

# Educational Technology for Teaching and Learning in the Post Covid-19 Era: A Case Study of Tertiary Institutions in Imo State, Nigeria

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## ABSTRACT

The research work was on educational technologies for teaching and learning in the post Covid 19 era: A case of tertiary institutions in Imo State. The study has 4 research questions. The study adopted survey research design. A sample population of 10 educators each was drawn from the department of Library and Information Science of Federal Polytechnic Nekede Owerri (FPNO) and Imo State University Owerri (IMSU). Observation checklist and questionnaire were used to collect data. Data collected were analyzed using frequencies, percentages and mean scores. The study found that the available educational technologies for teaching and learning in tertiary institutions in Imo State were computers, powerpoint equipment, social media tools, projectors, etc. The educational technologies integrated in teaching and learning in the post Covid 19 era are computers, whiteboards, smart boards, projectors, tablet or smartphone, digital cameras, etc. The challenges to the integration of educational technologies for teaching and learning are inadequate funding, insufficiency of ET/ICT infrastructure, erratic power supply, high cost of ET, and poor ICT policy in the use of ICT/ET etc. The solutions to the challenges in the integration of educational technologies for teaching and learning are adequate funding, sufficiency of ET/ICT infrastructure, good power supply, good maintenance culture on ET, adequate technical support, and regular training of educators in use of ET etc. The research concluded that the outburst of Covid 19

pandemic has provided educators with the opportunity to adopt educational technologies for teaching and learning in the post covid 19 era, and integrating these educational technologies in tertiary institutions will improve digital education and as well enable students to continue their learning activities. The study recommended that adequate training on the use of educational technologies should be provided for educators and their students to improve their teaching and learning, and that there should be adequacy of educational technological tools and resources to support teaching and learning activities in the post Covid 19 era

**Keywords:** Educators, Educational technologies, Teaching and learning, Tertiary institutions, Post Covid 19 era

## INTRODUCTION

Covid 19 pandemic is a deadly disease. Coronavirus first appeared in the city of Wuhan, China, and has spread rapidly to almost all countries across the world (Agim, Oraekwe, Chivuzo & Emenari, 2020). In light of the rising concerns about the spread of Covid 19 and its rate of infections across the globe, many educational institutions have shut down classes and physical contacts/sessions. The Corona virus has revealed emerging vulnerabilities in the education systems around the world (Ali, 2020). It is now clear on the need for a flexible and resilient

educational system as we face unpredictable futures. Against the backdrop, various policy initiatives are being launched by governments and tertiary institutions across the world to map out a means that will enhance continuous teaching activities so as to contain the virus. However, as the world settles gradually towards the post Covid 19 pandemic era, there is anxiety on how to sustain the tempo in the use of related technology for classes and also in the event of a repeat of similar outbreak in the nearest future. This post Covid 19 pandemic era has brought about certain opinions about which system to use in teaching, how to use them to teach, the skills of teachers and students in using them for teaching and learning, and the availability of the system to be used for teaching and learning in tertiary institutions. These have led to the view that the adoptions of educational technologies will be best suited to the post Covid 19 teaching and learning activities while also supporting remote learning; distance education and online learning in future.

Educational technologies otherwise known as educational equipment, audio or visual resources are learning media or systems that are used to project learning instructions to a wide group of people cutting across locations, usually connected to provide access to learners. These educational technologies can be personnel computer, connected computers, projectors, computer-based learning softwares, Moodle, LMS (Black board), PowerPoint, smart boards, whiteboard and some collaborative tools, such as Microsoft Groove and Dropbox, which are teaching assistance technology. Education Technology (ET) is defined as “the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources” (Richey, 2008). ET can be used by all educators who want to incorporate technology in their teaching as well as educational administrators. The emergence of different educational tools and software has motivated many learning

organizations to integrate them into the curriculum as they can have a great impact on student learning (Hawkins, Panush & Spielvogel, cited in AlAmmary, 2012).

