INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN TEACHING AND LEARNING OF ELECTRICAL ELECTRONIC TECHNOLOGY IN THE UNIVERSITY OF BENIN, EDO STATE

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BENIN CITY

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A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF B.Sc, (Ed) DEGREE IN INDUSTRIAL TECHNICAL EDUCATION.

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APPROVAL PAGE

This project having been duly scrutinized, have been approved and accepted as meeting the requirement for the award of Bachelor of Science Education Degree (B.Sc. Ed) in Industrial Technical Education (Electrical Electronic Technology Option) in the department of Vocational and Technical Education, Faculty of Education, University of Benin, Benin City, Edo State.

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S.B ABUSOMWAN

[Project Supervisor]

CERTIFICATION

This is to certify that this research work was carried out by Jesse Osaguona OSAZE with Matriculation Number EDU1703834 and it has been read and approved as meeting the requirement of the Department of Vocational and Technical Education, Faculty of Education, University Of Benin.

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DEDICATION

This project is dedicated to God, the one who gives life and make knowledge and also to my beloved parents Mr. and Mrs. OSAZE for their prayers and financial support throughout the duration of the program.

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My friends Toviah, Kelly, Success. Thanks for you guy making my undergraduate days memorable.

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ABSTRACT

This study assessed the assessment of Information Communication Technology (ICT) in teaching and learning of Electrical Electronic Technology in University of Benin, Edo State. Four research questions were raised to guide the study. The population for the study consists of all the 113 University of Benin students studying electrical and electronics technology in the University of Benin, Edo state in the year 2021, 2020/2021 session. The population included 84 males and 29 females. The total populations were used for the study which comprises of 113 students studying electrical and electronics technology in University of Benin, Edo state, therefore no sampling technique was required. A survey research design was adopted for the study. The instrument for data collection was a self-designed questionnaire. The reliability of the instrument was determined using test-retest method and a reliability coefficients of 0.91 were obtained for the students questionnaires using Pearson Moment Correlation. Results showed that ICT tools/equipment such as computer/laptops, overhead projectors, interactive whiteboards/smart-boards, internet facilities, audio/recording devices, auto cad, simulators/teaching software and digital video cameras/multimedia aids are unavailable in majority of the schools in the studied area. Furthermore, it was indicated that these ICT tools were inadequate even when available. More so, it was discovered that these ICT tools/equipment have low utilization. Challenges facing the utilization of ICT tools for teaching-learning were found out to include unavailability, workload inadequate time allotted, unconducive classroom environment, poor electricity supply and lack of up to-date software. The study recommended that government should endeavor to make ICT tools/equipment available in University of Benin as instruction delivery has gone beyond the traditional method, school authorities should consider alternate means of raising fund for the procurement of these tools and also, Electrical Electronic teachers should be resourceful in relation to use and management of time allotted them for teaching using ICT tools.

CHAPTER ONE

INTRODUCTION

Background to the Study

Information and communication technology (ICT) is often used as an extended synonymous for information technology (IT), but in a more specific term that stresses the role of unified communications and integration of telecommunication (telephone lines and wireless signals), computers as well as system, which enables users to access, stores transmit and manipulate information.

The term ICT is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system using a single unified system of cabling signal distribution and management. Information and communication technology (ICT) has been in use by academic researchers since the 1980s. The term ICT became popular after it was used in a report to the UK government by Dennis Stevenson in 1977 and in the revised National curriculum for England, Wales and Northern Ireland tertiary institutions in 2000.

ICT Centre was established in the late 2002 with the aim of assisting schools and higher institutions such as the universities and polytechnics to realize its mandates of the innovative use of ICT services and products to support research, learning, teaching and administrative processes. Universities such as the University of Saskatchewan, Kenyatta

University ICT Directorate have mandated the ICT Center to carry out the following functions:

1. To develop and implement an evolutionary ICT policy and strategy that is sensitive to emerging technologies and responsive to changing and practices.
2. To guarantee the security of ICT resources and the safety of people working in ICT environment.
3. To enhance skills to develop, implement, support and exploit ICT resources effectively and efficiently.
4. To provides quality network infrastructure and improve students and staff access to ICT services in line with university priorities.
5. To ensure that business system accommodate and facilitate changes in business practice that reflect changing institutional, staff and student needs.
6. To advance the need for adequate and sustainable ICT funding from within the university and develop capacity to attract external resources

In recent years, there has been a broadly based shifting of public opinion of interest in how computers and the internet can be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings, ICTs are more than these technologies. Older technologies such as the telephone, radio and television although now given less attention, have a longer and richer history as instructional tools. For instance, radio and television have for over forty years been used

for open and distance learning although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries. The use of computers and the Internet is still in it's infancy in developing countries, if there are used at all. Due to limited infrastructure and the attendant's high costs of access.

Many countries across the world have introduced Information and Communication Technologies (ICT) into their schools via different courses of action and the use of ICT in schools have been taken seriously by various government and educational system around the world (Nwigbo & Madhu, 2016). Information and communication technology (ICT) is used to connotes all the electronic technologies for collecting, storing, processing and transmitting information. This information could be voice/audio, data fax, and video or internet service (Cascio & Monrealegre, 2016). ICT is also a generic term that covers the acquisition, processing, storage and dissemination of information-textual, numerical, pictorial and vocal based on combination of computing and telecommunications technology. Its application includes video conferencing, teleworking, distance learning, management information system, stocktaking; and a broad array ranging from 'old' technologies such as radio and TV to 'new' ones such as cellular mobile.

ICT has become a veritable tool in education and training by linking students with information technology and improving innovations for teachers. ICTs are potentially powerful enabling tool for educational advancement and reform, when used appropriately; it will improve teaching and learning processes and it is a major tool for building

knowledgeable societies (UNESCO, 2013). The various ICT facilities used in the teaching and learning process in the university include; computers, overhead projectors, AutoCAD, corel draw among others.

The role ICT plays in the classroom teaching and learning process is very important to Electrical Electronic Technology. It provides opportunities for students to operate computer, store information, manipulate and retrieve information, active learning and self-responsibility for learning such as distance learning motivate students to continue learning outside school environment. This versatile instrument has the capability of engaging students in instructional activities and increasing their learning by helping them to solve complex problems to enhance their cognitive skills (Pernia, 2008; Ahmodu & Sheu, 2018).

In order to understand the influence of ICT on the teaching and learning of Electrical Electronic Technology, it is imperative to investigate the extent to which ICT is use in the teaching and learning of Electrical Electronic Technology, the impact of ICT on the teaching and learning Electrical Electronic Technology, factors militating against the effective use of ICT in the teaching and learning of Electrical Electronic Technology, and the strategies that could be used to ensure the effective application of ICT in the teaching and learning of Electrical Electronic Technology. This investigation will enable use make logical conclusion and generalized that ICT whether or not, ICT can indeed influence the teaching and learning of Electrical Electronic Technology. In the light of the above, this study seeks to investigate the influence of ICT on the teaching and

learning of Electrical Electronic Technology in University of Benin, Benin City, Edo state.

