E-Teaching Mechanisms in Selected Private Secondary Schools in Gombe Metropolis during the COVID-19 Era: Challenges and Implications

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Abstract
This paper analyses e-teaching mechanisms that are used in selected private schools in Gombe metropolis during the COVID-19 era. The pandemic halted educational activities in a face-to-face context at all levels. To accommodate this situation, e-teaching ensued in schools world over with Nigeria inclusive between March and August, 2020. In Gombe State, recourse was made to e-teaching especially by the private schools. The objectives of the study are to identify e-teaching facilities available in the schools; assess the efficiency of facilities (hardware and software); assess the support by management and parents; analyze the challenges and implications. The study is a descriptive qualitative survey that analyses the processes and structures utilized within the COVID-19 period to achieve continues teaching. The questionnaire is used to elicit data from the teachers. Purposive sampling is employed using teachers that participated in e-teaching. Twenty-five (25) teachers filled the questionnaire from three schools: The findings indicate that the schools have a number of facilities to enable e-teaching and most of the facilities are efficient. Management and parents gave moderate support. The implication of the findings is that more still needs to be done toward the provision of enough and adequate facilities. This is because this study is conducted in private schools where the population of the students is commensurate with the available facilities.

Keywords: E-teaching/mechanisms, COVID-19 era, Secondary e-teaching, Analysing e-teaching

Introduction

From December 2019 and the year 2020 the entire world was thrown into an unprecedented pandemic that threatened every aspect of human existence and development as various parts and regions of the world came to a standstill with major activities halted. Sectors such as industry, technology, the economy and education were affected. In some regions and areas of the world, educational activities were halted completely while in others, scanty activities were ongoing using technology. But even those that relied on technology to drive the educational sector did not find it easy as the pandemic was so sudden and there was no adequate preparation for it.

The COVID-19 experience really exposed the inadequacies in the educational sector especially in developing countries like Nigeria. In Nigeria, there are policies and moves to bring technology to the grass root schools, but those interventions were scanty, sporadic and unsustainable because today, those facilities are either outdated or non-functional any longer. A number of private schools were able to resort to e-teaching and learning when it was observed that the traditional form of teaching would not resume for a long time due to the upward surge of cases.

The reason for this study is because the previous studies on e-teaching/learning dealt mostly with the tertiary institutions as against the secondary schools. But with the experience of COVID-19 there is the need to investigate e-teaching /learning in the secondary school level of education. Therefore, this study analyses the e-teaching mechanisms that were made available, put in place and adapted to enhance the continuation of learning by students in spite of the pandemic in Gombe metropolis as well as the challenges and implications.

In Gombe State as in most parts of Nigeria, the advice by the government to employ e-teaching during the pandemic was reluctantly received. Therefore, only a handful of private schools hosted the online teaching. The objectives of the study were to identify if the secondary schools have adequate facilities for e-teaching; assess the efficiency of the facilities of the schools; assess the support by school management and parents for the e-teaching; analyse the effectiveness of the e-teaching during the lockdown and suggest ways that e-teaching can be improved to enhance learning; and examine the challenges and implications.

Literature Review

The term e-learning/e-teaching has been in existence since 1999 when the word was first utilized at a Computer Based Training (CBT) systems seminar. Other terms are “online learning” and “virtual learning”. However, the principles behind e-learning and teaching have been well documented throughout history and there is evidence which suggest that

early forms of e-learning existed as far back as the 19th century. (https://www.talent/ms.com>e-learning).

Hedge and Hayward (2004) define e-learning/e-teaching as an innovative approach for delivering electronically mediated, well designed, learner centred and interactive learning environment to anyone, at any place and time by utilizing the internet and digital technologies in concert with institutionally designed principles. Rosenberg (2001) says e-learning/e-teaching is the array of solutions that enhance knowledge and performance. E-teaching therefore, is seen as the latest form of distance teaching mediated by state-of-the-art technologies like the internet and World Wide Web (www).

