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Virtual Communication and E-learning at Federal Polytechnic of Oil and Gas, Bonny

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ABSTRACT
This study examined the effect of virtual communication and e-learning on tertiary institutions with Federal Polytechnic of Oil and Gas Bonny as a test case. It made use of three specific objectives, and three research questions. The study was anchored on Technology Acceptance Theory. Descriptive survey research method was adopted, and the population of this study consisted of 6210 students of Federal Polytechnic of Oil and Gas Bonny from which a sample of 376 students was determined using Taro Yamane's sample size determination formula. The data collected by the questionnaire were analysed using frequency distribution tables, simple percentages and weighted mean scores from a four-point Likert scale. The findings showed that the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny manifested as follows: it accelerates students' level of assimilation; it helps students to learn better with longer retention of ideas; it widens students' scope of understanding of economics; it helps to improve students' level of intelligence and it leads to improved academic performance. Based on the results, the study concluded that virtual communication and e-learning play a vital role in improving students' academic performance. The study therefore recommended, among others, that there should be adequate awareness on the importance of virtual communication and e-learning facilities to students and lecturers in tertiary institutions.
Keywords: Virtual communication, E-learning, Federal Polytechnic of Oil and Gas, Bonny, ICT

INTRODUCTION

The communication industry has witnessed remarkable changes. The new media, including Google+, blogs, live chats, LinkedIn, WhatsApp, Facebook, YouTube, Twitter, Instagram, Foursquare, and Pinterest, to mention a few, have not only widened the spectrum and method of communication but have also brought new possibilities and opportunities in their wake (Akarika & Ekanem, 2018). With the rapid evolution of information and communication technologies (ICT), the society continues to move forward into the "information age". Advancements in information and communication technologies are offering a promising new means in the educational sector to meet the needs and demands of information-age learners through virtual communication. According to Anekwe (2021), virtual communication is an effective electronic means of connecting learners without time and location constraints using computers. Virtual communication is the online transmission of ideas and messages. It encompasses the use of various digital media to convey thoughts, share information, and engage in conversations. This can range from written communication in emails to real-time discussions in virtual classrooms or video conferences. Virtual communication is a form of computer-mediated communication (CMC), where individuals interact through computers or other digital devices. It involves the use of text, audio, video, and

multimedia elements to convey messages and engage in dialogue. Social media, online forums, and messaging apps are common examples of CMC platforms (Chiaha, Eze, & Ezendu, 2013). Virtual communication has the potential to provide a learning environment where students can actively be involved in the development of "initiative, creativity, and skills in critical thinking and problem-solving; mental and physical skills needed for productive use of advanced technologies; engaging in group processes and developing good habits for self-direction and personal growth (Kemp, 2016). The use of virtual communication as a teaching-learning tool is increasing drastically in tertiary education. This increase in the use of virtual communication is not simply due to its pervasiveness but due to its unique communication qualities which offer a radical shift from traditional views of the communication process (Daniel, Nnamdie & Uduot, 2021). People are becoming more and more familiar with the use of smartphones, computers, and other technological devices to access the internet on a daily basis. The introduction of multimedia technologies and the internet in learning (electronic learning) has been observed as a vital means of improving accessibility and quality of delivery of learning among students and teachers in tertiary institutions (Alsaadat, 2018). Electronic learning (E-learning), often referred to as web-based or online learning, is currently a fast-growing educational paradigm in higher institutions in Nigeria. It involves all teaching and assessment approaches that use technology such as wikis, blogs, podcasts and learning management systems such as computers, the internet and web connectivity to enhance learning experiences and research works (Mahahusudhan, 2018). This new teaching and learning approach offers potential values to the traditional teaching and learning approach due to its flexibility and accessibility of information to a great number of students at a time. E-learning also provides easy access to any type of information required for academic purposes through the use of internet facilities such as World Wide Web (www) based technologies and other software (Naqvi, 2017).

