THE IMPACT OF ELEARNING ON STUDENTS LEARNING AND ACHIEVEMENT IN ELECTRICAL/ELECTRONIC IN TECHNICAL COLLEGES IN NIGER STATE.

BY

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2016/1/61838TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION,

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE.

MARCH, 2023.

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF TECHNOLOGY (B. TECH) DEGREE IN INDUSTRIAL AND TECHNOLOGY EDUCATION

MARCH, 2023

DECLARATION

I, ABDULHAKEEM, Nuhu with matriculation number **2016/1/61838TI**, an undergraduate student of the department of Industrial and Technology Education, certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other University.

....

Name & Matric No. Sign and Date

CERTIFICATION

This project has been read and approved as meeting the requirement for the award of B. Tech degree in Industrial and Technology Education, School of Technology Education, Federal University of Technology, Minna.

Mr I.K Kalat
Project Supervisor

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Signature and Date

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Signature and Date

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External Examiner

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Signature and Date

DEDICATION

With profound joy and gratitude in my heart, I dedicate this project to God Almighty for His Unshakable and Unbreakable Faithfulness. His Divine and constant guidance in my life has made this project a reality today. Thank God.

ACKNOWLEDGEMENTS

All thanks and adoration is due to almighty Allah (SWT) who gave me health, strength, wisdom and ability to be able to complete this project as one of my requirement to complete my study.

My sincere gratitude to my supervisor Mr. I.K Kalat for his careful guidance, patience, insight comment, helpful information and advice that have helped me in my Research work.

I would also like to extend my words of appreciation to project coordinator Dr. A.M. Hassan, my HOD Dr. T.M. Saba and all staff of ITE department.

My joy and happiness will be incomplete without specially thanking my parents in respect of Mallam Nuhu Sadiku and Mrs Zainab Sadiku who have assisted me financially throughout my stay in school and my siblings for their support and prayers all these years.

A big thanks to all those who by virtue of their encouragement, advice and prayers seen to the success of this work.

ABSTRACT

This study examined the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State. Four research questions were developed to guide the study and one null hypotheses were tested at 0.05 level of significance. It employed a survey research design. The study used a four-point scale questionnaire, which contains a total of 52-items, as instrument. The total population of the study is 54 respondents comprising 48 Electrical/electronic teachers and 6 principals. The result showed Flash drive for storing instructional materials, Students and teachers always pass instruction via Telephone (cell phone). The study recommended among other things, Efforts should be made by the Ministry of Education (Federal and State levels) and National Board for Technical Education (NBTE) to post and provide teachers that are skilled in ICTs to each school to impart ICT skills to the students.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Education is a vital tool for economic and individual development. Education is important for the development of any nation. One of the goals of education is to equip individual with adequate skills required to impact positively to his or her live and the society at large. For the goals of education to be achieved programed like vocational and technical education was establish in order equip individual with adequate and relevant skills need to be self-reliance which are offered in technical colleges and other technical institutions.

Technical colleges are geared towards producing craftsmen in various disciplines. Their existence, (Olubodun and Elesin 2018), is to stimulate technological and industrial development by developing and utilizing technologies for industrial and economic advancement. Technical college is an integral part of the total educational system. It contributes towards the development of good citizenship by developing the physical, social, civic, cultural and economic competencies of the (Akintayo and Olunusi 2018). The goals of technical colleges, as stated by Federal Ministry of Education (2014) are, to provide trained manpower in the applied sciences, technology and business, particularly at craft, advanced craft and technician levels; provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and give training and impart the requisite skills to individuals who shall be self-reliant economically and in tune with latest technology. In technical colleges, students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work (Efuwape and Yisa 2020). Technical colleges groom individual in different areas of live

such automobile technology, building technology, electrical/electronic technology, metal work technology and woodwork technology.

Electrical and electronic trades are among the skilled areas studied in technical colleges. The trade, as offered in the technical college, comprise Electrical Installation and Maintenance Work; Instrument Mechanics; Appliance Maintenance and Repairs; as well as Radio, Television and Electronic Work (Okoye and Chukwuermeka 2021). The trade provides learners with the practical skills and knowledge required for an electrical and electronics tradesperson employed in the manufacturing, mining, oil, and other industries. The goal of the programme at the technical college level is to turn out graduates that will be enterprising and self-reliant, with skills in domestic and industrial installation, as well as having the ability to operate, maintain and repair electrical and electronic equipment, among others.

The future of Technical Vocational Education and Training (TVET) is linked with new technologies and computing capacities for new intelligent machines. According to Obi, et al (2020), there is an increasing demand to adopt technology based education in Nigeria especially in TVET to catch-up with the trend of technology development in the world. TVET, as enshrined in the National Policy on Education (2014), is concerned with qualitative technological human resource development directed towards a national pool of skilled and self-reliant craftsmen, technicians and technologists in technical and vocational education fields. ICT is one of the new technologies to catch up with in order to facilitate learning.

The use of information and communication technology (ICT) has brought about a change in learning environment and transforms learning and teaching process in which students deal with knowledge in an active, self-directed and constructive ways. ICT is not only considered as a tool to be added to existing traditional teaching methods, it is an important gadget to support new

ways of teaching and learning (Nwaukwa et al, 2019). The integration of ICT in teaching and learning process has resulted in a new system of learning globally referred to as "e-learning". According to the Facilitating E-learning Industry Law as cited in Tinmaz and Ozturk (2019), e-learning is a learning process utilizing electronic devices, information technology and broadcasting communication technology. E-learning is only made possible when ICT infrastructure has been put in place. E-learning is the appropriate application of the internet to support the delivery of skills and knowledge in a holistic approach not restricted to a particular courses, technologies or infrastructure. Azrul, et al (2019) defined e-learning as the use of a computer or electronic device (for example, a mobile phone, internet, intranet, CD–ROM and DVD to provide training, educational or learning materials). The basic principle of e-learning is connectivity, that is, the process by which computers are networked to share information which can connect people Oladeji, (2021). E-learning drives education reform that provides access anytime and anywhere to students with desire to learn.

E-learning encourages the continued modification of teaching and assessment methods to nurture thinking skills, creativity and knowledge generation (Nwaukwa et al, 2019). E-learning also offers students opportunities to develop communication, collaborative and lifelong learning skills. E-learning technologies such as audio, video, data or multimedia cable satellite, Fibre optics, wireless (radio, infra – red, Bluetooth, Wi-Fi) have the potentials for revolutionalizing the way teachers teach and students learn whether at the junior or senior secondary schools in Nigeria. Horton (2005) scited in (Nwaukwa et al, 2019) viewed e-learning technologies as those electronic learning technologies like the internet, software applications, hardware components and digital technologies that are used to support the educational (teaching and learning) processes. This means that e-learning technologies is needed in all functional areas of education.

The only factor, according to the author, is the creativity of teachers to access and use them in instructional delivery.

