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The Impact of E-learning Technology on the Emerging and Re-emerging of Infectious Disease Outcomes in Tertiary Institutions in Ondo State, Nigeria

Ebun, O.^{1*} and Ige, I.P.²

¹Department of Public Health Science, Achievers University, Owo Ondo State, Nigeria

²Department of Medical Laboratory Scientist, Achievers University, Owo, Ondo State, Nigeria

Corresponding Author's Email: wwwgbemi@yahoo.com

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Abstract

The lockdown measures to curtail the spread of corona virus pandemic brought major challenges to the educational system in Nigeria. It is therefore imperative that our educational system move with the pace at which education moves globally and technologically. Hence, this study examined the impact of e-learning technology on the emerging and re-emerging of infectious disease outcomes in Tertiary Institutions in Ondo State. The study equally finds out the level of utilization of ICT during the outbreak of infectious disease in tertiary institutions. The study adopted a descriptive survey design in which two research questions were posed. The population of the study was 10,000 while the sample size of 1000 was selected randomly out of the four private and public tertiary institutions Area of Ondo state. Four-point scale questionnaire was used as the instrument for data collection. The instrument was adequately validated with its reliability established using test retest. Data collected were analyzed using mean score. Base on the data collected and carefully analyzed, the result revealed that there was significant impact of e-learning technology on the emerging and re-emerging of infectious disease outcomes in Tertiary Institutions. Based on these findings; it was recommended that the government must further create enabling environment and investment in ICT centers for staffs and students to achieve excellence in teaching and learning process using technological tools. The educational system must be restructured as to accommodate e-learning technology, update the teachers and bridge the learning gap during an outbreak of disease.

Keywords: E-learning, technology, COVID-19, ILT, pandemic, ICT centers, corona virus, infection, outbreak.

1.0 Introduction

Epidemics of emerging and re-emerging infectious diseases are on the increase, with devastating health, social and economic consequences, especially in the developing

countries. The Novel coronavirus outbreak was declared by the World Health Organization as the sixth public health emergency of international concern (WHO, 2020). Nigeria higher education system, and by extension, the entire education system faces a severe setback as such, the

outbreak of the corona virus pandemic has brought the system to a standstill which kept and left dozens of the world's greatest cities indoors, either by choice or by government order. Across the world, shops, theaters, restaurants and bars were closed. Small Island nations, heavily dependent on tourism have empty hotels and deserted beaches (UNDP, 2020) perhaps the estimation of 195 million job could be lost according to the International Labour Organization. Drawing on our experience with other outbreaks such as Ebola, HIV, SARS, TB and Malaria as well as the long history of working with the private and public section, the UNDP has helped countries to urgently and effectively respond to the pandemic as part of its mission to eradicate poverty, reduce inequalities and build resilience to crises and shocks.

According to Adako (2020), African countries have no choice but to close their higher Educations as part of their lockdown measures to curtail the spread of the virus, and tertiary institutions have no option but to have recourse to the use of Information and Communications Technology (ICT) to deliver their programmes online at a distance to their enrolled students. The researcher is of the view that corona virus pandemic has become a catalyst for educational institutions all over the globe to search for innovative solutions to centuries-old lecture-based approaches and outmoded classrooms. This health crisis has presented Nigerians an opportunity to redirect her policies in this critical sector, education, as real change takes place in deep crisis. This crisis offers a turning point, a unique opportunity to learn, reshape and built resilience into the nation's education system. The process has lied bare the digital division within the African continent; between those countries that have improved ICT infrastructure than others. The rich who lived in urban areas and the poor in rural areas who can barely afford to access the internet when and if it is available. Chick (2020) further stated that majority of higher education

institutions do not have the capacity to fully deliver whole programmes online. It is the few open Universities in Africa that have that capacity, but their targets are mostly mature students, working class and those wishing to upgrade their qualifications.

E- Learning is commonly referred to as the international use of networked information and communication technology in teaching and learning which includes, virtual learning, distributed learning, network and web-based learning (Mustafa,2020) posited that the emergence of e-learning technology has made the world into a global village and has transformed teaching and learning processes. Technology integration outside the classroom instruction has gained much ground in developed countries. The concept of E-learning technology integration is now viewed as a fundamental part of successful teaching and learning which has gained the interest of many researchers who investigated and explored effective ways of integrating technology into the teaching and learning processes (Mustafa, 2020) Hagan (2020) noted that students in this generation are proficient and more comfortable with using technology than other generations; therefore, teachers need to prepare students to be proficient in its use so as to increase their performance and to avoid learning gap which may occur during disease outbreak.