Long before the internet was launched, distance courses were offered to provide students with education on particular subjects or skills such as that by Isaac Pitman 1984. The very first attempt at e-learning was in 1924, when Ohio State University's Professor, Sidney Pressey created the first electronic learning machine, the Automatic Teacher. In 1954, B. F. Skinner, a Harvard professor invented the "teaching machine" which enabled schools to administer programmed instruction to their students. In 1960, the first computer-based training programme was introduced known as PLATO – Programmed Logic for Automated Teaching Operations by Donald L. Bitzer. It is considered as the first significant invention in the history of online learning technology. Two decades later, the World Wide Web was invented.

Today, with the introduction of the computer and internet in the late 20th century, e-learning/teaching tools and delivery methods expanded. The first Media Access Control (MAC/Macintosh) in the 1980s enabled individuals to have computers in their homes. Then, in the following decade, virtual learning environments began to thrive with people gaining access to a wealth of online information and e-learning opportunities. By the early 1990s, several schools had been set up that delivered courses online only, making the most of the internet and bringing education to people's doorsteps.

Technological advancements also helped educational establishments to reduce the costs of distance learning which made education available to a wider audience. In 1999, the phrase "e-learning" was mentioned for the first time in a professional context by Elliott Masie during the TechLearn conference at Disney world. In 2000's businesses began using e-learning to train their employees. From the late 1980s and

1990s, the first form of electronic-education, computer-based training was born. It is considered as the cornerstone of today's e-learning (Eger, 2005). In 2003, the new Web-Based Training (WBT) was formed where new programmes were created not only to teach but to allow communication between the teacher and the student. Since from 2002, e-learning proved advantageous and is effectively used not only for distant but for face to face education (Eger, 2005).

E-learning started mainly with the university programmes but recently it has penetrated into secondary and primary schools. This explains why more literature is available on e-teaching/learning in tertiary institutions than in secondary and primary schools. This is why the bulk of the reviewed literatures for this study are on tertiary e-teaching hence, the importance of this present study that analyses e-teaching mechanisms in selected private secondary schools in Gombe metropolis during the Covid-19 era. E-learning/teaching is still growing and only time would show whether and which kind of effect the growth will have on traditional learning institutions. In Nigeria, online teaching is not feasible as millions of the population do not have access to the internet. During the pandemic, some students dropped out of classes because their parents could not afford internet data and others had to stop because they did not have the right phones or access to the internet.

Also, a number of empirical studies are presented such as that by Gray and DiLoreto (2016) who investigate the effects of student engagement, student satisfaction and perceived learning in online learning environments using 187 participants that completed the Qualtrics Research Suite Survey Online. The study looks at the variables that affect students' effective learning online with the e-teaching. The findings are that course structure, learner interaction and instructor presence have significant effect on the perceived student learning. That is, the more the instructor is present the more engaged a student becomes and the more satisfied they become.

Alstete and Beutell (2004) investigate the performance indicators in online distance learning courses where they studied the area of management education. A sample of 74 undergraduates and 147 graduate business students in ten (10) courses are selected and their grade performance is statistically analysed against various indicators. The study found out that gender and age were related differently for undergraduate and graduate students to their performance in distance learning courses,

but for the undergraduates, grades, age, work experience and discussion board grades are significantly related to overall course performance. However, Standardized Test Scores, SATs and GMATs and organization position level are not related to performance in distant learning courses.

Similarly, a study was conducted on e-learning Africa (2020) to provide unique insight into the perspective of EdTech experts on the impact of the COVID-19 pandemic on education. 1650 participants in various sectors from 52 countries in Africa are used. The survey points out that Africa's education sectors are diverse and so are their challenges. It then highlights three main obstacles to e-teaching/learning as: lack of access to technology, unsuitable home learning environment and lack of access to learning materials. For the teachers, the main obstacle is the lack of appropriate training to design and manage distance teaching/learning programmes. This is compounded by the lack of infrastructure, lack of appropriate teaching materials and lack of adequate preparation for teachers and parents.

