



Impact of Multi-media Technologies to Learning on Secondary Education During Covid-19 Lockdown in Selected Secondary School in FCT, Abuja

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Abstract

During Corona Virus Disease 2019 (COVID-19) lockdown, citizens were directed to stay in door in other to break the chain of transmission of the pandemic. The only mode of communication available to the outside world during the lockdown is digital communication via telephone, computer, information communication technology (ICT) devices and other multi-media learning technologies and devices. This research' Impact of multi-media technologies to learning on secondary education during covid-19 lockdown in selected secondary school in FCT, Abuja' explore challenges militating against using e-learning and m-learning during COVID-19 lockdown by conducting investigative study among the students and teachers to assess their readiness to use of multi-media for teaching and learning by schools during COVID-19 lockdown. This research work is a survey research that used random sampling to obtain data from the sampled population of 225 out of the total study population of 5567 that comprises students and teachers across the nine (9) selected secondary schools with 4 publics and 5 private secondary schools in FCT, Abuja. Findings revealed that e-learning and m-learning were effectively used while m-learning was used by the majority of the students with 81.8% used it for learning. It was concluded that, the challenges that were raised need to be addressed to improve the state of learning via multi-media technologies in both private and public schools. This will in return bridge the gap between current state of things when we compare both the private and public schools in terms of multi-media facilities to deliver online and broadcasting media learning.

Keywords: Multi-media Technology; Lockdown; Covid-19; e-learning; m-learning

1. Introduction

Multi-media" is a term frequently heard and discussed among educational technologists today. Unless clearly defined, the term can alternately mean "a judicious mix of various mass media such as print, audio and video" or it may mean the development of computer-based hardware and software packages produced on a mass scale and yet allow individualized use of learning. In essence, multimedia merges



multiple levels of learning into an educational tool that allows for diversity in curricula presentation [1]. The plural form of medium is media, which, in the context of education, includes the means to create, store and present instructional content. These include tools such as chalk and talk, books and computers, slide projectors, video projection, overhead projectors, document cameras, audio systems (a CD player, radio), e-learning gadgets and platform, combined sound and video systems (television, digital video cameras, and DVDs), and the media objects themselves [2]. Multimedia is the exiting combination of computer hardware and software that allows you to integrate video, animation, audio, graphics, and test resources to develop effective presentations on an affordable desktop computer” [2] define the term multi-media as the combination of multiple technical resources for the purpose of presenting information represented in multiple formats via multiple sensory modalities. The above listed multi-media systems for learning are classified into traditional and modern multi-media learning system. [2].

Multi-media is all-pervading, thrilling and involving method of info-edutainment with multiple facets and long lasting approbation. Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. It is most simply and contentedly defined as an assortment of tools that might prove helpful in student centered learning, problem based learning or case-based learning. It advocates the teacher becoming “Guide on the Side” rather than “Sage on the Stage”. [3]. Educational Technology also called „Learning Technology“, mainly comprise of the use of technology in the process of teaching and learning. Here the term „Technology“ does not only include the use of latest tools and techniques like laptops, interactive whiteboards, and smart phones; internet, Wi-Fi, and YouTube etc., although they are massively preferred by today’s learners for their learning potential, but also encompasses efficient and enhanced learning management systems, schema of information dissemination, effective teaching and management of student masses, feedback mechanisms and performance evaluation methodologies etc. Multimedia Learning Environment Multimedia provides a technology based constructivist learning environment [3] where students are able to solve a problem by means of self-explorations, collaboration and active participation. Simulations, models and media rich study materials like still and animated graphics, video and audio integrated in a structured manner facilitate the learning of new knowledge much more effectively. The interactive nature of multimedia provides the room to enhance traditional "chalk-and-talk" method of teaching [3] with more flexibility to learners to adapt to individual learning strategy. It enables both the educators and learners to work together in an informal setting. The role of educators and learners are extended. Furthermore, it encourages and enhances peer learning as well as individual creativity and innovation.