With the progress of information and communication technology development, E-learning is emerging as the paradigm of modern education. E-learning technology is an innovative way to motivate students to learn without congregation in the classroom, allowing them to partake in their learning experiences perhaps with the aid of zooming, Skype, Streaming and other distant learning devices.

Table1: Online teaching tools and their applications

S/N	Online Tools	Applications
1	Zoom	Cloud-based video conferencing service. It can also serve as virtual classroom with teacher and students participation through chat. Sessions can be recorded to be viewed later
2	Kaltura	Video e-learning solution for educational institutes and organizations to train students and employees.
3	Google Classroom	Simplify how to create assignments, get the grade out to the students, and provide feedback efficiently in a paperless way
4	Canva	For easy creation of presentation and project instantly using various available online templates.
5	Flipped classroom model	Help in demonstrating events that have traditionally taken place inside the classroom to take place outside the school and vice versa.
6	Kaizala	Used for posting training, quizzes, and assignment online effectively.
7	MOOC	Offers learning opportunities to teachers across the globe by receiving a lot of input on varied topics, sharing views, etc
8	WebEx	Allow teachers to host video meetings with ease. Can also serve as a virtual classroom with teacher and student participation through chat
9	Video Streaming	Is an online entertainment source for TV shows, movies and other streaming media? This service provides an alternative classroom lectures
10	MOODLE	An excellent tool for learning and assessing students performance and generating feedbacks
11	Docebo	A software that offers a learning portal for teachers and students, companies and their employees as well as partners and customers.
12	Adobe captivate	Allow creation of aesthetically-designed, fully-responsive e-learning content with a smart authoring tool in just a few minutes without programming. Also allow application of video-based learning by quickly adding interactivity to videos, which you record yourself, or bring in from YouTube, and drive up learner engagement.
13	Bamboo learning	Voice-based e-learning instructional tools cover a range of academic subjects, including math, listening comprehension, and social studies. The unique nature of voice technology promotes active convectional learning, which is highly beneficial during social distancing. Suitable mostly for Children.
14	Microsoft teams	This is a digital hub that brings conversations, content, and assignments together in one place, allowing educators to create vibrant learning environments, quickly converse with students, share files and websites, grade and assignments.
15	Google hangout (meet)	Video conferencing tools allow users to collaborate at a distance, instant message, video chat, and share photos, computer screens, and files. Also allow engagement of students in collaboration outside of the classroom.
16	Skype	Skype is a video conferencing platform that provides a variety of educational opportunities for active online classrooms. Students can connect with other students as well as their teachers, increase their knowledge, learning progress monitored and assessed.
17	Edubakery.com	It provides puzzles which can either be downloaded or created. Using the same or different vocabulary, you can construct crosswords, bingo cards, word searches, or word scrambles that will aid in learning processes.

Labbo and Place (2010) revealed that technology allows students to learn in ways. Sahu (2020) posited that integrating technology in or outside the classroom allows students a greater opportunity to learn and also allows students to develop critical-thinking skills.

Many countries across the globe have been using various e-learning pedagogies to facilitate teaching and learning, which wouldn't have been possible without the availability of e-learning teaching materials/activities. There are several e-learning teaching materials/activities currently available that are supported by internet services. Without the e-learning tools, internet service alone is useless (Sahu, 2018).

Majority of Nigerian universities are not fully exposed to the use of these new innovation of e-learning tools, skills acquisition and practical teaching (Adako and Aturamu, 2020). It should be noted that spite of the copious exposure to computer education as a general studies course in Nigeria Universities, more than 80% Nigerian Universities does not utilize computer for teaching and learning purposes (Adako and Aturamu, 2020). This implies that a practicing lecturer must frequently update his/her knowledge in this dynamic world to be relevant in the profession. An obsolete teacher loses touch realities of life and will gradually lose his/her status, which could not use ICT facilities to enhance their productivity in the classroom environment?

Talking about the quality of teaching and learning, it is a fallacy to believe that online learning could be effective by merely posting a lecture note or having a video recording of the lecture which is actually happening at the moment. Experience has shown that quality online learning implies that the teaching materials is prepared by a professional instructional designer, that the lecturer is pedagogically trained for delivery the programme and the students are equally exposed to the pedagogy of online learning as the unprepared

online delivery will have an impact on the quality of the programmes (Mustafa, 2020). The worst affected programmes would be science subjects, as students would be unable to access laboratories for their practical lectures.

