IMPACT OF E-LEARNING ON STUDENT ACADEMIC ACHIEVEMENT IN BUILDING TECHNOLOGY IN TECHNICAL COLLEGES IN NIGER STATE.

BY

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2016/1/63753TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

SCHOOLOF SCIENCE AND TECHNOLOGY EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGER STATE

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

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CEFTIFICATION

I, Bakare Kafayat Jumoke, with the matriculation number 2016/1/63753TI an undergraduate student of the Department of industrial and technology education, Federal university of technology Minna certify that the research project is original and has not been submitted in any form for the award of degree, diploma, or NCE in any other institution.

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APPROVAL PAGE

This project has been read and approved as meeting the requirements for the award of Bachelor of technology (B.Tech) in Industrial And Technology Education, School of Science And Technology Education, Federal University of Technology, Minna.

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DEDICATION

This study is dedicate to Almighty Allah for making it a success, to my parents the person of Mr. and Mrs. Bakare and to my family and friends.

ACKNOWLEDGEMENT

I thank God Almighty, the originator, the mighty for his mercies and grace that kept me all through my undergraduate program. My sincere appreciation goes to my supervisor Dr. C.O IGWE for all his sincere efforts, guidance, knowledge he impact in me and support he gives me, and for his resourcefulness towards the realization of this research work. I also want to acknowledge Project Coordinator, Dr. A.M Hassan, the Head of the Department, Industrial and Technology Education, Dr. T.M Saba, the Exam Officer, Dr. D. Ibrahim , and also to my level adviser Dr. A. M. Abdulkadir, and also to all others lecturers in the department of Industrial and Technology Education.

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ABSTRACT

This study examined the impact of E- learning on student's academic achievement in building Technology in technical colleges *i*n Niger state. *Four* research questions were developed to guide the study and one null hypothesis was tested at 0.05 level of significance. The study employed *a* survey research design. The study used a four-point scale questionnaire, which contains a total of 36-items, as instrument. The total population of the study is 66 respondents comprising 60 building technology teachers and 6 principals. The result showed Non-government organization, parents, Parents and teachers association (PTA), and area councils should contribute in equipping the school, with ICT facilities Lack of fund to Introduce modern ICT facilities in teaching and learning. The study recommended among other things, the school management and education development board in the state should as a matter of necessity put more e-learning facilities and equipment in place providing solutions to specific problems of curricula. The management of technical colleges and government agency (ies) in charge of technical college development should recognize the impact and applicability of e-learning tools to enhance qualitative and quantitative decision-making in the successful academic output. It was recommendations that use of e-learning tools in technical colleges should be encouraged across all the secondary schools so as to improve students' academic performance significantly by creating awareness.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Education is a vital activity and quality education has traditionally been associated with strong teachers having high degree of personal contact with learners. The significance of education, particularly in a developing country like Nigeria has increased because of the need to catch up with the developed world in several areas, particularly in global competitiveness and best practices. The Federal Republic of Nigeria (FRN, 2014), stated that one of the aims and objectives of education is to help the child acquire appropriate productive skills, abilities and competencies both mental and physical as equipment to live in and contribute to societal development. In order to achieve the goals and objectives of education in Nigeria, government has geared efforts towards making individuals contribute to the growth of the nation's economy and become self-reliant through well-developed curriculum covering academic and vocational subjects at the secondary school level and TVET.

Technical Vocational Education and Training (TVET) is a type of education designed to equip individuals with competencies in an occupational trade for the technological and economic development of Nigeria. According to Federal Government of Nigeria (2014), TVET is described as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. The objectives of TVET according to FGN (2014) include: providing training for manpower development in applied sciences, technology and business particularly at craft, advanced craft and technical levels; providing technical knowledge and

vocational skills necessary for agricultural, commercial and economic development; acquire technical and vocational skills, and give training and impact the necessary skills to individual who shall be self-reliant economically. The attainment of these objectives is an important function of formal vocational institutions in Nigeria such as Polytechnics, Monotechnics and Technical Colleges (Umoru and Moshood 2022). Technical college is one of the TVET programme which equip students with adequate and relevant skills in order to be self-reliance and also be a job creator.

Technical college is post primary technical institution established to offer vocational technical programmes. It is established to equip students with technical skills to earn a living. Ibrahim, (2021) said that technical college is equivalent to senior secondary but designed to prepare individuals to acquire practical skills, basic scientific knowledge and attitude required as craftmen and technicians at sub-professional level. According to Ariyo, et al (2020), a technical college in Nigeria is established to prepare individual to acquire practical skills and basic scientific knowledge. It is charged with the production of skilled personnel in the area of mechanical technology, metal work, electrical/electronics technology, wood work and building technology for the needs of society.

Building technology is one of the courses offered in Nigeria technical colleges. Almost all the members of the society benefit from the products of building technology. Building technology programme at the technical college level is designed to produce skilled builders for the building industry (Auta, 2020). Building technology as a course comprises of different components or operations which require skills to perform them. These components include designing of building plans, setting out of the building, execution, block work on the concrete foundation, leveling of the building, roofing pattern, plastering and rendering of walls Ibidapo, (2021). These

areas of operation require that students of building technology should possess the necessary skills to carry them out. In order to achieve the aim and objective building technology as the world grows more towards being a global village, the need to innovate in teaching building technology with particular reference to Information Communication Technology, ICT, becomes imperative if attempt is to be made to bridge the gap between the developing and developed world (Jolselt, 2019).