Statement of the Problem

Development in technology has provided scope for innovative practices in the teaching-learning Electrical/Electronic Technology students are expected to be introduced to the knowledge and skills of Information and Communication Technology as they begin their studies. In Nigeria, however, due to peculiar challenges in universities in Nigeria the use of ICT in teaching and learning has not been optimal. In the present world, the traditional mode of teaching and learning has been replaced with modern technologies and methodologies which involve various uses of Information Communication Technologies. Hence, these technologies must be utilized in other to enhance effective teaching and learning outcome. Koc (2010) argued that the integration of technology into teaching-learning process means using it as a tool to teach academic subjects and to promote higher-order thinking skills of the students. Without this being done, students may not be able to acquire requisite knowledge in Electrical/Electronic subjects that could influence relevant behavior as the world keeps changing every day.

It is equally noted that many teachers who have access to the technology may not use it because they do not have technical knowledge and are satisfied with their current approach to teaching. Okebukola (2015) lamented that chalkboard and textbooks continue to dominate classrooms activities in most Nigerian universities, even with the

high demand of computer literacy and the need of ICT. From this statement, it can be seen that Nigeria has many challenges preventing the full usage of ICT in universities because majority of universities still use the traditional methods of chalkboard and textbooks as the only instrument for teaching and learning, hence the need to assess the influence of ICT in Teaching and Learning Electrical/Electronic Technology in the University of Benin, Edo State.

Purpose of the Study

The purpose of this study is influence of Information and Communication Technology (ICT) for effective Teaching and Learning of Electrical/Electronic Technology in the University of Benin with the view of ascertaining whether or not there are possibilities to achieving this, the specific objectives of this study are to:

1. Examine the impact of ICT in teaching Electrical /Electronic Technology students in University of Benin.
2. Understand the possibilities at which Electrical /Electronic Technology students in University of Benin are able to obtain and comprehend knowledge in teaching and learning electrical and electronics through the use of ICT.
3. Promote insight for government in providing quality network infrastructure in ICT to improve the teaching of Electrical/Electronic subjects to students and ability to learn in academic field in University of Benin.

4. Enhance University of Benin students with skills to develop, implement, support and exploit ICT resources effectively and efficiently in electrical and electronics.

Research Questions

The following research questions shall be raised to guide the study;

1. What extent can ICT successfully impact University of Benin students with basic skills in teaching and learning Electrical/Electronic subjects?
2. How can ICT influence students in University of Benin to be able to attain and comprehend knowledge in teaching and learning electrical and electronics subjects?
3. To what extent can the government provide quality network infrastructure in ICT to improve the learning of electrical and electronics subjects in University of Benin?
4. How can ICT enhance University of Benin students with skills to develop, implement, support and exploit ICT resources effectively and efficiently in electrical and electronics?

Significance of the Study

The findings of this study will be of immense benefits to the following; Student, Teachers, Government, Policy Makers, Principals and Other Researchers.

It is believed that the outcome of this study will be of benefit to students, as it will further improve their previous knowledge about the importance of ICT in learning and hence provide more enlightenment and capability in the use of ICT for acquiring knowledge in Electrical Electronic Technology. It will assist the students in the acquisition of practical and applied skills that will enable it's recipients to secure employment in a particular occupation. These skills cannot be acquired in a vacuum but rather in a well-established and functional workshop with the right equipment such as sophisticated computers, internet, software, hardware, telephone and network signal for effective implementation of the program.

This study will be of great benefit to the principal and head of department in order to suggest an improvement for physical facilities and instructional approaches in University of Benin. The principal and head of department will relay and subsequently enforce the findings for use in the ICT workshops and lecture rooms for maximum output. And also to be provided in this study to the principal and the head of department are instructional approaches that lead towards the attainment of specific objectives. This will help to ensure that the graduates acquire a level of training in electrical and electronics technology to enable them function effectively.

This study will also be of immense benefit to teachers or tutors in University of Benin. They will get the findings apply effective instructional approach that will enable them achieve a high level of instructional effectiveness. The finding of this study will

also be of benefit to University of Benin in other to be able to develop the teachers and learners to become productive in a paid employment or in self-employment.

The outcome of this study will be of benefit to educational researchers. This work will assist future researchers with literature and it will open new horizons for further investigation towards ensuring improved Electrical/ Electronic Technology teachers' performance and effective human resources management in school with the use of ICT resources.

Furthermore, this study will also be of benefit to the government. This benefit will be derived, due to the fact that it will raise government's awareness of which areas to provide more reinforcement to enhance the technical learning such as teaching and learning of the Electrical/Electronic Technology students and productivity in the University of Benin. The findings from this study will encourage the government concerned in University of Benin to build more ICT workshops and the workshops should be well equipped with up-to-date equipment in other to achieve the desired goals and objectives.

Scope of the Study

This study focuses on the influence of Information and Communication Technology (ICT) in the teaching and learning of Electrical/Electronic Technology among students in University of Benin. Therefore, this study examines not only the influence of ICT in teaching Electrical/Electronic Technology students in University of

Benin, it also investigates how it can influence the students' technical know-how in electrical and electronics matters.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter is specifically concerned with the review of related literature by individuals and groups in connection with relationship between Information and Communication Technology for effective teaching and learning of electrical and electronics technology among students in University of Benin, Benin City, under the following sub-headings.

- The model of communication technology
- The concept of Information and communication technology
- The Concept of Electrical
- The Concept of Electronics
- Contemporary issues in University of Benin, Benin City
- Importance and functions of ICT in learning electrical and electronics subjects in University of Benin, Benin City.
- The role of teachers in using ICT in teaching and learning electrical and electronics technology in University of Benin, Benin City.
- Problems of using ICT in improving teaching and learning electrical and electronics technology in University of Benin, Benin City.
- Summary.

The Model of Communication

The first major for communication was introduced by Shannon C. and Warren Weaver for Bell Laboratories in 1949. The original model was designed to mirror the functioning of radio and telephone technologies. Their initial model consisted of three primary parts: sender, channel, and receiver. The sender was the part of a telephone a person spoke into, the channel was the telephone itself, and the receiver was the part of a telephone where one could hear the other person. Shannon and Weaver also recognized that often there are statics that interferes with one listening to a telephone conversation, which they deemed noise.

In a simple model, often referred to as the transmission model or standard view of communication, information or content (e.g. a message in natural language) is sent in some form (as spoken language) from an emisor, sender or encoder to a destination, receiver or decoder. This common conception of communication simply views communication as a means of sending and receiving information. The strengths of this model are simplicity, generality, and quantifiablility. Weaver and Weaver (1987) structure this model based on the following elements;

- An information source, which produces a message.
- A transmitter, which encodes the message into signals
- A channel, to which signal are adapted for transmission
- A noise source, which distorts the signals while it propagates through the channel
- A receiver, which 'decodes" (reconstructs) the message from the signal

- A destination, where the message arrives.