The pace at which education moves globally technologically calls for an urgent step to swing towards that direction so as not to become oblivion in the scheme of global development. Institutions of higher learning consciously and unconsciously compete with each other in the world over. This competition remains the engine that drives the wheel of innovation and continuous research into these institutions. To remain relevant and maintain the preferred university Education status in the globe, Nigeria is unrelenting in her drive to achieve excellence. Hence, her mission focuses on enhancing the quality of teaching and learning continuously updating the methods and skills of knowledge providers by equipping them with modern technology services delivered by skilled and motivated members of staff to meet the contemporary and future needs of Nigeria with the capability to compete globally.

Asaolu (2021) posited that the emergence of technology has made the world into a global village and has transformed teaching and learning processes. Technology integration into classroom instructions has gained into more grounds in both developed and developing countries, the concept of technology integration is now viewed as a fundamental part of successful teaching and has gained the interest of many researchers who investigate and explored effective ways of integrating technology into the teaching and learning processes (Asaolu, 2021). Asaolu (2021) identified one overarching goal of technology integration as the school's ability to have a global learning environment with

effective and appropriate use of technology in the classroom. However, the author noted that the high cost of acquiring technology is still a major challenge in many developing countries, and its adoption is not expanding as quickly as expected.

Technology is an innovative way to motivate students to learn in the classroom allowing them to partake in their learning experience. Ayodele and Oyewole (2020) revealed that technology allows students to learn in new ways. Ayodele (2020) posited that integrating technology in the classrooms allows students a greater opportunity to learn and also allows students to develop critical thinking skills. Ayodele (2020) noted that students in this generation are proficient and more comfortable with using technology than other generations. In view of this fact, Ayodele (2020) describe students of this generation as technologically proficient, therefore, teachers need to continue to prepare students to be proficient in its use. It is important for educators to understand that students learn more effectively with technology (Ayodele, 2020)

It is impossible to think of effective utilization of ICT in tertiary institutions without the proficiency of lectures in ICT as they have a vital role to play. However, it appears that the use of ICT in facilitating lecturers' education is still a myriad in Nigeria as many of the lecturers are not proficient in ICT. It could be observed that few lecturers in Nigeria tertiary institutions are computer literate. This is a great challenge facing the effective use of ICT. Closing down schools due to corona virus epidemic by extension has created a lot of setbacks on the progress of our higher institutions of learning. Some of these setbacks include reduced international education, disruption of the academic calendar, cancelation of local and international conferences and workshops, etc (Eze, 2020).

This decision of completely shutting down educational institutions came as a shock to many countries, including Nigeria. This is because

preparedness was not there to handle the pandemic or to continue with educational activities amidst the epidemics. This situation appears to mark a turning point for the words educational system to restructure how teaching and learning are delivered in a crisis- stricken condition like this one. The first point of thought by all education institutions is the use of e-learning platforms. E-learning means, incorporation of modern telecommunication equipment, notably computers, Tablets, and ICT resources into the education system for convenience and effective learning process (Hagan, 2021). However, despite the immense benefits of the e-learning platforms available, not many Nigerian higher institutions of learning embraced it (Hagan, 2020). The sporadic pace of information and Communication Technology (ICT) is seen in the innovative development of advanced countries such as America, the United Kingdom, and Canada. These countries have embraced e-learning platforms long before the outbreak of this corona virus pandemic. For example, Japan conducts a virtual convocation ceremony for its students using robotics due to her advancement in (ICT) (UNESCO, 2021).

The higher education system in most African countries, particularly Nigeria, lags so much in the utilization of e-learning platforms as such educational activities have come almost to a standstill during this pandemic (UNESCO, 2016). Numerous constraints are responsible for the backwardness in the utilization of e-learning resources in Nigeria such as lack of adequate electricity supply, many high institutions of learning do not have constant power supplies, access to ICT infrastructure, majority of the lecturers are not ICT literate and lack of funding etc are discouraging technology and digital education and its applications.

One of the sure ways of raising the standard of Nigeria education, notably the higher education system, is the complete and uninterrupted access to modern technology (Eze, 2018). Connecting

schools to the internet is a foundational aspect and driver of transformative learning. Almost half of the world's population is affected by the digital divide, of which Africa is the worst hit. Connecting remote Institutions to bridge the gap should be the focus of our leaders (Eze, 2018). If all the rural and urban institutions of Nigeria are to be covered with internet services, Standard fiber connections will be extremely costly and inefficient, as such, satellite connections are the best solution for better and sustainable internet connectivity (Eze, 2018)