The role that ICT play in the educational and learning environment cannot be over emphasized. The use of ICT in modern learning environment ranges from slide use of computers in practical aspects to an online learning experience which enhances and improves students' intellectual and learning behavior (Smith, 2003) cite in (Jolselt, 2019). With the introduction of computers, the precursor of our modern-day ICT, and the promising potentials of computer-based instruction and learning, many researchers and institutions were motivated to invest viable resources so as to ensure the possibility of computers enhancing learning culture (Uwah and Ododo 2022). One the ICT means which promo effective teaching and learning in this era of post pandemic is ELearning.

E-learning according to Aboderin (2015) cited in Jolselt, (2019), encompasses an ample array of systems, from the teacher using visual effects to students accessing academic materials online and teaching delivered entirely with the use of computer. E-learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. It (e-learning) involves the use of network technologies to create, foster, deliver and facilitate learning and it encompasses face-to-face, distance, mixed and blended delivery models that utilizes electronic means, a unifying term used to describe the fields of online learning, web-based training and technology delivered instructions (Okeke and Ihenacho 2019).

E-Learning is making use of e-technologies to access educational curriculum outside of a traditional classroom. According to Nnadozie, (2018), e-learning is mostly delivered through the internet, although in the past it was delivered using a blend of computer-based methods like CD-Rom. E-learning is a unifying term used to describe the fields online learning, web- based and technology delivered instructions (Alabi, (2021). The use of e-learning tools in respect to learning process is critical for the successful implementation of various learning environments.

E-Learning, in comparison with traditional learning, significantly reduces the time needed to collect information. It also offers access to online resources, databases, periodicals, journals, and other material. If a student has trouble understanding part of the coursework, finding tips on the matter couldn't be easier than having immediate access to supplementary, unlimited, and mostly free material online (Salama, et al 2020). It reduces unnecessary load of study material that may not be directly effective for students learning and it enhances efficiency of access to study material. Massive open online courses have developed as new way of acquiring knowledge and are more useful when integrated with classroom technologies. (Kim, et al (2019) found, e-learning can have a significant positive impact on students' academic achievement.

Achievement in a perspective relates to what somebody has succeeded in doing, usually by efforts, skill, or courage, and a level of knowledge attained. In an academic setting, achievement connotes performance in a school subject as symbolized by a score or mark on test or examination (Ogbuanya, et al 2021). Meanwhile, record shows present low achievement in building technology trades, with abstract contents and ways of teaching them being indicted. Gender issues have also assumed important in students' achievement discourse. It has been documented that disparity exists between male and female students. In some cases boys had an edge over girls in academic achievement (Shoval, et al 2021). On the other hand, Bhargava, et al

(2021) reported that such difference does not exist. It is also possible that biological, psychological, and personal differences between boys and girls can be a factor when considering strategies for teaching them cum academic achievement.

Enhanced understanding of abstract contents, increased achievement and ease of critical thinking for solving clinical cases are the benefit that eLearning brought into education. A good grasp of abstract contents in building technology trade has been attributed as germane to the understanding and application of other contents in the trade. Also, the poor performance of students in the trade attributed to shallow understanding of the abstract contents is linked to the continued use of traditional method of instruction. The success recorded with the use of eLearning motivated the need to embark on this study.

1.2 Statement of the Problem

Building technology programme in technical colleges is aimed at producing skilled craftsmen who will be able to perform basic functions in building technology both in private and public sector (Ibidapo, 2021). It has been observed that the objectives have not been achieved over the years. This because of the poor performance of students in building technology. Continuous poor performance in NABTEB examinations, have also attested to the congruency of abstract contents mastery to improved learning outcomes. Again, NABTEB recorded high failure rate among the graduates of technical colleges in the examination held in May/June 2022 (This day, 2023). This is a crown on the failure recorded in previous years, as exemplified in NABTEB‘s External examiner Reports.

The traditional teaching approach has been attributed to the problem encountered in the effective teaching and learning of abstract contents in building technology trade. In order to facilitate students‘ understanding of abstract concepts, in the quest to improve achievement, and also

salvage the incessant production of ineffective building technology trade graduates, it is now imperative to investigate innovative strategies, such as eLearning. 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. ELearning can replace the ineffective conventional mode of teaching the abstract contents in building technology trades. The study therefore seek to determine the impact of E-learning on students' academic achievement in building technology 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 student academic achievement in building Technology in technical colleges in Niger state. Specifically, the study will determine:

1 The available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

2 The extent of utilization of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

3 The constraint of use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

4 Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology 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 eLearning 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 seek to determine the impact of E- learning on student academic achievement in building Technology in technical colleges in Niger state. The scope of this study will cover the available e-learning tools, extent of utilization of e-learning tools, constraint of utilization of e-learning in technical colleges in Niger State. Due to time constraint the level of adequacy of eLearning tools will not be covered.

1.6 Research Question

1 What are the available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

2 What are the extent of utilization of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

3 What are the constraint of use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

4 What are the Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State

1.7 Hypotheses

H_{01} There is no significant difference between the mean responses of principals and building technology teachers on the available e-learning tools for learning and Achievement of students in building technology 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 Building Technology

2. 1.2 Concept of E-Learning

2. 1.3 The Benefits of ICT in Education

2.1.4 The Impact of E-Learning on Academic Performance

2.1.5 How E-Teaching and E-Learning Can Improve the Quality of Education in technical colleges

2.1.6 Constraints to E-learning Adoption in technical colleges

2.2 Related Empirical Studies

2.3 Summary of Literature Review

2.1.1 Building Technology

Human begins of today have basic needs for shelter (building) the early men went into caves for shelter, but this could not protect them from wild animals, cool weather and hot weather. People in the process of time required an aspect of education that in involves in addition to general education, skills attitudes, understanding and knowledge relating to occupation in various sectors of economic and social life.

