

**AVAILABILITY AND UTILIZATION OF ICT TOOLS FOR VIRTUAL LEARNING
DURING COVID 19 ERA AND ITS IMPACT ON ACADEMIC PERFORMANCE**

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FEBRUARY, 2023.

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**A RESEARCH PROJECT PRESENTED TO THE FACULTY OF EDUCATION,
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REQUIREMENT FOR THE AWARD OF BACHELOR OF EDUCATION [B.Ed.]
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FEBRUARY, 2022.

CERTIFICATION

We the undersigned hereby certify that this research work was carried out by **Annabel Abieyuwa IGBINEDION** with matriculation number **EDU1603091** and that the research work is adequate in scope and quality in the Department of Educational Management, University of Benin, Benin city, Edo state, in partial fulfillment of the award of Bachelor of Education (B.Ed.) degree in Library and Information Science.

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DEDICATION

This research is dedicated to Almighty God who gave me the strength and grace to successfully carry out this research and complete my academic program at the University of Benin.

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ABSTRACT

This study was designed to investigate the Availability and Utilization of ICT Tools for Virtual Learning During Covid 19 Era and Its Impact on Academic Performance. The Simple Random sampling technique was adopted to get a sample size of 101 respondents from the total population of 335 Library and Information Science Students from 100 - 400 Level in the University of Benin as at the 2022/2023 academic session. A well-structured questionnaire was used for data collection.

The purpose of the study was aimed at Determining the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin, Examining the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin, Examining the impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era and Ascertaining the challenges of associated with the use of virtual learning during covid-19 era in the University of Benin. A total of 101 copies of questionnaires were distributed to the respondents and 81 copies were retrieved and found to be usable, resulting to a 82% response rate.

Based on the results, it was recommended that School Administration should be able to provide bandwidth for lecturers so as to be able to teach the students without any interruptions, Most lecturers doesn't know how to navigate through the computer system to organize virtual classes. The School Administration should be able to train its staff on how to use these ICT tools well, Students and Lecturers should also be disciplined enough to focus in class when they are learning virtually, because virtual learning gives room for distractions and Students should also be able to source for an alternative when it comes to powering their devices as a result of erratic power supply, like getting a power or solar supply.

CHAPTER ONE

INTRODUCTION

Background to the study

Information and communication technology (ICT) has had a significant impact on national and technological systems as well as the global community. It has had a significant influence on government, business, education, and practically every facet of modern life. The way societies function, do business, study, and have fun has altered as a result. One of the contemporary sciences and technologies that has significantly altered education is ICT. The availability and utilization of information and communication technology (ICT) technologies for virtual learning and how it affects academic performance during the Covid 19 era brought about a revolution from the traditional/convention method of teaching in a classroom to an intellectual information center denoting the concept of an e-learning. What then is Information Communication Technology (ICT)?

Information and communication technology (ICT) is according to UI-Amin (2013) as the fusion of informatics technology and other complementary technologies, particularly communication technology. There are many different ICT products that are available and relevant to education, including virtual learning, teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response systems, etc. These products have always been utilized for educational needs for a variety of purposes. ICT could also be described as a range of equipment (hardware: personal computers, scanners and digital cameras) and computer programs (software: database programs &

multimedia programs), & the telecommunications infrastructures (phones, faxes, modems, video conferencing equipment and web cameras) that allow us to access, retrieve, store, organize, manipulate, present, send material and communicate locally, nationally & globally through digital media (Dunmill & Arslanagic 2006 as cited in Lakshmikant & Jyoti , 2014).

Practical applications of ICT may be made in nearly every aspect of our lives; they influence both our personal and professional life. One cannot emphasize enough how important ICT tools are for virtual learning in the context of COVID-19 and how important they are for guaranteeing successful learning. The word "information and communication technology" (ICT) encompasses the three key ideas of "information," "communication," and "technology." Understanding these three principles is necessary to comprehend ICT. Processed data or anything that helps in decision-making is referred to as "information." Information is abstract, and could also be visualized as a commodity, which could be bought or sold (Krubu and Osawuru, 2014).

Communication refers to the process of transmitting or conveying information from one place or from one person to another. An exchange of information has occurred when an action elicits a response, whether favorable or unfavorable. According to some authors in the discipline of communication, communication is a process that involves the flow of information, ideas, thoughts, and messages. It involves a sender, a receiver, a language that both the sender and the receiver understand, a code, and all of these. a method of communication that entails the exchange of messages using symbols that are familiar to and understood by all participants. The sharing of concepts, information, viewpoints, attitudes, and beliefs among individuals is a part of it. The relationship is reciprocal. There must be a sender to transmit the message, and receiver to make appropriate decisions on how the rest of the exchange should continue (James, 2014).

Technology is the application of scientific knowledge to the creation of technologies that help people overcome environmental risks and comfort barriers. When used in this context, the term "technology" refers to items such as computers, telephones, mobile phones, GSM handsets, televisions, radios, etc.

Information and Communication technology (ICT) according to Bappa (2015), is a broad-based term that encompassed the gathering (acquisition), organization (packaging), storage and retrieval (dissemination) of information that can be in textual or numerical form (books, documents), pictorial and vocal form (audio-visuals) or all of the above (multi-media), using a combination of computer and telecommunications (telephony). ICT includes any product that stores, retrieves, manipulates, transmits, or receives information digitally. ICTs encompass a range of rapidly evolving technologies and they include telecommunication technologies (telephone, cable, satellite, TV and radio, computer-mediated conferencing, video conferencing) as well as digital technologies (computers, information networks (internet, World Wide Web, intranets and extranets) and software applications (Chisenga, 2016).

Agbo (2011), opined that information and communication technology (ICT) is an umbrella term that includes all technologies for the manipulation and communication of information. It includes all types of recording media (such as magnetic disks, tape, optical disks (DVD/CD), flash memory, and paper records), technologies for information broadcasting (such as radio, television, and movies), technologies for voice and image communication (such as microphones, cameras, loudspeakers, telephones, and cellular phones), and a wide range of computing hardware (such as desktop computers, laptops, servers, mainframes, and networked storage). It may also be described as a system for gathering, handling, storing, sending, and communicating data. The "internet," which has today generated a limitless influx of information

and improved reference services in our libraries, came along with this rapid technical growth. ICTs have unquestionably had an impact on the area of education, which has in turn had an impact on teaching and learning during the Covid-19 epidemic. ICTs offer the potential to improve teaching and assist systemic change in schools, as well as innovate, accelerate, enrich, and deepen skills, engage and excite students, help connect academic learning to real-world employment scenarios, and develop the economic viability of tomorrow's workforce. ICT incorporates electronic technologies and techniques used to manage information and knowledge, including information-handling tools used to produce, store, and process, distribute and exchange information (Joshi & Meza, 2013).

Information and communications technology emphasizes the importance of connectivity, the combination of computers and telecommunications (telephone lines and wireless signals), as well as the crucial business software, software components, retrieval, and visual and audio systems that allows the user to access, store, transfer, and manipulate the data. The term ICT is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system (Nureni, 2014). According to (Ratheeswari, 2018), ICT refers to the computer and internet connections used to handle and communicate information for learning purpose. Technology is what makes information accessible via communications.

The delivery of educational information to students through the internet or lectures that have been recorded in audio and video is known as virtual learning. This system offers capabilities for communication, collaboration, student tracking, evaluation, and direct student interaction. Participants can learn or acquire information in a collaborative, cooperative learning environment through interactions and activities. Virtual learning environment includes a course

syllabus, pre- requisites registration, skillful mentor or instructor, and distant learning applications (Fu, 2013 as cited in Monisha & Ananta 2017). This normally includes materials such as copies of lectures in the form of text, audio/video presentations and the supporting visual presentations. (Gurol, Kayisli & Basal, 2010). The virtual classroom comprises many forms of communication, three-dimensional visual learning environments for reading, threaded conversations, chat rooms, twitter, Skype, wikis, and blogs. Students must cooperate and work together throughout this style of reading in order to share knowledge. Virtual learning is a type of learning that is enhanced by the use of computers and the internet both within and outside of the educational institution's facilities. The training is commonly carried out in online settings. The teacher and students are geographically separated since the learning activities are carried out online (in terms of place, time, or both). The phrase "virtual learning" may also be used to refer to distant learning, which takes place in a virtual learning environment and makes use of electronic study materials designed for asynchronous (self-paced) or synchronous (in-person) online teaching and tutoring. The delivery of teaching to students through virtual learning specifically makes use of computer software, the Internet, or both. This minimizes or eliminates the need for teachers and students to share a classroom. (Racheva, 2017).