To realize an African Outer Space Programme, one of the Major programs of the AU Agenda 2063. The African Space Policy and Strategy were adopted by African Union Heads of State Government during their Twenty- Sixth Ordinary Session on 31 January 2016 in Addis Ababa (UNESCO, 2020). This space technology has been placed in the forefront as a significant feature of national development and transformation by some African countries. For instance, Rwanda has launched a satellite named Icyerekezo, in partnership with OneWeb, a global communications company, and the Rwandan Government. The satellite was launched to bridge the digital divide in rural schools in Rwanda (UNESCO, 2020)

Several studies have shown that online learning provides an alternative that make education accessible and that there are various means of virtual classes (Adako, 2020). These include integrated digital platforms using personal tablets, video lesson. However, very few studies have examined actual factors associated with *the impact of e-learning technology on the emerging and re-emerging of infectious disease outcomes in Tertiary Institutions in Ondo State and the level of utilization of ICT during the outbreak of infectious disease in tertiary institutions.* To fill this gap, the researcher therefore wants to *examine the impact of e-learning technology on the emerging and re-emerging of infectious disease outcomes in Tertiary Institutions in Ondo State.*

The study equally finds out the level of utilization of ICT during the outbreak of infectious disease in tertiary institutions in Ondo State.

In addition to assessing how utilization of IC might induce changes in higher educational system, it will also show how Technology is an innovative way to motivate students to learn in the classroom, allowing them to partake in their learning experience. Adako (2020) revealed that technology allows students to learn in new ways. Adako (2020) posited that integrating technology in the classrooms allows students a greater opportunity to learn and also allows students to develop critical thinking skills. Hagan (2004) noted that students in this generation are proficient and more comfortable with using technology than other generations. In view of this fact Hagan (2004) describe students of this generation as technologically proficient. The advancement of technology continues; therefore, teachers need to continue to prepare students to be proficient in its use. It is important for educators to understand that students learn more effectively with technology.

1.2 THE OBJECTIVES OF THE STUDY

The objectives of the study were:

1. To examine the effect of lockdown measures during an outbreak of infectious disease on the academic activities in tertiary institutions in Ondo State
2. To examine the level of utilization of e-learning technologies in the tertiary institutions during an outbreak of infectious disease in Ondo State.

1.3 RESEARCH HYPOTHESIS

1. There is no significant relationship between lockdown measures during an outbreak of infectious diseases and the academic activities in tertiary institutions in Ondo State.

2. There is no significant relationship between lockdown measures during an outbreak of infectious diseases and the utilization of e-learning technologies in tertiary institutions in Ondo State.

2.0. Methodology

The study adopted a descriptive survey design in which two research questions were posed. The population of the study was 10,000 while the sample size of 1000 was selected randomly out of the four private and public randomly selected tertiary institutions Area of Ondo state. These higher educational institutions include 1. Adekunle Ajasin University, Akungba Akoko, 2. Federa University of Tecnology, Akure. 3. Achievers University, Owo 4 National Open

University Akure. Four-point scale questionnaire was used as the instrument for data collection. To ascertain the validity of this instrument, the researcher gave three copies to three experts in the relevant fields, the comments and suggestions were used to improve the quality of the instrument. To determine the reliability of the instrument, the researcher adopted a test re-test method to twenty (60) respondents outside the study area at two weeks interval. Both results were compared using Pearson product moment correlation (PPMC) statistical analysis. A reliability coefficient 0.75 was obtained which was considered high enough for the study. The data for this study was collected, sorted, coded and subjected to appropriate descriptive statistical analysis and inferential statistical method. Mean score was used to analyse the stated hypothesis at 0.05 alpha level of significant.

3.0 RESULTS

Table1; Mean responses on the effect of lockdown measures on the academic activities among the four selected tertiary institutions in Ondo State.

S/N	ITEMS N=200	SA	A	D	SD	N	DF	X	0.05	DECI SION
1	Academic activities were not stopped in FUTA during coronavirus pandemic lockdown	200 (800)	300 (900)	200 (400)	300 (300)	1000	2	2.4	2.5	Sig
2	Academic activities were not stopped in Adekunle Ajasin University during coronavirus pandemic lockdown	10 (40)	20 (60)	90 (80)	80 (80)	1000	2	2.3	2.5	Signif icant
3	Academic activities were not stopped in Achievers University during coronavirus pandemic lockdown	18 (72)	90 (270)	10 (20)	82 (82)	1000	2	2.2	2.5	Signif icant
4	Academic activities were not stopped in National Open University of Nigeria during coronavirus pandemic lockdown	60 (240)	40 (120)	50 (100)	50 (50)	1000	2	2.55	2.5	Not Signif icant

The result presented in table 1 shoes that the grand mean t calculated (9, 45) is lesser than the t- table (10). Thus the null hypothesis is rejected, meaning that there is significant relationship between lockdown measures on the academic activities among the four selected tertiary institutions in Ondo State. It is observed that in the National

Open University, majority of the responses supported that academic activities was not interrupted during coronavirus pandemic. Meaning that the institution adopted e-learning method of teaching and learning during coronavirus pandemic.