Kawasaki and Sandoval (2020) stated that, teaching is a research activity in which the teacher as a facilitator creates opportunities for learners to observe situations and investigate phenomena. He stressed that it is only after this has been settled that efforts invested in curriculum development can yield visible results. Building Technology plays a vital role in the economic development of any Nation. Being a developing country, the following are the identifiable roles which Building Construction as a programme could play is Nigeria economic development.

i. Meeting the demands of a rapidly growing population for much better and cheaper buildings.
ii. Supplying adequate and cheap raw materials for building local industries.
iii. Foreign exchange or capital information through inceased earnings from building exports.
iv. Providing markets for industrial/manufactured consumer goods and providing profitable employment opportunities in the rural areas for our teaming school leavers. If building construction must play these roles, the need for buildings construction development should therefore be paramount in the technical colleges programme.

Building technology is a branch of environmental studies which deal with building construction, the emphasis is on the building team or personnel involve in the construction, building industries

and the process of construction principles and practice of constructional tools, equipment and materials and organization of building industry, like the client, Architect, Quantity Surveyor, Engineer, Land Surveyor, Builders and Constructors. Lanau and Liu (2020) describe, building construction as any industry that has the main objective of constructing, renovating, demolishing, relocating, maintaining and repairing of buildings, chimneys, sporting, recreational activities waste disposal, fencing, landscaping, structural works using building equipment and tools.

Ebirim (2016) stated that building construction covers a wide range of loosely integrated group involved in the construction, renovation, alteration repairs and maintenance of buildings. Adeleye *et al.* (2014) observes that, building construction satisfies man's needs for shelter and infrastructures such as houses, schools, offices, hospitals, shops, factories, recreational facilities warehouses, banks, churches etc. and to construct all equipment, tools and materials are involved. Thus building construction is the pivotal and primary conduit for infrastructure development in developed and developing countries. Building construction is an organized education which is directly related to preparation of individual for paid or unpaid employment or for additional preparation for a career.

Sima *et al.* (2020) stated that, building construction is a type of technical programme designed specifically to improve efficiency of a person in specific occupation, through and learn in relation to Falloon (2020), explained that, the most crucial change agents in building construction programmes are the teachers with adequate skills, knowledge and information in the area of building construction. It is therefore important to import the spirit of programme among building construction students in primary and secondary schools through efficient and tracked B.Sc. building technology teachers. In order to develop building construction programme in technical colleges and information necessary in building construction programmes. It is also

necessary to identify objectives, content and teaching methods of the programme in technical colleges.

The nation provides five types of technical education institutions outside Universities;

1. Pre vocational Schools
2. Vocational schools
3. The technical colleges
4. The polytechnics/ colleges of technology
5. Colleges of Education (technical)

2. 1.2 Concept of E-Learning

E-learning describes using information and communication technology (ICT) towards improving learning within educational training. Nevertheless, e-learning involves use and application of a variety of tools and techniques, for instance e-mails, websites, blogs, social and business media, and being able to access program supplies on the internet whilst carrying out programs delivered entirely on the internet (Nwakoby & Okoye, 2020). Although e-learning platforms can be of different kinds, some advanced private secondary schools provide educational programs that involve use of web or the internet systems to improve students' academic achievements.

According to Samuel (2021), e-learning is all about learning that occurs at the computer. In our contemporary world, the learning through the aid of a computer simply means online knowledge acquisition through the internet or offline through CD-ROM etc. In other words, it is the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere. Nwagwu (2020) defined e-learning as the use of internet and digital technologies to create experiences that educate our fellow human beings. E-learning has the potential to revolutionise the way we teach and how we learn.

According to Gupta and Pathania (2021) technology vis-à-vis instructional technology whether as a field of education or new terminology to what has been there before like teaching aids or apparatus, as it was earlier called but recent achievements in the field of computer and communication technologies have offered tremendous opportunities for learning by electronic means. Therefore, the world of technology continued to grow and today the whole world has become a global village. By the beginning of the 21st millennium educational technology has stretched educational boundaries and created new ones on a daily basis. One of these new and rapidly expanding boundaries is e-learning which is offering tremendous advantage to education sector (Gupta & Pathania, 2021).

Following Prakash and Kumar (2021), e-learning is basically a teaching and learning method via the web, system or a standalone personal computer (PC). From another dimension Babu AND Sridevi (2018), defines e-learning as a network-enabled expression associated with functions that facilitate teaching and learning in an efficient manner.

E-learning programs and procedures consist of web-based learning, computer-based learning, digital classes and electronic activity (Oduma *et al*., 2019). The programs provide platforms with content materials which are transferred by the web intranet or extranet, sound or even movie MP3s, satellite televisions and CD-ROMs. It is against this background that e-learning was initially known as “internet-based learning”, while nowadays, e-learning is called “web-based learning”. Technically, e-learning does not only regard instructions and coaching by the instructor, but also involves learning that is tailored made to specific learner needs in the private secondary school. According to Singh and Thurman (2019), numerous terminologies occur to be accustomed to determine learning which are on the internet. For that reason, e-learning and learning online are regarded to have different meanings.