The Middle East respiratory syndrome and severe acute respiratory syndrome (SARS) are two additional dangerous disorders that can be caused by the coronavirus family of viruses, according to the World Health Organization (WHO) (MERS). Initially, animals were the source of these viruses' human-to-human transmission. The 11 million-person city of Wuhan, which serves as the cultural and economic center of central China, formally alerted the World Health Organization (WHO) on December 31, 2019, about a cluster of pneumonia cases. 59 instances were known as of January 5; none had resulted in death. 282 confirmed cases were known to the

WHO ten days later, four of which were in Thailand, South Korea, and Japan. Six individuals had died, 51 had serious illnesses, and 12 were in critical condition in Wuhan. The causative virus was discovered on January 7 and its genome was released on January 12. SARS-CoV2, a new coronavirus, was the culprit behind the severe acute respiratory disease that became known as COVID-19. A wide family of zoonotic viruses called coronaviruses may cause everything from the common cold to serious respiratory illnesses. These viruses are zoonotic, which means they may spread from animals to people.

The virus is a disease, brought about by intense respiratory condition, which is contacted through diverse respiratory areas such as the mouth and the nostrils. Numerous coronaviruses have been identified in a variety of animal species, but none of them have infected humans. COVID-19 was the most recently discovered virus to infect people. A dry cough, fever, shortness of breath, and breathing issues are typical signs of the COVID-19 infection, which are similar to the common cold. In more severe cases, an infection may cause renal failure, severe acute respiratory syndrome, pneumonia, and even death. The COVID-19 infection is spread from one person to another by respiratory droplets, which are typically generated when coughing or sneezing. According to current data, time from exposure to onset of symptoms is usually between two and 14 days, with an average of five days (McLeod, 2020).

The reasoning behind this research is to reveal the existing gap that exists in this study, by identifying how ICT played a crucial role during the pandemic, and to show the level of influence virtual learning had on the academic performance of university students during this time. Therefore, this study will show the availability and utilization of ICT tools on virtual learning during covid-19 era and its impact on undergraduate's students' academic performance.

Statement of the Problem.

Due to the novelty of the disease and the limited supply of approved therapeutics in some countries to combat the pandemic, the non-clinical measures of social isolation and hygiene measures were the most practical options in combating the pandemic. The COVID-19 pandemic challenged norms and conventions of doing things in various contexts. These actions essentially had an impact on all facets of human existence, including education. Schools, universities, libraries, and other educational institutions were closed in compliance with the disease control protocols to reduce the disease's spread through social contact (Jandrić, 2020).

As of March 28, 2020, the COVID 19 pandemic caused more than 1.6 billion children and youth to be out of school in 161 countries (Aiyedun, & Ogunode, 2020). This came to about 80% of all registered students worldwide. Following the shutdown of higher education institutions to stop the spread of COVID-19, the Association of African Universities (AAU) urged universities in Africa to "urgently" establish alternate means of delivering teaching and learning utilizing technology and other distant learning approaches. Undergraduate and graduate students have to convert to online learning since many schools and institutions had to stop offering classroom instruction. This form of learning provided an alternative way to minimize either the contact between students themselves or between the students and lecturers (Pragholapati, 2020).

With the overabundance of technological advancement in the globe, it was becoming more and more important for higher education to adopt information communication technology (ICT) tools for virtual learning. Technology use allowed students to increase their willingness to

acquire extensive knowledge and improve their learning processes without the need to be physically available, which drastically reduced the chances of students in higher institutions of learning from contacting the virus. This study therefore seeks to investigate the availability and utilization of ICT tools for virtual learning during the COVID 19 era and how it impacted on the academic performance of students in the University of Benin.

Objective of the Study

The study is focused on availability and utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of under graduate students: a case study of University of Benin, Edo State. The study seeks to:

1. Determine the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin
2. Examine the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin.
3. Examine the impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era.
4. Ascertain the challenges of associated with the use of virtual learning during covid-19 era in the University of Benin.

Research Questions

The Following Research Questions will be asked to Guide the Study:

1. What are the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin?

2. What is the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin?
3. What is the impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era?
4. What are the challenges of associated with the use of virtual learning during covid-19 era in the University of Benin.

Significance of the Study

The study of the availability and utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of under graduate students, will be of value to the University, Students, Lecturer, Library users, and researchers in the University of Benin. The study will be useful to the university because it would expose the university to the impact ICT tools can have on the academic performance of its students, it will expose them to the various aspect of technology that can positively influence undergraduates and better improve their academic performance.

Lecturers will benefit from this study because it will expose them to all the technological tools that can be used for virtual learning and how to make use of them to further enhance teaching activities. It would also help enlighten them and develop their ICT skills and competencies which will improve their ability to continuously update themselves academically and professionally.

This study will also be helpful to students by making learning more active when enhanced by Information and Communication Technology tools, the knowledge of this study will enable efficiency and effectiveness of students in applying ICT tools in their learning process. .

The study will also be very important to researchers, especially those who may wish to carry out further research on this topic. Furthermore, this study will point the way forward to address the challenges associated with the use of virtual learning to improve academic performance in the covid-19 era.

Scope of the Study

The study will cover availability and utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of under graduate student. Geographically, the study will be focused on the University of Benin, Benin City, Edo State, specifically Library and information science students in the university of Benin, Edo state.

Definition of Operational Terms

Availability: the capacity of a patron to retrieve information or resources in the appropriate format and location

Covid 19: a disease that spreads from one person to another by respiratory droplets, frequently during coughing or sneezing, generated by infected persons.

Information: are valuable concepts, information, imaginative creations, and statistics that have the ability to aid in decision-making, question-answering, and problem-solving. It results in a sense of awareness.

Information and Communication Technologies (ICTs):These encompass all forms of communication, including wired and wireless networks, computers, smartphones, tablets, software, middleware, video conferencing, social networking, and other media applications and services.

Virtual learning: A virtual learning system involves sending educational information to students through the internet or through lectures that have been recorded in audio and video. Tools for collaboration and communication are included in this system, along with evaluation, student direct engagement, and student monitoring.

Utilization: is a methodical approach to the utilization of resources and processes to benefit undergraduate students in higher education institutions in their learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents a comprehensive review of related literature on the availability and utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of undergraduate students. It is reviewed under the following headings: Conceptual framework of Information Communication Technology and Virtual Learning, Availability of ICT tools for virtual learning during the COVID 19 era, Types of ICT tools used for virtual learning during the COVID 19 era, Impact of virtual learning on the academic performance of undergraduates during the COVID 19 era, Challenges of associated with the use of virtual learning during covid-19 era and Summary of reviewed literature.

CONCEPTUAL FRAMEWORK OF INFORMATION COMMUNICATION TECHNOLOGY

Information and communication technology (ICT), according to Agbo (2017), is an umbrella term that includes all technologies for the manipulation and communication of information. It includes all methods of storing information (such as magnetic disks, tape, optical disks (DVD/CD), flash, and paper records), methods of disseminating information (such as radio, television, and movies), methods of exchanging information via voice, sound, or images (such as microphones, cameras, loudspeakers, telephones, and cell phones), and a wide range of

computing hardware (such as desktop computers, laptops, servers, mainframes, and networked storage). Additionally, it is described as the process of gathering, handling, storing, sending, and communicating information. The "internet," which has today generated a borderless flood of information, came along with this rapid technical improvement and improved reference services in our libraries.