In view of the forgoing, it is clear that these educational technologies can empower teachers and learners, promote change and foster the development of twenty-first century skills. Educational technologies can also enhance students’ learning and achievement; provide motivation for them to get more involved in learning activities through which they become more active and more interested in learning even at the post Covid 19 pandemic era. According to Stošić (2015), the application of educational technology requires knowledge from several areas: pedagogy, psychology, didactics, computer sciences, informatics... (111). Therefore, the educator must be skilled in the use of Microsoft Groove and Dropbox which are teaching assistance technologies. The integration of these technologies can enhance their communication with the students; reduce the teaching pressure caused by the course material preparation. Aside integrating these educational technologies, Ngakan (2016) stated that educators need to be innovative and creative in their teaching methods so that the learning process will more interesting and can reach the target learning. This can be happen if the educator continues to update the teaching materials (educational technologies) with varied learning methods.

Notwithstanding the fact that integration of educational technologies are emerging and evolving quickly, educational technologies are still not being applied sufficiently, mostly for reasons of lack of technology budget and IT investment, and technical support. Other issues that have affected their integration in teaching and learning are inadequate computing and ICT infrastructure, lack of teacher and students skills in utilizing the educational technologies, low internet bandwidth and poor connection, epileptic power supply to operate the educational technologies and

imminent lack of maintenance culture on the tools. In view of the forgoing, the research work will examine the integration of educational technologies for teaching and learning in the post covid 19 era: A case of tertiary institutions in Imo State. Specifically, the study has posed the following research questions:

- i. What are the available educational technologies for teaching and learning in tertiary institutions in Imo State?
- ii. What are the educational technologies that educators integrate in their teaching and learning in the post covid 19 era?
- iii. What are the challenges to the integration of educational technologies for teaching and learning by educators in the post covid 19 era?
- iv. What are the solutions to the challenges to the integration of educational technologies for teaching and learning by educators in the post covid 19 era?

### **Educational Technologies**

Educational technologies are any learning tools, connected systems or applications that are projected, applied or integrated in a learning environment for the purpose of enhancing teaching and learning. According to Stošić (2015) educational technology is a systematic and organized process of applying modern technology to improve the quality of education (efficiency, optimal, true, etc.). Stošić further sees it as a systematic way of conceptualizing the execution and evaluation of the educational process, i. e. learning and teaching and help with the application of modern educational teaching techniques. It includes instructional materials, methods and organization of work and relationships, i.e. the behavior of all participants in the educational process. Definition of educational technology according to AECT (The Association for Education Communications & Technology) is the study and ethics of practice to facilitate learning and improve performance by creating, using, and managing appropriate technological processes and resources (Molenda, 2013). In the process /

concept of educational technology, the task of the media or tool is not only to communicate the relationship between the source (instructor) and the recipient (the student), but more than that it is an integral part and has interrelationships between components with one another, mutually interact and influence each other (Sudarsana, 2013). Educational technologies are learning tools such as teleconferencing, computer, Internet, projectors, computer-based learning softwares, Moodle, LMS (Black board), PowerPoint, smart boards, whiteboard and some collaborative tools, such as Microsoft Groove and Dropbox, which provide solutions to instructional problems and also improves the effectiveness and efficiency of learning in educational contexts

### **Integration of educational technologies for teaching and learning in a post Covid 19 era**

Over the years, there has been the call for integration of ICT and educational technologies in the teaching and learning process in educational institutions. This is because of the widespread belief that ET can enhance teaching and learning practices (Higgins, 2003), and create an "ideal" learning environment (Marshall, 2002). Regrettably, they have not been applied fully in schools as the manual or traditional teaching and learning methods are still highly prevalent in the school system. However, with the closedown of schools due to the Covid 19 pandemic, there has been an increased shift of many educational institutions to the integration of educational technologies in their learning process. This massive move to the use of educational technologies is connected with the view that if any future circumstance occurs that will warrant closedown of schools; these tools would have been greatly utilized and domesticated by majority of educational institutions.

With a view of the post Covid 19 realities, appropriate educational technologies in learning must be assessed

based on its potential to meet new educational goals that will be developed due to the outburst of Covid 19. The main potential of educational technology in the post Covid 19 pandemic is to support creativity and innovativeness, thus, integration of educational technologies will create opportunities for learners to develop their cognitive, critical thinking, information reasoning and communication skills (Chigona and Chigona, 2010). With the integration of educational technology, students can independently progress in mastering teaching materials, to choose the pace of work, to repeat the material that is not sufficiently clear, that after tests performed immediately get results and track their progress (AlAmmary, 2012). Interactive multimedia content if used as a post Covid 19 teaching and learning tool will provide a great advantage of modern learning over traditional learning.

