ASSESSMENT OF THE EFFECTS OF COVID 19 PANDEMIC ON TECHNICAL EDUCATION IN NIGERIA, A CASE STUDY OF MINNA MUNICIPAL

BY

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2017/2/68140TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOOGY, MINNA

MARCH 2023

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**A RESEARCH PROJECT SUBMITTED TO THE
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DECLARATION

I Waheed Ismail Adekunle Matric No: 2017/2/68140TI 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

Waheed ismail adekunle
2017/2/68140Ti

_____   _____
Name & Matric No.   Signature & Date

CERTIFICATION

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

_____   _____
DR. G.A USMAN   **Sign & Date**
Project Supervisor

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DR. T.M SABA   **Sign & Date**
Head of Department

_____   _____
External Examiner   **Sign & Date**

DEDICATION

This is research is dedicated to almighty ALLAH for all his mercies and protection toward me and also to my parent MR AND MRS ADULWAHEED ADULRAHEEM, to all my siblings, and my friend for their love and support.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION

1.1   Background to the study

Technical education is an educational process involving the study of technologies and related sciences and acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (FGN, 2014). Okoye and Arimonu (2016) defined technical education as a form of education whose primary purpose is to prepare persons for employment in recognized occupation. In the same vein also that saw technical education as a post-secondary vocational training programme which the major purpose is the production of craftsmen. The terms technical education refers to skill based programmes which are designed for skill acquisition at post primary level of education. Technical education programmes focus on specific vocations for entry into defined workplace. Technical education, in the other hand is not designed for any particular vocation but provides general technical knowledge. This type of education prepares people for entry into recognized occupation at a higher level but usually lower than the first degree at the polytechnic, colleges of education and university.

According to Olaseni and Olawale (2017), technical education is the training of technically oriented personnel who are to be the initiators, facilitators and implementers of technologically development of a nation. In their opinion, this training of its citizens on the need to be technologically literate would eventually lead to self-reliance and sustainability. They observed that technical education more than any other profession has direct impact on the development of the country. Despite the role of technical education in the nation the rise of pandemic in the world has made the programme to suffer set back in the past years.

Pandemics are diseases that are regarded as new set of viruses that can easily become infectious and which have the tendency for a quick spread within short period of a time. Pandemics are regarded global or are identified as such if the rate of infection spread and fatalities become high, and efforts to overcome them prove difficult or costly for the global key players in health sector (Israhadi, 2020). In the case of a virus, it may spread as airborne, waterborne and through other means. In the history of the world, there are many pandemics which claimed heavy casualties including the Spanish Flu in 1918, HIV/AIDS in 1981, Ebola Virus in 2014 Disease, Bird Flu in 1997, Zika in 2015 and recently COVID 19 in 2020. Some pandemics quickly spread worldwide while others are restricted in some areas (Gössling *et al.,* 2020).

One of the devastating and fatal pandemics in the history of contemporary world is COVID 19. COVID 19 is a virus which emanated from the industrial city of Wuhan in China in December 2019 and is associated with difficulty in breathing, blocking of chest, severe cold and catarrh, severe fever and cough (Fang *et al.,* 2021). The Virus is contacted through coming into contact with the infected persons either by mixing of breath, handshake or body contacts and even a close contact not necessarily a direct body contact. Within a short period of a time, the world was shock and paralysed in awe of the potential of the Virus in terms of number of novel cases, deaths and its spread worldwide. In less than two (2) months of the emergence of the Virus, it has nearly spread to all parts of the world. By January 2020, the WHO declared COVID 19 a global pandemic because it has been spreading quickly beyond Chinese borders into other parts of the world in an unprecedented speed (Zizek, 2020).

Eze *et al.* (2021) found that the pandemic has impacted education in three major ways, including missed learning for the majority of the pre-pandemic students, loss of access to vital school-provided services and leaving more kids behind. Thus, these impacts are

likely to widen the gaps in education quality and socioeconomic equality following the school closures in the country. This is because a lesser percentage of learners who are in the urban areas, who are likely to hail from higher-income families, stand more chance to access education during school closure through technology (Eze *et al.,* 2021), leaving behind the majority of learners from poor homes and underserved rural and suburban areas of the country. Apart from this, learners in schools that lack the resources or capacity to transition to online delivery are currently missing learning (Crawford *et al.,* 2020).

Though school closure is intended to control the spread of the virus within schools, prevent carriage to other vulnerable individuals, and sustain public health, these closures have had widespread socioeconomic impacts (Eze *et al.,* 2021). Furthermore, the far-reaching effects of social/physical distancing and the associated lockdown measures, as well as school closures, have thwarted the education sector and are expected to leave an indelible mark on the education system. Learning within the homes could also be a challenge or present challenges for learning. Such depends on parents' educational attainment and other commitments, leaving a greater percentage of the learners' population behind.

1.2 Statement of the Problem

Technical education is a skill oriented programme which required both theory and practical teaching and learning in classroom and also in the workshop. Most of the activities of teaching and learning in technical colleges are been carried out in workshop since most of the subject are skill oriented and also required close working together of both learners and teachers. According to the Adequate number and sizes of workshops/studios to sustain an initial intake of 30 students in each of the two years of the programme should be available and 40 students are expected to be in the classroom.

With the coming of COVID -19 pandemic in which different measure where put in place such social distancing and a limited number people that can occupy a particular place at a time, this had been a great challenge because large number of students won't be able to participate in some activities due to COVId-19 pandemic. All public and private schools have to shut the doors of their schools following the government directive while some private schools in urban areas are engaging their students through online teaching. The process of effective teaching and learning in TVET was drastically hindered because of the difficulty teachers faced in providing practical training virtually, and delivering lectures under limited access to the internet and devices.

Today, teachers and students have been struggling with virtual and distance instructional delivery processes, which was introduced suddenly under the new norm of lockdown and social distancing (Madu & Edokpolor, 2021). The implication is that TVET programmes faced a significant challenge of providing practical skills training using tools and machines through virtual training. It is against the above problem that this study sought to assess the impact of covid-19 on technical education in Niger state.

1.3 Purpose of the Study

The purpose of this study is to assess the effect of covid-19 on technical education in Niger state. Specifically, this study will determine:

1. The effect of Covid-19 pandemic on school closure on technical college's students

2. The effect of Covid-19 on technical teacher's performance

3. The Activities technical college students engage in within the COVID-19 pandemic school closure.

1.4 Significance of the Study

The study would be of significant to the following: - the students, teachers, Ministry of education, parent and society.

The findings of the study will be of benefit to the students as it will enable them to know how to fill up for the setback caused by covid-19 pandemic and also be able to know the best strategies for learning in line with a new advanced technology.

Technical teachers will also benefit from the findings of the study as it will be an eye opener for them in areas which they need to improve on and strategies for continuous education.

The finding of the study will help the ministry of education to develop a better approach to teaching and learning that will help technical college student to learn both practical and theory any time.

Parent will benefit from the findings of this study as it will enable them to know better ways of giving their children an uninterrupted education.

The findings of the study will be of benefit to the society it will be an eye opener in terms new approaches to teaching and learning in the post pandemic era and also the findings of the study will enable to know better ways of giving their children better education.

1.5 Scope of the Study

The study will be carried out to determine assess the effect of covid-19 on technical education in Minna metropolis, Niger state. This study will cover the effect of covid-19 pandemic school closure on student and teachers and the activities the students engage in to during the school closure that help them learn better. Due to time constraint availability of facilities to for eLearning will not be covered.

1.6 Research Questions

The following research questions will guide the study;

1. What are the effect of Covid-19 pandemic on school closure on technical college's students?

2. What are the effect of Covid-19 on technical teachers' performance?

3. What are the activities technical college students engage in within the COVID-19 pandemic school closure?

1.7 Hypotheses

The following null hypotheses formulated will be tested to guide the study at 0.05 level of significance.

H_{01} There is no significant difference in the mean responses of technical teachers and students on the effect of Covid-19 pandemic on school closure on technical college's students.

H_{02} There is no significant difference in the mean responses of technical teachers and students on the effect of Covid-19 on technical teachers' performance.

H_{03} There is no significant difference in the mean responses of technical teachers and students on the activities technical college students engage in within the COVID-19 pandemic school closure.

<center>**CHAPTER TWO**</center>

<center>**REVIEW OF RELATED LITERATURE**</center>

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

2.1 Theoretical Framework

2.1.1 Theory of Social Constructivism

Social Constructivism theory explains teaching and learning as social phenomena between teachers and learners (Taguma, Feron, & Lim, 2018). It is a clear departure from the idea that teachers are custodians of knowledge, instead the theory considers teachers as facilitators in the learning process (Yunusa *et al.,* 2021). Advocates of this theory believe that learning is about finding solutions to problems and that the social construction of solutions is the essence of the learning process (Picciano, 2017). In other words, problem-solving through collaboration is the primary objective of social constructivism. Many social media solutions developed for collaborations are leveraged in this COVID-19 pandemic and social distancing era. In the view of social constructivist, teachers could develop social relationship with their students to support their remote learning during the school closure.