E-learning makes use of computers, laptops, mobile phones, Android phones, etc., which most tertiary education students have access to. These components are either owned by the students or their parents; therefore, they could watch a video on what was taught in the class for better understanding. The use of these facilities in the classroom and at home could make abstract concepts become very real to the students. Globally, the strength of e-learning is gradually taking over the contemporary educational system and as well dominating day-to-day activities across the globe. E-learning is regularly considered the essential instrument for educational improvement, which requires extremely serious continuous teaching and learning in tertiary institutions (Levy, 2020).

Similarly, Jimoh and Bupo (2021) posited that the e-learning approach has become an increasingly popular learning approach in higher educational institutions due to the vast growth of internet technology. E-learning has a competitive advantage, and many higher institutions have implemented it, and this has impacted students' academic performance. However, there are other academic institutions that use very low-interactive e-learning, which is not enough to contribute to the performance of the students. In contrast to that, other higher institutions use highly interactive e-learning, which directly improves students' academic performance universally. Ministry of Education and Vocational Training (MoEVT) (2022) posited that technology-enabled instructional learning helps to a greater extent to advance the eminence of education and students' academic performance. Hence, it has been found that students in higher institutions that engaged in e-learning normally perform better than those in face-to-face learning environments. Generally, the importance of virtual communication and e-learning is being realised by the educators and stakeholders across the globe, as it has the potential to provide access to higher education. It encourages an education system which has something to offer to people across the whole society. It covers all technologies and supports the pursuit of lifelong learning for all. Virtual communication and e-learning have become major approaches to learning in tertiary institutions due to the rapid advancement of internet technology. This approach of learning enables students on different continents to attend the same classes almost at the same time (Nwakoby & Okoye, 2020). Also, virtual communication and e-learning significantly reduce the time needed to collect information. It also offers access to online resources, databases, periodicals, journals, and other material. If a student has trouble understanding part of the coursework, finding tips on the matter could not be easier than having immediate access to supplementary, unlimited, and mostly free material online. Therefore, virtual communication and e-

learning reduce the unnecessary load of ineffective study materials and enhance the efficiency of accessing relevant resources (Nwokonko, 2020).

Empirically, Allison, Dangari, Sanchi, Alhassan and Badamasi (2022) found that e-learning plays a positive role in the academic performance of undergraduate students. Also, the findings of Ayeni and Aderinkola (2022) revealed, among others, that virtual communication and virtual learning have positive impacts on the students' academic performance. Additionally, Alabi (2021) established a positive and significant relationship between e-learning and the academic achievement of students, while mobile learning and learning management systems as dimensions of e-learning significantly influence students' academic performance. Lastly, Egoigwe, Nweke, Wada, Ali and Madu (2020) discovered that e-learning has a positive impact on the academic performance of postgraduate students in higher institutions. Drawing from the foregoing, this study sought to examine virtual communication and e-learning at the Federal Polytechnic of Oil and Gas.

The Problem

Previous research (Oladosu, 2015) has identified several challenges affecting the successful implementation of e-learning in Nigerian tertiary institutions, including insufficient ICT facilities, lack of trained academic staff, unreliable power supply, slow internet connectivity, and limited funding for digital education initiatives. Despite these findings, there is little empirical research on the combined effect of virtual communication and e-learning on academic performance, particularly in Federal Polytechnic of Oil and Gas Bonny. Existing studies have largely focused on either the impact of social media on students' education or the availability of e-learning facilities without addressing the interconnection between the two. This gap in knowledge necessitates an in-depth study of how virtual communication and e-learning influence students' academic performance in tertiary institutions.

Addressing these challenges requires strategic interventions, including investments in digital infrastructure, improved internet connectivity, the provision of modern e-learning tools, and capacity-building programs for both students and lecturers. By improving infrastructure and enhancing digital literacy, institutions can create an enabling environment where virtual communication and e-learning complement traditional teaching methods rather than distract from them. This study therefore addresses the existing research gap by examining the availability, utilisation, and impact of virtual communication and e-learning at the Federal Polytechnic of Oil and Gas, Bonny.