Obiakor and Adeniran (2020) analyse the COVID-19 impending situation which threatens to deepen Nigeria's educational crisis. They observe that for an already fragile education system, the COVID-19 pandemic poses unprecedented challenges on the government, students, parents and teachers that highlight and amplify the cracks in the system. As the nation struggles with these challenges, its ability to ensure continuation of learning depends largely on its swiftness to harness available technology, provide adequate infrastructure and mobilize stakeholders to prepare alternative learning programmes. This study also observes that while several private schools have begun to initiate distance learning/teaching programmes by taking advantage of the many ICT-learning opportunities provided by the international community, the government is yet to announce any official plans for providing distance learning opportunities especially for public schools. The paper examines the immediate and long-term impacts of closures and proffered suggestions as to how the government can mitigate these consequences and turn them into an opportunity to address several of its pre-pandemic education problems.

Another collaborative study by TEP and NESG on learning in a pandemic: Nigeria's response to teaching and learning during the COVID-19 (2020) also evaluates the effect of the closures of schools in Nigeria as it concerns learning specifically and the education sector in general. 1901

respondents completed an online survey in May 2020 and they represent government, individuals and organizations across 35 states plus the FCT of Nigeria. The study found out that there is high level responsiveness and many innovations sprang up online. Also, the Federal Government, states, local governments and parents offered their interventions/supports for e-teaching/learning, and there are the opportunities for education stakeholders to develop and execute strategies to enhance and enable the Nigerian education system to compete in the global scene. Also, innovative partnerships can be developed between the government, education technology companies and internet service providers as well as business opportunities on entrepreneurial skills that abound and its provision of avenue for accelerated digital skills acquisition (Ikodu, 2020).

Chiedu and Ohwonohwo (2021) investigate the teaching of English language through e-learning in Nigerian tertiary institutions considering its challenges and prospects. The study shows that online learning and resources can catch the attention of even the most passive learner and offers a favourable external environment for English language teaching and learning. The paper recommends that computer literacy training programmes for English language teachers and adequate information technology facilities should be provided for tertiary academic institutions for effective teaching and learning of English language for e-learning to be realizable and feasible.

Another study was a survey on the effectiveness of online teaching: learning methods for university and college students (Darius, Gundabattini & Solomon, 2021). The findings of these studies point to the need for the provision of adequate facilities for e-teaching/learning and training for teachers (Evoh, 2007).

Methodology

This study employed the descriptive survey conceptual framework for the collection of data; and statistical tool of frequency and percentages for the analysis of data for this study. The questionnaire was given to seven staff from the three schools for validity and reliability check. The observations were affected in the final version of the questionnaire. Three (3) private secondary schools in Gombe metropolis namely, Evangel College, Matrix International Academy and Pen Resource Academy were used. The choice of these schools was because they used e-teaching during the COVID-19 period for education. Twenty-five (25) teachers filled the questionnaires as

follows: eight (8) teachers from Evangel, five (5) from Matrix and twelve (12) from Pen Resource. The number of teachers varied from one school to another because of the holiday period.

The questionnaires were administered from the 24th – 26th of August, 2021. Using phone contacts, participants were met at school, home or business area. The data was analyzed using frequency counts and percentages which were presented in tables and pie charts.

Analysis and Results

Table 1: Background Information of Teachers

School	No. of Teachers	Subject(s) Taught	Qualification	Years of Teaching	E-teaching Period
Evangel College	8		PGDE, BSc Estate Management	8	Jun-Aug
		Biology	BSc Botany, MSc Botany Ecology	9	"
		Mathematics	BSc Engineering	2	"
		English	BA Mass Comm.	12	"
		Physics, Chemistry	BSc, MSc Chemical Engineering	8	"
		Civic Educ., Commerce, Marketing	BSc Business Admin	4	"
		Coordinated all subjects	B. Tech Computer Science	2+	"
		Civic Educ., Govt.	M. A. History	11	"
Matrix International Academy	5	Literary, verbal reasoning	B Ed, M Ed English language	2	All year, COVID-19
		Science, Geog, Vocational studies	PGDE (on course), BSc Microbiology	4	All year, COVID-19
		English, Verbal reasoning	B. Tech surveying, PGDE	3	All year, COVID-19
		Mathemetics, Science	B.Tech mathematics, NCE Maths/Comp.	2	All year, COVID-19
		Literary, Verbal reasoning	B. A. English	2	All year, COVID-19
Pen Resource Academy	12	Biology	BSc microbiology	6	Apr.-Jun.
		French	BA French	5	Apr.-Jun., All round
		Mathematics	BSc Statistics	3	Apr.-Jun.
		Govt., Civic Educ.	BSc Pol. Scien.	4	Apr.-Jun. All round
		English, Lit. in English	BA English	8	Apr.-Jun. Till date
		Basic science	BSc	3+	All round
		Chemistry	HND, PGD chemistry	5	All round
		Physics	BSc Ed Physics	10+	Apr.-Jun.
		English	BA, MA English	3	Apr.-Jun. Till date
		English	BA English, TESL	2	Apr.-Jun.
		Basic technology, Technical drawing	B. Engr., Civil Engineering	4	Apr.-Jun. All round
		Business Studies	NCE Maths, BSc Ed Economics		Apr.-Jun. Till date