Connectives' is often referred to as the learning theory for the digital era, as it describes how people learn in today's "technology-driven" society (Shrivastava, 2018). The theory is based on the premise that the older learning theories – behaviourism, cognitivism, and constructivism are inadequate to explain how learning happens in the present technology-driven era (Crompton & Traxler, 2019). While the older theories are anchored on the idea that learning occurs inside a person, the connectivist metaphor presents the notion that technology has now made it possible for learning to happen outside of a person's brain and may be stored in a variety of digital formats (Shrivastava,

<center>7</center>

2018) – such as databases. According to Crompton and Traxler 92019), knowledge does not only reside in the mind of a person but it in a distributed manner across a network. An information network contains several nodes a node is a learning community that serves as a cluster of similar interests that allow for interaction, sharing, debating, and thinking together (Yunusa *et al.,* 2021).

2.2.2 Theory of Vocational Education

Prosser (1949) propounded sixteen theories of Vocational Education. The theories are popularly known as "Prosser sixteen theories of Vocational Education, the first theory which emphases on the working environment is mostly relevance to this study. Therefore, this study will be drives by the Environmental habit theory of Vocational Education. This theorem stated that "Skill training will be efficient in proportion as the environment in which the learner is trained is a replica of the real environment in which he/she must subsequently work".

School environment is a place where training of the learner is being carried out. Classroom or drawing room is the main environment for teaching or tutoring Technical drawing students. This assertion is in line with the theory enumerates, which states that computer software packages and other computer facilities which are used in training the Technical drawing learners should be the same type as those facilities that exist where they will work after graduation or training. For example, it will be deceitful to training students using manual drawing tools only, while the actual job required the use of modern tools such as CAD. Also, Training in building drawing using obsolete tools will certainly produce graduates who will not be relevant on the job unless given a new training to meet the desire of their employers. In order to make technical drawing students to acquire relevant skills in the subject, they must be trained with modern computer packages as those that are used in the industry.

The true reflection of the level of the knowledge and skills acquired in the course of training of technical students is determined by their academic performance in a test. Such knowledge and skills determine to a large extent; how effective they will be in the industries where they will be engage after graduation. Most industries nowadays conduct aptitude test for measuring the abilities in theory and practical for their prospective employees.

Therefore, this theory encourages the learners to be inquisitive, explorative, initiative, and innovative and to encourage self-discovery in the process of learning.

2.2 Conceptual Framework

2.2.1 Technical and vocational education in Nigeria

Technical and Vocational education programme in Nigeria evolved in response to technological and industrial needs of the people. Technical and vocational education is a type of training that borders on the acquisition of knowledge and skills in occupational trades such as woodwork, metalwork, electrical/electronics, welding and fabrication, building, auto-mechanics, etc., including workshop organization and management. According to Oviawe *et al.,* (2017), there are five technical institutions in Nigeria outside the universities namely- pre-vocational and vocational schools at post primary level (Technical Colleges), Polytechnics and Colleges of Education (Technical) at the post-secondary level established to provide a base for technological take off of the country.

According to Laleye (2022) during the Colonial era little emphasis was placed on technical and vocational education to produce individuals that were adequately skilled, confident and properly oriented towards self-reliance. Jacob further attributed the low attention to technical and vocational education to the high level of youth unemployment till date. However, as reported by Ndille (2021) attempts were made by government to

introduce vocational and technical education into the school system as far back as 1847 with the recommendation of the Privy Council to the Colonial office. The committee recommended among other things that Nigerian schools should:

i. Provide a channel of improving the conditions of the peasantry by educating them how health may be well-maintained by appropriate nutrition, hygiene, airing and clothing;

ii. Give practical training in household economy and in the cultivation of the cottage garden as well as those common hand crafts by which a labourer may improve his/her domestic comfort.

iii. Provide improved agriculture to replace the system of exhausting the virgin soil and leaving it to natural influence to repair.

The Federal Government of Nigeria (FGN) in her National Policy on Education FGN (2014) stated that the curricula activity for Technical Colleges is structured in foundation and trade modules, with the trade modules consisting of five components. These five components or elements include: General Education; Theory and Related Courses; Workshop Practice; Industrial Training/Production Work and Small Business Management and Entrepreneurial Training.

According to Yadav *et al.,* (2022) in the traditional period vocational programmes included: metal smelting, weaving (cloth and mat), dyeing, pottery, leather work, bead making, wood carving and canoe carving, artistry, agricultural activities, singing and dancing. Others included: music, hair styling, tattoo or body art and hunting. He further added that the recent vocational curriculum which has been enlarged includes carpentry and joinery, furniture making, baking, shoe making and repairs, dress making, sign writing, photography, metal work, hairdressing, fashion design, fabrication, motor

mechanic work and electronic servicing. Other subjects include: mechanical engineering, building, home economics, advanced agriculture and secretarial accounting work.

Achieving the goals stated in the national policy will be impossible if the students are not properly trained; it is in this light that Mupa and Chinooneka, (2015) contends that effective training can only be accomplished in a conducive environment adequately equipped with the necessary requirements. According to Mupa and Chinooneka, such requirements include qualified and adequate numbers of teachers, well equipped workshops and laboratories with modern tools and equipment. Longhurst *et al.,* (2020) argues that effective implementation of any educational programme requires the provision of human and material resources made available to the institution of learning.

2.2.2 Importance of Technical and Vocational Education

Technical and vocational education as a means of social, economic, technological and national development has been a major debate in many spheres in Nigeria and other nations of the world (Bako & Syed, 2018). Technical and vocational education otherwise known as Technical and Vocational Education and Training (TVET) according Latif, (2019) is the brain behind technological advancement and economic fortune of developing countries across the globe. According to Kenned *et al.* (2017), for Nigeria to meet with other developed nations of the world, there is a need to deploy adequate human and material resources into TVET as a worthwhile education. They further asserted that post-independence zeal towards TVET by the Nigerian government after adoption of the TVET yielded positive results. Products of TVET institutions worked as engineers, middle-level officers and technicians in a number of firms in Nigeria. Considering this promising impact of TVET, Nigeria was regarded in the early 1970s as one of the 50 rich countries in the world, but later degenerated to be

one of the most poverty-ridden nations in the early 2000s (Matemilola, 2017). This decline was influenced by many factors, among which indifference towards TVET in preference for general education is a key factor (Ashari *et al.,* 2019). As confirmed by the Federal Ministry of Education (FME) (FME 2005), in the growing population of Nigerian students, a total of 74.3 per cent chose conventional education in universities, whilst 18.71 per cent enrolled for vocational education in the polytechnics.

The preference for conventional education to vocational education triggered massive youth unemployment, growing poverty rates, hopelessness, youth restiveness and low pace of national progress in Nigeria because graduates from conventional or general education lacked the practical skills needed in the world of work (Oviawe, 2018). According to the Nwaka *et al.* (2015) and the Central Bank of Nigeria, the poverty and unemployment rates in Nigeria as of recent are 72% and 23% respectively.

According to NPE (2004) and FME (2005) TVET was prescribed by policymakers as a practical education choice for re-directing the nation towards sustainable development, poverty mitigation, responsible citizenship, industrial progress and economic advancement. Considering the experiences of the Koreans and Asian Tigers whose economies were changed from regressive states to frontline nations, Dangote (2013) endorsed TVET as a necessary paradigm for Nigeria's industrial advancement.

If TVET in Nigeria must be a tool for technological development, then it must equip its recipients with both technical and soft skills that allow for flexibility and the ability to work across a wide range of work (Shola *et al.,* 2019). Shola *et al.,* (2019) suggests that TVET in Nigeria needs to prepare its graduates with skills that go beyond taking up immediate employment, but with skills that enhance the employability of its graduates so they can adapt to different jobs throughout their life time. This notion is in agreement with Brown and Bonnard (2020) who defined employability as the ability to secure and

sustain different jobs. According to Shola *et al.,* (2019), the heart of employability lies on soft skills; these skills acts as a base for the development of industrial skills that allows for adaptability to new work environments and development of new skills while on the job. The need for a flexible workforce brought about by a dynamic environment is on the increase (Shola *et al.,* 2019). Technological industries are in dire search for innovative solutions with emphasis on employees with creative skill, reasoning skills, ability to work in a group and work experience. There is a great question as to how relevant the school curriculum is to meet these requirements outlined by industry (Shola *et al.,* 2019).