Objectives and Research questions

The broad objective of this study was to examine virtual communication and e-learning at Federal Polytechnic of Oil and Gas Bonny. Specifically, the objectives of this study were to:

i. examine the virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny;
ii. determine the factors affecting effective utilization of virtual communication and e-learning facilities in Federal Polytechnic of Oil and Gas Bonny;
iii. ascertain the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny.

Based on the objectives, the following research questions were raised to guide the study:

5. What are the virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny?
6. What are the factors affecting effective utilization of virtual communication and e-learning facilities in Federal Polytechnic of Oil and Gas Bonny?
7. What is the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny?

Literature Review

Theoretical Framework

This study was anchored on Technology Acceptance Theory (TAM). Technology Acceptance Theory was originally proposed by Davis in 1986. This model was designed to forecast the user's acceptance of information technology and usage in an organizational setting. Cracknell (2004) posited that firms are adopting technology to cope with the change in the external environment. This model has been tailored in a manner that can accommodate changes for improved cost reduction and efficiency. TAM deals with perceptions as opposed to real usage. The model suggests that users are the key factors that influence their decision on how, where and when they will use it (Davis, 1989). One of the factors to consider is perceived usefulness (PU). According to Davis, perceived usefulness is the degree to which a person believes that using a particular system will lead to improved performance and perceived ease-of-use (PEoU) is explained as the degree to which a person believes that using a particular system would result in improved productivity. In this study, perceived usefulness (PU) and Perceived ease-of-use (PEoU) will be assumed to be the reason for virtual communication and e-learning adoption by many tertiary institutions today.

Conceptual Review

Virtual communication, often referred to as the exchange of information through digital channels, has been defined and explored by numerous scholars. According to Tuncay (2016), virtual communication is the digital exchange of information, ideas, and messages through electronic channels such as the internet, email, instant messaging, video conferencing, and other online platforms. It transcends geographical boundaries, enabling individuals to connect and interact irrespective of physical distance. Virtual communication involves electronic interaction and collaboration facilitated by digital tools and technologies. It includes activities such as online discussions, collaborative document editing, virtual meetings, and other forms of engagement that leverage digital platforms to enhance communication and collaboration (Oladosu, 2015). At its core, Wani (2018) sees virtual communication as the online transmission of ideas and messages. It encompasses the use of various digital mediums to convey thoughts, share information, and engage in conversations. Such interactions can range from written communication in emails to real-time discussions in virtual classrooms or video conferences. Virtual communication is a form of computer-mediated communication (CMC), where individuals interact through computers or other digital devices. It involves the use of text, audio, video, and multimedia elements to convey messages and engage in dialogue. Social media, online forums, and messaging apps are common examples of CMC platforms (Chiaha, Eze & Ezendu, 2013). Markus and Robey (2018) define virtual communication as the technological facilitation of social interaction, allowing people to connect, share, and communicate in the digital realm. It involves the use of technological tools to create virtual spaces where individuals can interact socially, fostering relationships, collaboration, and the exchange of information.

Virtual classrooms are a type of communication that replicates the traditional classroom experience in an online setting. These environments, often integrated into LMSs or standalone platforms, feature interactive elements such as whiteboards, live chat, and real-time document sharing, facilitating dynamic and engaging virtual teaching and learning experiences. Furthermore, collaborative document editing tools, such as Google Docs or Microsoft 365, allow multiple users to work on the same document simultaneously. These tools promote virtual collaboration on projects, assignments, and group activities, enhancing teamwork and efficiency. Furthermore, blogs and online journals, as types of virtual communication, serve as platforms for students to share reflections, research findings, or creative works. Instructors may incorporate blogging assignments into courses to encourage written expression, critical thinking, and peer interaction (Oladosu, 2015). In tertiary institutions, virtual communication brings about a myriad of benefits, revolutionising the way education is delivered and transforming the learning experience for both students and faculty. Some advantages or benefits of virtual communication in tertiary institutions include those highlighted by Oladosu (2015) and Markus and Robey (2018):