The rapid growth in e-learning is influenced by the high demand and supply of e-learning technologies. E-learning technology is highly demanded by teachers and students because of its cost-effectiveness, flexibility of access, and elimination of distance barriers for learners, creating opportunities for individual differences and permission for alternative pedagogies like simulation, experiential, interactivity and self-paced learning. One of the problems which e-learning can solve is by giving the students opportunity to learn anywhere (may be at home or any other convenient place) and also to learn at their own pace, which will enhance their achievement.

Students' achievement is something that students accomplish successfully, especially by means of exertion, skill, practice or perseverance. Achievement in this context specifically refers to academic attainment of students after completing a course Wolters and Hussain (2015). The method a teacher employs in teaching has a lot to contribute in the achievement of the students. These teachers' styles, manner or ways of presenting information, knowledge or value to learners has the potential of promoting or hindering learning, sharpening mental activities, encouraging curiosity, initiative and self-reliance. Students' achievement in technical subjects may depend on their gender.

Gender is a sense of awareness of being a male or female. It is also a behaviour, pattern and attitudes perceived as masculine or feminine within a culture deMayo, et al (2020). Olabiyi, (2020) remarked that disparities exist between the performance of male and female when taught vocational and technical education. Ogbonna, (2016), revealed that e-learning bridge the gap between boys and girls academically in technical subjects. Hence an attempt will be made to find

out whether e – learning modes will bridge the gap between the boys and girls in academic achievement. It would therefore, not be out of place to determine the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

1.2 Statement of the Problem

E-learning technologies have been viewed as tools used to remove limitations of time and space so that students can learn anytime and anywhere. Research have shown that e-learning enhances teaching and learning by providing opportunities for students to applying knowledge to new situations, analyzing information, generating new ideas, communicating, collaborating, solving problems and making decisions.

These skills are relevant in this dynamic society. The call for utilization of e-learning technologies in instructional delivery is to infuse and inject efficiency and effectiveness in educational system. However, in Nigeria, technical colleges teachers' e-learning utilization seems to be challenged by problem of ICT infrastructure such as computer, computer laboratories, internet and e-mail facilities, videophone systems and teleconferencing devices, wireless applications, digital library, digital classrooms and multimedia systems. Chukwu, et al (2019) observed with great concern that technical college teachers are finding it difficult to even utilize e-learning in instructional delivery. This could be linked to high cost of ICT infrastructures, high cost of maintenance, insufficient funding for the development of e-learning infrastructures, teachers' preference of traditional talk and talk method, and lack of ICT skills by teachers.

The real issue is, are technical college teachers integrating these facilities to support instruction, and enable students to use technology as an important gadget to meet their learning goals? The inability of technical college teachers to utilize e-learning technologies in instructional delivery could result to students not having enough opportunities to use ICT to achieve their learning goals, teachers' continued use of traditional method of teaching.

Half-baked students produced, lacking adequate ICT skills necessary for gainful employment or rather to be self-employed upon graduation. However, it is against this problem the study seeks to determine the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

1.3 Purpose of the Study

The purpose of the study is to determine the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State. Specifically, the study will determine:

1 The available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

2 The extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

3 The constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

4 Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State

1.4 Significance of the Study

The findings of the study would be of benefit to teachers, students, school administrators, curriculum planners, and other researchers. The findings of this study would provide teachers with the information on the best e- learning mode to adopt in teaching word processing in secondary schools so that the objectives of introducing computer studies in the curriculum of secondary schools would be achieved. As it will equip the students with the necessary skill that would help them to survive in this technology driven age

The students would benefit from this study because when their teachers adopt the best e- learning mode in teaching word processing, it would help the students to have an in-depth knowledge and skill in word processing which would help them to tackle the problem facing them today in the educational sector. The student will also benefit from the information that would be provided in this study as this study would increase their chances of meaningful learning. Learners learn differently, therefore some students whose learning style is enhanced through computer simulation would learn better through the technique. The opportunity to learn better would not only be provided by the teachers, but also by the students themselves. This is because computer simulation provides personalised instruction.

The result of this study would l guide the school administrator and curriculum planner on how to restructure the computer studies curriculum in order to effectively teach word processing in schools. The findings would as well provide the modalities the administrator would use in conferences, workshops, and seminars and curriculum planning on innovation in teaching and learning, such as the e – learning modes.

The findings of this study could be used by other researchers as a basis for further research. Interested researchers could use the findings of this study as a background for research in other geographical areas or by studying other variables that are not covered in this study.

1.5 Scope of the Study

The study seeks to determine the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The scope of this study will cover the available e-learning resource, extent of utilization of e-learning resource, constraint of utilization of e-learning resource in technical colleges in Niger State.

1.6 Research Question

1 What are the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

2 What are the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

3 What are the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

4 What are the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

1.7 Hypotheses

H_{01} There is no significant difference between the mean responses of principals and electric/electronic teachers on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature to this study is organized under the following subheadings:

2.1 Conceptual Framework

2.1.1 Technical Colleges in Nigeria

2. 1.2 Electrical and Electronic Trades in Technical Colleges

2. 1.3 ELearning in TVET programmes

2.1 Conceptual Framework

2.1.1 Technical Colleges in Nigeria

Technical colleges are geared towards producing craftsmen in various disciplines. Their existence, as cited by Akintayo and Olunusi (2018), is to stimulate technological and industrial development by developing and utilizing technologies for industrial and economic advancement. Technical college is an integral part of the total educational system. It contributes towards the development of good citizenship by developing the physical, social, civic, cultural and economic

competencies of the individual (Sanni, 2002) cited in (Akintayo and Olunusi 2018). In technical colleges, students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work (NBTE, 2014).

According to Federal Ministry of Education (2014), a technical college is a segment of Technical and Vocational Education (TVE) designed to produce craftsmen at the secondary school level and master craftsmen in advanced craft. The goals of technical colleges, as stated by Federal Ministry of Education (2014) are, to provide trained manpower in the applied sciences, technology and business, particularly at craft, advanced craft and technician levels; provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development; and give training and impart the requisite skills to individuals who shall be self-reliant economically and in tune with latest technology.

Technical colleges are regarded as the principal vocational institutions in Nigeria. They give full vocational training intended to prepare students for entry into various occupations. Technical colleges train craftsmen in auto mechanics, plumbing, carpentry and joinery, cabinet making, painting and decorating, welding, electrical installation, radio and TV repair, building construction and a few other areas. On completion of the course of training, students obtain work in industries or established business on their own.

According to NBTE (2014) the list of available programmes in technical colleges is presented below.