2.2.3 COVID 19 Pandemic

COVID 19 is one of the major pandemics recorded in the history of the world. It is a virus which quickly spread and defied all forms of treatment in its early and even present stage. The Virus was transmitted through breath, handshake, face to face contact, body contact and through physical contact. The Virus emanated from an Industrial city of Wuhan in China with some certain symptoms of cold, catarrh, difficulty in breathing, severe fever and complications from the illness. Early efforts in responding towards the Virus by researchers failed to materialise in terms of presenting a breakthrough that will lead to an efficacious treatment or vaccination that will prevent it (Omolo *et al.,* 2020). In a blink of an eye, the Virus spread in all parts of China from Wuhan and because of the nature of global connectivity and technological breakthrough as well as innovation in modern transportation system, the Virus spread worldwide to the extent that by May 2020, almost all countries of the world recorded either confirmed cases or symptoms that are indicating towards that (Makurumidze, 2020). The WHO officially declared the Virus a pandemic in January 2020. Many world countries started taking measures towards preventing and countering its spread. Researches were embarked upon in

understanding the nature of the Virus and its treatment. However, a significant portion of 2020 was spent without any reliable breakthrough (Dhillon *et al.,* 2020). World economies became comatose, social activities were halted, cultural interactions were abruptly stopped and international politics became heightened with tensions of allegations, accusations and counter-accusations among world leaders on the lukewarm attitude exhibited in curtailing the pandemic (Liang *et al.,* 2020).

The COVID 19 pandemic as at 10 April, 2021 has confirmed cases of 135,804,081 (approximately one hundred and thirty-six million), 2,934,713 deaths, 23,617,864 active cases, 109,251,504 recovered cases and 112,186,217 closed cases. Countries that are most affected by the pandemic are USA, Brazil, China, Mexico, India, Italy, France, Spain, Iran, South Africa, Egypt, Russia, England, Nigeria and other high populous countries. The following table sample top ten (10) most affected as at the time of writing this research.

The WHO became busy finding a solution towards the management of the pandemic in terms of fund raising for intervention especially in the developing or weak economies. World countries resorted to ban on international travels particularly from the countries that are hit most by the pandemic such as China, USA, Brazil and India. Domestically, lock down was announced in many countries. Schools were closed and social gatherings of all forms including religious places of worship were all banned temporarily (Jiao *et al.,* 2022). The world became terrified and the search for a responsive treatment was made. The Virus continued to mesmerise the world until in the early 2021 when the vaccine for the Virus was developed. Still, the discovery of the vaccine is not seen as the guarantee for protection against contracting the Virus. Precautionary measures remain the major alternative to the pandemic.

2.2.4   COVID 19 Pandemic in Nigeria

The COVID 19 pandemic emerged and spread in Nigeria in 2020 precisely in the month of February. Most of the cases recorded in Nigeria resulted from the travelers who returned from abroad within the period. They may have contacted the virus from the departed destination, on aero plane or at arrival in the airport after intermingling with the carrier patients. Nigeria is the area of study (Attah, Sambo, Sule, Bello, & Saragih, 2021). The country is located in West Africa and is one of the Sub-Saharan African countries.   The country has a geographical land area in square kilometres of 983, 213 km2. The approximate population of Nigeria is 200 million based on the projection of 2006 population census. The country is currently a federal state divided into six geopolitical zones and three tiers of government, Federal Capital Territory in Abuja (FCTA), 36 states and 774 local governments areas. Politically, Nigeria operates a presidential system of government with a bi-cameral legislature consisting of the Senate and House of Representatives. The country is neighbouring Niger Republic in the North, Benin Republic in the West, Chad in the North and Cameroon Republic in the South and North.

Nigeria is the most populous country in Africa, the seventh most populous country in the world, the tenth largest oil producing country and the biggest GDP in Africa above South Africa. Historically, Nigeria has three stages of evolution. An existence of kingdoms, chiefdoms, societies and organizations during pre-colonial period which lived independently but coordinately. The global health index in 2019 reported Nigeria as one of the countries with the low level of healthcare services. The report further suggested that Nigeria's health system is weak. This means the country may not be able to fight COVID 19 (Ozili, 2021).

By March 26, Nigeria had already recorded over fifty (50) cases with one death from COVID. Most of the early symptoms or cases of COVID infection were reported from the Nigerian ruling class. Perhaps, this is because they are perceived as the privilege few that has the opportunities for international travels and exposure (Sambo, 2020). This submission seems valid because apart from the Chief of Staff to the President, Malam Abba Kyari, the son of former Vice President and the PDP Presidential in 2019 Candidate, Alhaji Atiku Abubakar was reported positive. Some state governors in Bauchi, Kaduna and Osun were also reported infectious. Initially, public perception of the disease was inimical and hostile. Many could not believe in the pandemic due to culture, religious influence, ignorance and loss of confidence in the political leadership of the country. It took a serious national re-orientation embarked by the media, intellectuals, religious clerics, royal fathers and the NCDC. The incidences of death reported in televisions from Spain, Italy, Iran and United States of America further helped swayed the public opinion to embrace the disease as real. This enabled for the government to secure enough support for taking the measures of response as discussed in the subsequent sections (Shaaban *et al.,* 2022).

The virus which was spreading slowly in Nigeria suddenly began to increase in index cases daily. From fifty (50) cases in March, Nigeria recorded 1, 300 cases by 29th April with 40 deaths. This has been attributed to the low level of testing of the Nigerian population of 200 million in consideration. This is proved by the fact that Nigeria conducted just around 12, 000 tests as at 23rd, April while Botswana, a country with a population of 10 million had conducted over 5, 000 and South Africa, with a population of around 50 million had conducted over 185, 000 around that time (Syed *et al.,* 2020). The situation revealed the weakness of the Nigerian response considering the way in which the numbers of index cases keep on rising daily in a geometrical scenario. By the

end of May, Nigeria recorded over 8, 000 cases with more than 150 deaths (National Centre for Disease Control, 2021).

From the inception of the month of May, over 100 new cases are reported daily. This may not lack linkage with low response in terms of testing coverage and other related factors. Many infected persons might be roaming the Nigerian environment freely spreading the virus before detection and testing. To this end, this study anticipated that before the overcoming of the pandemic globally, which is unknown for now, Nigeria may report hundreds of thousands of cases or even a million or millions with thousands of deaths. This can be related to the negligence from the part of the government and the populace (Africa CDC, 2021). The government was hitherto, advised by health experts and other stakeholders to shut down the Nigerian border from international travels in January ending. However, because the children of the privileged ruling class and the ruling elites were abroad, the government failed to adopt this measure until late February when many of them returned affected. This has been established accurately if one considers the first set of the cases from the above report). The confirmed cases reported in Nigeria currently as at 10 April, 2021 is 1,803,177 samples tested, 163,652 confirmed cases, 2,059 deaths, 2, 697 deaths, 154,073 discharged cases and 7, 520 active cases. States with the highest case are Lagos and Federal Capital Territory Abuja (FCTA) (National Centre for Disease Control, 2021).

2.2.5   Teaching and Learning of STVE before COVID-19 Pandemic

Prior to the pandemic, the typical academic year in Nigerian schools ran from September to July of the following year. During this period, most institutions of higher learning offering STVE courses in the country operated a two-semester-based program in which students spent between 12-15 weeks in a semester for registration, lectures and examination. This conventional mode of schooling was usually characterized by

over-crowdedness in class, abnormal student-lecturer ratio, inadequate infrastructure, lack of qualified human resources and ultimately, less-quality education among others. Since face-to-face interaction between the teacher and students is a requirement, a course lecturer would gather a group of students in a class for physical and direct interaction during teaching and learning. These classrooms are usually overcrowded due to the overpopulation of students against the resources available. A classroom that was originally meant to accommodate only 30 students would now accommodate about 100 students.

In addition, student-lecturer ratio was abnormally represented because of the understaffed nature of Nigerian institutions of higher learning. Lecturers are left with no option than to combine students in large classrooms especially during general courses. In such situations, 65% of the students would have no place to sit while those who managed to get a seat would manage to hear what the lecturer was teaching. Classroom management and control by the lecturer therefore became a difficult task to achieve.

Furthermore, work overload in terms of laboratory/workshop practical, project and thesis supervision were an issue that could be linked to shortage of manpower in most Nigerian institutions offering STVE. Supervision overload is an issue arising from the abnormality in lecturer-student ratio. Students were not adequately and effectively supervised during practical and projects because the ratio of students assigned to a lecturer was always more than what he or she could productively handle viz-a-viz other administrative tasks. This directly affects lecturer's productivity in science, technical and vocational education practice.

The inadequacy of physical infrastructures as well as unavailability and insufficiency of teaching and learning resources were also contributory characteristics. In some

institutions, the resources were not available, while in some others, it was either obsolete or not working because of shortage of funds to buy spare parts or for maintenance. Consequently, science courses which includes biology, chemistry, physics, general mathematics, further mathematics, agriculture, physical education, and health education were often taught in abstraction. The skills of science may be learned easily if the students are given opportunities to explore, exercise creativity, debate and argue in the process of learning science. Such experiences lead to a sustainable development through the provision of a well-skilled human capital capable of providing solutions to real-life problems (Falode *et al.,* 2022).