Virtual communication enables students to access educational resources and courses from anywhere in the world. Tertiary institutions can offer online programs, which allow individuals who may not have the means to relocate or commute to participate in higher education. Also, virtual communication provides flexibility in terms of when and where students engage with course materials. Asynchronous learning platforms allow students to access lectures, assignments, and discussions at their convenience, accommodating diverse schedules and commitments. In addition, tertiary institutions can leverage virtual communication to provide a wealth of digital learning resources. This includes multimedia presentations, interactive simulations, and access to online libraries, enhancing the variety and richness of educational materials available to students. Moreover, virtual communication tools facilitate collaboration among students, regardless of their physical location. Online discussion forums, group projects, and collaborative document editing platforms promote teamwork, allowing students to work together on assignments and projects seamlessly. Also, tertiary institutions can bring in experts and guest speakers from around the world through virtual communication channels. Virtual lectures, webinars, and online conferences provide students with opportunities to learn from professionals and experts who may not be physically present on campus. Additionally, both institutions and students can benefit from cost savings associated with virtual communication. Tertiary institutions can reduce infrastructure costs related to physical classrooms, and students can save on commuting, accommodation, and other expenses often associated with traditional education.

Furthermore, virtual communication allows for more personalised and adaptive learning experiences. Learning Management Systems (LMS) can track individual progress, provide tailored feedback, and offer customised learning paths based on each student's strengths and weaknesses. Furthermore, virtual communication can cater to diverse learning needs. Institutions can implement accessibility features in online materials, making education more inclusive for students with disabilities. Additionally, virtual communication allows for various learning modalities and accommodates different learning styles. It facilitates quick and efficient communication between faculty and students. Emails, virtual office hours, and discussion forums provide avenues for students to seek clarification, ask questions, and engage with course content outside of traditional classroom hours. Virtual communication platforms enable real-time updates and notifications. Institutions can communicate important information promptly, ensuring that students are informed about changes in schedules, deadlines, and other relevant announcements, contributing to a smoother learning experience. In addition, virtual communication allows for the implementation of interactive assessments. Online quizzes, discussion participation, and collaborative projects can be integrated into courses, providing a more dynamic and engaging way to assess students' understanding and application of concepts (Markus & Robey, 2018).

Uzodimma (2017) points out that the problem we have in the tertiary institutions in Nigeria is lack of the competencies of utilising the computer and operating other educational software using a keyboard and connecting to the internet to surf information on education. Based on this, teachers or lecturers using e-learning applications have to be trained in ICT, administration and management of e-learning applications and the ability to provide academic counselling to learners of economics via e-learning. Undoubtedly, e-learning as an internet-based learning demands new skills for effective teaching and learning. The new role of lecturers, for instance, as facilitators, collaborators, coaches and mentors, according to Anderson (2003), requires that all the lecturers should be trained to be familiar with e-learning experiences as part of ongoing professional development. No matter the stage of development one has reached in the use of e-learning technologies, he/she still needs training. The reason being, according to White (2003), that there are new ways of storing and manipulating data/information that would necessitate further development of the teachers.

In the past, students and lecturers wasted time and money, and at extremes, lives as they travelled long distances to access study materials for reading or other things relevant to their areas of study. This added more stress to the strenuous nature of research activities. Asogwa (2011) opined that through virtual libraries, which are part of e-learning packages, lecturers can avail themselves of materials necessary to carry out research. More importantly, relevant secondary data necessary for research of that nature can also be obtained online through the use of computers and the internet.