- Automobile trade: these trades comprise of auto electric works, motor vehicle mechanics, vehicle body building, agricultural implement mechanics

- Building and woodwork trades: these trades cover block laying, bricklaying & concreting, carpentry and joinery, draftsmanship craft practice, furniture design and construction, machine wood working, painting and decorating.
- Business trades: consist of business studies, parts merchandising, typewriting, stenography Computer trades: contain computer maintenance & GSM repairs, computer studies
- Electrical/electronic trades: encompass appliances maintenance & repairs, electric installation and maintenance works, instrument mechanics, radio, television & electronic work
- Hospitality trades: contain catering craft practice
- Mechanical trades: embrace fabrication and welding, foundry craft, marine engineering, mechanical enginnering craft practice, plumbing and pipe fitting, refrigeration and air condition work
- Printing trades: are ceramic, graphic arts, and printing craft
- Textile trades: comprise garment making, leather trades, textile trades
- General education courses: include biology, chemistry, entrepreneurship education, ICT, mathematics, physics, economics, technical drawing.

The programmes in the technical college were designed to train craftsmen and artisans for the profiting of the individual and the economy (Ezenwakwelu, *et al* 2019). The success of technical and vocational education programme in making substantial contribution to the economy of a

nation like Nigeria depends largely on the success of the process of imparting the required knowledge, attitude and skills to the students.

2. 1.2 Electrical and Electronic Trades in Technical Colleges

Electrical and electronic trades are among the skilled areas studied in technical colleges. Electrical and electronic trade programme aim at producing craftsmen, technicians, and other skilled personnel who will be enterprising and self-reliant with skills in domestic and industrial installation, as well as operate, maintain and repair electrical and electronic equipment, among others (Mkpozi and Eze 2022). The trade, as offered in the technical college, comprise of Electrical Installation and Maintenance Work; Instrument Mechanics; Appliance Maintenance and Repairs; as well as Radio, Television and Electronic Work (NBTE, 2014).

The trade provides learners with the practical skills and knowledge required for an electrical/electronic tradesperson employed in the manufacturing, mining, oil, and other industries (Owusu-Agyeman and Fourie-Malherbe 2021). The study encompasses contents that include electricity, electronics, electromagnetism, and communications, among others. Most of this content requires understanding of some abstract science content, which serves as the foundation upon which other contents are laid. The skills developed in this trade include fault finding, servicing, modification of machinery, and equipment maintenance.

The NTC and ANTC programmes are run by technical colleges accredited by NBTE. This is at craft and advanced craft level (Eze, *et al* 2020). For all craft programme, candidates must not be less than 14 years of age and should have successfully completed three years of junior secondary education of its equivalent. Special consideration may be given to sponsored candidates with lower academic qualifications who hold trade test certificates and are capable of benefitting from

the programme. Advanced craft programme candidate should possess the national technical certificate or its equivalent and should have had a minimum of two years post qualification cognate experience.

As spelt out by NBTE (2014), the curriculum of each electrical and electronic trade programme is broadly divided into three components viz:

- General education, which account for 30% of the total hours required for the programme,
- Trade theory, trade practice and related studies which account for 65%, and
- Supervised industrial training/work experience, which account for about 5% of the total hours required for each programme. This component of the course, which may be taken in industry or in college production unit, is compulsory for all full time students.

All students who have successfully completed their modules will take a national examination conducted by NABTEB and awarded certificates.

2. 1.3 ELearning in TVET programmes

E-learning is essentially computer and network enabled transfer of knowledge and skills with reference to individual experience and practice (Obi *et al.,* 2020). According to Akubuilo (2011) cited in Obi *et al.* (2020), E-learning is a computer assisted pattern of teaching and learning. ELearning which is electronic learning is subsumed under Information Communication Technologies (ICTs) (Alrusheidi, 2022). Simply put, ICTs which are a combination of three concepts- information, communication, and technologies are electronic devices used to store and speed up information and communication to a mass audience. Acronyms like CBT (Computer-Based Training); IBT (Internet-Based Training); WBT (Web-Based Training) have been used as

synonymous with E-learning (Nwankwo and Okoro, 2021). Most of these activities are internet enabled.

The internet is central to E-learning but it is not by any means the only technology for it. Intranets, extranets, satellite broad costs, audio/video tape, interactive TV and CD Rom are also facilities for obtaining and delivering knowledge anytime and anywhere, asynchronously or synchronously for E-learning (Bubou and Job, 2021). Asynchronous E-learning is pre-recorded and available to students anytime and anywhere with technologies such as blogs, wikis, e-mails and discussion boards to exchange ideas and information. A major advantage of asynchronous ELearning is that it allows for self-paced and flexible learning. Synchronous or "live" ELearning requires that learners be with their computers at the same time for electronic mediated teaching (Bubou and Job, 2021). Synchronous activities use on-line technologies such as chat, instant messenger/massaging, video conferencing and other kinds of virtual meetings for real time live interactions. Both ELearning form at present countless opportunities for effective education service delivery, especially in countries like Nigeria (Job, 2021). Therefore, TVET teachers should equip themselves with digital skills to thrive with the trend of E-learning for quality delivery of knowledge and skills.

2. 1.4 Benefits of ELearning

E-learning platforms have immense benefits to technical colleges students, undergraduate and graduate student, it allows students to paste assignment, short reading on their platform, it support students and teachers learning by facilitating reflection, questioning by self and others. It enables collaboration and provide context for engaging in higher order thinking, by sharing information and tips among learning. Floriello (2019) cited in Wordu and Chinda (2019) outline the advantages of e-learning to students.

- One can log-in and get cell blended learning courses on the World Wide Web environment.
- Student can learn independently at any time and place. E-learning is self-paced and the learning sessions are available all time.
- Students can customize the course material to meet their own needs. They have added control over their learning process and are able to better understand the subjects.
- E-learning gives support environment to all for all individual for learning methods.
- Student gets single central location for all course material.
- Students get a chance for enhanced exchange with other students and qualified teachers which are based on communication and information technologies.
- E-learning provides improved organization for regular students like meeting assignment deadlines, homework etc.
- Students can deal with teachers who are highly qualified, but cannot reach because of distance barriers, with e-learning they can give their inputs and help students in their research.
- Students have an option to choose what they like. It draws students to topics they like and enjoy.

Benefits of e Learning to Teachers

The didactic is the traditional method mainly involves Discussion and demonstration, a method that is commonly used in the technical colleges. This method involves verbal one-way presentation of ideas, concepts, generalization and facts. The teacher does most of the activities in form of talking and perhaps makes notes on the board for students to copy hence the method is referred as talk chalk method. The teacher as the key man in the instructional process can change from a dispenser of knowledge to a facilitator of learning through the use of e learning technique. Floriello (2019) cited in Wordu and Chinda (2019) outlined the various advantages of e-learning to teachers as:

- The method of teaching becomes more interactive
- Teachers can prepare single document for different categories of students so that they need to produce it again and again.
- Timing is also flexible for teacher as they can do this with continuation to their regular classroom school.
- They can get more and more information on net that they embed in their course materials.
- Interaction with student becomes more appropriate with teacher since it not face to face they fearless and can ask their problem.