STVE courses that need more practical demonstration, observation and active learners' participation were poorly taught in Nigeria even before the COVID-19 pandemic due to the aforementioned points, one could only imagine the devastating impact of the disease on STVE in Nigerian institutions.

2.2.6   Teaching and learning during COVID-19.

From the global perspective, concern on how learning and teaching can be organized during the COVID-19 pandemic was raised (EAEA, 2020). Responding to this concern, a recent study by Izhar *et al.,* (2021), published by the Organisation for Economic Co-operation and Development (OECD) investigated the educational responses to COVID-19, approaches adopted by countries to provide teaching and learning to students, and instructional training and development for teachers and parents during the stay-at-home period. Therefore, countries are making paradigmatic shifts, for instance; China, Japan, Malaysia, United States of America, United Kingdom, South Africa, and South Korea and other countries who are also impacted by the COVID19 virus switched over to remote teaching and learning medium (Ebner et al., 2020; Huang, R.et al., 2020; Huang, R. H. et al., 2020; UNICEF DATA).   Shortly after the outbreak of COVID-19 in China,

the Chinese government ordered a nation-wide closure of schools and immediately implemented an emergency home-schooling plan through the Ministry of Education (Wang et al., 2020). This plan involved delivering organized courses online and through TV broadcast. In another study, Zhang et al. (2020) reported how China launched an educational emergency management policy, entitled "Suspending Classes without Stopping Learning" (Zhang et al., 2020). The policy, which was set up to curb the spread of the pandemic by limiting in-person teaching at schools and moving over to the online learning model, (Zhang et al., 2020), also aims to integrate China's national and local school teaching resources, provide rich, diverse, high-quality online resources for all students across the country. The policy supported teachers' online teaching and children's online learning (Ministry of Education of the People's Republic of China in 2020, as cited in Zhang et al., 2020). Nevertheless, there is a raging debate on how effectively this policy could be implemented, and the viability of online learning compared to traditional in-person learning is still being contested. Furthermore, at the University of California USA, several models were adopted by a group of medical professionals to provide knowledge for surgical residents and mitigate the loss of in-Person academics and minimize mass casualty among surgical residents (Chick et al., 2020). According to Chick et al., their innovative model adopted for teaching and learning during the pandemic includes flipped virtual classroom, online practice questions, academic conferences via teleconference, telehealth clinics with resident involvement, and facilitated surgical use videos. A study revealed that most European countries are supporting education during the pandemic by providing digital content and educational materials to support online distance learning (Reimers & Schleicher, 2020). For example, in the Czech Republic, the Ministry of Education has launched a website equipped with online education tools. A similar approach is adopted in Estonia,

where the Ministry of Education and Research (MoER) partners with Foundations to provide support and guidelines on distance learning to keep academic instruction ongoing. The same approach goes for Finland students, where the Finnish National Agency for Education is guiding schools to organize different kinds of flexible learning by leveraging already established online educational platforms. In France, a free pedagogical platform tagged: "My class at home" is used to provide virtual classes, making it possible to maintain the human link between students (Reimers & Schleicher, 2020).

Elsewhere in Georgia, Basilaia & Kvavadze (2020) revealed that the government-supported online distance learning by adopting online portal, TV School, and Microsoft teams for public schools and the alternatives such as Zoom, Slack, and Google Meet in some cases, were used. Their report also shows that virtual classrooms have been created for all school classes and subjects in the Microsoft TEAMS program. As reported in a study the Georgian government agency, Education Management Information System (EMIS), carried out several activities to support ongoing education during the COVID-19 pandemic where over 600,000 students and 55,000 teachers in public schools are actively profiled on Microsoft Office 365 for online learning (Reimers & Schleicher, 2020).

From the African perspective, statistics from UNESCO on the impact of COVID-19 on education, as of the time this study was conducted, shows that all countries in Africa except Burkina Faso had a country-wide closure of educational institutions (UNESCOb, 2020). This indicates that the impact is perceived to be more in those regions that had country-wide closure if alternative means of teaching and learning were not provided. For instance, in the case of South Africa, the study by Ojo & Onwuegbuzie (2020) revealed that some universities' decision to open their schools for online learning in

April 2020 created mixed reactions among their students. Most of the students complained about several inconveniences they encountered by studying from home. The study revealed issues such as noise and disturbances from the home environment, limited Internet connection, and lack of consistent electricity, which affects their academic performance. In addition, the government of South Africa had directed that each university should make a mitigation plan, that is, online study delivery as an alternative method for teaching and learning to curb the spread of the disease (Chothia, 2020). While it seems that the devastation caused by COVID-19 on education has pushed most nations to seek an alternative for teaching and learning, South African scholars have expressed concern over the level of training and experience of educators in the pedagogy for effective delivery of online learning (Hedding et al., 2020). As part of the effort to create more opportunities to learn during the lockdown in South Africa, a study by Mhlanga & Moloi (2020) reported the launching of "STEM Lockdown Digital School." According to Mhlanga & Moloi (2020), this an initiative where more than 34 public and private school teachers were organized to teach through a live stream on "Africa Teen Geek's" social media pages such as Facebook, Twitter, and Ms Zora. A similar experience was reported in the northern part of Africa. For example, a report from Egypt shows that most private universities in the country switched to online teaching through Moodle, Microsoft class Notes, Microsoft Teams, email, and Zoom (Crawford et al., 2020). In Nigeria, over 39 million learners including pre-primary and tertiary students were asked to stay at home during the pandemic situation (UNESCOb, 2020). Consequently, students face barriers from accessing learning materials, receiving mentorship, counselling from teachers, and other supports that are easily made available in a face-to-face learning environment. Besides, teachers are not left out of the impact of school closure due to COVID-19 pandemic. Reports from some parts

of the world suggest that teachers will experience temporary or permanent layoff during and post-COVID19 (Hernandez, 2020).

2.2.7 Impact of covid-19 pandemic on teaching and learning of STVE.

COVID-19 is a health challenge which requires drastic precautionary measures. Being a global health problem, there was lockdown and restrictions of movement in many countries of the world to curtail the spread of the pandemic and educational institutions were not exempted (Chukwuemeka et al., 2020; Falode, 2020). Although, the lockdown was put in place to curb the pandemic, it however, left teaching and learning STVE with some irreversible impacts which its implications call for the need to re-tool future educational practices. UNESCO (2020b) reported that over 100 countries that implemented school closure had many students experience disruptions of their academics. During this period, unlike developed countries, students in Nigerian schools felt the impact of physical separations from their teachers and schools in the following ways.

Interruption of Academic Activities

The Federal Government of Nigeria through the Federal Ministry of Education on March 19, 2020 ordered the closure of all schools nationwide in order to prevent the circulation of the deadly virus. The closure lasted more than the duration pronounced making the closure of schools' indefinite until a little window of reopening in December 2020. No school was able to flow in their normal routine as many activities such as students' learning; internal assessments were interrupted just to meet up with the examination. According to Ogunode et al. (2020), public assessments were cancelled while some were replaced by inferior alternative.

Cancellation of Academic Conferences and Exhibitions on Research Outputs

Academic programs were put on hold due to the seriousness of the pandemic. The education sector especially the science, technical and vocational education cancelled and in areas where cancellations were not possible, re-scheduled academic conferences and exhibitions on research outputs scheduled for the first quarter of the year 2020 and early 2021. Ogunode et al. (2020) reported that during the pandemic, institutions were mandated to suspend research activities involving large gatherings leading to a low turnout of academic research and exhibition work.

Loss of Workforce

The COVID-19 pandemic claimed a lot of lives while many staff quit their jobs for the fear of contacting the virus and for the safe keeping of their loved ones. According to Ogunode et al. (2020), tertiary institutions in Nigeria and others across the world recorded loss of many lecturers and great researchers to COVID-19 pandemic; a loss that is irreplaceable in a decade. These losses left laboratories deserted with no research activities going on, many reagents lost viability and laboratory animals died in the process. The loss of human workforce coupled with social distancing practices in laboratories affected the growth and development of science, technical and vocational education in Nigerian institutions of higher learning.

Social Distancing in Laboratories and Workshops

STVE by its demand is a practical oriented education which requires collaborative approach and methodologies, interactions and the conduct of experiments in teams among scientists, technologists and researchers. Thus, the mandatory social distancing of two meters, posed limitations to physical collaboration of researchers, students and lecturers during such practical activities in laboratories and workshops.