Given that the success of e-learning in enhancing students' academic achievement depends on the quality of information and communication technology (ICT), the impact of e-learning on student academic achievement cannot be isolated from the nature ICT infrastructure (Jolselt, 2019). In today's highly globalised world, the use and application of information and communication technology (ICT) in teaching for learning has brought about remarkable achievement in improving students' academic performance in many academic disciplines.

According to Hasanah *et al.* (2023), application of ICT-based teaching and learning in an interactive manner stimulates students' interests to acquire knowledge and apply the acquired knowledge in solving practical life social and economic problems.

The use of information and communication technology (ICT); which comprises of desktop and personal computers (PCs), laptops, the internet, and multimedia, enhances capacity to accomplish tasks faster with speed and accuracy in teaching and learning. These features change the role of the teacher and the learner, facilitate learning, and lead to interactive learning, learner autonomy, self-sufficiency, and self-confidence (Mothibi, 2015). By integrating content and information literacy, often in textual and visual forms, ICT produces significant learning and academic achievement. In other words, incorporation of ICT into the area of education has changed the role of teachers from a mere source of educational material to supervision of learning process. This increases self-sufficiency and self-confidence in students' learning processes (Mothibi, 2015).

The knowledge of ICT today is being emphasized as the effective vehicle for teaching and learning (Mothibi, 2015). With the widespread use of the internet, knowledge has become more effectively reachable by the mass population of students. The use of ICT promotes effective engagement of the learners, enhancement of learning, ease the use of teaching methods and

materials to respond to students' interests and needs; empowerment of the learners to control the learning schedule, and the pace of execution of the learning program; enables interactions between learners and materials, and learners and teachers by the usage of animation, image and sound together in the learning process; abstract concepts that are difficult to understand can be solid and easy to learn by eliminating the limitations of conventional method of teaching and the constraints of time and space (Ongie *et al.,* 2020).

2. 1.3 The Benefits of ICT in Education

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.

Benefits of E-Learning to the Teacher are as Follows:

Covering of Syllabi/Course Content: The use of the e learning saves the teacher the problem of not covering the course content. Since the learning is done online the teacher does the teaching of the various topic online the learner can access them anytime everywhere. In the case of national or institutional holiday lesson timetable are not alter.

Variety of Method: E-learning or e-classroom give the teacher the opportunity to use various instructional strategies to teach his lesson. The lecturer in the higher institution uses the lecture method only. The lecture method can be blended with other instructional strategies through the use of e learning.

Team Teaching: Keiler (2018) defines team teaching as a method where multiple teachers develop and present course material to class on the fact that each teacher has his/her own area of

specialization, preference, content mastery, level of experience, resourcefulness, voice and ability to manage a class with a view of cross pollinate ideas, rob minds in other to improve students' performance. These teaching done as a team can be placed online for these students, without the students discovering the area of weakness of the teacher. The students will not be disadvantaged on the areas where the teacher is incapacitated.

Adaptation to Modern Technology: The use of e-learning makes the teacher to move with the time. E-learning has encouraged teachers to attend training and retraining in other to fit in to demands of emerging technology. A teacher that is not moving with the trend will become outdated, obsolete and handicapped.

Cost Effective: E-learning is cost effective when compared to the traditional form of learning. The reduction in cost is due to learning through this mode happens quickly and easily. A lot of training time is reduced with respect to trainers' travel, course materials and accommodation. The teacher and students can attend online training anywhere in world. Econferencing is a new way of attending conferences. Participants can attend the conference anywhere in the world thereby reducing time and cost of conference.

Another Major Benefit of E-Learning is That it is Environmental Friendly: E-learning is a paperless way of learning. It protects the environment to some extent. Gupta (2017) conducted a study on environmental friendliness of e-learning. It was found that e-learning courses and programme consumed around 90% less power generated and generated 85% less amount of CO_2 emission as compared to traditional campus-based educational courses. With e-learning, there is no need to cut trees for obtaining paper. E-learning is a highly eco-friendly way of learning. E-learning is in support of the green environmental revolution.

2.1.4 The Impact of E-Learning on Academic Performance

Attitudes concerning e-learning, echoed by scholarly and academic reviews, range from neutral to positive. On one hand, it is noted that e-learning is at least as effective as traditional instructional strategies (Evendi *et al.*, 2022), and that there are no major differences in academic performance between the more traditional and more technology-oriented modes of instruction. On the other hand, many reviews go further, reflecting a principally positive attitude towards the impact of e-learning (Alenezi, 2020). The current piece sought to demystify e-learning by concentrating on how specific e-learning factors (socio-demographic characteristics and prior computer skills) influence individual academic performance.

There is a considerable body of evidence to suggest that different teaching delivery styles can have different degrees of success; as measured in terms of academic results (Blazar & Kraft, 2017). In relation to online teaching, some studies indicate that this medium of delivery has a positive impact on performance. Other studies however, find that greater online teaching has a negative impact on performance (Gopal *et al.*, 2021).

Benefits include offering a variety of new possibilities to learners, in addition to having a positive effect on students' achievement in different subject matter areas. Other benefits of electronic education include increases in enrollment or time in school as education programs reach underserved regions, broader educational opportunity for students who are unable to attend traditional schools, access to computer resources and instructors not locally available, and increases in student-teacher communication. According to Chen and Hu (2018), students in virtual schools showed greater improvement than their conventional school counterparts in critical thinking, researching, using computers, learning independently, problem-solving, creative thinking, decision-making, and time management.