Technology

This is the application of scientific knowledge for practical purpose, especially in industry. They are machinery and equipment developed from the application of scientific knowledge. Technology (from Greek word, *techne*, means "art, skills, cunning of hand"; and *λoyia*, *logia*) is the collection of techniques, skills, methods and process used in the production of goods or services or the accomplishment of objectives, such as specific investigation. Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operates by individual without detailed knowledge of the working of such things.

The human species use of technology began with the conversion of natural resources into simple tools. The prehistoric discovery of how to control fire and the later Neolithic Revolution increase the available sources of food and the invention of the wheel helped humans to travel in and control their environment. Developments in historic times, including the printing press, the telephone, and the Internet, have lessened physical barriers to communication and allowed humans to interact freely on a global scale. The steady progress of military technology has brought weapons of ever-increasing power, from clubs to nuclear weapons.

Technology has many effects; it has helped develop more advance economies (including today's global economy) and has allowed the rise of a leisure class. Many

technological processes produce unwanted by-products known as pollution, and deplete natural resources, to the detriment of earth's environment. Various implementation of technology influence the rise of the notion of efficiency in terms of human productivity, a term originally applied only to machines and the challenge norms.

Philosophical debates have arisen over the use of technology, with disagreements over whether technology improves the human condition or worsens it. Neo-Luddismanarcho-primitivism, and similar reactionary movements criticize the pervasiveness of technology in the modern world opinion that it harms the environment and alienates people; proponents of ideologies such as trans humanism and techno-progressivism view continued technology progress as beneficial to society and the human condition.

Until recently, it was believed that the development of technology was restricted only to human beings, but 21" century scientific studies indicate that other primates and certain dolphin communities have develop simple tools and passed their knowledge to other generations. The use of the term "Technology" has changed significantly over the last 200 years. Before the 20th century, the term was uncommon in English, and usually referred to the description or study of the useful arts.

The term "technology" rose to prominence in the 20th century in connection with the Second Industrial Revolution. The term's meaning changed in the early 20th century when American social scientists, beginning with Veblen (1990), who translated ideas from the German concept of "technology" In German and other European languages, a

distinction exists between *technik* and *technologie* that is absent in English, which usually translates both terms as "technology".

Bain (2010) wrote that "technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them". Bain's definition remains common among scholars today, especially social scientists. But equally prominent is the definition of technology as applied science, especially among scientists and engineers, although most social scientists who study technology reject this definition. More recently, scholars have borrowed from European philosophers of technique to extend the meaning of technology to various forms of instruments reason, as in Foucault's work on technologies of the self (*techniquesde soi*).

Dictionaries and scholars have offered a variety of definitions. The Merriam-Webster Dictionary offers a definition of the term: "the practical application of knowledge especially in a particular area" and "a capability given by the practical application of knowledge". Stiegler (1861), in *Technics* and *time*, defines technology in two ways: as "the pursuit of life by means other than life", and as "organized inorganic matter."

Technology can be most broadly defined as the entities, both material and immaterial, create by the application of mental and physical effort in order to achieve some value. In this usage, technology refers to tools and machines that may be used to solve real-world problems. It is a far reaching term that may include simple tools, such as

a crowbar or wooden spoon, or more complex machines, such as a space station or particle accelerator. Tools and machines need not be material, virtual technology, such as computer software and business methods, falls under this definition of technology. Arthur (2011) defines technology in a similarly broad way as a means to fulfill a human purpose".

The word "technology" can also be used to refer to a collection of techniques. In this context, it is the current state of humanity's knowledge of how to combine resources to produce desired products to solve problems fulfill needs, or satisfy wants; it includes technical methods term, such as "medical technology" or "space technology", it refers to the state of the respective field's knowledge and tools "State-of the art technology" refers to the high technology available to the humanity in any field.

Technology can be viewed as an activity that forms or change culture. Additionally, technology is the application of math, science, and the arts for the benefits of life as it is known. A modern example is the rise of communication technology, which has lessened barrier to human interaction and, as a result, has helped spawn new subcultures; the rise of cyber culture has, at its basis, the development of the Internet and the computer. Not all technology enhances culture in a creative way; technology can also help facilitate political oppression and war via tools such as guns. As a cultural activity, technology predates both science and engineering, each of which formalizes some aspects of technological endeavor.

The Concept of Information and Communication Technology

Information and communication technology is simply defined as the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. Its anagram is formally known as ICT. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system using a single unified system of cabling signal distribution and management. ICT can be defined as a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. These technologies include computers, the internet, broadcasting technologies (radio and television), and telephony. Daniel (2012) 1CT has become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy.

However, there appears to be a misconception that ICT's generally refers to "computers and computing related activities". This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTS. Pelgrum and Law (2013) stated that near the end of the 1980s, the term "computers' was replaced by IT (information technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information.

This was followed by the information of the term ICT (information and communication technology) around 1992, when e-mail started to become available to the general public.

United Nations (2019), states that ICTs cover Internet service provision telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial and communication activities. According to UNESCO (2012), information and communication technology (ICT) may be regarded as the combination of Information Technology with other related technology, specifically the communication technology. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interaction radio counseling, interaction voice response system, audio cassettes and CD ROMs etc. have been in education for different purpose [Sharma (2013), Sanyal (2011): Bhattacharya and Sharma (2017)]. The field of education has affected by ICT's which have undoubtedly affected teaching, learning, and research; Yusuf (2015). A great deal of research has proven the benefits to the quality of education. Al Ansari (2016), ICTs have help related school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change [Davis and Tearle, (2011); Lemke and Coughlin, (2009); Yusuf, (2015)].

Jhurree, (2015) states, much has been said and reported about the impact of technology, especially computers, in education. Initially computers were used to teach computer programming but the development of the microprocessor in the early 1970s

saw the introduction of affordable microcomputers into schools at a rapid rate. Computers and application of technology became more pervasive in society led to a concern about the need for computing skills in everyday life. Laval and Rehbein, (2014) claimed in their paper "Technology in Schools: Education, ICT and the Knowledge Society that ICTs have been utilized in education ever since their inception, but they have not always been massively present. Although at that time computers have not been fully integrated in the learning of traditional subject matter, the commonly accepted rhetoric that education system would need to prepare citizens for lifelong learning in an information society boosted interest in ICTS [Pelgrum and Law (2013)]. The 1990s was the decade of computer communication and information access, particularly with the popularity of interest-based services such as electronic mail and the World Wide Web (www). At the same the CD-ROM became the standard for distributing packaged software (replacing the floppy disk). As a result educator became more focused on the use of the technology to improve students learning as a rationale for investment. Any discussion about the use of computer systems in school is built upon an understanding of the link between schools, learning and computer technology.

When the potential use of computers in school was first mooted, the predominant conception was that students would be taught by computer, Mevarech and Light (2013). In a sense it was considered that the computer would take over the teacher's job in much the same way a Robert computer may take over a welder's job. Collis (2017) refers to this as "a rather grim image" where "a small child sits only with a computer". However, the

use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTS in Education. ICTs for education refers to the development of information and communication technology specifically for teaching/learning purpose, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process.

