



UTILIZATION OF E-LEARNING TECHNOLOGIES FOR EFFECTIVE INSTRUCTIONAL DELIVERY OF ELECTRICAL/ELECTRONIC COURSES IN POST COVID-19 ERA IN TERTIARY INSTITUTIONS IN RIVERS STATE

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Abstract

The study examines utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic courses in post COVID-19 era in tertiary institutions in Rivers State. Three research questions were answered to guide the study. The study adopted descriptive research survey design. The population of the study was 47 Electrical/Electronic Technology respondents comprises of 11 lecturers and 36 postgraduate students from Rivers State University, Port Harcourt and Ignatius Ajuru University of Education. Due to small population size, the entire population was used for the study and hence there was no sample and sampling technique. The instrument for data collection was a self-structured questionnaire design in a four-point modified rating of agreement which was used for data collection. The instrument was given to three experts for face and content validation. The reliability of the instrument was established using test-retest method and computed with Pearson Product Moment Correlation (PPMC) and a coefficient (γ) of 0.86 was obtained. Data collected were analysed with frequency and percentage for research question 1 while research question 2 and 3 were analysed using mean with standard deviation. The study found that majority of the e-learning platforms identified were not utilized in Electrical/Electronic Technology for effective instructional delivery in tertiary institutions in Rivers State. The study further found that utilization of e-learning technologies for instructional delivery are marred with challenges despite it benefits in teaching and learning of Electrical/Electronic Technology courses in tertiary institutions in Rivers State. Based on the findings of the study, it was recommended that e-learning platforms that are available should be encouraged and used among students and lecturers as it is obtainable in other institutions for academic activities. This would serve as an alternative for face-face teaching and learning processes. The Department/institution should improve their ICT facilities and provide free internet access. This will create an awareness about the potentials and prospects of e-learning in Electrical/Electronic Technology and the school generally.

Keywords: Covid-19, E-Learning, Electrical/Electronic Technology, Instructional Delivery, Technologies and Utilization

Introduction

The existence of man right from creation has been characterized with outbreak of certain diseases that are infectious, pestilence, and other natural/environmental disasters which have caused havoc and disrupted economic, social, political, educational activities of man and other sectors of society's life. According to Ali, Ahmad and Husain (2017), the history of pandemics is not new and dates back to years with effects on huge population across continents of the world and deaths of millions of people. According to Scheidel (2017), pandemic outbreaks have decimated societies, determined outcomes of wars, wiped out entire populations, but have also paved the way for innovations, inventions and evolutions in technology in diverse areas of life including sciences, agriculture, economy, political and educational systems.

The evolutionary trend in technology has brought about rapid transformations in all facets of education, including the admission processes, content development and delivery, mode of instructions and assessment, result computation, student-teacher interactions, research, and staff development programmes. The recent outbreak of Corona virus Disease 2019 (COVID- 19) reechoed the growing influence of technology on education. Many educational institutions across the world relied on the use of technologies to ensure continued education during the Corona virus lockdown. It was reported by Charles, Stephanie, Barb, Torrey and Aaron (2020) that many institutions cancelled all their face-to-face classes, including labs and migrated to e-learning. The effects of school closures due to COVID- 19 were mitigated by educational institutions that had supportive e-learning facilities during the crisis. For instance, several tertiary institutions provided online education and trainings for her students and staff during the COVID-19 lockdown through the use of e-learning technologies (platforms).

According to Olaniyi (2016), e-learning is the process of delivering knowledge through electronic media, such as the internet, extranet, satellite broadcast, audio video tape, interactive TV, CD-ROM, electronic board and e-library. E-learning is education that uses computerised communication systems as an environment for communication, the exchange of information and interaction between students and instructors (Bermejo, 2005). E-learning is learning based on information and communication technologies with pedagogical interaction between students and the content, students and the instructors or among students through the web (González-Videgaray, 2007). E-learning is defined as learning facilitated by the use of digital tools and content that involves some form of interactivity, which may include online interaction between the learner and their teacher or peers (Ministry of Communication and Technology of New Zealand, 2008).