Multi-media facilitate mastering basic skills of a student by means of drill and practice. It helps in problem solving by means of learning by doing, understanding abstract concepts, provide enhanced access for teachers and students in remote locations, facilitate individualized and cooperative learning, helps in management and administration of classroom activities and learning content, and simulate real life problem handling environments [4]. Multi-media Technology is used and experimented by various educational institutions of all levels all over the world in their own designed modes.

Some of these multi-media systems become very useful during the lockdown of Corona virus disease 2019 (COVID-19) pandemic outbreak. It serves as the learning medium for secondary education in FCT Abuja and Nigeria at large. It aids teachers of various secondary institution to teach students from their comfort zone while the students access the learning from their comfort zone too. COVID-19 outbreak is a pandemic disease that has traveled wide since it first surface at china in December 2019, as at March 31st 2020 COVID-19 cases has been noticed in 202 countries across the land, sea and air and is still

trending. Government from one country to another has been battling with strategies and methods to stop the pandemic and its spreading. Social distancing, self-quarantine, Isolation, and lockdown have become major and acceptable approaches to curtail spread of COVID-19 Pandemic. Consequently, Computer mediated and Digital Communication Technologies has replaced face to-face system of communication. During this period, people have been restricted to their homes, and cyberspace has become a place of refuge from the risk of infection of COVID-19 [5]. The question now is, how many Nigerians has what it takes to communicate effectively with the use of Computer mediated and Digital Communication Technologies? Digital divide is one of the factor mitigating computer mediated communication approaches [5]. Now that people are restricted to their homes, the gap between demographics and regions that have access to modern information and communications technology, and those that do not or have restricted access now been perceived by majority of Nigerians especially those working in cities but live in the rural areas.

The digital divide technology and devices include the mobile devices, televisions, radio, personal computers and the Internet, and high subscription and infrastructure costs, coupled with the poor quality of service by service providers is one of the factors contributed to digital divide with little or no idea of awareness, knowledge, and interaction. In recent time some Nigerian are now digital Immigrants as they are struggling to be connected and use digital devices for communication. [6].

The focus of this research is to evaluate the impact of multi-media technologies to learning on secondary education during COVID-19 lockdown in some selected secondary school in FCT, Abuja. The research will also evaluate the compliances of students and teachers to government directive of using e-learning gadget and platforms and other multi-media gadgets in schools during lockdown due to COVID-19, and chat way forward for continuous usage of e-Learning and other multi-media learning technologies beyond COVID-19 lockdown era.

Nigeria 's fight against the COVID- 19 outbreak has been unique. The "FCT Abuja Curfew" was a positive step for further awareness and preparedness about the quarantine and provided the doorway for implementation of lockdown in several states. President Muhammadu Buhari announced the initial 14days shutdown in two states of Lagos, Ogun and FCT Abuja. This pronouncement came about one week after the minister of education Mallam Adamu Adamu has directed the closure of secondary schools in FCT Abuja among others [7]. When it comes to the education sector, many countries have closed down schools. It is the creativeness and mastermind of policymakers that prompt their intervention on how they can bridge a gap for this in a positive way or negative way. However, most secondary institutions in Abuja have to go for multi-media technology adoption. Hence teaching is moving into both broadcasting and online on an untested and unprecedented scale. Students' assessments are also moving online. Teachers, school managements and students are doing their part to support each other. And this disruption was a time to rethink and reflect on the education sector. Multi-media technologies have a key role in educating the future generations. In a world where knowledge is a mouse-click away, the role of the educators must change too. In the late 1990s a number of surveys and reports in the United States highlighted the role of teacher education in preparing new teachers to use multi-media technology in the classroom [8]. The general finding was that although technology use is increasing in teachers training programme, teacher educators could do more to help pre-service teachers learn to integrate educational multi-media technology into their teaching and learning [9]. Multi-media allow teachers to integrate text, graphics, animation, and other media into one package to present comprehensive information for their students to achieve specified course outcomes.