The Concept of Electrical

This is field of engineering that generally deals with the study and application of electricity, electronics, and electromagnetism. This field first became an identifiable occupation in the latter half of the 19th century after commercialization of the electrical telegraph, the telephone, and electric power distribution and use. Subsequently, broadcasting and recording media made electronics part of daily life. The invention of the transistor, and later the integrated circuit, brought down the cost of electronics to the point they can be used in almost any household object.

Electrical engineering has now subdivided into a wide range of subfields including electronics, digital computers, power engineering, telecommunications, control systems, radio-frequency engineering, signal processing, instrumentation and microelectronics. The subjects of electronic engineering are often treated as its own subfield but it intersects with all the other subfields, including the power electronics of power engineering.

Electrical engineers typically hold a degree in electrical engineering or electronic engineering. Practicing engineers may have professional certification and be member of the professional body. Such bodies include the Institute of Electrical Engineers (IEEE) and the Institution of Engineering and Technology (IET).

Electrical engineers work in a very wide range of industries and the skills required are likewise variable. These range from basic circuit theory to the management skills required of a project manager. The tools and equipment that an individual engineer may need are similarly variable, ranging from a simple voltmeter to a top end analyzer to sophisticated design and manufacturing software.

The Concept of Electronics

Electronics is the science of how to control electrics energy in which the electrons have a fundamental role. Electronics deals with electrical circuit that involves active electrical components such as vacuum tubes, transistors, diode and integrated circuits, and associated passive electrical components and interconnection technologies. Commonly, electronics devices contain circuitry consisting primarily or exclusively of active semiconductors supplemented with passive elements; such a circuit is described as an electronics circuit.

The nonlinear behavior of active components and their ability to control electrons flows makes amplification of weak signals possible, and electronics is widely used in information processing, telecommunication, and signal processing. The ability of

electronic devices to act as switches makes digital information processing possible. Interconnection technologies such as circuit boards, electronics packages technology, and other varied forms of communication infrastructure complete circuit functionality and transform the mixed components in to a regular working system.

Electronics is distinct from electrical and electro-mechanical science and technology, which deal with the generation, distribution, switching, storage, and conversion of electrical energy to and from other energy forms using wires, motors, generators, batteries, switches, relays, transformers, resistors, and other passive components. This distinction started around 1906 with the invention by Lee De Forest of the triode, which made electrical amplification of weak radio signals and audio signals possible with a non-mechanical device. Until 1950 this field was called "radio technology" because its principal application was the design and theory of radio transmitters, receivers, and vacuum tubes.

Today, most electronic devices use semiconductor components to perform electron, The study of semiconductor devices and related technology is considered a branch of solid-state physics, whereas the design and construction of electronic circuits to solve practical problems come under electronics engineering, This article focuses on engineering aspects of electronics.

Contemporary issues on University of Benin

In recent years University of Benin have been looking for innovative ways to meet the growing demands of their non-traditional student body on a shrinking budget. One highly promising approach was to offer a greater percentage of courses in the format of online classes. As online classes do not utilize any school facilities, it was initially viewed with great enthusiasm, representing a cost-effective solution that promised to address the educational needs of University of Benin students. Moreover, educators reasoned that the flexibility of online classes would be very appealing to University of Benin students who are often juggling school, work, and family. Unfortunately, research has shown that university students do not fare as well in online classes as in traditional course venues.

However, this same research suggested that university students do as well in hybrid classes as they do in face-to-face classes. Hybrid learning may be particularly attractive to university students who are often juggling school, work, and family. Hybrid classes are a mix of online and face-to-face instruction.

Additional research has found that hybrid learning is more time efficient. Research has shown that university students experience a high level of frustration with operating systems in online courses. Online university students frequently expressed frustration with system failures and their own lack of computer skills. In addition, online university students reported difficulty with navigating course management systems and following the material on the screen.

Importance and Functions of ICT in Learning Electrical and Electronics Technology in University of Benin

1. ICT Enhances Teaching And Learning Process In University of Benin As An Educational Sector.

The field of education has been affected by ICT's, which have undoubtedly affected teaching, learning and research Yusuf, (2015). ICT's have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change Davis and Tearle (2011); Lemke and Coughlin (2009); Yusuf (2015). In a rapidly changing world, basic education is essential for an individual to be able to access and apply information. Such ability must find include ICTs in the global village.

Conventional teaching has emphasized content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and

performance-based curricula that make sound use of the affordances of these technologies (Oliver 2019). The integration of information and communication technologies can help revitalize teachers and students.

This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. Zhao and Cziko (2011), three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology, However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly.

Harris (2012) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2012) concludes that the benefits of ICT will be gained when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers Wheeler (2011). Changed pool of teachers will change responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles.

According to Cabero (2011), "the flexibilization time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning". The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICT's by their very nature are tools that encourage and support; independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools, the influence of the technology on supporting how students learn will continue to increase. In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome.

Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission, Duffy and Cunningham (2016). In this domain learning is viewed as the construction of meaning rather than as the memorization of facts, Lebow (2013); Jonassen and Reeves (2016).

Learning approaches using contemporary ICT's provide many opportunities for constructivist learning through their provision and support for resource based, student centered settings and by enabling learning to be related to context and to practice Berge, (2018); Barron, (2018).

As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become. Teachers generate meaningful and engaging learning experiences for their students, strategically using ICT to enhance learning. Students enjoy learning, and the independent enquiry which innovative and appropriate use of ICT can foster. They begin to acquire the important 21st century skills which they will need in their future lives.

2. ICT Enhances the Quality and Accessibility of Education in University of Benin.

ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning. In concert with geographical flexibility, technology facilitated educational programs also remove many of the temporal constraints that face learners with special needs, Moore and Kearsley (2016). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. One of the most vital contributions

of ICT in the field of education is Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers; previous year papers etc., and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers all over the world. This flexibility has heightened the availability of just in time learning and provided learning opportunities for many more learners who previously were constrained by other commitments, Young (2012). Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching.

ICT also allows the academic institutions to reach disadvantaged groups and new international educational markets. As well as learning at any time, teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Mobile technologies and seamless communications technologies support 24/7 teaching and learning. Choosing how much time will be used within the 24/7 envelope and what periods of time are challenges that will face the educators of the future, Young (2012). Thus, ICT enabled education will ultimately lead to the democratization of education. Especially in developing countries like India, effective use of ICT for the purpose of education has the potential to bridge the digital divide. India has a billion plus population and a high proportion of the young and hence it has a large formal education system. The demand for education in developing countries like India has skyrocketed as education is still regarded as an important bridge of social, economic and political mobility Amutabi and Oketch (2013). There exists infrastructure, socio economic,

linguistic and physical barriers in India for people who wish to access education, Bhattacharya and Sharma, (2017).