Naeem, Faizat, Musbau, Yahaya and Adeyinka (2023) identified factors that influence the use of e-learning systems and investigated the perception of students on the quality of e-learning systems. Wagbara and Adiela (2023) examined the use of e-learning technologies as predictors of students' academic performance in public secondary schools in Port Harcourt and Obio-Akpor LGA of Rivers State. The study was guided by three objectives, three research questions and hypotheses. The population of the study comprised 14,769 academic staff and SS2 students from all 37 public senior secondary schools in Port Harcourt and Obio-Akpor LGA in Rivers State. The sample size for this study was 1477 respondents, representing 10% of the entire population. The sampling technique was a proportionate stratified random sampling. The instruments were a questionnaire and a teacher-made test, used for the study to generate data. The instruments were validated, and its reliability was done using the Kuder Richardson method, which yielded coefficients of 0.84 and 0.82 for the Use of E-learning Technologies Scale (TUETS) and Teacher Made Test Scale (TMTS), respectively. The research questions were answered with the use of simple regression, while the hypotheses were tested with a t-test associated with simple regression at the 0.05 level of significance. The findings revealed that the use of laptop and tablet computers predicts students' academic performance in public secondary schools in Rivers State to a low extent, while smartphones as e-learning technologies predict students' academic performance in public secondary schools in Rivers State to a high extent. Based on the findings, it was recommended, among others, that the government, who are the owners of public secondary schools, should ensure that all schools have functional laptop computer laboratories accessible to both teachers and students with trained personnel to help them acquire relevant ICT skills that will aid the teaching and learning process for improved academic performance of students. Also, parents should explore all positive means to provide smartphones, constant strong Wi-Fi connection, browsing data, and a constant power supply for students with strict monitoring by the school PTA to guide, orientate and control students on how they can use the smartphones available to them to their own advantage, as all of these will enhance effective academic learning activities with minimal distraction.

METHODOLOGY

This study adopted descriptive survey research. The population comprised 6210 students of Federal Polytechnic of Oil and Gas Bonny as at December 2023 (Office of the Registrar, Federal Polytechnic of Oil and Gas Bonny). The sample size(s) of the study was ascertained using Taro Yamane (1967) formula (see formula 1). The Taro Yamane's Formula is shown as:

$$n = \frac{N}{1 + N(e)2}$$

Where,

n = Sample Size

N = Total Population

e = Tolerable error (0.05)

With the total of 6210 and 95% level of confidence (0.05 significance level), the sample size of this study was determined as follows:

$$n = \frac{6210}{1 + 6210 * (0.05)^2}$$

$$n = \frac{6210}{1 + 6210 * (0.0025)}$$

$$n = \frac{6210}{1 + 15.525}$$

$$n = \frac{6210}{16.525}$$

$$n = 375.7943$$

$$n \approx 376$$

The simple random sampling method was used in selecting 376 students of Federal Polytechnic of Oil and Gas Bonny. This means that each student had an equal chance of being part of the 376 selected respondents.

Data for this study were collected with the aid of a structured questionnaire which was validated by communication experts. The internal consistency of the instrument was using Cronbach's alpha value. The test yielded a reliability coefficient of 0.7 which was acceptable.

The data generated were arranged and coded using Statistical Package for Social Sciences (SPSS) 23 which facilitated the overall data analysis. The data analysis was done using frequency distribution tables, simple percentages and weighted mean scores. The mean was calculated by assigning nominal value to the response categories: strongly agree (SA) 4, agree (A) 3, disagree (D) 2 and strongly disagree (SD) 1. The criterion mean was achieved thus:

$$\text{Criterion mean} = \frac{4+3+2+1}{4} = \frac{10}{4}$$

$$\text{Criterion mean} = \frac{10}{4} = 2.50$$

Decision rule for the research questions were based on a criterion mean of 2.50. Any mean response of 2.50 or above was regarded as agreeing while any mean response rating less than 2.50 was regarded as disagreeing with the given statement.

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

This section presents the statistical analysis of the data gathered from the views and opinions of the respondents as regards answers to the research questions. Descriptive statistics (tables, frequencies and simple percentages) were used.