The media mentioned above targets either the eye or the ear. Of the five human senses, vision is recognized as the most powerful data-acquisition device for the brain. [10] a professor of statistics and graphic design at Yale University, explains why the most effective presentation methodologies attempt to convey information visually, rather than verbally alone. "Visual displays of information encourage a diversity of individual viewer styles and rates of editing, personalizing, reasoning, and understanding. Unlike speech, visual displays are simultaneously a wideband and a perceiver-controllable channel". Students who are given access to multi-media courseware, whether as individuals or in groups, can take control of their own learning, constructing knowledge at a pace and in a direction that suits their needs and desires.

New capabilities allow teacher-made [presentations] to be accessed via the internet, allowing students the opportunity to study at home. The constructivist approach to learning in which the learner plays an active role in the teaching and learning process can further encourage students to learn through personal experiences with suitable learning material and teachers should use new and effective modes, ways, and designing thoughts into multi-media teaching practice [11]. The use of multi-media technology in secondary schools as a means to improve student learning from home has received extensive attention over the period of COVID-19 lockdown in FCT, Abuja. The impact of educational technology has been met with much scepticism in recent years due to a lack of evidence that it has been effective in improving student learning and its perceived excessive cost [12]. The reality of these impacts has been proven beyond doubt during this COVID-19 lockdown era in FCT, Abuja and Nigeria at large.

2. Literature Review

This chapter reviews relevant related literature to the research problem under investigation. The method used in reviewing the literature is thematic. This involves discussing sources in terms of the themes they cover. The choice of this method will ensure that what is discussed is relevant to this study.

2.1 Theoretical framework

2.1.1 *Impact of E-learning M-learning versus Digital Divide in Nigeria*

Research work title Impact of E-learning M-learning versus Digital Divide in Nigeria by [4] came with results and analysis that explain the lack of Internet access, affordability of computers and Internet usage, poverty, lack of computer skills, and poor infrastructures as the major components of digital divide in Nigeria.

In the research work, mobile phones are recognized as a primary platform for mitigating the digital divide and increasing economic growth, and the same appears to be true for Nigeria, the largest economy in Africa. Surveying method was applied in this research to gather result and analyze that mobile phone penetration has shown nearly linear growth, reaching 83% in 2016. However, this statistic falls to only 46% after correcting for ownership of multiple SIM cards and sharing of mobile phones among multiple users [13].

2.1.2 *Digital Communication Device Penetration and Handling*

In this study, (Clement, J. 2019) carry out research on the digital communication device and its penetration in Nigeria. It was reviewed that Nigeria had 92.3million internet users in 2018 which is projected to grow to 187.8millions in 2023 (Nigeria Communication Commission NCC report 2017). The number of smart phone users in Nigeria, Africa's biggest economy and most populous country, is

forecast to grow to more than 140 million by year 2025 [14]. The total number of active telephone subscriber or tele-density, Mobile Peak Period (Voice) Tariff, Percentage (%) Market Share by Technology, Internet Subscriber Data, Broadband Penetration, and Percentage (%) contribution of Telecoms Industry to Nigeria GDP. These study shows that, the impact of digital penetration to learning during COVID-19 lockdown is enormous and improving the current level of digital penetration will definitely improve learning in case any possible lockdown in future.

2.1.3 COVID 19: Technology Adaption, Teaching and learning

In this study, [5] study how people resist change without understanding the need and importance of it and when a situation arises all should adapt to change unwillingly. This was the situation which occurred to teaching fraternity too. It was also reviewed that Nigeria secondary education institution has used various pedagogy for innovation, development and engagement of students and many faculties have resisted the change when they had been asked to take virtual classes for students and a couple of training was provided by the management of the schools hence teachers and students will not face any difficulties. [5]. The schools have to change their mind-set towards the virtual classroom and adopt multi-media technology for the betterment of students. Multi-media technology has created the revolution in the Nigerian secondary education system and it is widely accepted by all due to the COVID-19 crisis [5]. Teaching and learning are always in demand and when schools heard about lockdown due to COVID 19, it was a challenge for schools to perceive this as an opportunity to go for virtual classrooms, virtual learning and teaching. With the crisis, there is a wide adaption of technology in teaching; learning process. It was also reviewed that the secondary educational schools in Nigeria have opted for online classes during the COVID-19 lockdown and the tools used by the schools during lockdown for teaching and learning are mentioned as Zoom, Google Hangouts, Skype meet up, Google classrooms, LMS, Whatsapp, ICT, YouTube, etc.