This includes infrastructure, teacher and the processes quality. There exist drawbacks in general education in India as well as all over the world like lack of learning materials, teachers, remoteness of education facilities, high dropout rate etc. UNESCO (2012). Innovative use of Information and Communication Technology can potentially solve this problem. Internet usage in home and work place has grown exponentially, McGorry (2012), ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. It can be used as a tool to overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers, McGorry (2012). People have to access knowledge via ICT to keep pace with the latest developments, Plomp, Pelgrum and Law (2017).

ICT can be used to remove communication barriers such as that of space and time Lim and Chai (2014), ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time Bhattacharya and Sharma (2017); Cholin (2015). Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work Cholin (2015), ICT eliminating time barriers in education for learners as well as teacher. It eliminates geographical barriers as learners can log on from any place Sanyal, (2011); Mooij (2017); UNESCO (2012); Bhattacharya and Sharma. (2017).

ICT provides new educational approaches Sanyal, (2011). It can provide speedy dissemination of education to target disadvantaged groups, UNESCO (2012); Chandra and Patkar, (2017). ICT enhances the international dimension of educational services. UNESCO (2012). It can also be used for non-formal education like health campaigns and literacy campaigns, UNESCO (2012). Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems. Bhattacharya and Sharma, (2017); Lim and Hang (2013). It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy.

Plomp et al (2017) states that the experience of many teachers, who are early innovators, is that the use of ICT is motivating for the students as well as for the teachers themselves. Bottino (2013) and Sharma (2013) mention that the use of ICT can improve performance, teaching, administration, and develop relevant skills in the disadvantaged communities. It also improves the quality of education facilitating learning by doing, real time conversation, delayed time conversation, directed instruction, self-learning, problem solving information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn.

A great deal of research has proven the benefits to the quality of education. Al-Ansari (2016) Hepp, Hinostroza, Laval and Rehbein (2014) states that the literature many unsubstantiated claims about the revolutionary potential of ICTs to improve the quality of education. They also note that some claims are now deferred to a near future when

hardware will be presumably more affordable and software will become, at last, an effective learning tool.

3. ICT Enhances Learning Environment.

ICT presents an entirely new learning environment for students, most especially students in the University of Benin where focus are actually made on the practical aspect of what is been taught, thus requiring a different skill set to be successful. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through, New Media Consortium, (2017) ICT is changing processes of teaching and learning by adding elements of vitality to learning environments including virtual environments for the purpose. ICT is a potentially powerful tool for offering educational opportunities. It is difficult and maybe even impossible to imagine future learning environments that are not supported, in one way or another, by Information and Communication Technologies (ICT).

When looking at the current widespread diffusion and use of ICT in modern societies, especially by the young the so called digital generation then it should be clear that ICT will affect the complete learning process today and in the future. Authenticity is an important issue which should be addressed in the design and development of learning environments. Learning environments need to reflect the potential uses of knowledge that

pupils are expected to master, in order to prevent the acquired knowledge from becoming inert, Bransford, Sherwood, Hasselbring, Kinzer, and Williams (2013).

In addition, teachers should stimulate pupils to engage in active knowledge construction. This calls for open-ended learning environments instead of learning environments which focus on a mere transmission of facts, Collins, (2016). ICT may contribute to creating powerful learning environments in numerous ways. ICT provides opportunities to access an abundance of information using multiple information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments. ICT may also make complex processes easier to understand through simulations that, again, contribute to authentic learning environments. Thus, ICT may function as a facilitator of active learning and higher order thinking Alexander (2019); Jonassen (2019). The use of ICT may foster.co-operative learning and reflection about the content, Susman (2018). Furthermore, ICT may serve as a tool to curriculum differentiation, providing opportunities for adapting the learning content and tasks to the needs and capabilities of each individual pupil and by providing tailored feedback. Mooij, (2019); Smeets and Mooij (2011). As Stoddart and Niederhauser (2013) point out. ICT may fit into a spectrum of instructional approaches, varying from traditional to innovative. Another aspect which may of course influence the use of ICT is access to technology, Kennewell, Parkinson & Tanner 2013; OTA. (2015)

This refers not only to the number of computers, but also to the placement of the equipment, e.g. in the classroom or in a computer room. Kennewell et al (2013) feel it is

essential that computers be placed in the classroom, in order to maximize the opportunities for curriculum activity. ICT environment improves the experience of the students and teachers and to use intensively the learning time for better results. The ICT environment has been developed by using different software and also the extended experience in developing web based and multimedia materials. ICTs have an important role to play in changing and modernizing educational systems and ways of learning.

4. ICT Enhances Learning Motivation Amongst Students in the University of Benin.

ICTs can enhance the quality of education in several ways, by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which when used appropriately, can promote the shift to a learner centered environment. ICTS, especially computers and Internet technologies, enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. ICT has an impact not only on what students should learn, but it also plays a major role on how the students should learn. Along with a shift of curricula from "content-centered" to "competence based", the mode of curricula delivery has now shifted from "teacher centered" forms of delivery to "student-centered" forms of delivery.

ICT provides Motivation to Learn such as videos, television and multimedia computer software that combine text, sound, and colourful moving images can be used to provide challenging and authentic content that will engage the student in the learning

process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become more involved in the lessons being delivered. Some of the parents of the respondents opined that their children were feeling more motivated than before in such type of teaching in the classroom rather than the stereotype 45 minutes lecture. They were of the view that this type of learning process is much more effective than the monotonous monologue classroom situation where the teacher just lectures from a raised platform and the students just listen to the teacher.

ICT changes the characteristics of problems and learning tasks, and hence play an important task as mediator of cognitive development, enhancing the acquisition of generic cognitive competencies as essential for life in our knowledge society. Students using ICTS for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools, Reeves and Jonassen (2016), the influence of the technology on supporting how students learn will continue to increase. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource based, student centered settings and by enabling learning to be related to context and to practice, Berge (2018); Barron (2018).

The teachers could make their lecture more attractive and lively by using multi-media and on the other hand the students were able to capture the lessons taught to them easily. As they found the class very interesting, the teachings also retained in their mind

for a longer span which supported them during the time of examination. More so than any other type of ICT, networked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events, ICT enhanced learning is student directed and diagnostic. Unlike static, text or print based educational technologies, ICT enhanced learning recognizes that there are many different learning pathways and many different articulations of knowledge. ICTS allow learners to explore and discover rather than merely listen and remember. The World Wide Web (WWW) also provides a virtual international gallery for students' work, Loveless (2013). ICT can engage and inspire students, and this has been cited as a factor influencing ready adaptors of ICT, Long (2011).

5. ICT Enhances The Scholastic Performances Of Students In The University of Benin.

Based on the extensive usage of ICTs in education the need appeared to unravel the myth that surrounds the use of information and communication technology (ICT) as an aid to teaching and learning, and the impact it has on students' academic performance in the electrical and electronics based subjects taught in the University of Benin. ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential

educational benefits of ICT. The direct link between ICT use and students' academic performance has been the focus of extensive literature during the last two decades. ICT helps students to their learning by improving the communication between them and the instructors Valasiduo and Bousiou (2015).