With the integration of educational technology in the post Covid 19 era, it can profitably empower teachers and learners, transforming teaching and learning processes from being highly teacher dominated to student centred (Higgins, 2003), as there will be effective feedback between the teacher and the student. Lowther, Inan, Ross and Strahl (2012) stated that educational technology has not yet taken its place, in spite of their recommendations. Also, Leu, O'Byrne, Zawlinski, McVerry and Everett-Cacopardo (2009) found that learners in poorer areas very rarely use the Internet as a learning tool. The innovation brought about by the ICT has seen today's learners use modern technical equipment from an early age (Gutnik, Robb, Takeuchi & Kotler, 2011; Rideout 2011) so that their learning with the educational technologies in the post Covid 19 era will not be a problem.

The integration of educational technologies will become an integral part of both the teaching and learning process in the post Covid 19 era and they will have the greatest impact on improving student learning and achieving measurable

educational objectives. Previous study by Greenhow, Robelia and Hughes (2009) shows that more students use modern technical equipment and Lee, Lim and Grabowski (2008) found that these educational technologies have an influence on the cognitive processes of learners. The task for educators in educational institutions is to ensure that their integration of educational technologies are primarily focused on the educational value of the tools and applications they use, their level of skills in its usage, and how to transfer technological knowledge and competencies on the students.

A critical factor in the successful implementation of educational technologies in tertiary institutions has been identified as the competence of the teachers to know why, when and how best to implement educational technologies (Krumsvik, 2014; Lindberg & Olofsson, 2012). The integration of educational technologies by teachers is however a complex process influenced by many factors both extrinsic and intrinsic (Drent & Meelissen, 2008; Price, 2014). The integration of educational technologies in the post Covid 19 era must be structurally related in a hierarchy of inclusiveness, ranging from information transmission to facilitating learning through conceptual change. The integration of educational technologies must have content-focused teaching which is likely to manifest itself in technology use. Comparatively, a learning-focused use of technology will allow students to demonstrate their understanding of a topic (Kirkwood & Price, 2013). Conclusively, Kreber and Kanuka (2013) posited that it is important for teachers to perceive and use technology as an integral part of a student-centred approach to teaching if enhanced learning outcomes are to be achieved.

## **METHODOLOGY**

The study adopted survey research design. A sample population of 10 educators each was drawn from the department of Library and Information Science of Federal

Polytechnic Nekede Owerri (FPNO) and Imo State University Owerri (IMSU). Observation checklist was used to collect data for research question 1 while questionnaire was used to collect data for research questions 2 to 4. The reliability coefficient of the instrument was established using Richard Kudarson 21. A reliability coefficient of 0.86 was obtained from the analysis and was considered highly reliable

for the study. A total of 20 copies of each set of the instruments were distributed in the two tertiary institutions out of which 15 completed copies were found usable. Data collected were analyzed using frequencies, percentages and mean scores. The instrument was structured on a four point scale. The decision rule for the mean score is 2.50.

## Analysis of Findings

**Table 1: Checklist on the available educational technologies for teaching and learning in tertiary institutions in Imo State**

S/NO	Available educational technologies	Tertiary Institutions		Total	% of total availability
		FPNO	IMSU		
1	Computer	1	1	2	100
2	Microsoft Groove	0	0	0	0
3	Dropbox	0	0	0	0
4	Whiteboard	1	1	2	100
5	Smart boards	1	0	1	50
6	PowerPoint equipment	1	1	2	100
7	Social media tools	1	1	2	100
8	Moodle	1	1	2	100
9	Internet	1	1	2	100
10	Projectors	1	1	2	100
11	Computer-based learning softwares	1	1	2	100
12	Teleconferencing	0	0	0	0
13	Audio or video tape	1	1	2	100
14	CD-ROM	1	1	2	100
15	Satellite TV	0	0	0	0
16	Local intranet/extranet	1	1	2	100
17	Tablet or smartphone	1	1	2	100
18	Interactive TV	0	0	0	0
19	Camcorders	0	0	0	0
20	Digital cameras	1	1	2	100
21	Scanners	1	1	2	100
22	Audio and video conferencing	1	1	2	100