2.2.8   Innovative approaches to teaching STVE during and after pandemic

Here were identified problems associated with STVE before the COVID-19 outbreak. The pandemic in addition to the problems on ground, added more challenges, yet teaching of STVE should continue and be better improved upon. This therefore calls for innovative approaches that could take care of the present and the unforeseen future challenges.

The teacher training received in the 1980s and 1990s need to be updated to reflect the needs of present reality. This is because, the teacher training programmes of those years could not be applicable to the reality of this period as there was no COVID-19 pandemic, neither did the method of teaching require any form of technology. However, with COVID-19 and related health challenges, teachers need to make adjustment in planning and delivering teaching through different platforms such as Zoom, Skype, and other electronic learning (Cortez, 2020). The adjustment required is in skill development, paradigmatic shift toward incorporating technology for distant interactions, meetings, conferences. The need to integrate technology in teaching and learning is in line with the UNESCO 2030 education declaration and framework for action which emphasized the need for countries to provide alternative modes of learning that would ensure flexible learning in both formal and non-formal settings, as well as during emergency situations (UNESCO, 2020a).

COVID-19 is an emergency situation and the following are effective and flexible approaches that could be employed during and after the pandemic for teaching and learning while still maintaining standard.

Online Teaching and Learning

Online teaching/learning is an approach where online tools and resources are employed for the purpose of disseminating and acquiring knowledge. The key element to

achieving this is the internet. Some of these platforms available online are www.openlearning.com, www.helphub.com, www.teachable.com, www.eliademy.com, and www.learnworlds.com among others, which allows the teacher to create contents, connect with students and experience online teaching and learning through these easy-to-use platforms. Apart from learning online, other interactions between the teacher and the students can be done online, assignment and examination at the end of the academic period can also be conducted using online facilities. The entrance examination into some tertiary institutions were conducted online during the pandemic with the candidates remaining in their homes while some institutions also successfully conducted semester examinations for students who were not at school. Online teaching and examination platforms were deployed for these exercises and would be much more needed in the future for the teaching, learning and evaluation of learning outcomes of students in science, technical and vocational education.

Social Media Platforms

Students in institutions of higher learning constitute the largest users of mobile devices (tablets and Android phones). Nearly all social media platforms for interactions can be installed on these devices which can enable the lecturer to make use of the chat feature capability on these platforms. The lecturer can create a group chat for students who are registered for a course at a particular period. Furthermore, planned educational contents in form of texts, audio, pictures or short video clips can gradually be released to the group in bits, discussions and interactions support can be ensured and the extent of participation by all students can also be monitored by the teacher. Platforms that allow those who may not be online at a scheduled time to have access to previous discussions and posts could be given preference in order to be of benefits to individuals who could

be having problems related to internet connectivity. According to Chukwuemeka et al. (2020), the adoption of WhatsApp and Facebook as well as other social media platforms has increased significantly after the pandemic because of its ability to offer access to learning resources at any time and location in various formats.

Electronic Learning

Electronic learning entails the use of information and computer technologies, systems for developing and transmitting educational knowledge through the use of various electronic devices (Coman et al., 2020). CDs, mobile phones, radio, television, and computers are useful devices that support electronic learning. Even with the advent of world wide web, the use of offline resources such as CD ROMS and prerecorded class sessions are still useful. A teacher could record his teaching and such could be packaged on CD and watched individually by students at different locations. Video camera used to be the major known tool for such recordings, but with improved computer technologies, there are several simple-to-use software that can be used by a teacher to record, edit, score and share presentations to students. Students could download, copy and watch such recordings on computer, mobile devices or through digital video disc players at home or locations of their convenience. Further clarifications and discussions on watched session can thereafter be forwarded to the teachers by the students using different available means which is not limited to e-mail, phone conversion, WhatsApp platforms and so on. One major benefit of this is that recordings can be played back and watched over and over again until a learner is satisfied.

Learning Management Systems

Through the emergence and use of learning management systems (LMSs), many institutions have now made their teaching and learning internet-based. LMSs are web-based platforms for delivering quality online teaching which allows students to interact

with educational contents, instructional providers as well as other learners (Angelova et al., 2015; Chukwuemeka et al., 2015; Falode et al., 2018). Popular LMSs include, Canvas, Moodle, Blackboard, WizIQ, D2L, eCollege, Sakai, Amazon Web Services Talent, HotChalk, and WizIQ (Dobre, 2015; Shakeel & Ijaz, 2011). Through a dedicated LMS, the entire academic activities meant for a specified class of learners can be completed online. Students can complete their course registration, receive instructional contents, interact with instructors and colleagues, attend to assignments and test, manage their schedules, monitor and track their academic progress (Chukwuemeka et al., 2015). The COVID-19 pandemic leading to closure of many schools spurred several educational institutions to accept and adapt suitable LMS to their students' needs, of which has encouraged teaching, learning, and also having exams taken without any hindered.

Printed Courseware

Courseware refers to computerized learning material or other material designed on a specific discipline for use in an educational course or training. It is usually written and presented in a structured and sequential format in such a way that the end-user (learner) will feel that the writer directly teaches him or her (Falode, 2019). It is mostly used in distance learning programmes where the education provider and the learners are not in the same physical location. The material is then studied by students at their own pace, location and time of choice to acquire knowledge in a subject instead of attending regular classes. Although, in most cases, courseware is computer-decoded, traditionally, it can also be printed for learners who do not have access to required hardware for the courseware. When printed as text, it is affordable, easily accessible and offers experiences almost similar to those obtained in the classroom where learners rely on teachers' lesson notes and explanations.

If properly developed through team approach of instructional designers, subject-matter experts, graphic artists and language experts, all subjects and courses to be taken by learners in an academic term or semester can be printed, given to learners to study at home and learning will take place. If clarifications and additional points are needed from students, this could take place in classroom whenever schools resume.

Flipped Classroom Model

Flipped classroom is a classroom-inverted strategy in which students study instructional contents at home through online, electronic or digital means and complete assignments, exercises or practical in classroom with their peers and teachers (Abah et al., 2017). Lecturers are expected to create practical video contents of lectures and practical demonstrations that would be used throughout the session using a camcorder and editing software. These contents are stored in portable devices so as to enable students to safely transport media for learning at home (Chukwuemeka et al., 2020).

Based on the flipped classroom model, learning is shifted from classroom to the home while classroom contacts are only for assessments. At the commencement of schools' closure, the academic contents to be studied at school could be packaged and given to students to study at home while discussions and activities on them could later take place in the classroom whenever schools are opened.

Educational Broadcasting

Broadcasting is the transmission of signals to many receivers or viewers simultaneously via powerful electromagnetic waves. Through educational broadcasting, well-planned contents relating to school subjects can be relayed to students in different locations through public or dedicated radio and television stations. Falode et al. (2019) reported that each of the 36 states in Nigeria have at least one state-owned government television station, and a branch of the Nigeria Television Authority station established by the

Federal Government. Also, considering the relatively inexpensive of radio and television gadgets, with well-planned school subjects and broadcast scheduled, students can be at home, or even at school and tune in the broadcast station at the scheduled time and connect to teachers, lecturers or instructors as the case may be. Broadcasting of school contents to learners during school closure would be highly effective if implemented as Omiko (2018) already found and reported that Nigerian children are more familiar with radio and television programmes. One major advantage of this is that a teacher can reach out to a large number of students in the same academic level in different locations while still minimizing physical contacts.

The Synchronous Communication Tools

The synchronous teaching takes place virtually in a real time and all participants receive instructional contents from the teacher simultaneously and there could be mutual reactions from both the learners' end as well (Cortez, 2020). Interactive real-time tools such as Zoom, Skype, Google Meeting, and Google Classroom could be deployed for instructional delivery and teacher-students' interactions during a pandemic such as COVID-19, necessitating schools' closure. The main advantage of this is that, since communication is possible from both ends, instant feedback can be provided.

Internship Schedules

Whenever the school is closed, to curtail a public crisis or health challenge like COVID-19 pandemic, the period should be diverted and spent by learners to acquire practical skills in science, technical and vocational skills at relevant workshops or laboratories of their choice outside the school premises while aligning and maintaining all health precautionary measures such as social distancing as in the case of COVID-19. During this time, students could work as interns or apprentices and acquire real life practical

experiences that would complement and simplify abstract contents already learnt or meant to be learnt in the classroom.

2.3   Related Empirical Studies

Abdullahi (2021) carried out a study on The Impact of the COVID-19 Pandemic on Higher Education in Nigeria: University Lecturers' Perspectives. The entire globe is battling the novel coronavirus disease (COVID-19) outbreak, which has caused a downward spiral in many nations' economies, particularly in the higher education contexts.   A growing number of universities have either postponed or cancelled academic activities. A few universities have intensified measures to prevent face-to-face interactions, intending to protect staff members and students from this highly contagious disease. This study investigates the COVID-19 impact on the higher education sector in Nigeria.   Interview sessions involving seven lecturers across five universities in three geographical locations of Nigeria were conducted. The interview data were gathered using digital applications, such as Zoom cloud meetings and Skype, transcribed into a textual format, and further analysed. Six themes with corresponding sub-themes emerged from the study. In the final analysis, results revealed that COVID-19 negatively impacted several universities.   This study presents opportunities for responding issues, problems and trends that are currently arising and will arise in the future due to the impact of the COVID-19 pandemic in the Nigerian higher education system.