Electronic education is not the most effective choice in all situations. Virtual school students

show less improvement than those in conventional schools in listening and speaking skills (Hamouda, (2020). Highly technical subjects have also proven to be difficult to teach well online. The Alberta Online Consortium evaluated student performance on end-of-year exams among virtual school students across the province, and found that virtual school student scores in mathematics, and the sciences lagged significantly behind scores of non-virtual school students (Peleg *et al.,* 2019).

Sun *et al.* (2017) notes that given instruction of equal quality, groups of students learning online generally achieve at levels equal to their peers in classrooms. Equality between the delivery systems has been well documented over decades for adult learners. Evidence to date convincingly demonstrates that when used appropriately, electronically delivered education—'e-learning'— can improve how students learn, can improve what students learn, and can deliver high-quality learning opportunities to all children" (NASBE, 2001).

2.1.5 How E-Teaching and E-Learning Can Improve the Quality of Education in Technical Colleges

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways:

1. By increasing learner motivation and participation in academic activities,
2. By facilitating the acquisition of basic skills, and
3. By enhancing teacher training.

ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

Motivating to Learn

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.

ICTs 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 (Kozyreva *et al.,* 2020), the influence of the technology on supporting how students learn will continue to increase.

Facilitating the Acquisition of Basic Skills

The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. Educational television programs such as "Who want to be a millionaire" for students and "Cowbell mathematics competition"; Nigeria's biggest thought provoking program, enlightens students and encourages their participation through ICT and computer skills because of the questions that are required to be answered before the cash price is awarded. Questions are drawn from all works of life ranging from academics, religious, cultural, educational to contemporary issues, thereby facilitating the acquisition of basic skills amongst populace.

Enhancing Teacher Training

ICTs have also been used to improve access to and the quality of teacher training. For example, institutions like the ICT Teacher Training Center (ITTC) in Lagos, Nigeria are taking advantage of the Internet to provide better teacher professional development opportunities to in-service teachers.

Blair *et al.,* (2016) found that ICT increases student engagement, which leads to an increased amount of time students spend working outside class. Young and Jerome (2020) showed that students in on-campus courses usually score better than their online counterparts, but this difference is not significant here. 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, developing the kind of graduates and citizens required in an information society,

improving educational outcomes (especially pass rates) and enhancing and improving the quality of teaching and learning (Lewallen *et al.,* 2015). ICT can help deepen students' content knowledge, engage them in constructing their own knowledge, and support the development of complex thinking skills.

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 (Martin & Bolliger, 2018). 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 (Su and Cheng (2015), the influence of the technology on supporting how students learn will continue to increase.

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. Ihuoma (2019) 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.

Wamuyu (2015) 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,

Mutua and Ng'eno (2016) 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 teachers, 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 teachers.

2.2 Related Empirical Studies

Yayomin (2015) the impacts of e-learning in facilitating academic performance among private secondary schools and tertiary institutions in Ota, Ogun state, Nigeria. The introduction of multimedia technologies and the internet in learning has been observed as a means of improving accessibility and quality of delivery and learning among the students and teachers in private Secondary Schools and tertiary institutions in Nigeria. Thus, e-learning is a new paradigm shift in educational sector for the purpose of advancing the knowledge base.

The beginning of 21st Century has heralded the educational technology that has facilitated e-learning among secondary and tertiary institutions in the developing countries. The empirical study will focus on some selected private Secondary Schools and Higher Institutions in Ota. Both primary and secondary data shall be utilized in the study. Structured and unstructured interviews with some staff and students of the selected Secondary and tertiary institutions will be conducted. This is necessary so as to obtain qualitative data on their e-learning experiences as well as the understanding of the usage.

The Secondary Schools and Tertiary institutions websites will be assessed so as to elicit information on their learning management system which is crucial for this study. Questionnaires will be administered to the students in order to elicit information on their experiences on e-learning. This study in its purpose employs descriptive design in its procedural approach. The method of data collection entails a survey study conducted by the researchers using the questionnaire as the research instrument. This provides opportunity of the researchers having a direct contact with the target population in a bid to obtain vital information necessary for a thorough study of this kind.

The survey method also provides the researchers with the privilege of obtain "first hand' information and having a personal interview with the key players in the field or area of focus by the researcher. The descriptive design is utilized to analyze the characteristic of the respondents and the number of participants that responded to a particular issue of concerned being addressed the current study.

The impacts of e-learning in facilitating academic performance were examined using regression analysis based on the testable hypothesis based on the study objectives. Analysis of the result from the study provides evidence of significant impact of e-learning in facilitating academic studies and self-development resulting to improved learning process and high academic performance. Therefore recommends that more effort should be made by the management of secondary schools and tertiary institutions in providing a e-learning facilities in their institutions and students should be encouraged to make a proper use of these facilities by given them e-learning related assignment and projects.

Adebayo (2019) carried out a study to determine the effect of e–learning tools on the students' academic performance in secondary schools in Ilorin metropolis, Nigeria. Descriptive research

design of survey type was adopted for this study, a total of three hundred and thirty (330) teachers made up the sample of the study drawn from 10 public and private schools each.