**Table 2: Mean ratings on the educational technologies that educators integrate in their teaching and learning in the post covid 19 era**

**KEYS:** Strongly Agreed (SA) = 4; Agree (A) = 3; Disagreed (D) = 2; Strongly disagree (SD) = 1.

S/NO	ET that educators integrate in their teaching and learning	Mean	Decision
1	Computer	3.20	Agree
2	Microsoft Groove	2.01	Disagree
3	Dropbox	2.09	Disagree
4	Whiteboard	2.72	Agree
5	Smart boards	2.84	Agree
6	PowerPoint	3.03	Agree
7	Social media tools	3.11	Agree
8	Moodle	2.61	Agree
9	Internet	3.12	Agree
10	Projectors	3.05	Agree
11	Computer-based learning softwares	2.66	Agree
12	Teleconferencing	2.31	Disagree
13	Audio or video tape	3.03	Agree
14	CD-ROM	3.06	Agree
15	Satellite TV	2.14	Disagree
16	Local intranet/extranet	2.75	Agree
17	Tablet or smartphone	3.18	Agree
18	Interactive TV	2.27	Disagree
19	Camcorders	1.63	Disagree
20	Digital cameras	2.91	Agree
21	Scanners	2.81	Agree
22	Audio and video conferencing	2.70	Agree

In Table 1, the analysis of the checklist on the available educational technologies for teaching and learning in tertiary institutions in Imo State shows that the schools have computers, whiteboards, smart boards, powerpoint equipment, social media tools, moodle, internet, projectors, computer-based learning softwares, audio or video tape, CD-ROM, local intranet/extranet, tablet or smartphone, digital cameras, scanners, and audio and video conferencing. However, the schools do not have microsoft groove, dropbox, teleconferencing, satellite TV, interactive TV, and camcorders.

In Table 2, the educational technologies that educators integrate in their teaching and learning in the post covid 19 era in tertiary institutions in Imo State are computers, whiteboards, smart boards, powerpoint equipment, social media tools, moodle, internet, projectors, computer-based learning softwares, audio or video tape, CD-ROM, local intranet/extranet, tablet or smartphone, digital cameras, scanners, and audio and video conferencing. However, the educators do not integrate microsoft groove, dropbox, teleconferencing, satellite TV, interactive TV, and camcorders in their teaching.

**Table 3: Mean ratings on the challenges to the integration of educational technologies for teaching and learning by educators in the post covid 19 era**

S/NO	Challenges to the integration of ET for teaching and learning	Mean	Decision
1	Inadequate funding of tertiary institutions	2.74	Agree
2	Insufficiency of ET/ICT infrastructure in schools	2.82	Agree
3	Poor confidence of educators in the use of ET	3.05	Agree
4	Erratic power supply to use ET	3.12	Agree
5	Poor maintenance culture on ET	2.60	Agree
6	High cost of ET	3.15	Agree
7	Low usage literacy of ET by students	3.02	Agree
8	Poor ICT policy in the use of ICT/ET	2.70	Agree
9	Insufficient budget for procurement of ET facilities	2.82	Agree
10	Lack of technical support	2.51	Agree
11	Poor quality of the ET resources	3.10	Agree
12	Lack of incentive to change educator's readiness to adopt and use ET	3.00	Agree
13	Low students' acceptance and attitude to the use of ET	2.90	Agree
14	Poor training of educators in use of ET	2.85	Agree
15	lack of policy and planning of using the ET	2.71	Agree
16	Poor instructor's attitude towards use of ET	3.02	Agree
17	Poor attitude and support of administrators towards the adoption of ET	3.07	Agree

In Table 3, the challenges to the integration of educational technologies for teaching and learning by educators in the post covid 19 era in tertiary institutions in Imo State are inadequate funding of tertiary institutions, insufficiency of ET/ICT infrastructure in schools, poor confidence of educators in the use of ET, erratic power supply to use ET, poor maintenance culture on ET, high cost of ET, low usage literacy of ET by students, poor ICT policy in the use of ICT/ET, insufficient budget for procurement of ET facilities, lack of technical support, poor quality of the ET resources, lack of incentive to change educator's readiness to adopt and use ET, low students' acceptance and attitude to the use of ET, poor training of educators in use of ET, lack of policy and planning of using

the ET, poor instructor's attitude towards use of ET, and poor attitude and support of administrators towards the adoption of ET.