2. 1.5 Strategies for Optimizing E-Learning

E-learning is a driving force for achieving better education in recent times, as many universities are offering degree and diploma programs through E-learning mode. According to Goyal (2012) one way to achieve this is to integrate appropriate pedagogical methods, enhance system interactivity and personalization to better engage learners. Ilechukwu & Njoku (2014)

recommended twelve ways of optimizing E-learning. They are: prioritization and optimal investment in science and technology, research and development (R & D), and education to promote technological competencies. In this wise, universities of technology and faculties of engineering need to be reengineered and rebranded to fast track technological knowledge, acquisition, innovation and practice. Secondly, E-learning has to be mainstreamed into the university curriculum, from fresh year to final year. It should not be an elective or a basic general studies course. The third recommendation was continuous programme of retooling academic and non-academic staff in E-learning skills and practice. In the fourth recommendation, the authors proposed a deliberate robust and dynamic policy and programme of informal, formal and non-formal education upgrade by the ministry of education pivoted on E-learning. The fifth and sixth recommendations were optimal funding of critical E-learning infrastructure and the provision of adequate and stable power generation and transmission to schools.

Integration of online mobile computing devices such as iPods, MP3 players, e-book readers, tablet PCs and modules into E-leaning platforms to make courses of instructions more accessible and portable with optimal maintenance and sustainability culture were the seventh, eighth and ninth recommendation. The tenth recommendation was effective collaboration and partnership among all stakeholders in the public and private sector. These include teachers who must package the instructional modules, the university that provides the administrative and management mechanism, students or learners, IT experts, policy makers, telecommunication companies, financial institutions such as banks, and platform providers. In the eleventh recommendation, the authors averred that ELearning technologies can best be realized by using it to expand the university educational courses to people who might otherwise be excluded by the regular university programmes especially TVET. This will reinforce and optimize the distance

education programme of Nigerian universities to address the high illiteracy rate in the country. Finally, the Federal Ministry of Information Technology, Federal Ministry of National Planning and National Planning Commission should be more proactive in making digitalization a cardinal national development policy, plan, progrmame and project of all national institutions including education. The above strategies are no doubt capable of bridging the gap between E-learning and TVET, it is therefore necessary to explore and exploitoptimal E-learning opportunities in a bid to sustain TVET in Nigeria.

2. 1.6 Constraints to E-learning Adoption in technical colleges

Human capital problems – These involve low literacy level, poor information technology skills and poverty.

Institutional problems – These cover organizational problems, resistance, and lack of awareness.

Infrastructural problems – These include poor internet access, low bandwidth, high cost of ICT services, inadequate investment in ICT by government and poor power generation. Ekundayo and Ekundayo (2009) outlined the constraints to e-learning adoption in Nigerian tertiary institutions to include inadequate human resources, brain drain, staff-student ratio, lack of finance, poor infrastructural provision, electricity challenge, ICT and bandwidth constraints, highly bureaucratic management systems, digital divide and political instability. Gunga (2010) and Suleimann (2012) added to the above lists cost of laptops, software, poor liberalization of telecommunication market, poor licensing of internet service providers (ISPs) to use facilities to connect to the internet and boost bandwidth, high cost of permit to carry out internet café services, lack of training workshops, seminars and conferences on e-technologies for lecturers. Contributing, Adelekan (2013) and Ilechukwu (2013) mentioned high cost of e-learning

hardware and other gadgets, dearth of skilled manpower for the implementation of e-learning and management of ICT infrastructure, inadequate initial lack of relevant competencies by lecturers, inadequate funding of education as well as high cost of installation and maintenance of relevant e-learning gadgets as some of the constraints to its adoption by lecturers.

2.4 **Related Empirical Studies**

Nwaukwa (2019) conducted a study on Extent of Utilization of E-Learning Technologies by Secondary School Teachers for Instructional Delivery in Abia State. The need to improve the standard of teaching and learning in public and private secondary schools necessitated this study to determine the extent of utilization of e-learning technologies by secondary school teachers for instructional delivery in Abia State**.** Two research questions and one null hypothesis guided the study. Descriptive survey research design was adopted. The population of the study comprised 4,000 secondary school teachers in public and private secondary schools in Abia State. Taro Yamane formula was used to draw 1,200 teachers. A-20 item questionnaire titled Utilization of E-learning Technology by Secondary School Teachers (UETSST) and face validated by three experts in the field of education was used for data collection. The reliability of the instrument was established through pilot-testing and data analysis using Cronbach alpha method yielded correlation coefficients of 0.81 and 0.92 for sections A and B and overall coefficients value of 0.87. Mean and standard deviation was used to answer the research questions and determine the homogeneity in opinions of the respondents while the hypothesis was tested using t-test at 0.05 alpha level. Findings showed that respondents utilize e-learning technologies at small extent due to a number of constraints. It was also revealed that public and private secondary school teachers differ significantly in their mean ratings on the extent they utilize e-learning technologies for

instructional delivery. Based on the findings of the study, the researchers concluded that there is need for training of secondary school teachers on how to effectively utilize e-learning technologies to ensure teaching and learning effectiveness. It was recommended among others that; the federal and state governments should ensure adequate provision of e-learning technologies for use by teachers in all fields of study. Because eLearning technologies are expensive to acquire, and cannot be left in the hands of secondary schools.

Hillary (2019) carried out a study on e-learning systems for remedying deficiencies in teaching and learning in tertiary institutions in West Africa. The modern technologies have engaged the attention of many todays particularly the youth on the use of cell phones, laptops projection, flash drive, Video Compact Disk (VCD) and television. The propensity of information and communication technology (ICT) to education especially to the tertiary education. E-learning has made tertiary more accessible to all. ELearning platforms are of immense benefits to the teacher and students of tertiary education. The major constraints in e-learning adoption in tertiary institution range from human capital problem, institutional problem, and infrastructural challenge. The study recommended among others that tertiary institution management; state and federal levels in West Africa should treat teacher training and development with utmost seriousness and sincerity by organizing, seminars, workshops and symposia to equip them with knowledge, and competencies for e-learning adoption in classroom instruction.

Alaa Zuhir (2021) conducted a research on Advantages and Disadvantages of Using e-Learning in University Education: Analyzing Students' Perspectives. The architecture of a learning system implies a heavy task for e-learning to be integrated into a complicated system that is flexible, time scalable, and capable of lasting, even though there are many diverse tools. Currently, higher education in United Arab Emirates is experiencing a major transformation, considering increased

accessibility. Therefore, the study aims to identify the advantages and disadvantages of e-learning in university education in United Arab Emirates. A descriptive study design was used to randomly select students from Ajman university, who were enrolled in 2018/2019 academic year. A close-ended structured questionnaire was constructed to collect data from students. Frequencies and percentages were used to analyse the data collected. 81% students stated that e-learning provides scientific material in an interesting way. Similarly, 80% students have responded that e-learning increases the possibility of contact between students among themselves and between the students and the teacher. 73% students indicated that due to increasing social isolation, they spend more time in front of the technical means of social interaction account and face-to-face with others. 70% students have indicated that there is a presence of electronic illiteracy among parents, which reduces their ability to follow their children electronically. It is essential for potential e-learners to understand the differences between an e-learning classroom setting and a conventional classroom setting as there are both advantages and disadvantages of eLearning to both environments that can probably influence their overall performance as a student.