The instrument for the study consisted of twenty (20) items questionnaire generated to answer the research questions and hypotheses. The data were presented and analyzed using descriptive statistics of frequency distribution analysis (FDA). The study found that there is positive and significant relationship between the use of eLearning tools and students' academic performance. Based on the findings of the study, it was concluded that students' use of e-learning tools has significant effect on their academic performance. Thus, it is affirmed that e-learning tools would significantly promote students' interest in the learning contents, make learning easy for students, allow students and motivate students towards better academic performance. The study recommends that the use of e-learning tools and technology in secondary schools should be encouraged so as to improve students' academic performance significantly.

Alabi (2021) conducted a study on study investigated the correlation between E-learning and secondary school students' academic achievement. it is a descriptive survey of expo-facto type. A total of 100 secondary school students were randomly selected from 5 randomly selected secondary schools in kosofe local government area of Lagos state. An E-learning questionnaire was used to collect data while the students' scores in English and Mathematics were used to measure academic achievement. Data were analyzed with Pearson product-moment statistics at 0.05 level of significance. Three hypotheses were raised and tested. The result of the analysis indicated a positive relationship between e-learning and academic achievement of secondary school students (junior, senior). Based on these findings, recommendations were made that all stakeholders in academics (parents, teachers, and school administrators) should encourage and support students to acquire computer training for e-learning knowledge to enhance the academic

achievement of secondary school students.

Baba (2021) conducted a study on E-Learning Facilities for Teaching Secondary School Physics: Awareness, Availability and Utilization. Secondary school physics contribute significantly to the technological development of a nation because it lays the foundation for further studies in physics. Physics is an abstract science subject that relies greatly on practical, and the crucial role played by the use of instructional materials especially, e-learning facilities in this 21st century cannot be over emphasized. This study investigates the awareness, availability and utilization of e-learning facilities among secondary school physics teachers. We adopt the descriptive survey design which involved 78 physics teachers, randomly selected from all the secondary schools in Ondo, Nigeria.

A research designed checklist was used to collect data for this study. Three research questions were answered using descriptive statistics (frequency, percentage, mean, standard deviation) and the findings from this investigation revealed that physics teachers are aware of most of the e-learning facilities for teaching secondary school physics but only few of these facilities are readily available for teaching physics. This investigation also revealed that only one of these elearning facilities (desktop computer) was utilized by secondary school physics teachers. This study conclude that e-learning facilities were not used in teaching secondary school physics in Ondo. Based on these findings, physics teachers are encouraged to use the few e-learning facilities that are available in secondary schools. Also, government education agencies and school management team are encouraged to further stress the importance of using the available e-learning facilities for teaching secondary school physics through in-service trainings and workshops.

2.3 Summary of Literature Review

The literature review is discussed under the following subheading: Building Technology, Concept of E-Learning, The Benefits of ICT in Education, The Impact of E-Learning on Academic Performance, How E-Teaching and E-Learning Can Improve the Quality of Education in technical colleges, Constraints to E-learning Adoption in technical colleges. Relevant and adequate 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 determine impact of E- learning on student academic achievement in building Technology 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

This study covers the entire Minna Township. Minna is a city in west central Nigeria with an estimated population of 304,113 as at 2007. It is the capital of Niger State where the state covers an area of about 76,368squarekm (29,484square miles) and with a population of about 3,950,249 figures as at 2006 (www.wikipedia.com 2006). Minna is as well headquarters of Chanchaga local government of Niger state.

3.3 Population for the Study

The population for the study consists of 66 respondents comprising 60 building technology teachers and 6 principals in 6 technical colleges in Niger state.

[google scholar]

List of technical colleges in Niger state	No. of Principals	No. of Building technology teachers
Government Technical college Eyagi Bida	1	10
Government technical Minna.	1	10
Suleiman technical college Suleja	1	10
Federal Science and technical college Shiroro	1	10
Government technical college Kontongora	1	10
Government technical college New-Bussa	1	10

Total	6	60

3.4 Sample and Sampling Technique

Random sampling was used employed in selection of the sample of the study. The sample for this study consists of 66 respondents comprising 60 building technology teachers and 6 principals in 6 technical colleges in Niger state.

3.5 Instrument for Data Collection

The researcher designed a structured questionnaire as the instrument that was used in collecting data for the study. The questionnaire is 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 tools for learning and Achievement of students in building technology in technical colleges in Niger State. Section 'C' find out the extent of utilization of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. Section 'D' find out the constraint of use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. While Section 'E' find out the Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology 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 require checking (√) against the response category that best satisfies their opinion.

3.6 Validation of Instrument

The instrument was 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 was 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 was analyzed using Crombach Alpha.

3.8 Administration of Instrument

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

3.9 Method of Data Analysis

Data collected was analyzed using mean and standard deviation for the research questions while t-test was use to test the hypothesis at the 0.05 level of significant. A four (4) point rating scale was 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 was calculated as the agreed. Therefore, an item with mean response below 2.50 was regard or consider as disagreed while an item with response at 2.5 and above was regard or considered as agreed.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Research Question 1

What are the available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

Table 4.1: Mean responses of the principals and building technology teachers on the available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

N_1= 6 N_2=60

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Computer simulation	3.53	.700	Agreed
2	Instructional television	3.85	.427	Agreed
3	Passing of instruction via Telephone (cell phone)	3.43	.621	Agreed
4	Radio player for listen to educational programmes	2.93	.350	Agreed
5	Flash drive for storing instructional materials	3.42	.619	Agreed
6	Overhead projector	2.98	.357	Agreed
7	Photocopies and scanners	3.48	.567	Agreed
8	Internet and Local Area Network	3.03	.158	Agreed
9	Mobile/Smart phone	3.65	.547	Agreed
10	Building drawing softwares such AutoCAD and Revit	3.30	.720	Agreed

N=66

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

N_1 = No. of principals

N_2= No. of building technology teachers

SD = standard deviation of the respondents

Table 4.1 showed that both the building technology teachers agreed on all items from 1 to 10. 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 0.427 and 0.720.