Table 1 shows the number of teachers per school, subjects that they teach, qualifications, years of teaching in the school and the period that e-teaching was conducted. For Evangel, the e-teaching was conducted only during the COVID-19 lockdown from June to August 2020. For Matrix, the school conducts e-teaching year-round but not for all subjects as indicated by some teachers who did e-teaching only during the COVID-19 lockdown. For Pen Resource, the school engages in e-teaching year-round but not for all subjects/teachers as some indicated that it was only during the lockdown that they did e-teaching.

Table 2: E-teaching Facilities Available in the Schools

School	School Facilities		Personal Facilities	
	Hardware	**Software**	**Hardware**	**Software**
Evangel	Desktop, interactive white board, pdf creator, modem, USB storage HD storage, recording stand, video recorder, laptop	Video compressor, video editors, word processor, pdf converter, google classroom, zoom, internet service	Desktop, smart/ android phone, video camera, devices to access internet, laptop	Internet service
Matrix	Desktop, laptop, magnetic board, plugging	Google classroom, whatsapp, zoom, congrea, moodle	Smart/android phone	zoom, congrea, moodle, Google classroom,
Pen Resource	Projector, desktop, laptop, interactive white board, television, speaker, ICT lab, videos, tablet audio tapes	Whatsapp, google app, zoom, padlet, blog page. Youtube, email, google d oc	Laptop, phone, modem, video, audio tapes	Zoom, google classroom, blog page, google classroom, whatsapp, email, internet, youtube,

The above table presents the e-teaching facilities that are available in the three private schools used for this study. For the hardware, desktop, laptop and interactive/magnetic board are available in all the schools, while the other hardwares are available in one school or another. For the software, google classroom and zoom are used in all the schools. The teachers had various hardwares and softwares. The e-teaching facilities used during the lockdown in the three schools were those that belonged to the school and the personal ones owned by the teachers. 23 (92%) used both the facilities that the school provided as well as theirs, while 2 (8%) relied on the facilities provided by the school.

The ratings for the adequacy of the facilities were 11 (44%) adequate, 08 (32%) moderate, 5 (20%) fair and 01 (4%) not adequate. The overall adequacy rating of the facilities is 44%.. The efficiency of the facilities is rated from 1-5, with 5 as the highest denominator. Ratings from 3–5 are counted as efficient. Therefore, desktop has the highest efficiency of 12 (26.7%) followed by laptop with 9 (20%), projector 7 (15.6%), phone 6 (13.3), smart/magnetic/interactive board 5 (11.1%), camera 4 (8.9%) and speaker 2 (4.2%).

For the softwares that were used in the schools, the most efficient software is the google class with 21 (33.3%), followed by zoom 15 (23.8%), whatsapp 14 (22.2%), internet 5 (7.9%), Microsoft word 3 (4.8%), pdf 3 (4.8%), email 2 (3.2%). Other softwares with very low efficiency levels were video converter, congrea moodle, google doc, blog page, storage devices and powerpoint. On the level of support by parents during the e-teaching, excellent is 2 (8%), very good 7 (28%), good 10 (40%) and moderate 6 (24%). The cumulative of excellent, very good and good give a total of 76% support by parents.