Gordon (2020) carried out a research on the Individual innovativeness, self-efficacy and e-learning readiness of students of Yenagoa study centre, National Open University of Nigeria. Design/methodology/approach – Therefore, building on previous related research in this area, a quantitative approach was adopted to address the research questions and to establish whether a statistically significant relationship existed between individual innovativeness, e-learning self-efficacy, the independent variables; and e-learning readiness, the dependent variable. In total, 476 first- and second-years students of the university participated in the Four-Likert-type scale survey. The research instrument which comprises 74 survey items was completed by 217 of the

students. Statistical tools used for analysing data included both Pearson Product Moment Correlation coefficients and t-tests. Findings – It was discovered that a strong positive and significant relationship was observed between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of the National Open University of Nigeria (NOUN); a statistically significant relationship was also found between e-learning selfefficacy scores and the e-learning readiness of the first- and second-year students of the Yenagoa Study Centre of NOUN; there was a statistically significant joint relationship between the three variables under investigation; findings equally revealed that male respondents had higher e-learning readiness than their female counterparts. Research limitations/implications – Like every other study of this nature, this one also suffers some limitations. First, NOUN is a very large university with over half a million students spread across almost 78 study centres. This means that observation from just one study centre amounts to a very small sample size. This according to Schweighofer, Weitlaner, Ebner and Rothe (2019) jeopardises the generalisability and validity of study results. The authors also maintain that empirical data generated from surveys that usually rely participants' abilities to read and select responses without further interpretation by the researchers suffer from cognitive biases like social

Aliyu (2021) carried out a study on effect of e – Learning on Academic Performance of Students in Nasarawa State University, Keffi. The outcome of e-learning has changed the way everything is done in the educational sector, most especially academic activities and students are expected to receive quality services at the time that the services is seriously needed but this is often not achieved in practice because factors like perception about e-learning, adoption of e-learning and environmental factors has seriously affected academic performance of students. The aim of the

study is to assess the effect of e-learning on academic performance of students in Nasarawa State University, Keffi. Survey method was used and data for the work were obtained through questionnaire which was analyzed using descriptive statistics. A population of 6,800 students and a sample of 378 respondents were drawn using Yamane's (1967) simplified formulae. The findings revealed that perception about e-learning, adoption of e-learning and environmental factors has affected the performance of students in Nasarawa State University. Based on the findings, the study recommends that governments should improve awareness to educate the public on perception about e-learning, every stakeholder should embrace the adoption of e-learning and the institution should provide conducive environment to sustain and retained their customers.

2.4 Summary of Literature Reviewed

The review of related literature is discussed under the following subheading: Technical Colleges in Nigeria, Electrical and Electronic Trades in Technical Colleges, ELearning in TVET programmes, Benefits of ELearning, Strategies for Optimizing E-Learning and Constraints to E-learning Adoption in technical colleges. Adequate and relevant literatures were reviewed in the study.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Design of the Study

The study adopt the descriptive survey research design used to assess the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State. Survey design according Nworgu (1991) is aimed at collecting data on and describing in a systematic manner, the characteristics features or facts about a given population.

3.2 Area of the study

The study will be carried out six (6) technical colleges in Niger state.

3.3 Population for the Study

The population for the study consists of 54 respondents comprising 48 Electrical/electronic teachers and 6 principals.

List of technical colleges in Niger state	No. of Principals	No. of Electrical/Electrical teachers
Government Technical college Eyagi Bida	1	8
Government technical Minna.	1	8

Suleiman technical college Suleja	1	8
Federal Science and technical college Shiroro	1	8
Government technical college Kontongora	1	8
Government technical college New-Bussa	1	8
Total	6	48

3.4 Sample and Sampling Technique

There will be no sampling since the population was small and manageable.

3.5 Instrument for Data Collection

The researcher designed a structured questionnaire as the instrument that will be used in collecting data for the study. The questionnaire was made up of four sections (A, B, C, D and E). Section 'A' contains items on personal information of the respondents. Section 'B' seeks the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. Section 'C' find out the the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. Section 'D' find out the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. While Section 'D' find out the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The questionnaire items were based on four points scale types. Items for section B, C, D and E contain four responses category each.

The response categories for section B, C, D and E are strongly Agree (SA), Agree (A), and Disagree (D) and strongly disagree (SD). These response categories will be assign numerical values of 4, 3, 2 and 1 respectively. Respondents were required checking (√) against the response category that best satisfies their opinion.

3.6 Validation of instrument

The instrument will be validated by three lecturers in the department of Industrial and Technology Education, Federal University of Technology, Minna and contributions on the appropriateness of the instrument will be considered in the production of the final copy of the research instrument.

3.7 Reliability of instrument

In order to determine the reliability of the research instrument, a pilot test will be conducted using ten respondents in other locations. During the test, the questionnaires were distributed by the researcher. The questionnaire was filled by the respondents and then returned to the researcher. The data collected will be analyzed using Crombach Alpha.

3.8 Administration of instrument

The instrument that will be used for the data collection will be administered to the respondents by the researcher and three research assistant in the study area.

3.9 Method of data analysis

Data collected will be analyzed using mean and standard deviation for the research questions while t-test will be used to test the hypothesis at the 0.05 level of significant. A four (4) point rating scale will be to analyze the data as shown below.

Strongly Agree	(SA)	=	4points (3.5 – 4.0)
Agree	(A)	=	3points (2.5 - 3.49)
Disagree	(D)	=	2points (1.5 – 2.49)
Strongly Disagree	(SD)	=	1point (1.0 – 1.49)

Therefore, the mean value of the 4-point scale is:

$$\bar{X} = \frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$$

3.10 Decision Rule

The cutoff point of the mean score of 2.50 will be calculated as the agreed. Therefore, an item with mean response below 2.50 will be regard or consider as disagreed while an item with response at 2.5 and above was regard or considered as agreed.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Research Question one

What are the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

Table 4.1: Mean responses of the Principals and Electrical/electronic teachers on the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

N_1= 6 N_2=48

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Computer simulation	3.63	.517	Agreed
2	Instructional television	3.57	.529	Agreed
3	Passing of instruction via Telephone (cell phone)	3.60	.524	Agreed
4	Radio player for listen to educational programmes	3.58	.635	Agreed

5	Flash drive for storing instructional materials	3.62	.550	Agreed
6	Word processing software	3.62	.550	Agreed
7	Spreadsheet (excel) software	3.63	.547	Agreed
8	Design and graphic software	3.66	.509	Agreed
9	Desktop publishing software to support teaching	3.65	.513	Agreed
10	Statistical Analysis and forecasting software	3.69	.498	Agreed
11	Overhead projector	3.68	.503	Agreed
12	Wireless network	3.66	.509	Agreed
13	Internet and Local Area Network	3.66	.509	Agreed
14	Mobile/Smart phone	3.69	.498	Agreed
15	Social media e.g. Chat room, Facebook Twitter, 2go	3.68	.503	Agreed

N=54

$\bar{X}$**=** mean of the respondents

$\mathbf{N_1}$ = No. of principals

$\mathbf{N_2}$= No. of electrical/electronic teachers

SD = standard deviation of the respondents

Table 4.1 showed that both the principals and electrical/electronic teachers agreed on all items from 1 to 15. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.498 and 0.635. This showed that the responses of the principals and electrical/electronic teachers on the items were not divergent.