Table2; Mean responses on the level of utilization of e-learning methods in tertiary institutions in Ondo State during coronavirus disease outbreak

S/N	ITEMS N=200	SA	A	D	SD	N	DF	X	0.05	DECI SION
1	No constant power supply to use ICT materials	200 (800)	300 (900)	250 (500)	250 (250)	1000	2	2.45	2.5	Sig
2	No access to ICT materials due to the high cost of acquiring the technology	50 (200)	100 (300)	450 (900)	400 (400)	1000	2	1.8	2.5	signifi cant
3	Majority of the Lecturers are not ICT literate	10 (40)	40 (120)	490 (980)	460 (460)	1000	2	1.6	2.5	Signif icant
4	Lack of sufficient funding has made the realization of the e-learning process almost impossible	225 (900)	275 (825)	225 (450)	275 (275)	1000	2	2.45	2.5	Signif icant

The result presented in table 2 shows that the grand mean t calculated (9, 01) is lesser than the t- table (10). Thus the null hypothesis is rejected, meaning that there is significant relationship between the levels of utilization of e-learning methods in tertiary institutions in Ondo State during coronavirus disease outbreak.

4.0 DISCUSSION

Hypothesis one above indicated that there is a significant relationship between lockdown measures on the academic activities among the four selected tertiary institutions in Ondo State. The null hypothesis was rejected, meaning that the outbreak of the corona virus pandemic has

brought the educational system to a standstill, only the National Open University that was not affected by lockdown. From this analysis, it can be concluded that Nigeria Higher education system, and by extension, the entire education system faces a severe setback as such, Closing down schools due to coronavirus pandemic has created a lot of setbacks on the progress of our higher institutions of learning. This agrees with the findings of (Pearson, 2019) who stated that, one of the sure ways of raising the standard of Nigeria education, notably the higher education system, is the complete and uninterrupted access to modern technology. This decision of

completely shutting down educational institutions came as a shock to many countries, including Nigeria. This is because preparedness was not there to handle the pandemic or to continue with educational activities amidst the epidemics. This situation appears to mark a turning point for the words educational system to restructure how teaching and learning are delivered in a crisis-stricken condition like this one.

Hypothesis two above indicated that there is significant relationship between the levels of utilization of e-learning methods in tertiary institutions in Ondo State during coronavirus disease outbreak. The null hypothesis was rejected, meaning that, Technology integration into classroom instructions has gained into more grounds in both developed and developing countries the concept of technology integration is now viewed as a fundamental part of successful teaching and has gained the interest of many researchers who investigate and explored effective ways of integrating technology into the teaching and learning processes. This agrees with the findings of Asaolu (2021) who posited that the emergence of technology has made the world into a global village and has transformed teaching and learning processes. It was only the National Open University that served as reference point, because, e-learning is fully practiced by the school.

5.0 Conclusion

Arising from the findings of this study, it could be inferred that e-learning technology was inadequately utilized in Tertiary Institutions in Ondo State during corona virus pandemic, which resulted to the educational system and students to remain in locked-down. In the view of Atom (2020), the coronavirus pandemic has become a

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catalyst for tertiary institutions in Nigeria to search for innovative approaches towards sustaining educational activities while students are at home. The digital learning remains an option which the government can utilize to reach out to students at their different nooks and crannies of Nigeria.

6.0 RECOMMENDATION

This study has the following suggestions:

1. Higher education course creator should work closely with their information Technology (IT) Department to ensure that their programmes are supported and will be able to handle all lectures. The success recorded by National Open University of Nigeria should be a reference point for all higher education in Nigeria.
2. Educational radio and television programming, which have ready potential to reach a great number of students and educators should be encouraged and sustained.
3. Government should protect and prioritize education spending within the budget to address the challenge of poor funding for critical online learning infrastructure.
4. The higher education regulators must prevail on the higher institutions in Nigeria to explore the possibilities of online learning and redefine the platform for delivering tertiary education. Create communities of lecturers and school managers to facilitate sharing of experience and discussion on coping strategies and support when facing difficulties.
5. Digital literacy training for lectures and administrators must be encouraged and sustained.

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