Ijeoma (2021) conducted a study to examines the challenges of teaching technical courses through e-learning in Nigerian tertiary institutions during the COVID-19 pandemic lockdown. The COVID-19 pandemic has widespread aftereffect on education systems all over the world, with Nigeria, not an exception. The lack of the requirements needed for remote education during the worldwide lockdown caused by the COVID-19

pandemic has impeded teaching and learning. In the underdeveloped world, home education worked well for a few students who had adequate resources accessible to them and were adaptable to remote learning. This has not just affected teaching and learning but has posed a big problem in teaching technical courses. Problems associated with teaching technical courses in Nigeria during the pandemic lockdown especially the difficulties in handling practical and technical processes online are discussed. Students and educators at different programmes at the Federal Polytechnic Nekede Owerri, Nigeria will be interviewed to ascertain the most pressing problems.

Bello (2021) carried a study on Impacts of COVID 19 on Policy of Tertiary Education in Nigeria: The Case of Professional Diploma in Education Students of Federal College of Education. COVID 19 pandemic has strategically overwhelmed all the global sectors of human endeavours since its first appearance in December 2019. The Virus shattered and paralysed all socioeconomic activities for several months. One of the areas that is seriously affected globally is the education sector. Nigeria is most affected just like other world countries economically and socio-culturally. The Nigerian Policy on Education has been widely criticised for its failure to make adequate provisions for an unforeseen contingency like pandemic periods. Thus, when COVID 19 emerged in Nigeria, the education sector emerges arguably as the most affected. Schools were totally shut down for more than two terms or nearly two semesters for tertiary institutions. The study examined the Nigerian education policy and the impacts of COVID 19 on tertiary institutions. The study used both primary and secondary sources of data. The data obtained were discussed using manual SPSS. The study discovered that the obsolete educational policies subjected tertiary institutions to the mercy of COVID 19 protocols which left the schools closed for many months leading to crisis of confidence from the students and a total loss of a whole session in most cases. The

study recommends among others that the Nigerian Policy in Education should be immediately revisited to cater for future pandemic preparations that will avoid closure of schools or learning. This can be achieved through the adoption of e-learning and provision of modern tools of learning in public schools

Falode (2022) conducted a study on COVID-19 Pandemic: A Catalyst to Technology Integration in Teaching for Sustainable Science, Technical and Vocational Education in Nigeria. It is an undisputed fact that the existence of COVID-19 disease has posed many challenges to the different sectors of the Nigeria economy and the educational sector seems to be the most adversely affected. This is because of the total lockdown of schools for several months as part of the measures put in place by the federal government to curtail the spread of the disease. As a result, teaching and learning activities were shut down because of various technological development challenges. This paper focuses on the challenges posed by the COVID-19 disease to the education sector and the need to sustain the growth of science, technical and vocational education (STVE) in Nigeria in spite of the pandemic. Using the narrative literature review methodology, impact of the pandemic on teaching and learning STVE were discussed as well as different innovative and technology-driven approaches that could be integrated when similar crises occur in the future such as online teaching and learning, social media platforms, electronic learning, learning management systems, printed courseware, flipped classroom model, educational broadcasting, and synchronous communication tools were also explored in the paper. The recommendation elaborates on the need for stakeholders to be adequately prepared in terms of necessary trainings and provision of amenities that support continuous learning whenever civic and health crises necessitate emergency closure of schools in the country.

2.4   Summary of Review of Related Literature

The review of related literatures reveal that the outbreak of COVID-19 pandemic has affected the technical education nationwide and the adjustment required to fill the gap is in skill development, paradigmatic shift toward incorporating technology for distant interactions, meetings, conferences.   It was deduced from the study that E-learning is one of the key innovations to set back caused by COVID 19 pandemic. Adequate and relevant study was reviewed in the study.

CHAPTER THREE

3.0   METHODOLOGY

3.1 Design of the Study

The study adopted the descriptive survey research design used to assess the effect of covid-19 on technical education in Minna metropolis, 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.   Osuala (2005) said that it is a design which studies the characteristics of people, the vital facts about people and their beliefs, opinions, attitude, motivation and behavior.

3.2 Area of the study

The study was carried out in all technical colleges in Niger state. Niger state falls on the land mass area of about 76,363km2 and with the population of about 3,950,349 (NPC, 2006). Niger sate is considering suitable for the study because reasonable numbers of technical colleges available.

3.3 Population for the Study

The population for the study consists of 66 respondents comprising 60 technical teachers and 6 principals.

List of technical colleges in Niger state	No. of technical Teachers	No. of principals
Government Technical college Eyagi Bida	10	1
Government technical Minna.	10	1
Suleiman technical college Suleja	10	1
Federal Science and technical college Shiroro	10	1
Government technical college Kontongora	10	1
Government technical college New-Bussa	10	1
Total	60	6

3.4 Sample and Sampling Technique

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

3.5 Instrument for Data Collection

The researcher designed a structured questionnaire as an instrument that will be used in collecting data for the study. The questionnaire was made up of four sections (A, B, C, and D).   Section 'A' contains items on personal information of the respondents. Section 'B' seeks the effect of Covid-19 pandemic school closure on technical college's students.   Section 'C' find out the effect of Covid-19 on technical teachers. While Section 'D' find out Activities technical college students engage in within the COVID-19 pandemic school closure.   The questionnaire items were based on four points scale types.   Items for section 'B', 'C' and 'D' contain four responses category each.   The response categories for section 'B', 'C' and 'D' 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 requiring checking ($\sqrt{}$) 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 will be conducted using fifteen in other Kwara state. 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 and co-efficient of 0.78 was obtained.

3.8 Administration of instrument

The instrument that was 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 chosen as the agreed. This will be interpreted relatively according to the rating point scale adopt for this study. Therefore, an item with response below 2.49 and below 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 1

What are the effect of Covid-19 pandemic school closure on technical college's students?

Table 4.1: Mean responses of the Principals and Technical teachers on the effect of Covid-19 pandemic school closure on technical college's students.

$N_1= 6$ $N_2=60$

S/N	ITEMS	$\bar{X}$	SD	Remark
1	The teachers are poorly equipped with the required infrastructures	3.56	.530	Agreed
2	Many teachers could not deliver their lesson as a result of COVID-19	3.62	.890	Agreed
3	Instructional delivery was stopped as there was no face contact with the students	3.74	.590	Agreed
4	The investment in the purchase of technological equipment and software license payment for teachers to teach their class was high	3.58	.583	Agreed
5	The speed of internet connectivity affects teachers performance when teaching your virtual classes during COVID-19	3.06	1.276	Agreed
6	Many teachers working from home online invades family privacy	3.18	.783	Agreed
7	Repetitive interaction with electronic media negatively affects your emotional state of teachers which result to low performance	3.77	.549	Agreed
8	The teachers are poorly equipped with the required infrastructures	3.00	1.095	Agreed
9	Many teachers could not deliver their lesson as a result of COVID-19	3.45	.768	Agreed

N=66

$\bar{X}$= mean of the respondents
N_1 = Principals
N_2= Technical teachers
SD = standard deviation of the respondents

Table 1 showed that both the principals and technical teachers agreed on all items

from 1 to 9. 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 0.530 and 1.279. This showed that the responses of the principals and

technical teachers on the items were not divergent.

4.2 Research Question 2

What are the effect of Covid-19 on technical teachers?

Table 4.2: mean response of the Principals and Technical teachers towards the effect of Covid-19 on technical teachers.

$N_1= 6$ $N_2=60$

S/N	ITEMS	$\bar{X}$	SD	Remark
1	The teachers are poorly equipped with the required infrastructures	3.53	.996	Agreed
2	Many teachers could not deliver their lesson as a result of COVID-19	3.32	.947	Agreed
3	Instructional delivery was stopped as there was no face contact with the students	3.58	.556	Agreed
4	The investment in the purchase of technological equipment and software license payment for teachers to teach their class was high	3.58	.583	Agreed
5	The speed of internet connectivity affects teachers performance when teaching your virtual classes during COVID-19	3.06	1.276	Agreed
6	Many teachers working from home online invades family privacy	3.18	.783	Agreed
7	Repetitive interaction with electronic media negatively affects your emotional state of teachers which result to low performance	3.77	.549	Agreed
8	When teaching virtual classes teachers do not feel free to express him or herself like face to face teaching	3.00	1.095	Agreed
9	Simultaneous attention to household chores and their virtual classes affect their performance as a teacher	3.53	.684	Agreed
10	Many teachers was distracted and could not concentrate on teaching during the pandemic	3.00	1.095	Agreed

N=66

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

N_1 = Principals

N_2= Technical teachers

SD = standard deviation of the respondents

Table 4.2 showed that both the principals and technical 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

0.549 and 1.276. This showed that the responses of the principals and technical teachers

on the items were not divergent.