4.2 Research Question two

What are the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

Table 4.2: mean response of the principals and electrical/electronic teachers towards the productivity that women carry out in the construction industries.

N_1= 6 N_2=48

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Students and teachers use Computer simulation for teaching and learning of electrical/electronic trade	3.63	.517	Agreed
2	Students and teachers always watch lessons on the trade on Instructional television	3.57	.529	Agreed
3	Students and teachers always Pass instruction via Telephone (cell phone)	3.60	.524	Agreed
4	Students make use of Radio player to listen to educational programmes	3.52	.664	Agreed
5	Students and teachers make use of Flash drive for storing instructional materials	3.63	.547	Agreed
6	Students make use of Word processing software for typing of their assignment	3.58	.556	Agreed
7	Students make use of Spreadsheet (excel) software to	3.62	.550	Agreed
8	Design and graphic software	3.57	.612	Agreed
9	Desktop publishing software to support teaching	3.62	.521	Agreed
10	Statistical Analysis and forecasting software	3.69	.498	Agreed
11	Overhead projector	3.63	.517	Agreed
12	Wireless network	3.62	.521	Agreed
13	Internet and Local Area Network	3.65	.513	Agreed
14	Mobile/Smart phone	3.65	.513	Agreed
15	Social media e.g. Chat room, Facebook Twitter, 2go	3.62	.521	Agreed

N=54

$\bar{X}$**=** mean of the respondents

N_1 = No. of principals

N_2= No. of electrical/electronic teachers

SD = standard deviation of the respondents

Table 4.2 showed that both the principals and electrical/electronic teachers agreed on all items. This was because none of the mean response was below 2.50 which was the bench mark of agreed on the 4-point response options. The standard deviation score ranged between 0.498 and 0.612. This showed that the responses of the principals and electrical/electronic teachers on the items were not divergent.

4.3 Research Question three

What are the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

Table 4.3: mean responses of the principals and electrical/electronic teachers on the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

N_1= 6 N_2=48

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Lack of technical support regarding e-learning utilization	3.63	.486	Agreed
2	Lack of ICT infrastructure (i.e. computers, computer lab, internet)	3.57	.499	Agreed
3	Curriculum does not allow enough time to utilize e-learning technologies in teaching	3.58	.497	Agreed
4	Lack of training opportunities for elearning utilization knowledge acquisition	3.60	.607	Agreed
5	Schools are unsure as to how effectively to integrate ICT in teaching	3.62	.550	Agreed
6	Lack of fund to Introduce modern ICT facilities in teaching and learning	3.66	.509	Agreed
7	Lack of skilled teachers to use ICT facilities in teaching and learning	3.68	.503	Agreed
8	Students do not enjoy class without the use of ICT facilities.	3.71	.458	Agreed

9	Teachers and Students lack proper orientation when ICT facilities are not properly used in teaching and learning	3.63	.486	Agreed
10	Improper maintenance and service culture of ICT facilities in the school setting.	3.72	.451	Agreed
11	Time Management	3.72	.451	Agreed
12	Lake of proper of funding	3.71	.458	Agreed
13	Lake of Adequate internet services/equipment or facilities	3.72	.484	Agreed
14	Lack of Availability of power supply	3.74	.443	Agreed

N=54

$\bar{X}$**=** mean of the respondents

$\mathbf{N_1}$ = No. of principals

$\mathbf{N_2}$= No. of electrical/electronic teachers

SD = standard deviation of the respondents

Table 4.3 showed that both the principals and electrical/electronic teachers agreed on all items from 1 to 14. This was because none of the mean response was below 2.50 which was the bench mark of agreed on the 4-point response options. The standard deviation score ranged between 0.484 and 0.607. This showed that the responses of the principals and electrical/electronic teachers on the items were not divergent.

4.4 Research Question four

What are the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

Table 4.4: mean responses of the principals and electrical/electronic teachers on the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

N_1= 6 N_2=48

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Government should provide ICT facilities in technical colleges for effective teaching and learning of electrical/electronic and other subjects.	3.71	.551	Agreed
2	Skilled personnel should be employed to manage ICT facilities in the school	3.65	.557	Agreed
3	Government should introduce ICT training and seminars for teachers to improve teaching skills.	3.57	.544	Agreed
4	E-learning Software's should be introduced in the teaching and learning of electrical/electronic	3.49	.758	Agreed
5	Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.	3.34	.731	Agreed
6	Provision of adequate funds	3.73	.514	Agreed
7	Provision of Adequate internet services/equipment or facilities	3.30	.927	Agreed
8	Provision of adequate power supply	3.66	.540	Agreed

N=54

$\bar{X}$**=** mean of the respondents

N_1 = No. of principals

N_2= No. of electrical/electronic teachers

SD = standard deviation of the respondents

Table 4.4 showed that both the principals and electrical/electronic teachers agreed on all items from 1 to 8. This was because none of the mean response was below 2.50 which was the bench mark of agreed on the 4-point response options. The standard deviation score ranged between 0.540 and 0.927. This showed that the responses of the principals and electrical/electronic teachers on the items were not divergent.

4.5 Hypothesis one

There is no significant difference between the mean responses of principals and electrical/electronic teachers on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State

Table 4.4 T-test on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

$N_1 = 6$ AND $N_2 = 48$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Principals	6	3.52	0.50	52	0.549	0.06	NS
Electrical/Electronic Teachers	48	3.67	0.62				

N=65

$\bar{X}_1$**=** mean of principals

$\bar{X}_2$ = mean of electrical/electronic teachers

N_1 = No. of principals

N_2= No. of electrical/electronic teachers

SD_1 = standard deviation of principals

SD_2 **=** standard deviation of electrical/electronic teachers

NS=Not Significant

Table 4.5 showed that there was no significant difference in the responses of principals and electrical/electronic teachers on all the items as the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.6 Findings of the study

The following are the main findings of the study; they are prepared based on the research questions and hypothesis tested.