The analysis of the effects of the methodological and technological innovations on the students' attitude towards the learning process and on students' performance seems to be evolving towards a consensus, according to which an appropriate use of digital technologies in education can have significant positive effects both on students' attitude and their achievement. Research has shown that the appropriate use of ICI's can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. Kulik's (1994) meta-analysis study revealed that, on average, students who used ICT based instruction scored higher than students without computers. The students also learned more in less time and liked their classes more when ICT based instruction was included. Fuchs and Woessman (2014) used international data from the Programme for International Student Assessment (PISA), they showed that while the bivariate correlation between the availability of ICT and students' performance is strongly and significantly positive, the correlation becomes small and insignificant when other student environment characteristics are taken into consideration.

Attwell and Battle (2019) examined the relationship between having a home computer and school performance, their findings suggest that students who have access to a computer at home for educational purposes, have improved scores in reading and math.

Becker (2013) found that ICT increases student engagement, which leads to an increased amount of time students spend working outside class. ICTs especially computers and Internet technologies enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. ICT helps in providing a catalyst for rethinking teaching practice and developing the kind of graduates and citizens required in an information society, Department of Education (2011); improving educational outcomes (especially pass rates) and enhancing and improving the quality of teaching and learning.

ICT can help deepen students' content knowledge, engage them in constructing their own knowledge, and support the development of complex thinking skills Kulik (2013). Studies have identified a variety of constructivist learning strategies (e.g. students work in collaborative groups or students create products that represent what they are learning) that can change the way students interact with the content. ICTs have the potential for increasing access to and improving the relevance and quality of education.

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools, Reeves and Jonassen (2016), the influence of the technology on supporting how students learn will continue to increase.

General Conclusions of the review in order to conclude we will try to proceed to synthesize from a general viewpoint the results obtained, taking into consideration the

relevant aspects of the literature. The results provided by both the quantitative and qualitative analysis of the literature obtained will be exposed especially regarding those aspects which are related to ICTs for Education and ICTS in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process. This literature review has sought to explore the role of ICT in education as we progress into the 21st century. In particular ICTS have impacted on educational practice in education to date in quite small ways but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices.

Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: ICT and teaching learning process; quality and accessibility of education, learning motivation, learning environment and ICT usage and academic performance. The adoption and use of ICTs in education have a positive impact on teaching, learning, and research. ICT can affect the delivery of education and enable wider access to the same. In addition, it will increase flexibility so that learners can access the education regardless of time and geographical barriers. It can influence the way students are taught and how they learn. It would provide the rich environment and motivation for teaching learning process which seems to have a

profound impact on the process of learning in education by offering new possibilities for learners and teachers.

These possibilities can have an impact on student performance and achievement. Similarly wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching and improved academic achievement of students. The overall literature suggests that successful ICT integration in education.

The Role of Students in using ICT in Learning Electrical and Electronics Technology in University of Benin.

According to Kersh (2015), the classroom teacher will never be replaced by programme of self-instructions. Rather, he will be freed to guide the learning of his students in ways that only human being can. In using computer for instruction in electrical and electronics education, the teacher's role is hypothesized as changed basically from that of informer to learning facilitator. In the technical school, the instructor is the manager of the learning process. The instructor decide when the students use the terminal, read the textbook or work with the laboratory equipment. This is to say that the teacher is relieved from pure informative tasks. The teacher's role in using computer for instruction involves spending his time in leading small discussions and in working with students individually and in small groups using laboratory work where applicable. The teacher guides the students in the multitude of diversified documents to

make relevant choices. Hence, the teacher's attitudes, beliefs and preferences will be changed and adapted. Wynn (2019) says that the teacher cannot be removed from effective instructional positions he occupies irrespective of the level of the technology because of the paramount role he plays in teaching and learning processes.

In the University of Benin and any technology based teaching and learning practice, the major activities of the lecturers may include preparation of the software packages, adopting new concepts and new teaching practices, and above all these, they can spend time to continuously evaluating the teaching and learning outcomes.

Problems of using ICT in Improving Teaching and Learning Electrical/Electronic Technology in University of Benin.

The usage of ICT in improving the teaching and learning of electrical and electronics technology in the University of Benin is very important, though ICT has not really gained its root in the Nigerian technical schools, thus, its impact is not strongly felt by all, especially the students. This is because there are some problems facing its implementation in the society. Some of the problems are listed below.

The prominent among the problems are cost. The cost of computer has been on the high side over the years. This has been a deterrent to the adoption of computer for instructional purposes in most schools in Nigeria. Coupled with this, is the exorbitant price of software, it follows the same pattern as that for hardware. Where attempts are made to purchase computers for instructional purposes, the cost of installation,

maintenance and replacement are unavoidable. The meager funding of universities in the Nigerian education sector coupled with the technological level and poor technological development in Nigeria has been impediment to the provision of instructional materials and use of computers for instruction in universities.

In addition, lack of competent personnel also militates against the use of computer for instruction. Experts with the technical know-how of computers are few except the computer dealers who are profit conscious. Hence, there are no computer operators, keypunch operators, analysts, computer scientists, computer engineers and technicians to operate service and develop computer course ware for use on a large scale in technical schools. Another problem is resistance to change among Nigerian teachers. They see the use of ICT for University of Benin students as a means of displacing them from their cherished job rather than an instructional material to enrich and improve teaching and learning electrical and electronics subjects. They also view the use of ICT as an increase in their tasks in the classroom without enough compensation, hence, the prayer for premature death for computer literacy in the technical schools.

In addition to the above problem, lack of instructional facilities also militates against ICT usage in teaching electrical and electronics subjects in University of Benin. Facilities like adequate air-condition appropriate computer environment and buildings are not provided. Moreover, electricity, which is the major source of power supply to the computer, is not stable. There is incessant power supply and power surge when there is light. This actually causes damage to the computer system. Coupled with this, are the

scarcity of computer spare parts and the exorbitant cost of maintaining and using the computer for problem solving and information storage.

The world is a global village. The present age technological advancement has brought changes into virtually all human endeavor including teaching and learning processes. However, the use of computer or information and communication technology in Teaching and Learning Electrical/Electronics in University of Benin will change the roles of students, lecturers or tutors in the same field of study from classroom student to one of consultation, advice and direction giving. Information and communication technology being infused into the teaching and learning process would not just only build the students Electrical/Electronic skills, but would also build the students' knowledge in the IT world of communication.

CHAPTER THREE

METHODOLOGY

This chapter describes the procedures adopted in the conduct of the study discussed under the following headings.

- Research Design
- Population of the Study
- Sample and Sampling Technique
- Instrumentation
- Validity of Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Research Design

The survey research design was adopted in this study. A survey research is one in which a group of people or item is studied by collecting and analyzing data from a part of a group of people or items considered to be representative of the entire group (Nwangwu 2011). The research design provides the researcher with the framework or blueprint for conducting research showing how data are collected, analyzed and the extent to which a conclusion drawn are generalizable (Gay 2013).