Osawaru and Krubu (2014) opined that Information and Communication Technology (ICT) has brought unprecedented changes and transformation to academic library and information services, conventional LIS such as OPAC, users services, reference services, bibliographic services, current awareness services, document delivery, interlibrary loan, audio visual services and customer relations can be provided more efficiently and effectively using ICT, as they offer convenient time, place, cost effectiveness, faster and most-up-to-date dissemination and end users involvement in the library and information services process. Changes in format, content, and technique of creation as well as changes in how information products are delivered are some examples of how ICT has impacted information services.

Emergence of internet as the largest repository of information and knowledge has changed the role of library and information science professionals from intermediary to facilitator, new tools for dissemination of information and shift from physical to virtual services environment and extinction of some conventional information services and emergence of new and web-based innovations, (Agbo, 2017). ICT is a broad term that refers to the technologies that are used to collect, store, edit and communicate information in various format (Raji, 2018). ICT use increases digital information access, reduces the digital gap, and raises living standards. The information services offered by libraries can be enhanced by implementing ICT. The only way for individuals to easily obtain timely information in this day and age is through integrating ICT

into library services. It is also a means of assisting in the nation's sustainable development, as the timely and efficient dissemination of useful information can aid in the formation of a society. Using ICT as an enabling tool, libraries can help with the dissemination of information, which is crucial to the growth of the country's various economic sectors.

Information and Communication Technology (ICT) is a merging phrase that stands for the three key ideas of "information, communication, and technology." All three principles must be understood in order to comprehend ICT. Processed data or material that facilitates decision-making are both examples of "information.". Information is abstract, and could also be visualized as a commodity, which could be bought or sold (Krubu and Osawuru, 2014). Transmitting or exchanging information from one place to another or between individuals is referred to as communication. An exchange of information has occurred when an action elicits a response, whether favorable or unfavorable. According to some authors in the discipline of communication studies, communication is a process that involves the flow of information, ideas, thoughts, and messages. It involves a sender, a receiver, a language that both the sender and the receiver understand, a code, and all of these.

a procedure that involves conveying messages via the use of symbols that are encountered and understood by all participants to the conversation. It involves interpersonal exchanges of concepts, information, viewpoints, attitudes, and beliefs. It is a two-way process. There must be a sender to transmit the message, and receiver to make appropriate decisions on how the rest of the exchange should continue (James, 2014). Technology is the application of scientific knowledge to the creation of instruments that aid people in attempting to overcome environmental risks and comfort-impeding barriers. When referring to technology, we mean items like computers, phones, mobile phones, GSM handsets, televisions, radios, etc.

Information and Communication technology (ICT) is a broad-based term that involves the gathering (acquisition), organization (packaging), storage and retrieval (dissemination) of information that can be in textual or numerical form (books, documents), pictorial and vocal form (audio-visuals) or all of the above (multi-media), using a combination of computer and telecommunications (telephony), (Bappa, 2015). Information and Communication technology (ICT) refers to any product that uses electronic means to store, retrieve, manipulate, send, or receive data in a digital format. Robots, digital television, email, and personal computers are a few examples. Digital data transmission and reception are topics of ICT. The ability of these various uses to cooperate with one another is also important. ICT and Information Technology (IT) are terms that are similar and can be used interchangeably. The two terms are clearly equivalent because IT implies communication. ICTs encompass a range of rapidly evolving technologies and they include telecommunication technologies (telephone, cable, satellite, TV and radio, computer-mediated conferencing, video conferencing) as well as digital technologies (computers, information networks (internet, World Wide Web, intranets and extranets) and software applications (Chisenga, 2016).

The concept of ICTs in library originated quite some decades ago in the more technologically advanced countries of the world such as the United States of America, Canada, Great Britain (Akintunde, 2011). Ibrahim (2012) in agreement said that the above development soon enabled quick change from traditional and mechanized system of processing and retrieval of information into computer compatible systems. Obaseki (2017) defined Information and Communication Technology (ICT) in library as the process of adequately utilizing computer hardware and software's and its varying facilities such as networking cables, software packages, scanners and pointers in accomplishing library functions which were originally performed manually by the

librarians. According to Obaseki (2017) computers have transcended the status of mere computing to communication as the uses of computers worldwide are primarily for communication data in networked environments”. He opined that The planning stages, software and hardware selection, and hardware and software acquisition are all included in the process of computerizing library services and functions. instruction in usage for library staff; the upkeep of these innovative systems; networked computer terminals (interconnected computer systems); using computer software to retroactively convert the library's collections of printed books and artifact records into choices that machines can read.

According to Gupta in Babafemi and Adedibu (2017) the major importance of ICTs in library is the process of converting existing library services and practices to electronic-based media that ensures better performance with higher speed and greater cost effectiveness. The use of ICTs allows units to work together as a department because each will be able to link up in a network within the library system. Information and Communication technology for teaching, learning, and research in higher education institutions, (ICT) has replaced the antiquated techniques of library activities and services by introducing new dimensions. Abubakar (2011) opines that it is possible to store, retrieve, disseminate and organize information through the use of Information and Communication Technology (ICT). Today, information is disseminated in print and online, making it available to consumers in accordance with their needs. The uses of information and communication technology (ICT) in libraries and information centers must be evaluated in the light of evolving user requirements.

Khalid (2015) observes, networked and integrated functions draw on the experiences of the evolution of libraries in developed countries. In order to keep up with their counterparts in the developed world, Nigerian libraries are working really hard. Utilizing ICTs in libraries has a

huge potential for managing the massive resource boom and information technology growth. A library must be digitized in order to take use of the enormous resources present in the global information community. If academic libraries continue to be relevant to the community, they will benefit by following the trend.

ICT is the collective term for all the technology involved in managing telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring tasks. ICT is sometimes used as a longer synonym for information technology (IT), but its use is far broader. The use of computers for data storage, retrieval, transmission, and manipulation, frequently within the framework of a business or other entity, is known as information technology (IT). IT systems are often information systems, communications systems, or, to be more precise, computer systems that are controlled by a small number of people and comprise all necessary hardware, software, and auxiliary devices. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones, (Almekhlafi, 2016). Information and communications technology is thought to include information technology as a subset (ICT). ICT includes both the internet-enabled world and the mobile world supported by wireless networks.

Information and communication technologies (ICT) comprise electronic tools and methods for managing knowledge and information, including those for creating, storing, processing, distributing, and exchanging information (Joshi & Meza, 2013). The term ICT is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system (Nureni, 2014).

ICT stands for information and communication technology, and refers to computers and internet connections utilized for schooling. It is the technologies that provide access to information through telecommunication, (Ratheeswari, 2018). Nowadays, ICT-assisted learning technologies are mostly used online by educators, academics, and students. Internet access and personal computers have completely changed society. Today, we are living in knowledge based global world where there is a rapid advancement of science and technology (Almekhlafi, 2016). Recently, social media platforms like Facebook, Twitter, YouTube, Skype, and technology for distance learning have made it possible for billions of individuals across the world to communicate ideas quickly and, in most cases, for very little money.

These developments in computer technology are both amazing and commonplace. However, most individuals are unaware of how Internet and computer technologies are changing how pupils learn. This new educational paradigm, sometimes referred to as "virtual learning," has the potential to raise student success, educational accessibility, and school costs. Specifically, virtual learning is the delivery of teaching to students utilizing computer software, the Internet, or both. As a result, there is little or no requirement for teachers and students to share a classroom. These virtual learning processes are operating through ICT for making learning meaningful and high retention (Beek, 2011).