What are the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

- Computer simulation
- Instructional television
- Passing of instruction via Telephone (cell phone)
- Radio player for listen to educational programmes
- Flash drive for storing instructional materials
- Word processing software
- Spreadsheet (excel) software
- Design and graphic software
- Desktop publishing software to support teaching
- Statistical Analysis and forecasting software
- Overhead projector
- Wireless network
- Internet and Local Area Network
- Mobile/Smart phone
- Social media e.g. WhatsApp, Chat room, Facebook, Twitter, 2go

What are the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

- Students and teachers use Computer simulation for teaching and learning of electrical/electronic trade
- Students and teachers always watch lessons on the trade on Instructional television
- Students and teachers always Pass instruction via Telephone (cell phone)

- Students make use of Radio player to listen to educational programmes
- Students and teachers make use of Flash drive for storing instructional materials
- Students make use of Word processing software for typing of their assignment
- Students make use of Spreadsheet (excel) software to
- Design and graphic software
- Desktop publishing software to support teaching
- Statistical Analysis and forecasting
- software
- Overhead projector
- Wireless network
- Internet and Local Area Network
- Mobile/Smart phone
- Social media e.g. Chat room, Facebook, Twitter, 2go

What are the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

- Lack of technical support regarding e-learning utilization
- Lack of ICT infrastructure (i.e. computers, computer lab, internet)
- Curriculum does not allow enough time to utilize e-learning technologies in teaching
- Lack of training opportunities for elearning utilization knowledge acquisition
- Schools are unsure as to how effectively to integrate ICT in teaching
- Lack of fund to Introduce modern ICT facilities in teaching and learning
- Lack of skilled teachers to use ICT facilities in teaching and learning
- Students do not enjoy class without the use of ICT facilities.

- Teachers and Students lack proper orientation when ICT facilities are not properly used in teaching and learning
- Improper maintenance and service culture of ICT facilities in the school setting.
- Time Management
- Lake of proper of funding
- Lake of Adequate internet services/equipment or facilities
- Lack of Availability of power supply

What are the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

- Government should provide ICT facilities in technical colleges for effective teaching and learning of electrical/electronic and other subjects.
- Skilled personnel should be employed to manage ICT facilities in the school
- Government should introduce ICT training and seminars for teachers to improve teaching skills.
- E-learning Software's should be introduced in the teaching and learning of electrical/electronic
- Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.
- Provision of adequate funds
- Provision of Adequate internet services/equipment or facilities
- Provision of adequate power supply

4.7 Discussion of findings.

The result from table 4.1 shows the findings on the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The findings of the study revealed Computer simulation, Instructional television, Passing of instruction via Telephone (cell phone), Radio player for listen to educational programmes, Flash drive for storing instructional materials, Word processing software, Spreadsheet (excel) software, Design and graphic software, Desktop publishing software to support teaching, Statistical Analysis and forecasting software, Overhead projector, Wireless network, Internet and Local Area Network, Mobile/Smart phone, Social media e.g. Chat room, Facebook, Twitter, 2go. The findings of the study is in line with Ogunode (2021) that adequate learning environment in form of infrastructural facilities and technological equipment with internet connectivity should be provided for successful integration of ICT into teaching and learning of Electrical/Electronic courses in GTCs

Table 4.2 shows the result of the findings on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The findings of the study revealed that Students and teachers use Computer simulation for teaching and learning of electrical/electronic trade, Students and teachers always watch lessons on the trade on Instructional television, Students and teachers always Pass instruction via Telephone (cell phone), Students make use of Radio player to listen to educational programmes, Students and teachers make use of Flash drive for storing instructional materials, Students make use of Word processing software for typing of their assignment, Students make use of Spreadsheet (excel) software to Design and graphic software, Desktop publishing software to support teaching, Statistical Analysis and forecasting software, Overhead projector, Wireless network, Internet and Local Area Network, Mobile/Smart phone, Social media e.g. Chat room, Facebook,

Twitter, 2go. The findings of the study is inline with Ali and Anwar (2021) who stated that the extent of e-learning technology use in course delivery varies wide. On the other hand, courses delivered primarily by lecturers in classroom setting with some integration of technology.

The result of the hypothesis on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State shows that there was no significant difference in the responses of principals and electric/electronic teachers on the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

The result from table 4.3 reveal the findings on the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The findings of the study reveal Lack of technical support regarding e-learning utilization, Lack of ICT infrastructure (i.e. computers, computer lab, internet), Curriculum does not allow enough time to utilize e-learning technologies in teaching, Lack of training opportunities for elearning utilization knowledge acquisition, Schools are unsure as to how effectively to integrate ICT in teaching, Lack of fund to Introduce modern ICT facilities in teaching and learning, Lack of skilled teachers to use ICT facilities in teaching and learning, Students do not enjoy class without the use of ICT facilities, Teachers and Students lack proper orientation when ICT facilities are not properly used in teaching and learning, Improper maintenance and service culture of ICT facilities in the school setting, Time Management, Lake of proper of funding, Lake of Adequate internet services/equipment or facilities, Lack of Availability of power supply. This finding is in line with the findings of Eze *et al.* (2018) who found that there is poor telecommunication infrastructure in Nigerian institutions of learning and this constitutes a barrier to e-learning in Nigeria. This implies that for effective integrative use of ICT resources in the teaching and

learning process, these aforementioned constraints must be given urgent attention by the appropriate authorities

The result from table 4.4 reveal the findings on the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State. The findings of the study revealed that Government should provide ICT facilities in technical colleges for effective teaching and learning of electrical/electronic and other subjects, Skilled personnel should be employed to manage ICT facilities in the school, Government should introduce ICT training and seminars for teachers to improve teaching skills, E-learning Software's should be introduced in the teaching and learning of electrical/electronic, Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities, Provision of adequate funds, Provision of Adequate internet services/equipment or facilities, Provision of adequate power supply. The findings of the study is inline with government and university authorities should provide adequate ICT facilities as well as engage in continuous professional development of lecturers for quality e-learning

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

The main focus of this research study was to find out the impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in Niger State.

Chapter 1 of the study discussed the background of the study, the statement of problem, purpose, significance, scope and the research questions were all stated and discussed for the conduct of this research.

The review of related literature looked into Technical Colleges in Nigeria, Electrical and Electronic Trades in Technical Colleges, ELearning in TVET programmes, Benefits of ELearning, Strategies for Optimizing E-Learning, and Constraints to E-learning Adoption in technical colleges. Various views of different authors concerning the topic were harmonized in a comprehensive literature review and empirical studies.

A survey approach was used to developed instrument for the study; the respondents identified as the population of the study were the principals and electric/electronic teachers. The entire respondents were used. A number of 54 questionnaires were administered. The instrument used was analysed using frequency count, and mean scores. The research questions were discussed base on the findings from the responses and results of the instrument used.

Implication of the study and conclusions were also drawn from the findings discussed. Recommendations and suggestions for further study were formulated and stated according to the findings of the study.