2.1.4 Online teaching during COVID-19 school closure

[15] in their study analyse how COVID-19 pandemic situation has posed unprecedented challenges requiring teachers to adapt to teaching online. Until March 2020, the typical teaching situation at school was characterised by students who convened in classrooms according to their timetables and teachers who covered their subjects' standard content, frequently through formal lecturing. Students were required to listen to their teachers, work individually or in groups, and predominantly reproduce knowledge in assessments. The school lockdown confronted teachers, students, and parents with an entirely new situation [15]. Beyond instructional goals, teachers were also required to maintain contact with their students to account for the social integration of their learning groups. Survey method was applied in this study to investigate the modalities of online teaching and learning during the COVID-19 lockdown.

2.1.5 ICT transformation process in educational systems during COVID-19 era

[16] in this study explore the fact that, the transition to online teaching was unexpected and rapid due to COVID-19, it took place amid a wider ICT transformation process in educational systems Digitalisation in schools has recently attained prominence.

3. Methodology

This work used random sampling to obtain data from the sampled population that comprises students and teachers across the selected secondary schools in FCT, Abuja. Sampled population was taken and analyzed respectively, percentages statistics was used in analyzing the data. Findings revealed the effectiveness of multi-media technologies as regards to the challenges that revolved round non-availability of functional and modern information communication technologies resources, power, and skills to manipulate the digital devices. Suggestions were made in other to encourage citizen's adherence to such pronouncement and adoption of e-learning and broadcasting m-learning in schools in nearest future.

This section presents a description of the research procedures employed in this study to address the research objectives. The research procedures are presented under the following subheadings: Research design, locale of the study, target population, sample size and sampling procedures, research instruments, piloting of the research instrument, validity and reliability of the research instruments, data collection procedures and lastly data analysis. The design for this study is the survey method that explores the impact of multi-media technologies to learning on secondary education during COVID-19 lockdown in some selected secondary school in FCT, Abuja.

3.1 Population of the Study

The population for this study consists of all secondary school students in Abuja metropolis. Random sampling techniques was used to sampled one hundred and twenty-five (225) students and teachers in four (4) public secondary schools and five (5) private secondary schools. In some situation where large number of student might be difficult based on the nature of the research, then a selected population of one hundred and twenty-two (122) students were used in all the nine (9) secondary schools selected for the research. The reason behind the selection was based on some private schools that have no facility to run effective e-learning programme, some private schools with adequate e-learning facility, public school without e-learning facility and those with adequate e-learning facilities.

3.2 Validity of Instrument

In order to ensure the validity of the instrument used, the research study was carried out using fifty students, five (5) from Jewel model schools Kubwa, seven (7) from Government secondary school Kubwa, five (5) from Government secondary schools Chikakwere-Byazhin, five (5) from Federal government girls' college Bwari, five (5) from Reagent school Mabushi, eight (8) from Lead British international School Gwarimpa, five (5) from FCT Community school, Asokoro, five (5) from Regina Pacis College, Abuja and five (5) from Redeemers Private secondary school, Abuja. Very good structured questions were constructed for the purpose. The psychometric properties of the instrument used the reliability co-efficient. The instrument is valid and reliable hence it was used for the study. The reliability coefficient of the instrument used is tested to be 0.91 which means that 91% of the test score is accurate while the remaining 9% is suspected to contain standard error.