CONCEPT OF VIRTUAL LEARNING

Virtual learning is a web-based setting that enables you to take part in live training sessions without having to be physically there. According to Anekwe, (2017) Virtual learning is a system that allow a student listen to lectures, participate in lab exercises, ask questions, and receive feedback just as you would do in a conventional classroom – except you do it from the convenience of your desktop or anywhere you have an internet and phone connection. It saves

the trouble, expense, and travel time to a training site. For Anekwe, (2017), Virtual learning is capable of replacing partially or totally the conventional educational, evaluative and administrative functioning of a regular classroom by adopting the advanced computer and ICT technologies like the internet, e-mail, on-line chatting, www, CD-ROMS, DVDs, teleconferencing and video conferencing while Whatis.com, a virtual learning is, “an online learning environment. Students engage in synchronous virtual learning much like they would in a traditional classroom. In other words, the virtual learning environment (VLE) should have both teachers and students logged in at the same time. Lokie (2011), defined virtual learning as expanding the possibility of using internet facilities, platforms, satellite links, and related system to access, analyze, create, exchange, and use data, information, and knowledge in ways which until recently, were almost unimaginable.

Olibie, Ezoem and Ekene, (2014) noted that Virtual learning is made possible by developments in Information and Communications Technology (ICT) which have been rapid in recent years and have promised improved education and training to an increasingly diverse cohort of students. The higher education environment is anticipated to place a greater emphasis on satisfying student expectations and expanding students' engagement in ICT as a result of the exponential expansion of ICT. The growing use of technology in learning, the rise of new topic fields, and the concern with lifelong learning skills development are all results of ICT use in higher education. Virtual learning, one unique learning method that might be provided by ICT, is already being extensively researched in both conventional and non-conventional educational contexts.

Anekwe, (2017), stated some of the benefits of virtual learning and they include: It provides the learners the flexibility of getting the learning experiences at the time, place and rate

of assimilation, He also stated that Virtual learning can also help in good class organization; The operational documents, assignments, class notes and other related information in the internet can be readily categorized for easy accessibility for the teachers and students. For more effective teaching and learning, the content presented online might readily be updated and amended. Additionally, virtual learning gives students the chance to acquire new knowledge every day of the week, 24 hours a day, without interfering with their free time. In different areas of need, the system has the capacity to use the services of the most experienced individuals, which is not achievable in a regular classroom environment.

Anekwe, (2017), went further to say that there is an educational, intellectual and social partnership that is created by the technology of virtual learning; Students in their use of technological equipment's cultivate the habit of leadership role in relation to other students. The inference is that, particularly in distance learning environments, the technology employed improves group cohesiveness and mutual support. In addition, virtual learning helps students build a variety of communication skills that help them do well in class. Cost effectiveness is a significant benefit. He claims that pupils who learn virtually save time, money, and travel. Students who are motivated can work independently at home without wasting time or money on transportation. Due to the fact that everything is digital and assignments are typically provided via written email, the instructor equally likes instructing. The instructor may readily reuse his supplies and obtain supplies from other sources. Due to its online characteristics, the system may be highly helpful to students in a number of ways. It will assist with admission, information on the courses and academic activities, assignments and projects, tests and evaluations, grading and results, faculty who are available for interaction, guidance and needed assistance, information on

the start of the public examinations, merit-based programs, entry into a vocational and professional stream, etc.

Adavbiele (2016) stated that development of new broadband communication services and convergence of telecommunication with computers have created numerous possibilities to use a variety of new technology tools for teaching and learning system. With its ability to connect, improve, and engage with one another across a vast geographic distance in a meaningful way to accomplish the learning objectives, the combination of computers and communications gives education systems previously unimaginable prospects. The growth of these communication and computer systems, together with their ease of use, strength, and variety of information delivery, has given teachers and students access to a world outside the classroom. It has the ability to alter the characteristics and practices of the educational environment in addition to conceptualizing a new learning culture. In an atmosphere facilitated by ICT, interactivity, flexibility, and convenience have taken over. Because it allows for the access, extension, transformation, and sharing of ideas and information in multi-modal communication styles and formats, information and communication technology (ICT) creates new learning opportunities. It supports learner-centered, collaborative learning concepts, the sharing of learning materials and spaces, and the development of analytical, creative, and problem-solving abilities in learners.

THE AVAILABILITY OF ICT TOOLS FOR VIRTUAL LEARNING DURING THE COVID 19 ERA

According to Adigun, (2022), Information and communication technologies (ICT) had proven inevitable in all aspects of our society, the use of ICT in the pandemic period has fundamentally changed the practices and procedures of nearly all forms of endeavor within education, business and governance etc. The employment of information and communication

technology (ICT) tools in virtual learning as a reaction to the Covid-19 epidemic has undoubtedly come to play a significant part in the New Normal, and ICT usage in Nigeria has been expanding recently. The right opportunities and instruction for learning and applying information for self-improvement were given to pupils during this Covid-19 lockdown.

ICT made it easier for students to pursue their interests in research, invention, building, and other fields. They get used to the most important information sources, techniques for gathering the data they need, methods for processing that data, etc Information and communication technologies (ICT) also provided students and lecturers alike, with infrastructures and applications that helped to ensure they kept up to date with whatever information was disseminated. For example, video and audio call with the ability to see and hear and communicate with each other, direct messaging enables lecturers and students and others as well to communicate in real-time without having to be physically present and it also helped in sharing certain sensitive information among the family, friends and loved one within communities far and wide.

ICT infrastructures made it possible for individuals to get information quickly and easily throughout the pandemic crisis (Adigun, 2022). By disseminating knowledge about the COVID-19, professors, students, and administrators improved academic activities, encouraged lifelong learning, and even obtained information on public health. With the use of ICTs, medical information and preventative measures were disseminated in order to save lives throughout the epidemic. ICTs in this context refer to internet platforms, networks, computers, phones, applications, and databases, as well as to basic infrastructures that played a crucial role in the social order that existed at the time, especially during the COVID-19 worldwide pandemic. During the pandemic, the availability of ICTs was more helpful in locating, comprehending,

managing, treating, and interpreting information. ICT played a significant role through social media platforms and other information media in providing accurate information and curbing the coronavirus disease (COVID-19) across Nigeria. The response to COVID-19 decreased face-to-face interaction, which led to an increase in social media communication. ICT tools were “used to facilitate communication, processing, and transmission of information and sharing of knowledge by electronic means among lectures and students, whether through telephones, computers, electronic-based media like digital text and audio-video recording, or the Internet”.

Abidoye (2020) categorized the ICT tools available for virtual learning during the pandemic into: Hardware Technology which include laptops, desktop computers, workstations which were a necessity in sending, receiving as well as processing information. Telecommunication technologies, which includes; mobile phones, radio, television, tablets, which were the major devices used for quick communication and feedback. Networking technologies which includes; the internet, data service delivery agents, voice over IP telephony (VOIP) satellite communications and other forms of communications. ICT gave lecturers appropriate support for their educational activities and helped them become less accustomed to and dependent on reading resources like books, journals, and other reading materials. They were able to acquire the necessary instructional materials and methods thanks to the accessibility of audio-visual resources and apparatus, as well as electronic and telecommunication media. In this respect, computers, instructional aids, self-learning modules, and programmed learning materials were all very helpful to them.

Anna (2020), stated that there are Different Virtual learning forms that were used during the pandemic as a result of the availability of ICT tools, these forms include: Computer-Based: Instruction is not provided by a teacher; instead, instruction is provided by software installed on

a local computer or server. The content may regularly be modified by this program to meet the unique demands of each pupil. Internet-based: This is comparable to instruction that is supplied through a computer, but in this instance, the software that delivers the instruction is sent over the Web and is kept on a different server. Online instruction is delivered by a teacher who is not physically present with the learner, known as a remote instructor. Instead, the teacher and student communicate online using tools like online video, forums, email, and instant chat. Blended learning is the use of a computer, the Internet, or a remote teacher to deliver conventional face-to-face training with online courses. A regular classroom teacher and at least one of the previously mentioned virtual learning methods serve as the two main sources of education. This kind of education blends online learning with classroom instruction. The course materials must to be converted to digital form and made accessible online. As a result, students have control over the time, location, pace, and technique of their learning. Facilitated online education: This is online teaching delivered by a computer, the Internet, or a distant teacher that is complemented by a human "facilitator." Instead of directing the student's education, this facilitator offers tutoring or supplementary monitoring to support the student's learning. The facilitator may interact with the learner in person or remotely over the Internet or other technological channels.