In this study, e-learning technologies is an online teaching and learning approach that utilizes different educational platforms through the use of electronic media and devices such as mobile phones and computers as tools for enhancing communication and interaction between teacher and learner. By this, it means that e-learning technologies makes teaching and learning to occur at a defined and specific time without a specific venue of classroom and at a separation between the teacher and the student. It is the delivery of a learning, training or education program by electronic means. E-learning could also be considered a natural evolution of distance learning, which has always taken



advantage of the latest tools to emerge in the context of technologies for structuring education (Albert, Dimitrios, & Nati, 2012). Some of these e-learning technologies platforms utilized for effective instructional delivery include, Udemy, Skillshare, Pluralsight Skills, LinkedIn Learning, CBT Nuggets, Udacity, Cloud Academy, A Cloud Guru, ITProTV, Khan Academy, Coursera, Lynda, Masterclass, Edx and Iversity among others.

In order to enhance the functionality of Electrical/Electronic Technology courses in instructional delivery, lecturers and students should be exposed to modern technologies through the use of e-learning (electronic learning), especially in this era of post COVID-19 pandemic in the world, Electrical/Electronic Technology lecturers and students have to be skillful in the use of internet and computer facilities. E-learning is one of the vital tools that promote education which has been defined by Kehinde (2017) as the use of electronic educational technology in teaching and learning. This involves the utilization of resources such as information and communication technology (ICT), technology enhanced learning (TEL), multimedia learning, computer-based instruction (CBI), web-based training (WBT), flexible learning, virtual learning (VLE) among others. Okele (2008), defines Electronic learning as a branch of Information and Communication Technology (ICT) that focuses on the application of information technologies by using electronic devices to disseminate the information. Electronic learning is a sub-system in ICT which involves the use of computer network and web-based technology to facilitate learning opportunities and boost individual performance. The principle of e-learning is an inter-connectivity which is the process by which computers are networked to share information which can link people together. E-learning has some packages which are referred to as hardware, software and connectivity components required for learning.

The use of e-learning platforms provided opportunities for both students and staff of tertiary institutions to continue their normal teaching and learning activities during the COVID-19 lockdowns and has been adopted even in the post COVID-19 era, thereby mitigating to large extent, the adverse effects of the lockdown on their staff and students and hence contributing to an effective instructional delivery.

Effective instructional delivery embraces all human interactive skills employed by the teacher to promote/facilitate learning in the classroom situation thereby leading to improved performance on the part of the learner. It is a process in which teachers apply repertoire of instructional strategies to communicate and interact with the learners around academic content, and to support student engagement for better learning outcome (Leonard, 2013). For effective instructional delivery to take place in tertiary institutions, e-learning must be well utilized in all aspects of education and discipline in teaching and learning of different courses especially Electrical/Electronic technology courses that relates to digital applications and during the post COVID-19 era.

Electrical and Electronic Engineering or Technology is a field of study that implements and applies the principles and behavior of electrons to develop devices and equipment. Indeed, it deals with the design, application, installation, manufacturing, operation and/or maintenance of electrical/electronic systems (Sloan, 2010). It offers knowledge and skills for work and lifelong learning in various engineering and technology fields. Its study

manipulates electricity to design and manufacture products that transmit power or process information. The syllabus therefore, offers broad-based competencies in an appropriate combination of concepts that has to do with circuit design and development. Electrical/Electronic technology is the largest branch of engineering technology and includes a diverse range of subdisciplines such as applied design, electronics, embedded systems, control systems, instrumentation, telecommunications, and power systems (Robinson, 2008). Electronic sub-discipline is a specialized discipline that has more focus on application, theory, applied design, and implementation of the properties of electrons. Electronic sub-discipline also has to do with the use of some components like transistor, capacitor, resistor and diode to develop electronic systems (Bill, 2006). It brings up a workforce with professional skills in both theory and practical; enabling students to use the computers and other electronic systems as at when needed during teaching and learning. Instructional delivery in Electrical/Electronic Technology courses were affected mostly due to the outbreaks of COVID-19 which have negatively impacted on various sectors of the economy including education.

Corona Virus Disease (COVID – 19) written as covid-19 refers to an infectious disease caused by a virus known as corona virus. Corona virus was not common in the world till December 2019, when its first appearance was observed in Wuhan, China. Covid-19 is an infectious disease because it can be transferred from a positive carrier of the virus to another who does not have the disease but near the affected person. This deadly disease was declared a global pandemic by World Health Organization (WHO) on March 11, 2020, after claiming several lives globally. The severity of covid-19 is more on the economies of most developing nations around the world including Nigeria. Corona virus whose history is traceable to China was first noticed in Nigeria in February 2020. The disease posed a serious health risk to all Nigerians particularly, the elderly as many of them died from it due to poor immunity. Since the menace of covid-19, the Nigerian economy was adversely affected as most states of the federation declared partial or complete lockdown in their territories resulting in the closure of businesses, markets, schools, mosques and churches, eateries and schools among others. These effects were felt as no meaningful academic activities took place within this period.