3.3 Administration of Instrument

The researcher will administer the hard copy of the questionnaire to some students and teachers of some schools that have no access to both internet and multimedia gadget to respond to the issued hardcopy while the link of the questionnaire on Google form will be sent out to both students and teachers respondents in the selected schools to respond accordingly. Random students in both J SS 1,2,3 and S.S.S 1,2,3 will be administered the hardcopy and the softcopy (Google form link) of the questionnaire to respond accordingly. The researcher has a research representative in the nine (9) secondary schools which are Jewel model

schools Kubwa, Government secondary school Kubwa, Government girls secondary schools Dutse Makaranta, Federal government girls college Bwari, Reagent school Mabushi, Lead British international School Gwarimpa, FCT Community school, Asokoro, Regina Pacis College, Abuja and Redeemers Private secondary school, Abuja. These research representatives play a very key role in reaching out to the respondents among both students and teachers. The researcher directed the research representatives to give respondent's 2 days (48hours) to answer questions that could be answered within 30minutes and this will have helped in avoiding hasty responses [17].

Data collection was done in the sampled schools. The researcher visited the sampled schools first to request for permission from the school authorities, explain the purpose of the study and make necessary arrangements for actual administration of the instruments. A familiarization visit was done, during which time, the researcher talked and mixed freely with both teachers and students before the actual visit for data collection to try and minimize Hawthorne effect [18]. The researcher then collected data by issuing the research instruments to teachers and students. The two sets of instruments were administered when the respondents were relaxed enough to provide reliable information [19].

3.4 Method of Data Analysis

All raw data were collated using primary data which was analyzed using descriptive statistics to find the frequencies, percentages and bar chart to illustrate the result. Data collected were analyzed qualitatively. Qualitative data were obtained from the open and closed-ended items in the instruments. The data were grouped into different categories of items consistent with the research objectives and deductions and generalizations made using patterns and trends of the responses. The data were analyzed using simple descriptive statistics: percentages, means and frequencies. The data were presented in tables and bar chart where necessary.

The following are the data analysis as obtained from field work after getting the feedback from both the questionnaire and interview and it is as shown below:

Table 1: Sample sizes of Students and Teachers

S/No	School	Category	Sample size of students	Sample size of teachers
1	Jewel Model sch Kubwa	Private school	20	3
2	Govt sec. sch Kubwa,	Public school	25	4
3	Govt sec. sch Chikakwere-Byazhin	Public school	15	3
4	Federal govt girls college Bwari	Public school	20	3
5	Reagent school, Mabushi	Private school	25	3
6	Lead British international School Gwarimpa	Private school	30	5
7	FCT Community school, Asokoro	Public school	15	3
8	Regina Pacis College, Abuja	Private school	20	3
9	Redeemers Private secondary school, Abuja	Private school	25	3

TOTAL	195	30
	225	

Source: field survey 2020/2021

Table 1 is the sample size of the research work. It shows the numbers of students and teachers chosen from the selected nine (9) schools. Among the private schools, the highest number of students and teachers were chosen from Lead British international school, Gwarimpa with 30 students and 5 teachers while Government secondary school, Kubwa was the highest among the selected public schools with 25 students and 4 teachers.

4. Results

The following are the data analysis as obtained from field work after getting the feedback from both the questionnaire and interview and it is as shown below:

Table 2: Distribution of Students' and Teachers' Respondents by learning and teaching via both m-learning and e-learning multi-media technology

School	Students		Teachers	
	m-learning	e-learning	m-learning	e-learning
Jewel Model sch Kubwa	16	5	00	1
Govt sec. sch Kubwa,	10	2	00	1
Govt sec. sch Chikakwere-Byazhin	11	3	00	1
Federal govt girls college Bwari	16	4	00	1
Reagent school, Mabushi	12	18	1	3
Lead British international School Gwarimpa	15	25	2	5
FCT Community school, Asokoro	12	13	1	3
Regina Pacis College, Abuja	10	17	1	3
Redeemers Private secondary school, Abuja	14	21	2	3

Source: field survey 2020/2021

Table 2 shows that among the students' samples selected for the study. 121 students learn via m-learning and 103 students via e-learning. For the teachers, it was shown that 7 teach through m-learning and 21 through e-learning. These represent the fact that 56.90% of the sample population learn and teach via m-learning and 54.20% of the sample population that learns and teach via e-learning. The main reason why more students learn via m-learning platform is the fact that many students of the selected schools have no access to e-learning gadgets.