Population of the Study

The population for the study consists of all the 113 University of Benin students studying electrical and electronics technology in the University of Benin, Edo state in the year 2021, 2020/2021 session. The population included 84 males and 29 females.

Sample and Sampling Technique

The total populations were used for the study which comprises of 113 students studying electrical and electronics technology in University of Benin, Edo state, therefore no sampling technique was required.

Instrumentation

The major instrumentation for data collection in the study was the questionnaire. The questionnaire titled “assessment of the use of information and communication technology ICT in effective teaching and learning of basic skills in electrical and electronics technology (a case study of University of Benin) questionnaire " was designed in the sections; Section A and B. Section A was made to collect data on the demographic characteristics of the respondents such as sex, age and educational level. While Section B was designed to reflect items on two point rising scale of Yes and No that would enable the researcher answer the research questions stated for the study.

Validity of Instrument

The questionnaire was subjected to screening by the researcher's supervisor and other lecturers in vocational and technical education in the University of Benin, Benin City. These experts made their comments and suggestions on the content validity of the instrument and ensure that the items in the questionnaire were adequate and understandable.

Reliability of the Instrument

To establish the reliability of the instrument, the test re-test method was adopted. Twenty (20) copies of the instrument were administered to the respondents who are not part of the target population. After a time lag of two weeks the instrument re-administered on the same group of respondents. Thereafter their responses on the two accounts were collated and correlated using Pearson product moment correlation coefficient formula was used to calculate.

Method of Data Collection

The questionnaire was administered personally by the researcher to the respondents. The respondents responded to the instrument and it was retrieved immediately after their responses for analysis.

Method of Data Analysis

Data collected for the study was analyzed using descriptive statistics such as frequency count, simple percentage, Mean and Standard Deviation (SD). Any calculated mean equal or greater than 1.50 was regarded as agreed, whereas any calculated mean below 1.50 was considered as disagreed.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter is concerned with presentation of results, analysis and discussion of findings:

Research Question One

To what extent can ICT successfully impact University of Benin students with basic skills in electrical and electronics subjects?

Table 1: Mean and standard deviation on Impartation of basic skills.

S/N	Statements	Mean Score(X)	Standard Deviation(SD)	Remark
1	Do you think University of Benin students need basic skills in learning electrical and electronics subjects?	1.73	.446	Agreed
2	Do you think ICT can help University of Benin students in acquiring electrical and electronics skills?	1.66	.476	Agreed
3	Do you acquire electrical and electronics skills from the use of ICT?	1.69	.465	Agreed
4	Are you able to understand the electrical and electronics subjects taught through the use of ICT	1.81	.394	Agreed
5	Can the electrical and electronics skills derived through ICT be used by University of Benin students to become independent?	1.23	.423	Disagreed
	Total	**8.12**	**2.20**	**Agreed**

Table 1, shows that about 15% of the respondents disagreed while 85% of the respondents agreed, moreover an average mean of 1.62 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.44 concludes that there is an impartation of basic skills in electrical and electronics through the use ICT.

Research Question Two

How can ICT influence students in University of Benin to be able to attain and comprehend knowledge in teaching and learning electrical and electronic subjects in University of Benin?

Table 2: Mean and standard deviation on the influence of ICT in the comprehension of knowledge.

S/N	Statements	Mean Score($\bar{X}$)	Standard Deviation(SD)	Remark
6	Do you understand what taught by the teacher with the use of computer devices?	1.43	.408	Disagreed
7	Do you understand electrical and electronics better as a result of the use of ICT?	1.53	.502	Agreed
8	Can practical work be done on electrical and electronics successfully with the use of ICT?	1.19	.394	Disagreed
9	Does ICT improve your electronics performance electrical and electronics subjects?	1.63	.485	Agreed
10	ICT does not help me in acquiring	1.51	.502	Agreed

	knowledge in learning electrical and electronics subjects?			
	Total	**7.29**	**2.381**	**Agreed**

Source: Field work 2017

Table 1, shows that about 15% of the respondents disagreed while 85% of the respondents agreed, moreover an average mean of 1.62 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.44 concludes that there is an impartation of basic skills in electrical and electronics through the use ICT.

Research Question Three

To what extent can the government provide quality network infrastructure in ICT to improve the learning of electrical and electronics subjects in University of Benin?

Table 3: Mean and standard deviation on Government influence.

S/N	Statements	Mean Score(X)	Standard Deviation(SD)	Remark
11	Are the computers and network infrastructures maintained occasionally?	1.57	.498	Agreed
12	Are the government fully involved in the maintenance and upgrading of the ICT infrastructures in the school when the need arise?	1.24	.429	Disagreed
13	Do you have durable and quality ICT infrastructures in the school?	1.09	.288	Disagreed
14	Does the government provide professional tutors and expertise in the field of ICT in teaching and learning electrical and electronics subjects in the school?	1.43	.498	Disagreed
15	Do you think the government is interested in the students acquiring required knowledge in the field of electrical and electronics using ICT?	1.24	.429	Disagreed
	Total	**6.57**	**2.142**	**Disagreed**

Table 3, shows that about 10% of the respondents agreed while 90% of the respondents disagreed, moreover an average mean of 131 which shows that majority of the respondents disagreed and a standard deviation of 0.43 concludes that there is no

government influence in providing ICT infrastructures to students in the University of Benin.

Research Question Four

How can ICT enhance University of Benin students with skills to develop. implement, support and exploit ICT resources effectively and efficiently in electrical and electronics?

Table 4: Mean and standard deviation on Development and implementation.

S/N	Statements	Mean Score(X)	Standard Deviation(SD)	Remark
16	Do you think students in the University of Benin can successfully exploit the use of ICT in learning electrical and electronics subjects?	1.79	.409	Agreed
17	Do you think the innovation skills in electrical and electronics subjects of University of Benin students can be harnessed properly through the use of ICT?	1.80	.402	Agreed
18	Can a student in the University of Benin become self-employed in the long run as a result of the tutorship he/she undergone in the school?	1.67	.473	Disagreed
19	Can ICT really develop students studying electrical and electronics in University of Benin?	1.78	.416	Agreed
20	Do you think every student in the University of Benin can afford the teaching and learning of electrical and electronics through the use of ICT?	1.43	.498	Disagreed
	Total	**8.47**	**2.198**	**Agreed**

Source: Field work 2017

Table 4 shows that about 20% of the respondents disagreed while 80% of the respondents agreed, moreover an average moon of 160 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.44 concludes that there is development and implementation skills of University of Benin students through the use of ICT resources.

Discussion of findings

With reference to table 1, from the first research problem shows that about 19% of the respondents disagreed while 85% of the respondents agreed, moreover average mean of 1.62 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.44 concludes that there is an impartation of basic skills in electrical and electronics through the use ICT in accordance with Okoro, (2015); suggest that electrical and electronics instructors who possess adequate basic skills and industrial experience in ICT should be considered preferably.