THE TYPES OF ICT TOOLS USED FOR VIRTUAL LEARNING DURING THE COVID 19 ERA

Due to the COVID-19 pandemic's severe effects, public services were paralyzed, and academic activities and classes had to be taken online because universities had to close. According to this perspective, both libraries and schools were actively involved in managing the crisis by effectively disseminating pertinent health information on COVID 19. IFLA (2020) reported that on March 23, 2020, the president of IFLA had announced that "Libraries around the

world are being affected by the emergence and spread of the coronavirus." This situation has made librarians around the globe mobilize and provide a collection of valuable and reliable information on coronavirus in order to give people a source they can trust (IFLA, 2020). Librarians could provide and share information quickly, efficiently, and in real time as a strategy in response to the COVID-19 pandemic through their social networking pages like Facebook, Twitter, Instagram, and LinkedIn (Ladan, Haruna & Madu, 2020). They might offer a platform for gathering and sharing information to raise awareness of the present situation through their usage of the internet and blogs. Through online activism and campaigns, patrons were able to access local concerns and gain worldwide knowledge thanks to the librarians' usage of social media platforms.

The nature of technology is also changing in the 21st century in the shape of newer, more efficient, and more potent technologies. It will undoubtedly keep growing as a viable tool for knowledge distribution. The availability of a wide range of tools, each with its own set of benefits and drawbacks, is a key factor in determining how well they work as means for disseminating information.

Computers, laptops, desktops, data projectors, software programs, printers, scanners, etc. (Anjusha, 2020). Usage of these tools helped lecturers and students because they can be used as learning and education medium and a mass communication medium in promoting and campaigning practical and important issues such as health and social areas. With the help of so many digital and online initiatives and tools, ICT is one of the important aspects that have reduced this barrier of social distancing and lockdown. With the help of ICT, librarians can constantly disseminate information among themselves with the help virtual learning software's

such as: Skype, Zoom, Google Hangouts, Google Classroom, Google Meet, etcetera., (Anjusha, 2020).

In another view, Shava (2022), opined that, the outbreak of the COVID-19 pandemic was arguably the departure point for deconstructing contact lectures and integrating online learning as a strategic and most viable means to continue offering education in tertiary institutions. According to him, there was a perception that integrating technology in higher education would automatically improve students' performance. The use of technology to improve learning during the epidemic is, however, not well supported by empirical data. All educational levels are impacted by this dearth of evidence, most notably higher education. Several unanswered questions still exist regarding the efficacy of ICT in teaching despite technology use (Linda & Kirkwood, 2014). In countries such as Liberia and Sierra Leone, ICTs promoted Virtual education to respond to the COVID-19 pandemic (Montoya, 2021). Ghana delayed migrating to virtual education as the country was undertaking preparations to ensure that both educators and students adjust to the new 'normal' of online education, by especially ensuring that students with disabilities would gain accessibility (Montoya, 2021).

Shava (2022), went on to say that, the usage of ICT in modern day societies is based on access, attitudes, discourses, skills, structures and availability of infrastructures that are connected to individual societal domains and life chances. Furthermore, ICT use helps in improving citizen participation in political affairs, promote entrepreneurship growth across various races and gender. Noting these contestations, therefore, it can be argued that deconstructing contact lecture sessions and adopting virtual learning became apparent as institutions in South Africa and globally battled to continue with education while minimizing the risk of spreading the COVID-19 virus. Given these sentiments, the post-COVID-19 era may

require tertiary institutions to normalize and get prepared to embrace virtual learning as a contingency measure to respond to pandemics such as COVID-19.

Pramana, *et al* (2021), highlighted some of the ICT tools used for virtual learning during the pandemic, they include: Zoom meeting, Google Meets, Video Call, Webex, Skype, Edmodo, Google Classroom, Schoology, Moodle, Microsoft Teams, modems, video conferencing equipment, web cameras and Media Sharing Networks such as YouTube, Padlet, Blog, Messenger, WhatsApp Email, Facebook group.

Aslam & Kumar (2021), sub divided the ICT tools used for virtual learning during COVID 19 into the following categories: Productivity-oriented Tools: Under the category of productivity-oriented tools, all tools that give the student follow-up on activities. The elements that stand out include the calendar and progress review, which make time management for courses a vital component, and bookmarks, which enable students to quickly return to a previously visited webpage, whether or not it was part of the course. Helping participants to use the platform for orientation and helping participants to use the learning system (tutorials, manuals, online help, course search-engine to facilitate course selection and location indicating a search pattern, and synchronization and offline work mechanisms, where students have the option of working disconnected) would also be included, (Aslam & Kumar, 2021). Students' participation Tools: Work groups to organize a class into groups so that each student has their own space where the teacher assigns tasks or projects; self-assessment tools to practice or review online examinations and be aware of their evaluations are examples of tools for participating students, (Kumar, 2021). The teacher usually does not count these. Finally, the study findings can be added to the system: a student's corner or designated locations for learners (to display jobs and advertisements, see photographs, personal information, and so on), (Kumar, 2021).

Learning-oriented Tools: The discussion forums and tools that enable message exchange during the course's duration stand out among the learning-oriented tools' capabilities. Forums can be sorted chronologically, categorically, or according to discussion subjects, and postings can have or lack the option to attach files. Aside from forums, synchronous communication options for sharing immediate communications among participants (Chat, Video conference) and asynchronous communication tools for exchanging mail and messages both within the course and using external mail addresses must be available (Email, messaging). Another comparable format is blogs, which are a type of technology that enables both students and teachers to keep journals of their notes. These blogs can be about specific topics or about the personal blogs of the students they assist. Wikis, which allow for collaborative production of online documents, would be included in this category as well, (Kumar, 2021). Tools for Knowledge Management Systems: The things would be in knowledge management systems. Integral knowledge systems offer both resources for group collaboration and internal structuring of shared knowledge memory. To reflect how knowledge is organized, they often employ a hierarchical structure. The goal of moderating information systems is to offer users an interface that allows them to search for information in a certain area using diverse and distributed knowledge sources, (Aslam & Kumar, 2021).

THE IMPACT OF VIRTUAL LEARNING ON THE ACADEMIC PERFORMANCE OF UNDERGRADUATES DURING THE COVID 19 ERA

The aim and main goal of virtual learning, an electronic learning idea, is to make it possible for teachers and students to impart and understand knowledge online, mostly through the Internet. It allows both to communicate, interact and work together with one another remotely from any location, without actually being physically present face-to-face, via webinars,

audio and video conferences, web presentations, live streaming, text chats, Learning Management System (LMS) and online training courses, (Anna, 2020).

The informal education system includes virtual education and learning, which is essentially a teaching/learning paradigm. Mishra, *et al*, (2020), opined that, the technological advancement also influenced formal and informal education system through various technical tools like: Learning Management Systems LMS which provides the virtual platform for e-learning by enabling virtual classroom management, monitoring of student, delivery of lectures and study material, tracking of learning, testing, communication, registration process and scheduling.

Mishra, *et al*. (2020) went on to list some of the advantages of virtual learning for students' academic achievement. These advantages include: the direction of education through students' guidance; providing pupils with study materials and information in a variety of media, including word, word, powerpoint, flash, video, and audio; students' communication skills using a variety of interactive tools; using online platforms and forums to grade students' assignments and exams; online distribution of the findings to the pupils against student-teacher communication (e.g., discussion, web conferencing, meetings, webinar boards, chat, e-mail, etc.); interaction between the lesson plan and the students, the schedule, the class management, maintaining records for the system, teachers, and students (i.e. logs), Organizing and entering the examinations' records, together with the outcomes.