This showed that the responses of the building technology teachers on the items were not divergent.

4.2 Research Question 2

What are the extent of utilization of e-learning tools for learning and Achievement of students in building technology 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=60

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Teachers and students make use of Computer simulation for teaching and learning processes in building technology			Agreed
2	Students are allow to watch Instructional television on their various lessons in building technology			Agreed
3	Students and teachers Passes instruction via Telephone (cell phone)			Agreed
4	Students make use of Radio player for listen to building technology educational programmes			Agreed
5	Students and teachers make use of Flash drive for storing instructional materials			Agreed
6	Teachers makes use of Overhead projector to deliver their various lessons			Agreed
7	Teachers make use of Photocopies and scanners for their courseware			Agreed
8	Internet and Local Area Network			Agreed
9	Mobile/Smart phone			Agreed
10	Teachers and students make use for Building drawing softwares such AutoCAD and Revit			Agreed

N=66

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

N_1 = No. of principals

N_2= No. of building technology teachers

SD = standard deviation of the respondents

Table 4.2 showed that both the principals and building technology 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 building technology teachers on the items were not divergent.

4.3 Research Question 3

What are the constraint of use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

Table 4.3: mean responses of the principals and building technology 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=60

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Lack of technical support regarding e-learning utilization	3.75	.571	Agreed
2	Lack of ICT infrastructure (i.e. computers, computer lab, internet)	3.90	.379	Agreed
3	Curriculum does not allow enough time to utilize e-learning technologies in teaching	3.00	1.150	Agreed
4	Lack of training opportunities for elearning utilization knowledge acquisition	2.93	.474	Agreed
5	Schools are unsure as to how effectively to integrate ICT in teaching	3.48	.701	Agreed
6	Lack of fund to Introduce modern ICT facilities in teaching and learning	3.80	.648	Agreed
7	Lack of skilled teachers to use ICT facilities in teaching and learning	3.62	.524	Agreed
8	Students do not enjoy class without the use of ICT facilities.	3.75	.742	Agreed
9	Teachers and Students lack proper orientation when ICT facilities are not properly used in teaching and learning	3.66	.623	Agreed
10	Improper maintenance and service culture of ICT facilities in the school setting.	3.23	.584	Agreed

N=66

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

N_1 = No. of principals

N_2= No. of building technology teachers

SD = standard deviation of the respondents

Table 4.3 showed that both the principals and building technology 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 0.379 and 1.150. This showed that the responses of the principals and building technology teachers on the items were not divergent.

4.4 Research Question 4

What are the Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

Table 4.4: mean responses of the principals and building technology 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=60

S/N	ITEMS	$\bar{X}$	SD	Remark
1	Government should provide ICT facilities in technical colleges for effective teaching and learning of building technology	3.68	.676	Agreed
2	Skilled personnel should be employed to manage ICT facilities in the school	3.55	.552	Agreed
3	Government should introduce ICT training and seminars for teachers to improve teaching skills.	3.58	.766	Agreed
4	E-learning Software's should be introduced in the teaching and learning of building technology	3.85	.533	Agreed
5	Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.	3.52	.873	Agreed
6	Provision of adequate funds	3.78	.620	Agreed

N=66
$\bar{X}$**=** mean of the respondents
N_1 = No. of principals
N_2= No. of building technology teachers
SD = standard deviation of the respondents

Table 4.4 showed that both the principals and building technology teachers agreed on all items from 1 to 6. 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

0.533 and 0.872. This showed that the responses of the principals and building technology teachers on the items were not divergent.

4.4 Hypothesis 1

There is no significant difference between the mean responses of principals and building technology teachers on the available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

Table 4.4 T-test on the available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State.

$N_1 = 6$ AND $N_2 = 60$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Principals	6	3.47	.853	64	2.064	0.042	NS
Building Technology Teachers	60	3.53	.751				

N=66
$\bar{X}_1$**=** mean of principals
$\bar{X}_2$ = mean of building technology teachers
N_1 = No. of principals
N_2= No. of building technology teachers
SD_1 = standard deviation of principals
SD_2 = standard deviation of building technology teachers
NS=Not Significant

Table 4.5 showed that there was no significant difference in the responses of principals and building technology teachers on all the items as the available e-learning tools for learning and Achievement of students in building technology 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 tools for learning and Achievement of students in building technology in technical colleges in Niger State?

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
6. Materials
7. Overhead projector
8. Photocopies and scanners
9. Internet and Local Area Network
10. Mobile/Smart phone
11. Building drawing softwares such AutoCAD and Revit

What are the extent of utilization of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

1. Teachers and students make use of Computer simulation for teaching and learning processes in building technology
2. Students are allow to watch Instructional television on their various lessons in building technology
3. Students and teachers Passes instruction via Telephone (cell phone)
4. Students make use of Radio player for listen to building technology educational programmes
5. Students and teachers make use of Flash drive for storing instructional materials
6. Teachers makes use of Overhead projector to deliver their various lessons
7. Teachers make use of Photocopies and scanners for their courseware

8. Internet and Local Area Network
9. Mobile/Smart phone
10. Teachers and students make use for Building drawing softwares such AutoCAD and Revit

What are the constraint of use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

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.