Table 2, also shows that about 20% of the respondents disagreed while 80% of the respondents agreed, moreover an average mean of 1.50 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.47 concludes that there is an influence of ICT in the comprehension knowledge by students studying electrical and electronics subjects in University of Benin. Oliver, Chapman & French (2012) opine that a student could benefit the dynamism of ICT in learning some

difficult concepts, theories and in electrical and electronics subjects thereby giving meaning to his/her performance in class presentation to an exciting one.

The foregoing analysis table 3, shows that about 10% of the respondents agreed while 90% of the respondents disagreed, moreover an average mean of 1J which shows that majority of the respondents disagreed and a standard deviation of 0.43 concludes that there is no government influence in providing ICT infrastructures to students in the University of Benin. According to Adako, (2016) Government intervention in the areas of funding and providing necessary infrastructures to ensure success of ICT in infrastructures to students in technical education programmes in Nigeria must be urgently addressed.

Finally, the foregoing analysis table 4, shows that about 20% of the respondents disagreed while 80% of the respondents agreed, moreover an average mean of 1.69 which is above the accepted mean score 1.50 indicating that the response is positive and a standard deviation of 0.44 concludes that there is development and implementation skills of University of Benin students through the use of ICT resources. Governments all over the world are harnessing the rich potentials of ICT and are using ICT as a tool for educational developments, economic recovery and wealth creation (Okonta, 2016) ICT also enhances the development and implementation of skills of technical students' policies and procedures necessary to ensure the effective, secured and appropriate use of ICT resources and services: Moursund, (2015).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The results of the analysis in the data as seen in chapter four(4) shows that a higher number of students strongly believe that information and communication technology can be used for effective teaching and learning electrical and electronics technology among students in University of Benin. Four research questions were raised to investigate the study.

Data were collected from students using twenty item questionnaires. The deviation from the mean method of Pearson's product moment correlation efficient was used to obtain the reliability. The data were analyzed using the mean and standard deviation.

Summary of Findings

The research findings from the analysis indicated that:

- Information and communication technology can indeed enable University of Benin students in Benin metropolis to get basic skills and innovative concepts in electrical and electronics.
- Though information and communication technology can provide basic skills to students in University of Benin, some students on the other hand may not be able to attain and comprehend knowledge of what is being taught. This may be as a

result of the use of unprofessional teachers who lacks firsthand knowledge in the subject taught or not fully learned in the world of ICT, bad ICT facilities and poor learning environment.

- The ICT centers in University of Benin are not adequately funded by the government thus, provision for good infrastructural facilities in ICT are not taken into consideration.
- The use of information and communication technology can be used to enhance University of Benin students with skills to develop, implement, support and exploit ICT resources in the field of electrical and electronics.
- Students believe that apart from gaining special skills in electrical and electronics with the use of ICT, they can also be inspired enough to be innovative by not only creating further practical work in electrical and electronics, but also using ICT resources, and in the process of using it, develop on it to make it better, and then implementing it for further innovations in the long run.

Conclusion

From the findings of this study and the summary above, it is evident that, Information and communication technology can be used to impact knowledge to University of Benin students studying electrical and electronics technology in University of Benin. Apart from the various challenges that may arise from government not handling the schools in line with international best practices and providing necessary

infrastructures to induce learning. Students can also build themselves occasionally most especially in computer related equipment as everything taught or learnt is based on computers. From the findings also, it was noted that practical aspect could be a bit challenging due to lack of these facilities in the school. From the findings also, it was discovered in one of the findings that the students lack motivation to attain and comprehend knowledge in subjects relating to electrical and electronics using ICT. The University of Benin therefore, should work on the challenges and problems affecting the use of ICT in teaching and learning electrical and electronics.

Recommendations

In order to achieve the above, there is need to consider the following recommendations;

- Students should be given relevant practical works and basic skills in electrical and electronics which will be done with the teachers, and the ICT knowledge should be passed accordingly to every student.
- The ICT centers in the technical colleges should be well ventilated and spacious for both teachers and students in the school to avoid congestion during the course of learning.
- Government should make effort in helping the schools by assisting them with funds and also make provisions for upgraded quality network infrastructures in ICT to facilitate effective learning

- University of Benin should make effort in employing professionals who are not only good at what they do in the field of electrical and electronics, but are also technically inclined with the use of information and communication technology as it based mostly in the field of computer also.

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APPENDIX

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF BENIN
BENIN CITY

QUESTIONNAIRE

ASSESSMENT OF THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY ICT FOR EFFECTIVE TEACHING AND LEARNING OF ELECTRICAL AND ELECTRONICS TECHNOLOGY AMONG STUDENTS IN UNIVERSITY OF BENIN

Dear Respondents

This questionnaire is designed to obtain information in the assessment of the use of information and communication technology ICT in effective teaching and learning of basic skills in electrical and electronics technology among students in University of Benin. Kindly cooperate and supply the information needed below. Information collected will be treated confidentially.

Thanks

_____

Sign and Date

Yours Sincerely

Please tick [v] the appropriate answer in the space provided.

SECTION A

Sex: Male [ ] Female [ ]

Subject Area:……..

SECTION B

SN	ITEMS	YES	NO
	I. What is the impartation of basic skills in electrical and electronics through the use of ICT?		
1	Do you think technical college students need basic skills in learning electrical and electronics subjects		
2	Do you think ICT can help technical college students in acquiring electrical and electronics skills		
3	Do you acquire electrical and electronics skills from the use of ICT		
4	Are you able to understand the electrical and electronics subjects taught through the use of ICT		
5	Can the electrical and electronics skills derived through ICT be used by University of Benin students to become independents		
	II. What is the influence ICT comprehension of knowledge by students studying electrical and electronics subjects?		
6	Do you understand what is taught by the teacher with the use of computer devices		
7	Do you understand electrical and electronics better as a result of the use of ICT		
8	Can practical work be done on electrical and electronics		

	successfully with the use of ICT		
9	Does ICT improve your performance in electrical and electronics subject		
10	ICT does not help me in acquiring knowledge in learning electrical and electronics subjects		
III.	**What is the influence government in providing ICT infrastructures to students in the University of Benin?**		
11	Are the computers and network infrastructures maintained occasionally		
12	Are the government fully involved in the maintenance and upgrading of ICT infrastructures in the school when the need arise		
13	Do you have durable and quality ICT infrastructures in the school		
14	Does the government provide professional tutors and expertise in the field of ICT I teaching and learning electrical and electronics subjects in the school		
15	Do you think the government is interested in the students acquiring required knowledge in the field of electrical and electronics using ICT		
IV.	**What is the level developmental and implementation skills of university students through the use of ICT**		
16	Do you think students in the University of Benin on successfully exploit the use of ICT in learning electrical and electronics subjects		
17	Do you think the innovation skills in electrical and electronics subjects of University of Benin students can be harnessed		

	properly through the use of ICT		
18	Can a student in the University of Benin become self-employed in the long run as a result of the tutorship he/she undergone in the school		
19	Can ICT really develop students studying electrical and electronics in University of Benin		
20	Do you think every student in the University of Benin can afford the teaching and learning of electrical and electronics through the use of ICT		