4.3 Research Question 3

What are the activities technical college students engage in within the COVID-19 pandemic school closure?

Table 4.3: mean responses of the Principals and Technical teachers on the activities technical college students engage in within the COVID-19 pandemic school closure.

$N_1= 6$ $N_2=60$

S/N	ITEMS	$\overline{X}$	SD	Remark
1	Science Activities	3.56	.530	Agreed
2	Reading Activities.	3.62	.890	Agreed
3	Social gathering	3.74	.590	Agreed
4	Online coaching	3.58	.583	Agreed
5	Domestic activities	3.06	1.276	Agreed
6	Sporting activities	3.18	.783	Agreed
7	Learning of computer skills	3.77	.549	Agreed

N=66
$\overline{X}$= mean of the respondents
N_1 = Principals
N_2= Technical teachers
SD = standard deviation of the respondents

Table 4.3 showed that both the principals and technical teachers agreed on all items from 1 to 7. 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 0.530 and 1.276. This showed that the responses of the principals and technical teachers on the items were not divergent.

4.4 Hypothesis 1

There is no significant difference in the mean responses of technical teachers and students on the effect of Covid-19 pandemic school closure on technical college's students.

Table 4.4 T-test on the effect of Covid-19 pandemic school closure on technical college's students.

$N_1 = 6$ AND $N_2 = 60$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Principals	6	3.83	.408	64	1.330	0.001	NS
Technical teachers	60	3.53	.536				

N=65
$\bar{X}_1$= mean of principals
$\bar{X}_2$ = mean of technical teachers
N_1 = No. of principals
N_2= No. of technical teachers
SD_1 = standard deviation of Principals
SD_2 = standard deviation of Technical teachers
NS=Not Significant

Table 4.4 showed that there was no significant difference in the responses of mean responses of technical teachers and students on the effect of Covid-19 pandemic school closure on technical college's students; therefore, the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.5 Findings of the study

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

1. The finding on the effect of Covid-19 pandemic school closure on technical college's students showed that all the respondents agree on all the items, among all is the speed of internet connectivity affects teacher's performance when teaching your virtual classes during COVID-19.

2. The finding on the effect of Covid-19 on technical teachers' shows that showed that all the respondents agree on all the items, among all is the speed of internet connectivity affects teachers' performance when teaching your virtual classes during COVID-19.

3. The findings on the activities technical college students engage in within the COVID-19 pandemic school closure shows that showed that all the respondents agree on all the items, among all is Domestic activities and Reading Activities.

4. There was no significant difference in the responses of mean responses of technical teachers and students on the effect of Covid-19 pandemic school closure on technical college's students.

4.6 Discussion of Findings.

The result from table 4.1 shows the findings on the effect of Covid-19 pandemic school closure on technical college's students among all are School is completely closed during this lockdown, Student experience difficulties schooling/learning from home, Student engage in planned learning experiences at home during this COVID-19, Teacher regularly communicates with me for information and support for learning at home, Lack of technology for distance learning, School curriculum is accessible to me and other students for learning, Students believe learning can progress successfully online, Poor internet network and electricity is a constraint to my academic activities, lack of technology facilities.

The result of the hypothesis on the effect of Covid-19 pandemic school closure on technical college's students shows that there was no significant difference in the responses of technical teachers and principals on all the items as the effect of Covid-19 pandemic school closure on technical college's students. The findings of the study are in line with Eze (2021) who noted that Majority of the teachers (68%) and parents (56%) believed that the students are already losing what they have learnt before the school closure due to a long stay at home. Since e-learning for primary and secondary school's students in Nigeria has been rated as a very poor method of teaching. Also Obiako and Adeniran, (2020) found that the pandemic has impacted education in three major ways,

including missed learning for the majority of the pre-pandemic students, loss of access to vital school-provided services and leaving more kids behind.   Thus, these impacts are likely to widen the gaps in education quality and socioeconomic equality following the school closures in the country. This is because a lesser percentage of learners who are in the urban areas, who are likely to hail from higher-income families, stand more chance to access education during school closure through technology

Table 4.2 shows the result of the findings on the effect of Covid-19 on technical teachers the findings among other shows The teachers are poorly equipped with the required infrastructures, Many teachers could not deliver their lesson as a result of COVID-19, Instructional delivery was stopped as there was no face contact with the students, The investment in the purchase of technological equipment and software license payment for teachers to teach their class was high, The speed of internet connectivity affects teachers performance when teaching your virtual classes during COVID-19, Many teachers working from home online invades family privacy, Repetitive interaction with electronic media negatively affects your emotional state of teachers which result to low performance, When teaching virtual classes teachers do not feel free to express him or herself like face to face teaching, Simultaneous attention to household chores and their virtual classes affect their performance as a teacher, Many teachers was distracted and could not concentrate on teaching during the pandemic. The findings of the study are in line with Falode (2020) who stated that COVID-19 is a health challenge which requires drastic precautionary measures. Being a global health problem, there was lockdown and restrictions of movement in many countries of the world to curtail the spread of the pandemic and educational institutions were not exempted. Falode also noted the lockdown was put in place to curb the pandemic, it however, left teaching and

learning STVE with some irreversible impacts which its implications call for the need to re-tool future educational practices.

The result from table 4.3 reveal the findings on activities technical college students engage in within the COVID-19 pandemic school closure. The findings among others revealed that Science Activities, Reading Activities, Social gathering, Online coaching, Domestic activities, Sporting activities, Learning of computer skills. The findings of the study are inline Oboh *et al.* (2020) supported that the school closure will result in high dropout and poor enrollment in secondary schools after the pandemic. In this respect, it is a challenge to guarantee students return and stay in school when schools reopen. This is particularly the case of protracted closures such as the present one, when the associated economic stress causes school children to work and generate income for their family upkeep.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

The main focus of this research study was to assess the effect of covid-19 on technical education in Minna metropolis, 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 The Technical and vocational education in Nigeria, Importance of Technical and Vocational Education, COVID 19 Pandemic, COVID 19 Pandemic in Nigeria, Teaching and Learning of STVE before COVID-19 Pandemic, Teaching and learning during COVID-19, Impact of covid-19 pandemic on teaching and learning of STVE, Innovative approaches to teaching STVE during and after pandemic. 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 technical 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 the study had implications for government, students and parents. From the outcome of the study, it implies that If the identified areas where put in place it will give room for improvement in the educational sector in the country.

5.3 Conclusion

Based on the findings of the study, the following conclusions were drawn: Effective science, technical and vocational education is pivot to the growth of any nation. In Nigeria just like many other countries of the world, the COVID-19 pandemic is a terror that hinders physical presence in classrooms, laboratories and workshops, hence, preventing effective teaching and learning of STVE. Notwithstanding, education practitioners should regard the pandemic as a catalyst that has made us realize the need and urgency to integrate technology into teaching and learning for the sustainability of science, technical and vocational education in Nigeria.

The teaching and learning of STVE therefore requires innovative approaches that are technology-driven particularly now that COVID19 has taught us so many lessons and also in responding to post COVID 19 challenges.

5.4 Recommendations

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

1. Trainings and workshops on utilization of technology-driven instructional platforms should be conducted for science, technical and vocational education teachers and students. This is because their acceptance to use these platforms rely on their ability to use them.

2. Usage of technology-driven instructional platforms depends on availability of those facilities and their accessories. Schools' administrators should ensure that

necessary facilities, in adequate quality and quantity are available for teachers and students' usage.

3. Since students and teachers usually stay at home whenever schools are closed, it is suggested that efforts should be made by them to acquire distance learning trainings. This will equip them with adequate knowledge of distance learning procedures.

4. The teacher training curriculum should be updated to accommodate innovative techno-pedagogical approaches. This will help to equip pre-service teachers with adequate knowledge to practice on the field both in conventional and distance learning settings.

5.5 Suggestion for Further Study

The following are suggested for further studies:

1. Assessment of effect of covid-19 on technical education in other state

2. Assessment of the level of availability and utilization of facilities for sustaining teaching and learning during pandemic in technical colleges.

REFERENCES

Ashari, Z. H. M., Azman, N., & Rasul, M. S. (2019). Factors predicting career choice among Malaysian students in skills-based training institutions. *International Journal for Educational and Vocational Guidance*, *19*, 19-39.