Racheva, (2017), stated that, with Virtual Learning, students can learn at their own time and pace. It makes long-distance learning possible. Real-time teaching and learning are promoted, and cooperation and communication between students and lecturers are improved. Effective and efficient time management is possible. It provides teachers and students with global exposure.

accessible to all people equally from any location at any time. There is potential for synergy and a dynamic exchange between the lecturers and the students as well as amongst the students themselves. It gives instructors and students an introduction to educational technology. Due to the absence of several discriminatory factors—including age, attire, physical appearance, impairments, ethnicity, and gender—the playing field is equal. Instead, the focus of attention is clearly on the content of the discussion and the individual's ability to respond and contribute thoughtfully and intelligently to the material at hand, (Racheva, 2017).

Some of the effects of virtual learning on undergraduate students' academic performance were emphasized by Anna & Kisugu in 2020. These effects include; Innovative and creative classroom instruction: - With virtual learning, the New Normal of teaching and learning might be more inventive and creative in the global information society of the twenty-first century; People in groups or individuals, regardless of age, may take responsibility for what and how they study, attaining their personal objectives as self-directed lifelong learners through virtual learning, which engages learners in a more active learning process; Global reach - Learners are able to interact with other learners and practitioners worldwide and receive the same message wherever they are; Delivery speed: Students benefit from learning when necessary and may access the course materials at any time; Dynamism: Learners advance at their own speed and at their own convenience while receiving the knowledge they require; Better educational value may be achieved through virtual learning: - Educational administrators, professors, and instructors might devise creative ways to use their resources, utilizing virtual learning in addition to conventional forms of instruction to raise standards and provide economies of scale. It has come to stay and more applications will continue to emerge; Virtual learning offer flexibility: - A more responsive education system would adapt to the needs of all learners, wherever and however they need to

learn; Collaboration - Learners are able to meet in a virtual space with other members and practitioner experts to discuss issues, answer questions and even participate in simulations without having to leave their home, (Anna & Kisugu, 2020).

THE CHALLENGES OF ASSOCIATED WITH THE USE OF VIRTUAL LEARNING DURING COVID-19 ERA

Schools all across the globe have had to adjust to the almost quick advent of the totally virtual classroom in the aftermath of the epidemic. This unexpected presence has increased current digital issues while also posing a number of new ones for school administration, teachers, parents, and students. Below are some of the challenges as highlighted by Olorunfemi & Maria, (2021):

Cost of Data: To be able to participate in online learning and teaching, both the students and their teachers will need to subscribe to a data plan which is very expensive. If using audio and video files is required for the classes, it follows that depending on how long the lessons last, a lot of money will be spent on them.

Limited Computer Access: Another major obstacle is that some pupils do not own personal computers. This is the first thing to take into account when it comes to virtual learning. How can a student or teacher use the internet if they don't have access to a computer? Because some people don't have Android phones, even the option of using a phone may not be viable here.

Unreliable Power Supply: In order to access the internet, you will also need a powered computer or a charged phone, and every Nigerian is aware of the difficulties Power Holding Company of Nigeria (formerly NEPA) is currently experiencing. Imagine purchasing a computer or phone and then running a generator on top of everything else. This in itself is enough to deter people from planning to participate in virtual learning or teaching. An further monster that has found fertile ground in Nigeria is poverty. Students from underprivileged backgrounds might not be able to attend these programs when it comes to online

teaching and learning. They'll have a difficult time getting the supplies they need for the lessons, as well. Students from these social and economic levels will thus suffer if the government approves virtual learning for use in schools. Due to their inability to acquire even basic equipment and their likely lack of access to the internet at home, pupils from low-income households may not profit from this technology in the majority of cases.

Anna & Kisugu, (2020) also highlighted some challenges encountered while utilizing ICT tools for virtual learning, they include:

Lack of Technical Know-How: Some students and teachers are also not computer literate. How many of these folks can traverse the learning platform to access the internet, even if they know how to boot and shut down a computer? Although it is true that practice makes perfect, this activity could need some preparation before beginning. They must be competent with a range of search engines and at ease using online navigation tools. **Absence of Interest:** It's said that you can lead a horse to a creek but you can't make it drink. Traditional face-to-face classes have several advantages that virtual ones lack. For instance, the relationships that these children have developed with their peers over time in traditional face-to-face classrooms—such as camaraderie and team spirit—cannot exist in virtual ones. The fact of the matter is that these pupils frequently attend school so they may connect with and make new acquaintances. Virtual learning does not offer this chance. The result here is that these students easily get bored with virtual learning when they face their computers. (Okey-Kalu, 2020). Students who struggle with isolation need to communicate socially with their classmates, yet because of virtual learning, many students may feel lonely at home and cut off from their friends. **Being unable to read nonverbal cues:** In the digital era, virtual classes, for example, are the most analogous to actual schools. They are a step in the right direction, but not quite there yet. When instructing in a typical face-to-face class,

teachers can see students' expressions, pick up on nonverbal signs, and instantly determine their level of interest. In order to ensure that they are reaching the vast majority, if not all, of the students enrolled in the class, they may then change their lecture delivery (and pace) accordingly. Teachers in a virtual classroom are unable to see the students. Non-verbal indications are impossible to see, even though certain people will always contribute more than others. The teachers are unable to determine if a learner's lack of involvement is caused by their introversion, a strong preference for observing over engaging in the activity, or improper engagement. High tendency to be easily distracted: In a real classroom, it can be difficult to maintain students' attention, and employing zoom in a virtual environment presents a similar challenge. Numerous people attend online classes from their homes. While it may sound like a terrific alternative, the fact that these students study from the comfort of their living rooms while frequently wearing pajamas and having a hot cup of coffee nearby does demand a lot of self-discipline. Some of our lecturers have told tales of how students occasionally use the classroom phone for personal calls, leave the classroom to get a snack while the lecture is still going on, and so on.

SUMMARY OF REVIEWED LITERATURE

For effective discussion of the related available literature in this section, the review was classified into five sub-heading thus: Conceptual framework of Information Communication Technology and Virtual Learning, The availability of ICT tools for virtual learning during the COVID 19 era,

The study ahead to discuss the types of ICT tools used for virtual learning during the COVID 19 era, the impact of virtual learning on the academic performance of undergraduates during the COVID 19 era, and the challenges of associated with the use of virtual learning during covid-19 era.

The subheadings were discussed in details with different materials consulted during the review, among them are journals, books and online search using various websites. Therefore, with regards to the insight given to the summary of the literature review, virtual learning had a positive impact on the academic performance of undergraduates during the COVID 19 era.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter provides a detailed account of the methods used in carrying out this study. It is discussed under the following headings:

- Design of the Study
- Population of the Study
- Sample and Sampling Techniques
- Instrument for data Collection
- Validity of the Instrument

- Method of Data Collection
- Method of Data Analysis

Research Design

This research work was carried out using the descriptive survey research design. According to Creswell, (2008) descriptive design involves identification of attributes of a particular phenomenon based on an observational basis, or the exploration of correlation between two or more phenomena. This design was adopted because it involves a systematic and comprehensive collection of data or information about opinions, attitude, feelings and behaviors of people.

Population of the Study

The population for this research work are the Library and Information Science students which according to current statistical figures stood at 335. This consists of all the students from 100 level to 400 level in Library and Information science student, University of Benin, Benin, Edo State. According to the data retrieved from the course representatives from each level, there exists a total of Eighty-Nine (89) 100 level students, One hundred and five (105) 200 students, Seventy-seven (77) 300 level students and Sixty four (64) 400 level students.

Sample size and Sampling Technique

The sample size for this study is 101 respondents. The researcher adopted 30% of the total population as the sample size for this study. The simple random sampling technique was then employed in administering the questionnaires to the respondents. The sample size of 101 respondents is adequate for this study as it is in line with McMorgan (2005) table for determining a sample size, He opined that, a sample size of 150 is adequate for a population of 500. As such,

the adoption of a sample size of 101 for a population of 335 in this study is adequate for this study.

Research Instrument

The instrument that was used in this study, for the collection of data is the questionnaire. A questionnaire titled “Availability and Utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of under graduate students Questionnaire (AUICTTVLCEIAPUGSQ)” was designed by the researcher. The instrument was divided into different sections. While section A elicited information on the background of the respondents with item such as gender, age, qualification, and years of working experience, the other sections addressed issues pertaining to the research questions asked in this study.