In Table 4, the solutions to the challenges in the integration of educational technologies for teaching and learning by educators in the post covid 19 era in tertiary institutions in Imo State are adequate funding of tertiary institutions, sufficiency of ET/ICT infrastructure in schools, confidence of educators in the use of ET, good power supply to use ET, good maintenance culture on ET, subsidized cost of ET, training students on usage of ET, effective ICT policy in the use of ICT/ET, sufficient budget for procurement of ET facilities, adequate technical support, good quality of the ET resources, provision of incentive to change educator's readiness to

adopt ET, students' acceptance and attitude to the use of ET, regular training of educators in use of ET, good policy and planning of using the ET, enhanced

instructor's attitude towards use of ET, and positive attitude/support of administrators towards the adoption of ET.

**Table 4: Mean ratings on the solutions to the challenges to the integration of educational technologies for teaching and learning by educators in the post covid 19 era**

S/NO	Solutions to the challenges of integrating ET for teaching and learning	Mean	Decision
1	Adequate funding of tertiary institutions	3.05	Agree
2	Sufficiency of ET/ICT infrastructure in schools	3.02	Agree
3	Confidence of educators in the use of ET	2.95	Agree
4	Good power supply to use ET	2.88	Agree
5	Good maintenance culture on ET	2.78	Agree
6	Subsidized cost of ET	3.12	Agree
7	Training students on usage of ET	3.17	Agree
8	Effective ICT policy	2.94	Agree
9	Sufficient budget for procurement of ET facilities	2.72	Agree
10	Adequate technical support	3.01	Agree
11	Good quality of the ET resources	3.02	Agree
12	Provision of incentive to change educator's readiness to adopt ET	2.80	Agree
13	Students' acceptance and attitude to the use of ET	3.05	Agree
14	Regular training of educators in use of ET	3.12	Agree
15	Good policy and planning in using the ET	2.80	Agree
16	Enhanced instructor's attitude towards use of ET	2.92	Agree
17	Positive attitude/support of administrators towards the adoption of ET	2.71	Agree

## CONCLUSION

The outburst of Covid 19 pandemic has provided educators with the opportunity to adopt educational technologies for teaching and learning in the post Covid 19 era. Integrating educational technologies in tertiary institutions will improve digital education and as well enable students to continue their learning activities. Integrating educational technologies and other e-learning platforms will enable educators to be abreast with the rapid emergence of new technologies, thus making online, blended and remote learning a necessity in their instructional delivery. Notwithstanding that the Covid 19 has presented undue challenges to the delivery of effective teaching and learning in tertiary institutions, the integration of educational technologies will promote cross collaboration between instructional, content, and technological skills. In essence, educational technologies if applied in teaching and learning can serve as a potent force in transforming the educational landscape as they have proved to be very useful when optimized for teaching and learning activities. In addition, educational technologies can also make students more active, creative, and increase their interest in learning. The application of

technology in post Covid 19 era in tertiary institutions will make the learning process in general more efficient, more effective and have a positive impact.

## Recommendations

The following recommendations are provided:

- Adequate training on the use of educational technologies should be provided for educators and their students to improve their teaching and learning
- There should be adequacy of educational technological tools and resources to support teaching and learning activities in the post Covid 19 era
- Educational institutions should be properly funded to enable them build up relevant systems that will drive the integration of educational technologies for their institutions
- The existing ICT policy should be reviewed to favor tertiary institutions and students towards acquiring relevant ICT skills to utilize the educational technologies

**Acknowledgement:** None

**Conflict of Interest:** None

**Source of Funding:** None

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- How to cite this article: Ojukwu, Njideka-Nwawih Charlotte, Chukwuyere AE, Catherine A. Educational technology for teaching and learning in the post Covid-19 era: a case study of tertiary institutions in Imo state, Nigeria. *International Journal of Research and Review*. 2021; 8(7): 90-98. DOI: <https://doi.org/10.52403/ijrr.20210713>

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