5.3 Implication of the Study

The findings of this study have implications for Technical Teachers, Curriculum Planners-National Board for Technical Education (NBTE), Administrators of Technical Colleges and Ministry of Education (State and Federal). The study found that ELearning instructional strategy is more effective in improving Electrical and electronic trade students'achievement in abstract content in technical colleges. The implication of this finding is that there should be a development of appropriate curriculum that will make provision for adoption of ELearning strategy for teaching abstract content in Electrical and electronic trades in technical colleges. Having found that ELearning is more effective for improving student achievement; there is a need for technical teachers to adopt the use of ELearning in the teaching of abstract contents to Electrical and electronic trade student.

5.3 Conclusion

Based on the findings of the study, the following conclusions were drawn: E-learning has every sign of long survival as long as such digital devices become more available. This means that, when the devices become more afforded, the connectivity bandwidths become widely use and less constraint; the multimedia applications will prosper. The survival of GTCs in the 21st century will increasingly rely on various forms of electronic delivery system and communication facilities available in markets that are required to make education to be more flexible.

The adoption and use of ICTs in schools have a positive impact on teaching, learning, and research. Despite the roles ICTs can play in education, schools in Nigeria have yet to extensively

adopt them for teaching and learning. Efforts geared towards integration of ICTs into the school system, have not had much impact. Problems such as poor policy and project implementation strategies and poor information infrastructure militate against these efforts. For e-learning to succeed in Nigeria, there is the need to build on another important pillar i.e. the existence of befitting infrastructure and some degree of viable connectivity. A growing difference in market liberalization of the Internet-access supply is leading to another kind of "digital divide" on the global scale many countries have introduced or are introducing telecommunications regulations that discourage the development of Internet-access service. Nigeria should take heed of that.

5.4 Recommendations

Based on the findings of the study, the following recommendations were made:

1. Efforts should be made by the Ministry of Education (Federal and State levels) and National Board for Technical Education (NBTE) to post and provide teachers that are skilled in ICTs to each school to impart ICT skills to the students.
2. Federal Ministry of Mines and Power should work towards stabilizing electricity supply in Nigeria as to ensure adequate electricity supply in schools.
3. Ministry of Education (Federal and State levels) and NBTE should make all GTCs beneficiaries of ICT projects.

5.5 Suggestion for Further Study

The following are suggested for further studies:

1. Replication of this study in other geo-political zones in Nigeria

2. Impact of E-learning on Students learning and Achievement in Electrical/Electronics in technical colleges in other state.

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Appendix I

Department of Industrial and Technology Education
Federal University Technology, Minna,
Niger State.

Dear Respondent,

I am an undergraduate student of Industrial and Technology Education in the above-named University. I am presently conducting research on The Impact of E-Learning on Students Learning and Achievement in Electrical/Electronics in Technical Colleges in Niger State. The Questionnaire is designed as part of the study to collect relevant information for a successful completion of this research.
Please kindly provide response to these questions; assuring you that it will purely be used for academic purposes alone.
Thank you for your anticipated cooperation.

Yours sincerely,

NUHU ABDULHAKEEM
2016/1/61838TI

Appendix II

QUESTIONNAIRE

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

A QUESTIONNAIRE ON IMPACT OF E-LEARNING ON STUDENTS LEARNING AND ACHIEVEMENT IN ELECTRICAL/ELECTRONICS IN TECHNICAL COLLEGES IN NIGER STATE

INTRODUCTION: Please kindly complete this questionnaire by ticking the column that best present your perception about the topic. The questionnaire is for research purpose and your view will be confidentially and strictly treated in response to the purpose of the research work.

SECTION A

PERSONAL DATA

Principals: ☐

Electrical/electronic: ☐

Note: A four (4) point scale is used to indicate your opinion, tick the options which best describe your agreement as shown below:

Strongly Agree (SA) = 4points

Agree (A) = 3points

Disagree (D) = 2points

Strongly Disagree (SD) = 1points

Section B: What are the available e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

S/N	**Items**	**Scales**			
		SA	**A**	**D**	**SD**
1	Computer simulation				
2	Instructional television				
3	Passing of instruction via Telephone (cell phone)				
4	Radio player for listen to educational programmes				
5	Flash drive for storing instructional materials				
6	Word processing software				
7	Spreadsheet (excel) software				
8	Design and graphic software				

9	Desktop publishing software to support teaching				
10	Statistical Analysis and forecasting software				
11	Overhead projector				
12	Wireless network				
13	Internet and Local Area Network				
14	Mobile/Smart phone				
15	Social media e.g. Chat room, Facebook Twitter, 2go				

Section C: What are the extent of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

S/N	**Items**	**Scales**			
		SA	**A**	**D**	**SD**
1	Students and teachers use Computer simulation for teaching and learning of electrical/electronic trade				
2	Students and teachers always watch lessons on the trade on Instructional television				
3	Students and teachers always Pass instruction via Telephone (cell phone)				
4	Students make use of Radio player to listen to educational programmes				
5	Students and teachers make use of Flash drive for storing instructional materials				
6	Students make use of Word processing software for typing of their assignment				
7	Students make use of Spreadsheet (excel) software to				
8	Design and graphic software				
9	Desktop publishing software to support teaching				
10	Statistical Analysis and forecasting software				

11	Overhead projector				
12	Wireless network				
13	Internet and Local Area Network				
14	Mobile/Smart phone				
15	Social media e.g. Chat room, Facebook Twitter, 2go				

Section D: What are the constraint of utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

S/N	**Skill Items**	**Scale**			
		SA	**A**	**D**	**SD**
1	Lack of technical support regarding e-learning utilization				
2	Lack of ICT infrastructure (i.e. computers, computer lab, internet)				
3	Curriculum does not allow enough time to utilize e-learning technologies in teaching				
4	Lack of training opportunities for eLearning utilization knowledge acquisition				
5	Schools are unsure as to how Effectively to integrate ICT in teaching				
6	Lack of fund to Introduce modern ICT facilities in teaching and learning				
7	Lack of skilled teachers to use ICT facilities in teaching and learning				
8	Students do not enjoy class without the use of ICT facilities.				
9	Teachers and Students lack proper orientation when ICT facilities are not properly used in teaching and learning				

10	Improper maintenance and service culture of ICT facilities in the school setting.				
11	Time Management				
12	Lake of proper of funding				
13	Lake of Adequate internet services/equipment or facilities				
14	Lack of Availability of power supply				

Section E: What are the Strategies for proper utilization of e-learning resource for learning and Achievement in Electrical/Electronics in technical colleges in Niger State?

S/N	**Skill Items**	**Scale**			
		SA	**A**	**D**	**SD**
1	Government should provide ICT facilities in technical colleges for effective teaching and learning of electrical/electronic and other subjects.				
2	Skilled personnel should be employed to manage ICT facilities in the school				
3	Government should introduce ICT training and seminars for teachers to improve teaching skills.				
4	E-learning Software's should be introduced in the teaching and learning of electrical/electronic				
5	Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.				
6	Provision of adequate funds				
7	Provision of Adequate internet servicees/equipment or facilities				
8	Provision of adequate power supply				