Academic activities involve all processes carried out by lecturers within the universities. It comprises of teaching and learning between lecturers and students, giving and submission of assignment, administration of test and examinations, supervision of projects, thesis and dissertations and assessment of students among others. In a bid for the sustenance of these academic activities despite COVID-19, the universities adopted the use of e-technologies in the teaching and learning process which was later introduced and used by lecturers in Technical Vocational Education programmes. With these technologies, lecturers were able to deliver their lessons effectively, assignment were completely done and submitted, examinations were conveniently and comfortably administered and other academic activities were carried out effectively. These online technologies make lecturers to interact seamlessly with their students notwithstanding the location, or physical barrier between them. Hence, this study attempts to examine utilization of e-learning technologies for effective instructional delivery of



Electrical/Electronic Technology courses in tertiary institutions in Rivers State in the post COVID-19 era.

Statement of the Problem

Technology has introduced new methods of learning and teaching through online for speedy development. Many developed countries have exploited the potentials of technology while the developing countries like Nigeria are also exploiting same in order to improve and transfer education at landscape in institutions of learning. But how effective has instructional delivery in Electrical/Electronic Technology courses in these tertiary institutions as regards to utilization of e-learning technologies platforms.

The advent of new technologies most especially e-learning platforms like; Zoom, Google plus, YouTube, MySpace, Skye, Academia.edu, Twitter, Instagram, Whatsap, We-chat, Docebo, Adobe, Captivate, Google Classroom, Elucidat, Lectora, Blackboard learn, Articulate 360, LinkedIn learning, shift e-learning, udemy, coursera and Moodle has made the world a global village. The Federal Republic of Nigeria (FRN, 2013) in its national policy on education stated that students at all levels of educational system should utilize Information and Communication Technologies such as the internet to enable them complete their education. As a result of the pandemic, most universities across the world were cut in gap for not being able to make use of e-learning platforms for teaching/learning activities. Also, several tertiary institutions due to the lack of these e-learning facilities or lack of technical know-how were unable to make proper use of these platforms for effective teaching/ learning to their students which resulted to overlapping issues in taking examinations, defense, seminars and graduating students as in when due. These inability resulted to truncating of academic activities. The quality of teaching/learning by lecturers and students of Electrical/Electronic Technology cannot be overemphasized as several schools did not participate in online activities and hence most of the e-learning platforms were not utilized for the purpose of learning and research in our different respective tertiary institutions.

The above assertion has made some students to drop out of school and some suffered financial burden of paying extra-charges on school fees.

This breakdown in academic activities in some schools revealed that there was low or absent of online teaching and learning during this pandemic which hinders students carrying out their research studies even in the post era of the pandemic. It is against this backdrop that this study seeks to examine utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State.

Purpose of the Study

The purpose of the study was to examine utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State. Specifically, the study seeks to:

1. Identify various e-learning technologies utilized for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State.
2. examine the benefits of utilizing e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State.
3. Find out the challenges facing the utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State.

Research Questions

The following questions were answer to guide the study.

1. What are the various e-learning technologies utilized for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?
2. What are the benefits of utilizing e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?
3. What are the challenges facing the utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?

Methodology

The study adopted the descriptive research survey design. The study was carried out in tertiary institutions in Rivers State offering Electrical/Electronic Technology. These institutions include Rivers State University (RSU), Port Harcourt, Ignatius Ajuru University of Education (IAUE), Rumuolumeni and Federal College of Education, Technical (FCET), Omoku. The population of the study comprise of all lecturers and postgraduate students of Electrical/Electronic Technology. This gives a population of 47 respondents (Lecturers = 11; Postgraduate Students = 36). Due to small population size, the entire population was used in for the study and hence no sample and sampling technique was done. The instrument for data collection was a self-structured questionnaire titled “Utilization of E-learning Technologies in Electrical/Electronic Courses Questionnaire (UETEECQ)”. The instrument was design and pattern after a modified rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with numerical values of 4, 3, 2 and 1 respectively.

