTANCY (PE)</b>					
<b>D1</b>	I would find E-learning facilities useful for my learning.					
<b>D2</b>	Using e-learning facilities as a learning tool enables me to accomplish tasks more quickly.					
<b>D3</b>	Using the e-learning facilities as a learning tool increases my productivity.					

<b>D4.</b>	The use of e-learning facilities will increase my chances of getting better academic grades.					
	<b>SOCIAL INFLUENCE FACTORS (SI)</b>					
<b>D5.</b>	People who influence my behaviour think that I should use e-learning facilities as a learning tool.					
<b>D6.</b>	People who are important to me (such as my lecturers, course mates, etc.) think that I should use e-learning facilities as a learning tool.					
<b>D7.</b>	In my university, the management has been helpful in providing e-learning facilities and encouraging its usage.					
<b>D8</b>	E-learning facilities usage improves my prestige/image among my fellow students.					
	<b>(SLT:SOCIAL LEARNING THEORY)</b> <b>ATTITUDES TOWARD USING E-LEARNING FACILITIES (ATT)</b>					
<b>D9</b>	I like to use E-Learning technology tools					
<b>D10</b>	e-learning facilities make learning more interesting					
<b>D11</b>	Working with e-learning tools and facilities is fun/exciting					
<b>D12</b>	Using e-learning tools and facilities is a good idea					
	<b>SKILL</b>					
<b>D13</b>	I am capable of using e-learning tools and facilities with little or no assistance					
<b>D14</b>	I am competent in the use of e-learning tools and facilities					
<b>D15</b>	I have sufficient knowledge on how to operate/use e-learning tools and facilities					
<b>D16</b>	I am confident when I am using e-learning tools and facilities					
<b>D17</b>	I have previous access to relative technologies like TV, cable satellites, Video games, etc					

	<b>TECHNOLOGY CULTURATION</b>					
<b>D18</b>	My prior exposure to other related technologies like mobile phones, the internet, etc. will affect my acceptance of e-learning tools and facilities					
<b>D19</b>	I can use the internet to download learning materials					
<b>D20</b>	I have attended training/practical sessions on the use of e-learning tools and facilities					
	<b>POWER</b>					
<b>D21</b>	In my institution, Power (electricity) is very stable for e-learning usage					
<b>D22</b>	Power will not deter me from using e-learning tools and facilities					
<b>D23</b>	Power supply is not at an extra cost in my institution					
<b>D24</b>	The use of e-learning tools/facilities require stable Power supply					
	<b>USE BEHAVIOUR (UB)</b>					
<b>D25</b>	I regularly use e-learning facilities.					
<b>D26</b>	I regularly use the Internet for information search.					
<b>D27</b>	I regularly use the Internet for communication and interaction with other Internet users.					
<b>D28</b>	I regularly use the internet to download learning materials.					



**SECTION D: Other Obstacles/Challenges to the use and Integration of E-learning Tools and Facilities**

Kindly indicate some of the challenges or obstacles you have encountered in using or adopting E-learning facilities in your learning processes. Please tick (✓) on the appropriate answer from the alternatives given as they best describe your opinion.

*Strongly Disagree (SD) Disagree (D) Undecided (U) Agree (A) Strongly Agree (SA)*

	<b>Challenges/Obstacles</b>	<b>SD</b>	<b>D</b>	<b>U</b>	<b>A</b>	<b>SA</b>
E1	Poor and unreliable internet access					
E2	Limited availability of e-learning facilities					
E3	Lack of technical support					
E4	Lack of access to e-learning facilities					
E5	Institutional policy on e-learning adoption and usage					

## APPENDIX 2

### Sample of Interview Guide

(FOR LECTURERS)

Covenant University,  
Canaanland, Ota, Ogun State.

#### INTERVIEW QUESTIONS FOR LECTURERS

Dear Respondent,

I am carrying out a study on “**A Sociological Analysis of Factors Influencing the Use of Educational Technology in Selected Universities in Ogun State, Nigeria**”. This study is purely an academic exercise undertaken by me as a requirement for my PhD programme in Sociology, Covenant University.

You are kindly requested to answer all the questions to the best of your ability. Be rest assured that the information will be treated as confidential. Thank you for participating in this exercise.

Nicholas-Omoregbe, S. O.

- 
1. State your Gender      a. Male              b. Female
  2. How old were you (as at last birthday)?.....
  3. What is the name of your Institution?.....
  4. What Faculty/College do you belong to? .....
  5. What is your Department?.....
  6. What is your highest Academic Qualification?.....
  7. What is your designation?.....

#### SECTION B:

1.        How steady is the power supply in your school?
2.        Does the university organize training on the use of educational technology (e-learning tools and facilities) for lecturers to better enhance teaching and learning?

3. Do you have adequate e-learning facilities?
4. Do you have support from your technical staff with regard to the use of e-learning facilities and tools?
5. Do you have access to e-learning facilities and tools?
6. Do you have a good attitude (interest) towards the use of technology?
7. Do you use eLearning tools and facilities such as Moodle, Blackboard, Interactive Whiteboard, etc. for teaching?
8. How reliable and available is the internet access in your school?
9. Does your institution have an encouraging policy for the use of E-learning tools and facilities?
10. Do you have top management support with regard to the use of eLearning tools and facilities in your university?
11. Do you think that lack of previous exposure to other relative technologies like television, cable satellite, etc. (**Technological Culturation**) could affect the subsequent use of eLearning tools and facilities?

**APPENDIX 3**  
**Sample of Interview Guide**  
**(FOR ICT DIRECTORS)**

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Covenant University,  
Canaanland, Ota, Ogun State.

**INTERVIEW QUESTIONS FOR DIRECTORS OF ICT CENTRES**

Dear Respondent,

I am carrying out a study on “**A Sociological Analysis of Factors Influencing the Use of Educational Technology in Selected Universities in Ogun State, Nigeria**”. This study is purely an academic exercise undertaken by me as a requirement for my PhD programme in Sociology, Covenant University.

You are kindly requested to answer all the questions to the best of your ability. Be rest assured that the information will be treated as confidential. Thank you for participating in this exercise.

Nicholas-Omoregbe, S. O.

---

**SECTION A: Personal Data of Respondents**

1. State your Gender    a. Male                      b. Female
2. How old were you (as at last birthday)?.....
3. Institution/University.....

**SECTION B:**

1.        How steady is the power supply in your school?
2.        Do you organize training on the use of educational technology?
3.        Do you have adequate e-learning facilities?
4.        Do you provide adequate technical support to users of eLearning tools and facilities in your institution?

5. How reliable and available is the internet access in your school?
6. Does your institution have policies that support the use of E-learning tools and facilities?
7. Do you have top management support with regard to the use of e-learning tools and facilities?  
(What kind of support)?

Thank you.