Table 1: Virtual Communication and e-Learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny

S/N	E-learning Facility	SA (%)	A (%)	D (%)	SD (%)	$\overline{X}$	REMARK
1.	Zoom	183 (50.8%)	141 (39.2%)	16 (4.4%)	20 (5.6%)	3.35	Agreed
2.	Multimedia Projector	166 (46.1%)	157 (43.6%)	15 (4.2%)	22 (6.1%)	3.30	Agreed
3.	Computer/Laptop	121 (33.6%)	179 (49.7%)	35 (9.7%)	25 (6.9%)	3.10	Agreed
4.	Mobile phones	117 (32.5%)	206 (57.2%)	19 (5.3%)	18 (5.0%)	3.17	Agreed
5.	Internet	130 (36.1%)	168 (46.7%)	23 (6.4%)	39 (10.8%)	3.08	Agreed
	Cumulative Mean ($\overline{X}$)			**3.2**			**Agreed**

The results in the above table showed that the respondents were in agreement with all the five statements/items on virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny. This indicates that the virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny include: zoom, multimedia projector, computer/laptop, mobile phones and internet.

Table 2: Factors affecting effective utilization of virtual communication and e-Learning facilities in Federal Polytechnic of Oil and Gas Bonny

S/N	Factors affecting Virtual Communication Utilization	SA (%)	A (%)	D (%)	SD (%)	$\overline{X}$	REMARK
1.	Lack of ICT skills among lecturers and students.	165 (45.8%)	150 (41.7%)	10 (2.8%)	20 (5.6%)	3.19	Agreed
2.	Lack of internet or slow connectivity.	158 (43.9%)	149 (41.4%)	12 (3.3%)	21 (5.8%)	3.12	Agreed
3.	Lack of finance and distributive capacity.	124 (34.4%)	161 (44.7%)	14 (3.9%)	33 (9.2%)	2.89	Agreed
4.	Lack of electricity/power supply.	163 (45.3%)	151 (41.9%)	20 (5.6%)	26 (7.2%)	3.25	Agreed
5	High cost of personal computer, laptop, and phones.	133 (36.9%)	164 (45.6%)	25 (6.9%)	39 (10.8%)	3.09	Agreed
	Cumulative Mean ($\overline{X}$)			**3.1**			**Agreed**

The results in the table indicate that the respondents were in agreement with all the five statements/options on the factors affecting effective utilization of virtual communication and e-learning facilities in Federal Polytechnic. Thus, lack of ICT skills among lecturers and students, lack of internet or slow connectivity, lack of finance and distributive capacity, lack of electricity/power supply as well as high cost of personal computer, laptop, and phones affected the utilization of virtual communication.

Table 3: Influence of virtual communication and e-Learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny

S/N	Influence of Virtual Communication and E-learning Facilities on Students' Performance	SA (%)	A (%)	D (%)	SD (%)	$\overline{X}$	REMARK
1	It accelerates students' level of assimilation.	190 (52.8%)	135 (37.5%)	18 (5.0%)	17 (4.7%)	3.38	Agreed
2.	It helps students to learn better acquisitions and longer retention of ideas	173 (48.1%)	162 (45.0%)	25 (6.9%)	8 (2.2%)	3.43	Agreed
3.	It widens students' scope of understanding of economics.	166 (46.1%)	158 (43.9%)	17 (4.7%)	17 (5.2%)	3.30	Agreed
4.	It helps to improve students' level of intelligence.	134 (37.2%)	177 (49.2%)	29 (8.1%)	20 (5.6%)	3.18	Agreed
5	It leads to improved academic performance.	156 (43.3%)	155 (43.1%)	38 (10.6%)	11 (3.1%)	3.23	Agreed
	Cumulative Mean ($\overline{X}$)		**3.3**				**Agreed**

The results in the table revealed that the respondents were in agreement with all the five statements/options on the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny. This implies that the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny includes: accelerating students' level of assimilation; helping students to learn better acquisitions and longer retention of ideas; widening students' scope of understanding of economics; helping to improve students' level of intelligence; and leading to improved academic performance.