The instrument was given to three experts for face and content validation. Two of the experts in Electrical/Electronic Technology from Rivers State University, Port Harcourt and one expert in Measurement and Evaluation from Ignatius Ajuru University of Education respectively. To establish the internal consistency of the instrument and test the reliability, test-retest method was used by administering copies of the instrument to four lecturers and 11 postgraduate students from Electrical/Electronic Engineering from Rivers State University, Port Harcourt (initial test). After an interval of two weeks, the

same instrument was readministered to the same group (final test). At the end of the second test, the initial and final scores were collated and analysed using Pearson Product Moment Correlation (PPMC) and a coefficient (γ) of 0.86 was obtained. The instrument was administered to 47 respondents and all the copies were completely filled and successfully retrieved. This indicates 100 percent return rate. Data collected were analysed with frequency and percentage for research question 1 while research question 2 and 3 were analysed using mean with standard deviation. The decision was that any platform with a percentage of 50 and above was considered to be Agree (A) for instructional delivery in Electrical/Electronic Technology, otherwise Disagree (D). Also, any item with mean score of 2.50 and above were considered as Agree (A) otherwise Disagree (D).

Results

Results from the study were presented in Table 1 to 3 below.

Research Question 1: What are the various e-learning technologies utilized for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?

Table 1: Frequency and Percentage Response of Respondents on Various E-learning Platforms Utilized in Electrical/Electronic Technology Instructional Delivery

S/N	E-learning Technologies Platforms Utilized	YES (%)	NO (%)
1.	Udemy	0.00 (0.00)	47 (100)
2.	Skillshare	0.00 (0.00)	47 (100)
3.	Pluralsight Skills	0.00 (0.00)	47 (100)
4.	LinkedIn Learning	0.00 (0.00)	47 (100)
5.	CBT Nuggets	0.00 (0.00)	47 (100)
6.	Udacity	0.00 (0.00)	47 (100)
7.	Cloud Academy	0.00 (0.00)	47 (100)
8.	A Cloud Guru	0.00 (0.00)	47 (100)
9.	ITProTV	0.00 (0.00)	47 (100)
10.	Khan Academy	0.00 (0.00)	47 (100)
11.	Coursera	0.00 (0.00)	47 (100)
12.	Lynda	0.00 (0.00)	47 (100)
13.	Masterclass	0.00 (0.00)	47 (100)
14.	Codecademy	0.00 (0.00)	47 (100)
15.	Edx	0.00 (0.00)	47 (100)
16.	Iversity	0.00 (0.00)	47 (100)
17.	Zoom	47 (100)	0.00 (0.00)
18.	Whatsapp	47 (100)	0.00 (0.00)

Source: *Researchers' Field Work; 2021.*

Table 1 revealed that the respondents agree that majority of the listed e-learning platforms identified were not utilized in Electrical/Electronic Technology for effective instructional delivery in tertiary institutions in Rivers State. This was shown in frequency response of the respondents.

Research Question 2: What are the benefits of utilizing e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?

Table 2: Mean Response on Benefits of Utilizing E-Learning Technologies for Instructional Delivery of Electrical/Electronic Technology Courses

S/N	Benefits of Utilizing E-Learning Technologies	Lecturers XSDRMK X		Students SD RMK	
19	E-learning technologies makes learning interesting.	2.63	0.53 A	3.11	0.70 A
20	Learning materials can be accessed irrespective of time and space.	2.89	0.68 A	3.80	0.48 A
21	It is less stressful.	2.63	0.70 A	2.74	0.84 A
22	It provides multiple sources of knowledge	3.47	1.01 A	2.86	1.01 A
23	E-learning platforms stimulates students' interest in learning.	3.55	0.66 A	3.21	0.50 A
24	E-learning platforms makes lessons more interactive.	3.04	0.85 A	3.05	0.76 A
25	It creates online community of practice.	2.84	1.11 A	2.79	0.88 A
26	It enhances active learning in among students.	3.55	0.67 A	3.88	0.67 A
27	It promotes immediate feedback.	2.96	0.57 A	2.73	0.84 A
28	It allows learners move at their own pace.	3.74	0.69 A	3.26	1.01 A
	Average Mean/SD	3.13	0.75 A	3.14	0.77 A

Source: *Researchers' Field Result; 2021.* A - - Agreed

Result from Table 2 shows that the respondents agree that all the items listed are benefits of utilizing e-learning technologies for effective teaching of Electrical/Electronic Technology courses in tertiary institutions in Rivers State. This was shown in mean scores of the respondents with a mean value greater than 2.50 as the benchmark on the four-point rating scale.