Attah, N. E., Sambo, U., Sule, B., Bello, M. A., & Saragih, M. Y. (2021). COVID 19 and increased security challenges in northern Nigeria: Interrogating armed banditry in northwestern Nigeria. *SIASAT: Journal of Religion, Social, Cultural and Political Studies*, *6*(1), 33-44.

Bako, M. J., & Syed, J. (2018). Women's marginalization in Nigeria and the way forward. *Human Resource Development International*, *21*(5), 425-443.

Bonnard, C. (2020). What employability for higher education students? *Journal of Education and Work*, *33*(5-6), 425-445.

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, *3*(1), 1-20.

Crompton, H., & Traxler, J. (2019). Learning with mobile devices. In *Advanced methodologies and technologies in modern education delivery* (pp. 793-808). IGI Global.

Dhillon, P., Breuer, M., & Hirst, N. (2020). COVID-19 breakthroughs: separating fact from fiction. *The FEBS journal*, *287*(17), 3612-3632.

Eze, U. N., Sefotho, M. M., Onyishi, C. N., & Eseadi, C. (2021). Impact of COVID-19 pandemic on Education in Nigeria: Implications for Policy and Practice of e-learning. *Library Philosophy and Practice*, 1(2), 1-36.

Falode, O. C., Chukwuemeka, E. J., & Falode, M. E. (2022). COVID-19 Pandemic: A Catalyst to Technology Integration in Teaching for Sustainable Science, Technical and Vocational Education in Nigeria. *European Journal of Interactive Multimedia and Education*, *3*(1), e02208.

Fang, F. C., Benson, C. A., Del Rio, C., Edwards, K. M., Fowler Jr, V. G., Fredricks, D. N., & Schooley, R. T. (2021). COVID-19—lessons learned and questions remaining. *Clinical Infectious Diseases*, *72*(12), 2225-2240.

Federal Republic of Nigeria (FRN) (2014). National policy on education. (6th ed.) Lagos: Nigerian Educational Research and Development Council press.

Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of sustainable tourism*, *29*(1), 1-20.

Israhadi, E. (2020). The social impact of force majeure and the consequences of the determination of the Covid 19 disaster status on learning the manpower law. *Journal of Social Studies Education Research*, *11*(4), 28-51.

Izhar, N. A., Al-Dheleai, Y. M., & Ishak, N. A. (2021). Education continuation strategies during COVID-19 in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, *11*(4), 1423-1436.

Jiao, J., Shi, L., Zhang, Y., Chen, H., Wang, X., Yang, M., ... & Sun, G. (2022). Core policies disparity response to COVID-19 among BRICS countries. *International journal for equity in health*, *21*(1), 9.

Kennedy, G. W., Udoetuk, U. S., & Ufot, S. I. (2017). Challenges of technical vocational teacher education and teaching in Nigeria: The need for intervention. *International Journal of Education and Evaluation*, *3*(7), 71-82.

Laleye, A. M. (2022). Practical and Technological skills: An inevitable social engineering tool for sustainable development. *European Journal of Education and Pedagogy*, *3*(2), 171-177.

Latif, S. H. (2019). Halal Conception and Other Factors Affecting Income Distribution in Islam. *International Journal of Islamic Economics and Finance Studies*, *5*(3), 1-15.

Liang, Z. C., Ooi, S. B. S., & Wang, W. (2020). Pandemics and their impact on medical training: lessons from Singapore. *Academic Medicine*.

Longhurst, G. J., Stone, D. M., Dulohery, K., Scully, D., Campbell, T., & Smith, C. F. (2020). Strength, weakness, opportunity, threat (SWOT) analysis of the adaptations to anatomical education in the United Kingdom and Republic of Ireland in response to the Covid-19 pandemic. *Anatomical sciences education*, *13*(3), 301-311.

Madu, M. C., & Edokpolor, J. E. (2021). Issues and Challenges Facing the Teaching and Learning of Tvet in The Covid-19 Pandemic Era. *Journal of Vocational Education Studies*, *4*(2), 188-195.

Makurumidze, R. (2020). Coronavirus-19 disease (COVID-19): A case series of early suspected cases reported and the implications towards the response to the pandemic in Zimbabwe. *Journal of Microbiology, Immunology and Infection*, *53*(3), 493-498.

Matemilola, S. (2017). The challenges of food security in Nigeria. *Open Access Library Journal*, *4*(12), 1.

Mupa, P., & Chinooneka, T. I. (2015). Factors Contributing to Ineffective Teaching and Learning in Primary Schools: Why Are Schools in Decadence? *Journal of education and practice*, *6*(19), 125-132.

Ndille, R. (2021). Schools with invisible fences in the British Southern Cameroons, 1916–1961: colonial curriculum and the 'other'side of modernist thinking. *Third World Quarterly*, *42*(5), 1033-1051.

Nwaka, I. D., Uma, K. E., & Tuna, G. (2015). Trade openness and unemployment: Empirical evidence for Nigeria. *The Economic and Labour Relations Review*, *26*(1), 117-136.

Okoye, R., & Arimonu, M. O. (2016). Technical and Vocational Education in Nigeria: Issues, Challenges and a Way Forward. *Journal of Education and Practice*, *7*(3), 113-118.

Olaseni, L. O., & Olawale, O. O. (2017). Entrepreneurial awareness and skills in mechanical technology among technical education students in Tai Solarin University of Education. *Makerere Journal of Higher Education*, *9*(1), 65-73.

Omolo, C. A., Soni, N., Fasiku, V. O., Mackraj, I., & Govender, T. (2020). Update on therapeutic approaches and emerging therapies for SARS-CoV-2 virus. *European Journal of Pharmacology*, *883*, 173348.

Oviawe, J. I. (2018). Revamping technical vocational education and training through public-private partnerships for skill development. *Makerere Journal of Higher Education*, *10*(1), 73-91.

Oviawe, J. I., Uwameiye, R., & Uddin, P. S. (2017). Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st century. *International Journal of vocational education and training research*, *3*(1), 7-14.

Ozili, P. K. (2021). Covid-19 pandemic and economic crisis: The Nigerian experience and structural causes. *Journal of Economic and Administrative Sciences*, *37*(4), 401-418.

Pan, G., & Seow, P. S. (2016). Preparing accounting graduates for digital revolution: A critical review of information technology competencies and skills development. *Journal of Education for business*, *91*(3), 166-175.

Picciano, A. G. (2021). Theories and frameworks for online education: Seeking an integrated model. In *A guide to administering distance learning* (pp. 79-103). Brill.

Sambo, B. S. U. (2020). Influence of religious clerics on public perception and responses towards COVID-19 pandemic in Northern Nigeria. *Nigerian Journal of Social Sciences (Special Edition) Vol*, *14*(2).

Schaltegger, S., & Burritt, R. (2017). *Contemporary environmental accounting: issues, concepts and practice*. Routledge.

Shaaban, K., Shakeel, K., Rashidi, T. H., & Kim, I. (2022). Measuring users' satisfaction of the road network using structural equation modeling. *International Journal of Sustainable Transportation*, *16*(9), 792-803.

Shola F, B., Latib, A. A., Samari, R., Kamin, Y., Saud, M. S., & Amin, N. F. (2019). The Non-Technical Skills Needed by Graduates of Technical Colleges in Metalwork Technology. *International Journal of Evaluation and Research in Education*, *8*(4), 654-658.

Shola F, B., Latib, A. A., Samari, R., Kamin, Y., Saud, M. S., & Amin, N. F. (2019). The Non-Technical Skills Needed by Graduates of Technical Colleges in

Metalwork Technology. *International Journal of Evaluation and Research in Education*, *8*(4), 654-658.

Srivastava, K., & Dey, S. (2018). Role of digital technology in teaching-learning process. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, *23*(1), 74-79.

Syed, S., Ashwick, R., Schlosser, M., Jones, R., Rowe, S., & Billings, J. (2020). Global prevalence and risk factors for mental health problems in police personnel: a systematic review and meta-analysis. *Occupational and environmental medicine*, *77*(11), 737-747.

Taguma, M., Feron, E., & Lim, M. H. (2018). Future of education and skills 2030: Conceptual learning framework. *Organization of Economic Co-operation and Development*.

Yadav, U. S., Tripathi, R., & Tripathi, M. A. (2022). Global handicraft index: a pioneering approach and developing strategies for promotion completion and Welfare of Artisan in the Digital World. *Bank and policy*, *2*(1), 59-80.

Yunusa, A. A., Sanusi, I. T., Dada, O. A., Oyelere, S. S., Agbo, F. J., Obaido, G., & Aruleba, K. (2021). The impact of the covid-19 pandemic on higher education in Nigeria: university lecturers' perspectives. *IjEDict-International Journal of Education and Development Using Information and Communication Technology*, *17*(4), 43-66.

Žižek, S. (2020). Pandemic: COVID-19 shakes the world. John Wiley & Sons.