Validity of the Instrument

The instrument was designed by the researcher and validated by the researcher’s supervisor and other lecturers of Library and Information science. The researcher’s supervisor studied the items and assessed the suitability of the language, the adequacy and relevance of the items in addressing the research questions bearing in mind the purpose of the study. The corrections, comments and observations made were used to modify the final questionnaire used for this study. This ensured face and content validity of the instrument.

Method of Data Collection

The questionnaire was self-administered by the researcher in order to ensure high rate of return and also to ensure that all respondents are given the opportunity to receive and complete the questionnaire. This is also to enable the researcher to cover all the areas that will be used for the study. One week period was used for the administration and completion of the questionnaire.

Method of Data Analysis

The data was analyzed using descriptive statistics. Frequency will be used in analyzing the demographic data received for the research questions. This is because of the descriptive nature of the data. The researcher will also employ the use of tables in analyzing the results of this study.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the results and discussion of findings according to the research questions asked. This chapter is discussed under following subheadings:

- Questionnaire response rate
- Analysis of the respondents' bio-data
- Answering of the research questions
- Discussion of findings.

Questionnaire Response Rate

Table 3: Questionnaire Response Rate

Number of Questionnaires Administered	Number of Questionnaires Returned	Percentage of Questionnaires Returned
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101	81	82%
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A total of 101 copies of the questionnaires were distributed to the respondents and 81 questionnaires were retrieved and found usable, resulting to an 82% response rate.

Analysis of the Respondents' Personal-Data

Gender distribution of the Respondents

Table 4: Gender Distribution of the Respondents

Gender	Frequency	Percentage (%)
Male	38	47
Female	43	53
Total	81	100

Table 4 shows that there are more female respondents 53% than the male respondents 47%, which implies that Female students are more active in this study than the male respondents.

Age Distribution of the Respondents

Table 5: Distribution of the Respondents

Age	Frequency	Percentage (%)
16-20 years	25	31

21-25 years	44	54
26-30 years	10	12
Others	2	3
Total	81	100

Table 5 shows the age distribution of the respondents. The Table reveals that 54% of the respondents are within the age bracket of 21-25 years, 31% are within 16-20 years, 12% are within 26-30 years while 3% falls under the category of “others” above thirty years of age. This insinuates that majority of the respondents are within the age bracket of 21-25 years.

Level study of the Respondents

Table 6: Distribution of the Respondents by Level of Study.

Level of Study	Frequency	Percentage (%)
100	25	31
200	30	37

300	16	20
400	10	12
Total	81	100

Table 6 shows distribution of the respondents according to their levels. The Table indicates that 37% of the respondents are in 200 level, 31% are in 100 level, 20% are in 300 level while 12% of the respondents are in 400 level. This Table implies that 200 level students participated more in this study.

Answering of the Research Questions

Research Question One: What are the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin?

Data in Tables 7 provide answers to this question.

Types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin.	SA		A		SD		D		Total
	No.	%	No.	%	No.	%	No.	%	
Laptops	62	77	19	23	-	-	-	-	81
Desktop Computers	40	49	36	44	-	-	5	7	81
Mobile Phones	73	90	8	10	-	-	-	-	81
The Internet	69	85	12	15	-	-	-	-	81
Tablets	71	87	10	13	-	-	-	-	81
Television	36	44	32	40	4		9	11	81

Table 7: The Types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin.

Table 7 Indicates that Laptops (77%), Desktop computers (49%), Mobile Phones (90%), The Internet (88%), Tablets (87%) and Television (44%). This Implies that laptops, desktop computers, mobile phones, the internet, tablets and television are the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin.

Research Question Two: What is the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin?

Data in Tables 8 provide answers to this question.

The level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin.	VHL		HL		VLL		LL		Total
	No.	%	No.	%	No.	%	No.	%	
Laptops	51	63	20	25	-	-	10	12	81
Desktop Computers	73	90	8	10	-	-	-	-	81
Mobile Phones	42	52	22	28	6	7	11	13	81
The Internet	69	85	12	15	-	-	-	-	81
Tablets	54	67	18	22	2	2	7	9	81
Television	52	64	15	19	6	7	8	10	81

Table 8 indicates the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin, which includes, Laptops (63%), Desktop computers (90%),

Mobile phones (52%), The Internet (85%), Tablets (67%), Television (64%). This implies that the level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin is high.

Research Question Three: What is the impact of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID 19 era?

Data in Tables 9 provide answers to this question.

The Impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era.	SA		A		SD		D		Total
	No.	%	No.	%	No.	%	No.	%	
Students can learn at their own time and pace	70	86	11	14	-	-	-	-	81
It allows for long distance learning	65	80	16	20	-	-	-	-	81
It enhances collaboration and communication between students to students and students to lecturers	52	64	18	22	-	-	11	14	81
It helps to achieve better educational value	46	57	13	16	9	11	13	16	81
It promotes real-time teaching and learning	72	89	9	11	-	-	-	-	81
It gives room for effective and efficient time management	67	83	8	10	-	-	6	7	81
It improves quality and economy of scale	62	77	10	12	3	4	6	7	81
It gives room for synergy and allows a	60	74	8	10	9	11	4	5	81

dynamic interaction between the lecturers and students and among the students themselves									
It allows for level playing field as no discriminating factors such as age, dress, physical appearance, disabilities, race and gender are largely absent.	72	89	9	11	-	-	-	-	81

According to what the study reveals in Table 9 as impact of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID 19 era: students can learn at their own time and pace (86%), It allows for long distance learning (80%), It enhances collaboration and communication between students to students and students to lecturers (64%), It helps to achieve better educational value (57%), It promotes real-time teaching and learning (89%), It gives room for effective and efficient time management (83%), It improves quality and economy of scale (77%), It gives room for synergy and allows a dynamic interaction between the lecturers and students and among the students themselves (74%), It allows for level playing field as no discriminating factors such as age, dress, physical appearance, disabilities, race and gender are largely absent (89%). This implies that there are numerous impacts of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID-19 era amongst which are, quality improvement and economy of scale, promotion of real time teaching and learning.

Research Question Four: What are the Challenges associated with the use of virtual learning during COVID-19 era in the University of Benin.

Data in Tables 10 provide answers to this question.

Challenges associated with the use of virtual learning during COVID-19 era in	AGREE		DISAGREE		Total
	No.	%	No.	%	

the University of Benin.					
Cost of Data	71	88	10	12	81
Limited Access to Computer	59	73	22	27	81
Unstable Power Supply	62	77	19	23	81
Lack of Technical Know-How	60	74	21	26	81
Students struggling with Isolation	58	72	23	28	81
Lack of Interest	51	63	30	37	81
High tendency to be easily distracted	68	84	13	16	81
Not Being Able to Read Non-Verbal Cues	64	79	17	21	81
Poor Economy	74	91	7	9	81

Table 10 shows that cost of data (88%), limited access to computer (73%), unstable power supply (77%), lack of technical know-how (74%), students struggling with Isolation (72%), lack of interest (63%), high tendency to be easily distracted (84%), not being able to read non-verbal cues (79%), poor economy (91%). This implies that, cost of data, limited access to computer, unstable power supply, lack of technical know-how, students struggling with Isolation, lack of interest, high tendency to be easily distracted, not being able to read non-verbal cues and poor economy are the Challenges associated with the use of virtual learning during COVID-19 era in the University of Benin.

Discussion of Findings

This section discusses the findings of the study. The findings are discussed drawing conclusion from the view of the authors in the literature review and relating them to the findings of the study. The discussion is presented under four (4) subheadings following the aim of the study.

Types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin.

The study reveals that Laptops, Desktop computers, mobile phones, the internet, tablets and television are the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin. This finding is in agreement with (Anjusha, 2020) that the various ICTs that are the most important determinants of the effectiveness of such tools in the dissemination of information; the tools available are quite diverse, each with its own set of advantages and disadvantages. Computers, laptops, desktops, data projectors, software programs, printers, scanners, etc. Usage of these tools helped lecturers and students because they can be used as learning and education medium and a mass communication medium in promoting and campaigning practical and important issues such as health and social areas.