DISCUSSION OF FINDINGS

The study examined virtual communication and e-learning in tertiary institutions: A study of Federal Polytechnic of Oil and Gas Bonny. The study made use of descriptive statistics, in terms of frequencies, simple percentages, and weighted mean scores to analyse the demographic data of the respondents and to answer the research questions. However, having carried out the data analysis, the discussion of the findings was done as follows:

Research Question 1: What are the virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny?

The result of the answers to the first research question in this study showed that the virtual communication and e-learning facilities commonly used by lecturers and students for teaching and learning in Federal Polytechnic of Oil and Gas Bonny includes: zoom, multimedia projector, computer/laptop, mobile phones and internet. This finding is supported by the finding of Anekwe (2021) who stated that laptop, mobile phones, and projector are the commonly used virtual communication and e-learning facilities in Nigerian tertiary institutions.

Research Question 2: What are the factors affecting effective utilization of virtual communication and e-learning facilities in Federal Polytechnic of Oil and Gas Bonny?

The result of the answers to the second research question in this study showed that the factors affecting effective utilization of virtual communication and e-learning facilities in Federal Polytechnic of Oil and Gas Bonny includes: Lack of ICT skills among lecturers and students, lack of internet or slow connectivity, lack of finance and distributive capacity, lack of electricity/power supply as well as high cost of personal computer, laptop, and phones. This finding is supported by the finding of Egoigwe, Nweke, Wada, Ali and Madu (2020) who identified inadequate financing, high cost of digital gadget as the factors affecting effective utilization of virtual communication and e-learning facilities in higher institutions in Nigeria.

Research Question 3: What is the influence of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny?The result of the answers to the fourth research question in this study showed that the impact of virtual communication and e-learning facilities on academic performance of students in Federal Polytechnic of Oil and Gas Bonny includes the following: It accelerates students' level of assimilation, it helps students to learn better acquisitions and longer retention of ideas, it widens students' scope of understanding of economics, it helps to improve students' level of intelligence while it lead to improved academic performance. This finding is supported by the finding of Boma and Liah (2021) which stated that virtual communication and e-learning facilities play a vital role in improving student academic performance.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This study examined virtual communication and e-learning in tertiary institutions with Federal Polytechnic of Oil and Gas Bonny as anchor. The study was established with an introduction. Subsequently, relevant literature was reviewed theoretically, conceptually and empirically. This was followed with a summary of the review. The next section discussed the methodology of the paper.

Generally, the importance of virtual communication and e-learning is being realized by the educators and stakeholders across the globe as it has the potential to provide access to higher education. It encourages education system which has something to offer to people in society. It covers all technologies and supports the pursuit of life-long learning for all. Drawing from the foregoing, this study examined virtual communication and e-learning in tertiary institutions, using Federal Polytechnic of Oil and Gas Bonny as a test case study. It is concluded that virtual communication and e-learning play a vital role in improving students' academic performance in Federal Polytechnic of Oil and Gas Bonny.

Based on the findings, the following recommendations are proffered:

i. There should be adequate awareness on the importance of virtual communication and e-learning facilities to lecturers and students in tertiary institutions.
ii. Knowledge of ICT usage should be made a prerequisite for employing workers in the school system.
iii. The management of Federal Polytechnic of Oil and Gas Bonny should invest more on the acquisition of computers and other new electronic resources and computerized tools in order to encourage both students and lecturers to actively make use of virtual communication and e-learning facilities.
iv. Adequate funds should be allocated for the acquisition and development of virtual communication and e-learning facilities in tertiary institutions.

REFERENCES

Akarika, D. C. & Ekanem, E. D. (2018). The social media and the challenges of social responsibility in Nigeria. *AKSU Journal of Communication Research*, 3, 151-165

Allison, B. R., Dangari, E., Sanchi, I. D., Alhassan, Y. J. & Badamasi, Z. (2022). Role of e-learning on academic performance of undergraduate students of Kebbi State University of Science and Technology Aliero, Nigeria. *East African Scholars Journal of Education, Humanities and Literature,* 5(9), 170 -175.

Alsaadat, K. (2018). The impact of social media technologies on adult learning. *International Journal of Electrical & Computer Engineering (2088-8708),* 8(5), 3747-3755.