Research Question 3: What are the challenges facing the utilization of e-learning technologies for effective instructional delivery of Electrical/Electronic Technology courses in post COVID-19 era in tertiary institutions in Rivers State?

Table 3: Mean Response on Challenges Facing the Utilization of E-Learning Technologies for Instructional Delivery of Electrical/Electronic Technology Courses

S/N	Challenges Facing Utilization of E-Learning Technologies	Lecturers			Students		
		X	SD	RMK	X	SD	RMK
29	Poor internet connectivity	3.60	0.84	A	3.11	0.60	A
30	Computer illiteracy among users	3.70	1.01	A	2.63	0.64	A
31	Lack of resources	2.68	0.83	A	3.72	1.01	A
32	Learning materials cannot be accessed and downloaded in time to support efficient learning	3.04	0.66	A	3.40	1.03	A
33	High cost of personal computer.	3.55	0.74	A	3.94	0.66	A
34	Inequality of access to the technology itself by all the students.	2.94	1.03	A	3.30	0.75	A
35	High cost of acquiring license software	3.14	0.84	A	2.77	0.59	A
	Average Mean/SD	3.24	0.85	A	3.27	0.75	A

Source: *Researchers' Field Result; 2021.* A - - Agreed

Result from Table 3 shows that the respondents agree that all the items listed are challenges facing the utilization of e-learning technologies for effective teaching of Electrical/Electronic Technology courses in tertiary institutions in Rivers State. This was shown in mean scores of the respondents with a mean value greater than 2.50 as the benchmark on the four-point rating scale.

Discussion of Findings

Findings from Table 1 revealed that the respondents agree that majority of the listed e-learning platforms identified were not utilized in Electrical/Electronic Technology for effective instructional delivery in tertiary institutions in Rivers State. This finding is in line with the findings of Stephen (2013) which held that e-learning utilization is dependent on the school and its administrative skill. Stephen noted that the employment of qualified and knowledgeable staff in ICT and free internet access would help improve the staff and students' e-learning capabilities.

Result from Table 2 shows that the respondents agree that benefits of utilizing e-learning technologies for effective teaching of Electrical/Electronic Technology courses in tertiary institutions in Rivers State include enhances active learning in among students, promotes immediate feedback and that it is less stressful. The findings of this study agree with that of Okoro (2021) who found that some of the benefits of using e-learning technologies include making teaching and learning more interesting, allows learners move at their own pace, provision of immediate feedback, flexible to adopt among others. The findings also agree with Panda and Swain (2009) who submitted that e-learning platforms benefits teaching and learning. The findings are also supported by Eze (2016) who opined

that students' participation in online classes and use e-learning platforms can improve e-learning capability.

Result from Table 3 shows that the respondents agree that challenges facing the utilization of e-learning technologies for effective teaching of Electrical/Electronic Technology courses in tertiary institutions in Rivers State include poor internet connectivity, high cost of acquiring license software, lack of resources, high cost of personal computer and computer illiteracy among users. The findings of this study agree with that of Okoro (2021) who found that some of the challenges facing the use of e-learning technologies include shortage of power supply, non-availability of e-learning facilities, poor internet connectivity, high cost of equipment and computer illiteracy among lecturers among others.

Conclusion

The study concludes that various e-learning platforms for teaching and learning are not utilized by in tertiary institutions in Rivers State which affects effective instructional delivery of Electrical/Electronic Technology courses. In spite of its low platforms' utilization, it is beneficial in instructional delivery within the institutions. However, the utilization of e-learning technologies in tertiary institutions were found to be marred with challenges which hinders its level usage by students and lecturers of Electrical/Electronic Technology in effective delivery of courses.

Recommendations

The following recommendations were made based on the findings of the study.

1. E-learning platforms that are available should be encouraged and used among students and lecturers as it is obtainable in other institutions for academic activities. This will serve as an alternative for face-face teaching and learning processes.
2. The Department/institution should improve their ICT facilities and provide free internet access. This will create awareness about the potentials and prospects of e-learning in Electrical/Electronic Technology and the school generally.

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