The level of support by management for the e-teaching are excellent 6 (24%), very good 12 (48%), good 5 (20%), and moderate 2 (8%). The cumulative scores for excellent, very good and good give a total of 92% support by school management. The overall rating of the e-teaching experience during COVID-19 shows that excellent is 2 (8%), very good 11 (44%), good 8 (32%) and moderate 4 (16%). The cumulative scores for excellent, very good and good give a total of 84% overall efficiency.

On the ways that the government can improve e-teaching in secondary schools, options A-P were suggested for the subjects of the study to indicate the preferred areas that government support is needed. Option A is the provision of fast/efficient/reliable internet services (access to internet network) with16%, F is workshops/trainings of personal on e-teaching (like Google School etc.) with 13.6%, B is reduce/subsidize the cost of data to be affordable with 12.8% and D is the provision of/access to the required equipment for schools with 12.8%.

For the ways that the management/administrators of schools can improve e-teaching, there were options A-M. Those that have the five topmost ranking scores are option A which is the provision of the necessary e-teaching/internet facilities in schools with 17.6%, C is the adequate remuneration for staff engaged in e-teaching with 13.6%, D is the

training of personals for e-teaching with 13.6%, B is to ensure the constant supply/availability of power with 9.6% and H is online contents should be empowered with videos with 8%.

The ways that parents/guardians can support to improve e-teaching had options A-H. The five most preferred areas for parents' interventions are A which is to encourage/support management and tutors with 20.8%, H is to influence wards' change of attitudes to embrace e-teaching/learning against social media with 17.6%, C is to provide the necessary equipment/gadgets for their wards with 16.8%, B is to monitor and ensure that their wards are available for classes/lessons with 15.2% and D is to provide data and power for their wards at the needed periods with 13.6%.

The aspects that the students can contribute in improving e-teaching are options A-H. A is to develop interest in e-teaching and for e-learning with 17.6%, C is to provide reliable feedback on e-class delivery of the teacher with 14.4%, D is the proper use of gadgets/equipment and internet services with 14.4%, E is the willingness to undergo assessment as that of google classroom with 14.4%, and B is to participate constantly/actively in e-learning with 13.6%.

Discussion of Findings

The findings of this study from the analysed data are presented here and discussed based on the objectives and literature that was reviewed. The study on analysis of e-teaching mechanisms in selected private secondary schools in Gombe metropolis during the COVID-19 did seek to identify the e-teaching facilities available in the schools, assess the efficiency of the facilities both hardware and software, assess the support by management and parents, analyse the effectiveness of e-teaching, the challenges and implications of e-teaching in secondary schools.

The e-teaching facilities in the private secondary schools: Evangel College, Matrix International Academy and Pen Resource Academy were both hardware and software. The most common facility in the schools was the desktop. In Evangel, interactive board ranked second followed by others. For this school these facilities point to the type of e-teaching activity that Evangel engaged in during COVID-19 lockdown, which is, recorded e-teaching as against the real-time or blended teaching. In Matrix, the desktop ranked highest followed by laptop, then others. This school engaged in real-time e-teaching. In Pen Resource, desktop ranked

highest, followed by laptop and others. The school also conducted real-time e-teaching. The available facilities in the schools did serve in the emergency situation as nobody knew that there would be such a pandemic that would plunge every one into panic. In spite of these facilities in each of the schools, the fast rate of technological development and advancement in the world today exposes the inadequacy of these facilities, as they are neither a state of the art nor the latest in e-teaching.

On the efficiency of the available facilities, it was found out that for the hardware, desktop ranked highest as it had 4 frequency counts for denominator 3; 3 frequency counts for denominator 4 and 5 respectively. It was followed by laptop, projector, smart/android phone, interactive board, camera and lastly speaker. The efficiency of the software indicates that google classroom ranked highest, followed by zoom, whatsapp, internet, Microsoft down to Powerpoint. The most common software are the ones that ranked highest above the uncommon ones in Gombe. The use of desktops in the schools poses challenges because today, laptops are the most used, efficient and up to date as well as its portability and less space consumption. The implication is that the laboratories would take fewer desktops compared to laptops. Students may experience difficulties in accessing the net due to its slow speed.