Anderson, J. (2003). IT, e-learning and teacher development. *International Education. Journal, Shannon Research Press,* 5(5) 1-14.

Anekwe, J. U. (2021). Impacts of virtual classroom learning on students' of Nigerian federal and state universities. *European Journal of Research and Reflection in Educational Sciences,* 5(3), 21-36.

Asogwa, C. I. (2011). *The Challenges of Optimizing E-Learning Opportunities for Effective Education Service Delivery in University of Nigeria Nsukka*. Publication of Institute of Education University of Nigeria, Nsukka (UNN, 2011).

Boma, I. D. & Liah, P. B. (2021). Perceived influence of e-learning on business education students' academic performance in Rivers State Universities. *International Journal of Innovative Information Systems & Technology Research,* 9(4), 33-40.

Chiaha, G.T.U, Eze, J. U. & Ezendu, F. O. (2013). Education students access to e-learning facilities in universities South -East of Nigeria. *Information and Knowledge Management,* 3(10), 32-41.

Daniel, C. A., Nnamdie, U. K. & Uduot, A. I. (2021). Computer mediated communication and academic performance of university students in Nigeria. *Global Journal of Arts, Humanities and Social Sciences,* 9(9), 41-57.

Egoigwe, S. V., Nweke, P. O., Wada, I. B., Ali, A. A. & Madu, C. V. (2020). Impact of e-learning on academic performance of postgraduate students in higher institution in Nigeria. *Journal of Engineering and Applied Sciences*, 15(14), 2863 – 2868.

Jimoh, S. O. & Bupo, G. O. (2021). Challenges facing e-learning (electronic learning) in teaching business education courses: Strategies for improvement. *Unizik Orient J Educ,* 6, 163-169.

Kemp, J. E. (2006). Societal evolution and the need for systematic change in education technology. *Trends*, 50(2), 20-21.

Levy, Y. (2020). *Assessing the value of e-learning systems*. Information science Publisher, London, UK.

Mahahusudhan, N. (2018). *E-Learning in the 21st century: A framework for research and practice*. Routledge/Falmer, London.

Markus, M. & Robey, D. (2018) Information technology and organizational change: causal structure in theory and research. *Manag Sci*, 34(5), 583–598.

Naeem, A. B., Faizat, A. A., Musbau, D. A., Yahaya, I. S. & Adeyinka, A. (2023). Undergraduate students' perception on e-learning systems during COVID-19 pandemic in Nigeria. *Heliyon*, 9(2), e14549.

Naqvi, S. H. (2017). Use of electronic resources of Jamia Millia Islamia (A Central University): A case study. *NACLIN*, 320-324.

Nwokonko, R. N. (2020). E-learning and students academic performance in national open university of nigeria (noun): a case study of Yenogoa Study Centre, Bayelsa State. *International Journal of Educational Research and Policy Making*, 3(1), 468- 476.

Oladosu, I. O. (2015). Impact of e-learning and digitalization in primary and secondary schools. *Journal of Education and Practice*, 6(17), 53-58.

Tuncay, N. (2016). Smartphones as tools for distance education. *Journal of Educational and Instructional Studies in the World*, 6(2), 21467463.

Uzodimma, U. (2017). *The Use of Information Communication Technology in Secondary Schools in Nigeria: Problems and Prospect*. In Eze, D. N. and Onyegegbu, N. (Ed.) Information Communication Technology in the Service of education: Nsukka: Timex Publishers.

Wagbara, C. D. & Adiela, U. S. (2023). The use of e-learning technologies as a predictor of students academic performance in public secondary schools in Port Harcourt and Obio-Akpor LGA, Rivers State. *Journal of Advances in Education and Philosophy*, 7(8), 254-261.

Wani, H. A. (2018). The relevance of e-learning in higher education. *Journal Kajian Pendidikan*, 3(2), 181-194

White, G. (2003). E-learning – Key Australian initiatives: An opportunity for all leader.