What are the Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State?

1. Government should provide ICT facilities in technical colleges for effective teaching and learning of building technology
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 building technology
5. Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.
6. Provision of adequate funds

4.7 Discussion of Findings.

The result from table 4.1 shows the findings onthe available e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. The findings of the study revaealed tha Computer simulation, Instructional television, Passing of instruction via Telephone (cell phone), Radio player for listen to educational programmes, Flash drive for storing instructional materials, Overhead projector, Photocopies and scanners, Internet and Local Area Network, Mobile/Smart phone, Building drawing softwares such AutoCAD and Revit. The findings of the study is inline 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/Electronics courses in GTCs

Table 4.2 shows the result of the findings on the extent of utilization of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. The findings of the Teachers and students make use of Computer simulation for teaching and learning processes in building technology, Students are allow to watch Instructional television on their various lessons in building technology, Students and teachers Passes instruction via

Telephone (cell phone), Students make use of Radio player for listen to building technology educational programmes, Students and teachers make use of Flash drive for storing instructional materials, Teachers makes use of Overhead projector to deliver their various lessons, Teachers make use of Photocopies and scanners for their courseware, Internet and Local Area Network, Mobile/Smart phone, Teachers and students make use for Building drawing softwares such AutoCAD and Revit. 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 use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. The findings of the study reveal the 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. This finding is in line with the findings of Goshit (2006) stated that the main problem facing Nigeria's ICT programme is its workforce training and a lack of training does not make the teachers motivated enough to go the extra mile in assisting the students to acquire computer education.

The result from table 4.4 reveal the findings on Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology in technical colleges in Niger State. The Government should provide ICT facilities in technical colleges for effective teaching and learning of building technology, 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 building technology, Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities, Provision of adequate funds. The findings of the study is inline with Ogunode and Musa (2020) government and technical colleges authorities should provide adequate ICT facilities as well as engage in continuous professional development of lecturers for quality e-learning

CHAPTER FIVE

CONCLUSION 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 student academic achievement in building Technology 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 Building Technology, Concept of E-Learning, The Benefits of ICT in Education, The Impact of E-Learning on Academic Performance, How E-Teaching and E-Learning Can Improve the Quality of Education in technical colleges, 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 building technology teachers. The entire respondents were used. A number of 66 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.

5.2 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 Contribution to knowledge

The research has lead to the following:

E-learning enhanced teaching and learning by providing opportunities for students to applying knowledge to new situations, analyzing information, generating new ideas, communicating, collaborating, solving problems and decision makings.

5.4 Conclusion

Based on the findings of the study, The study shows that e-learning tools are essential for enhancing students' academic performance, because it encourages students' class participation, ensure that students learn independently which boost students' confidence and provide learning opportunities that enhance academic performance. Therefore, the study conclude that students use of e-learning tools have significant impact on their academic performance. Thus, it is affirmed that e-learning tools would significantly promote students' interest in the learning

content, make learning easy for students, allow students to apply skills and knowledge gained practically and motivate students towards better academic performance.

5.5 Recommendations

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

1. The use of e-learning tools in technical colleges should be encouraged across all the secondary schools so as to improve students' academic performance significantly by creating awareness.
2. The school management and education development board in the state should as a matter of necessity put more e-learning facilities and equipment in place providing solutions to specific problems of curricula. The management of technical colleges and government agency(ies) in charge of technical colleges development should recognize the impact and applicability of e-learning tools to enhance qualitative and quantitative decision-making in the successful academic output..
3. Teachers should orientate and encourage the students towards the use of e-learning tools in the classroom and also encourage the use of social media website that focus on promoting teaching and learning.

5.6 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 A

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 STUDENT ACADEMIC ACHIEVEMENT IN BUILDING TECHNOLOGY 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: ☐

Building technology teachers: ☐

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 tools for learning and Achievement of students in building technology 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	Overhead projector				
7	Photocopies and scanners				
8	Internet and Local Area Network				
9	Mobile/Smart phone				
10	Building drawing softwares such AutoCAD and Revit				

Section C

What are the extent of utilization of e-learning tools for learning and Achievement of students in

building technology in technical colleges in Niger State?

S/N	Items	Scales			
		SA	A	D	SD
1	Teachers and students make use of Computer simulation for teaching and learning processes in building technology				
2	Students are allow to watch Instructional television on their various lessons in building technology				
3	Students and teachers Passes instruction via Telephone (cell phone)				
4	Students make use of Radio player for listen to building technology educational programmes				
5	Students and teachers make use of Flash drive for storing instructional materials				
6	Teachers makes use of Overhead projector to deliver their various lessons				
7	Teachers make use of Photocopies and scanners for their courseware				

8	Internet and Local Area Network				
9	Mobile/Smart phone				
10	Teachers and students make use for Building drawing softwares such AutoCAD and Revit				

Section D

What are the constraint of use of e-learning tools for learning and Achievement of students in building technology 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.				

Section E

What are the Strategies to enhance the use of e-learning tools for learning and Achievement of students in building technology 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 building technology				
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 building technology				
5	Non-government organization, parents, PTA, and area councils should contributes in equipping the school, with ICT facilities.				
6	Provision of adequate funds				