The study also found out that both parents and management did support the e-teaching and learning activities during the lockdown period. Based on the responses by the teachers, the parents' cumulative frequency scores for excellent, very good and good give a total of 76%. This shows that the parents supported e-teaching maximally in Gombe metropolis private secondary schools under study. The management also gave support for the e-teaching during the pandemic as a cumulative score for excellent, very good and good totaled 92%. This indicates that the school management did fully support the e-teaching in spite of its lack of readiness which means that they quickly swung into action to see that education was not affected even with the sudden closures of schools as was cited in the review. The challenge is whether the parents and management can sustain it for a long time beyond the 3-5 months of the COVID-19?

The effectiveness of e-teaching in the three private schools studied indicates that on the overall, there was 84% effectiveness for the cumulative scores of very effective, effective and good. The high rating for these private schools might not be far-fetched from the fact that for private schools to enjoy high patronage, they need to offer services that the public

schools do not offer especially in terms of facilities and that was why the private schools went ahead in accordance with the directives to mount up e-teaching for pupils while the public schools compliance was observed to be slow and low. The challenge is whether the public schools would be able to embark on e-teaching and attain the level of effectiveness as that of the private schools. It implies that a lot needs to be done for the public schools.

Based on the e-teaching experiences by the teachers, there are certain crucial areas that need to be improved upon if e-teaching is to be done in Nigeria as it is obtainable in other places/countries. There were five most important suggestions each for the government, management, parents and students. The suggestions for the government with high percentages were only four which are: A (16%), F (13.6%), B (12.8%) and D (12.8%). These are the aspects that government interventions are needed to enhance e-teaching. Going forward after the COVID-19 pandemic, the traditional form of face to face teaching may need to be complemented with e-teaching, that is, the blending of both methods and complete overhaul as technology is fast advancing and the traditional method is becoming obsolete. For the management, the areas that support is needed to enhance e-teaching are: A (17.6%), C (13.6%), D (13.6%), B (9.6%) and H (8%).

Parents too have a part to play in enhancing e-teaching in Nigeria and especially in Gombe State. The areas are: A (20 .8%), H (17.6%), C (16.8%), B (15.2%) and D (13.6%). The need for parents' supports for e-teaching and learning was also buttressed in the findings of previous studies where recommendations were put forward such as the need for parents to support and the need of enlightenment for parents on how they can effectively support e-teaching as some studies observed that there is the lack of support that emanates from lack of knowledge. This makes it difficult for parents to guide and monitor the children during the e-teaching and learning processes especially for secondary school children as well as the resources to cope with the demands of e-learning for their children.

The students on their part also need to contribute in improving e-teaching and learning. The areas as elicited in this study are: A (17.6%), C (14.4%), D (14.4%), E (14.4%) and B (13.6%) as presented in the analysis.

The challenges found in this study with regard to e-teaching in Nigerian secondary schools in general and Gombe metropolis in particular border on the lack of up to date facilities; steady internet and power supplies, lack of knowledge on the part of parents; lack of enough

resources for gadgets and data. All these imply that e-teaching may not be readily feasible for Nigerian secondary schools because of the numerous challenges. This is because a lot of resources and full commitments are needed on the part of the government, school management and parents for e-teaching to be effective. This means that several years are needed to be able to put these facilities on ground. It also implies that as a government and citizens, there must be a change to the way things are done so that this giant feat can be achieved in the future for e-teaching in Nigerian secondary schools.

Conclusion

This study has identified that there were various facilities that enhanced e-teaching for private schools in Gombe metropolis (both hardware and software) which were to some extent adequate and efficient as the population of private schools are usually within the requirement stipulated by the regulating body in education. There was also high level of support by management and parents as well as positive feedback from the students. But in spite of these, the teachers indicated that more needs to be done by the government, management, parents and the students.

E-teaching was highly utilized to cope up with the COVID-19 pandemic that made the traditional face to face form of teaching and learning in most of the education sectors affected during the lockdown in Nigeria and the world over. This shows that computer mediated form of teaching and learning in this fast-growing technology has come to stay and might even override the former form of education. From this study, the government of Nigeria and Gombe State as well as the school management, parents and students need to brace up and embrace e-teaching so that the needed facilities can be planned for and made available to forestall any abrupt occurrences in future and so that Nigerian and Gombe State students can favourably compete with students from any part of the globe.

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