The level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin.

This study revealed that the level of availability of ICT tools for virtual learning during the COVID-19 era in the University of Benin is high. The finding corroborates with (Abidoeye, 2020) that ICT tools available for virtual learning during the pandemic are: Hardware Technology which include laptops, desktop computers, workstations which were a necessity in sending, receiving as well as processing information.

The Impact of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID 19 era.

The study revealed that there are numerous impacts of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID-19 era amongst which includes, students can learn at their own time and pace, it allows for long distance learning and also promotes real time teaching and learning. This finding is in conformity with (Racheva, 2017) where it was stated that, with Virtual Learning, students can learn at their own time and pace. It allows for long distance learning. It enhances collaboration and communication between students to students and students to lecturers; it promotes real-time teaching and learning. It gives room for effective and efficient time management. It gives students and teacher a worldwide exposure. Accessed to everyone equally from anywhere and at any time. It gives room for synergy and allows a dynamic interaction between the lecturers and students and among the students themselves. It gives instructors and students an introduction to educational technology. Due to the absence of several discriminatory factors—including age, attire, physical appearance, impairments, ethnicity, and gender—the playing field is equal. Instead, the discussion's topic and the individual's capacity to reply and make an informed contribution to the matter at hand are the evident centers of attention.

Challenges associated with the use of virtual learning during COVID-19 era in the University of Benin.

The finding from the study reveals the challenges associated with the use of virtual learning during COVID-19 era in the University of Benin, which includes, cost of data, limited access to computer, unstable power supply, lack of technical know-how, students struggling with isolation, lack of interest, high tendency to be easily distracted, not being able to read non-verbal cues, poor economy. This finding is in agreement with (Olorunfemi & Maria, 2021) where it was highlighted that cost of data, limited access to computer, unstable power supply, poor economy are challenges associated with the use of virtual learning during COVID-19 era in the University of Benin.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter focuses on the summary of the study, conclusion, recommendations and contribution to knowledge.

Summary of the Study

The study explored the Availability and utilization of ICT tools for virtual learning during COVID-19 era and its impact on academic performance in University of Benin. The study employed the use of descriptive survey research design. The main objective of the study was aimed at determine the types of ICT tools used for virtual learning during the COVID-19 era in the University of Benin, the level of availability of ICT tools for virtual learning during the COVID-19 era in the University of Benin, the impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID-19 era, the challenges of associated with the use of virtual learning during covid-19 era in the University of Benin.

One hundred and one (101) copies of questionnaires was administered and eighty-one (81) copies of questionnaires was retrieved from the respondents and found usable. The summary of the study findings are as follows:

1. That laptops, desktop computers, mobile phones, the internet, tablets and television are the types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin.
2. The level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin is high.

3. That there are numerous impacts of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID-19 era amongst which are, quality improvement and economy of scale, promotion of real time teaching and learning.
4. That, cost of data, limited access to computer, unstable power supply, lack of technical know-how, students struggling with Isolation, lack of interest, high tendency to be easily distracted, not being able to read non-verbal cues and poor economy are the Challenges associated with the use of virtual learning during COVID-19 era in the University of Benin.

Conclusion

The COVID-19 caused a big setback in the world, it was an unforeseen circumstances that took everyone by surprise including the Academic world. Several things were put in place to make sure academic activities continues as a result of the pandemic. Laptops, Desktop Computers, Mobile phones were used for virtual learning between students and lecturers, to continue academic activities. This study investigated the Availability and utilization of ICT tools for virtual learning during COVID-19 era and its impact on Academic performance in University of Benin. This topic is a unique one and the researcher hopes that more research will be further conducted in the future concerning the topic.

Based on the results of this study, the researcher concluded that all the players in the academic world should be prepared for unforeseen circumstances like this because our University system had little to no preparation when the pandemic came, even when some of the ICT tools that enables virtual learning were available, issues like cost of bandwidth, erratic power supply amongst others. Proper measures should therefore be put in place to enable virtual learning in such unforeseen circumstances to avoid any academic abruption.

Recommendations

In the light of the findings of this study, the following recommendations were made:

1. School Administration should be able to provide bandwidth for lecturers so as to be able to teach the students without any interruptions.
2. Most lecturers doesn't know how to navigate through the computer system to organize virtual classes. The School Administration should be able to train its staff on how to use these ICT tools well.
3. Students and Lecturers should also be disciplined enough to focus in class when they are learning virtually, because virtual learning gives room for distractions.
4. Students should also be able to source for an alternative when it comes to powering their devices as a result of erratic power supply, like getting a power or solar supply.

Contributions to Knowledge

This study has contributed immensely to the body of existing knowledge in numerous ways, some of which are:

1. The study has been able to identify the various types of ICT tools used for virtual learning during the COVID-19 era in the University of Benin.
2. The level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin was ascertained by the study.
3. The study has also been able to explain the impact of virtual learning on the academic performance of undergraduates in the University of Benin during the COVID 19 era in University of Benin.
4. Challenges associated with the use associated with the use of virtual learning during covid-19 era in the University of Benin were also established by the study.

APPENDIX

**DEPARTMENT OF EDUCATIONAL MANAGEMENT (DEM),
LIBRARY AND INFORMATION SCIENCE,
FACULTY OF EDUCATION,
UNIVERSITY OF BENIN, BENIN CITY.**

QUESTIONNAIRE

This research is carried out by **IGBINEDION ANNABEL ABIEYUWA**, to investigate the **Availability and Utilization of ICT tools for virtual learning during covid-19 era and its impact on the academic performance of under graduate students.**

I therefore count on your co-operation in filling this questionnaire which will contribute to the overall success of the project. This questionnaire is purely for academic purposes and all information given will be treated with utmost confidentiality.

Section A: Demographic Information

Please tick the appropriate boxes below

1. Gender: Male () Female ()
2. Age: 16 - 20 () 21 – 25 () 26 -30 () Others ()
3. Level: 100 () 200 () 300 () 400 ()

Section B: The types of ICT tools used for virtual learning during the COVID 19 era in the University of Benin

The ICT tools used for virtual learning during the COVID-19 era	SA	A	SD	D
Laptops				
Desktop Computers				
Workstations				
Mobile Phones				
The Internet				

Tablets				
Television				

Strongly agree (SA), Agree(A), Strongly disagree (SD), Disagree (D)

Section C: The level of availability of ICT tools for virtual learning during the COVID 19 era in the University of Benin.

The ICT tools available for virtual learning during the COVID-19 era	VHL	HL	VLL	LL
Laptops				
Desktop Computers				
Workstations				
Mobile Phones				
The Internet				
Tablets				
Television				

Very high level (VHL), High level (HL), Very low level (VLL), Low level (LL)

Section D: The impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era

What is the impact of virtual learning on the academic performance of undergraduates in the university of Benin during the COVID 19 era	SA	A	SD	D
Students can learn at their own time and pace				
It allows for long distance learning				

It enhances collaboration and communication between students to students and students to lecturers				
It helps to achieve better educational value				
It promotes real-time teaching and learning				
It gives room for effective and efficient time management				
It improves quality and economy of scale				
It gives room for synergy and allows a dynamic interaction between the lecturers and students and among the students themselves				
It allows for level playing field as no discriminating factors such as age, dress, physical appearance, disabilities, race and gender are largely absent				

Section E: The challenges of associated with the use of virtual learning during covid-19 era in the University of Benin

What are the challenges of associated with the use of virtual learning during covid-19 era in the University of Benin	Agree	Disagree
Cost of Data		

Limited Access to Computer		
Unstable Power Supply		
Lack of Technical Know-How		
Students struggling with isolation		
Lack of Interest		
High tendency to be easily distracted		
Not Being Able to Read Non-Verbal Cues		
Poor Economy		

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