Table 3: Awareness on the use of multi-media learning technology in the selected secondary schools before COVID-19 lockdown

	Student	Teachers
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Response	Frequency	Percentage	Frequency	Percentage
Yes	182	93.3	26	86.7
No	13	6.7	4	13.3
Total	195	100	30	100

Source: field survey 2020/2021

Table 3 shows that 86.7% of the teachers are aware of the use of multi-media learning and 93.3% of the students are also aware of the use of multi-media learning technologies before COVID-19 lockdown

Table 4: Students and Teachers views on the knowledge of Multi-media learning technologies before COVID-19 lockdown.

	Student		Teachers	
Response	Frequency	Percentage	Frequency	Percentage
Yes	167	85.6	25	83.3
No	28	14.4	5	16.7
Total	195	100	30	100

Source: field survey 2020/2021

Table 4 showed that a high percentage of students (85.6%) confirmed that they have the knowledge of multi-media technology before COVID-19 lockdown. while only a small percentage (14.4%) said that they had no idea of what multi-media technology is all about before the lockdown. The teacher's responses were also consistent with those of the students as 83.3% affirmed while only 16.7% said that they had no idea of what multi-media technology is all about before the lockdown. Students and teachers in these categories were asked to give a reason for this. They cited issues like lack of awareness, lack of multi-media gadgets and lack of adopting the use of multimedia technology in schools before the lockdown.

Table 5: Class in which students were first exposed to multi-media learning technology

Class	Frequency	Percentage
Primary (Basic level)	4	1.8
Junior sec. (Basic 7)	21	9.3
Junior sec. (Basic 8)	36	16
Junior sec. (Basic 9)	41	18.2
Senior sec. (SS 1, 2 and 3)	123	54.7
Total	225	100

Source: field survey 2020/2021

Table 5 results indicate that most of the respondents noted that they had mainly received learning through multi-media technology in their lower secondary (43.5%) and higher secondary (54.7%). 1.8% noted that they had received it in primary school basic level before getting into secondary school.

Table 6: Students' identifying the specific multi-media learning devices and platforms through which the learning takes place during COVID-19 lockdown

Multi-media learning devices and platform	Category	Student		Teachers	
		Frequency	Percentage	Frequency	Percentage

Broadcasting Radio	m-learning	93	47.7%	00	0%
Whatsapp	e-learning	45	23.1%	14	36.7%
Google classroom	e-learning	172	88.2%	19	63.3%
Broadcasting Television	m-learning	165	84.6%	2	6.7%
Zoom	e-learning	114	58.4%	16	53.3%
Facebook	e-learning	15	7.7%	2	6.7%
Google meet	e-learning	89	45.6%	13	43.3%
Study Bridge	e-learning	20	10.3%	2	6.7%
Google form	e-learning	79	40.5%	13	43.3%

Source: field survey 2020/2021

Table 6 shows the response from both the students and the teachers from the selected schools in respect to the specific multimedia devices and platform used for both teaching and learning during COVID-19 lockdown. Google classroom platform has the highest percentage of 88.2% follow by broadcasting television with 84.6% through which the students learned during COVID-19 lockdown. 63.3% of teachers teach via Google classroom follow by Zoom with 53.3%. This shows that, most of students that learn through broadcasting television were not taught by their teachers.

Analysis of Research Question 1: What are the impacts of multi-media technologies in learning on secondary education during COVID-19 lockdown?

Table 7: Impact of e-learning and m-learning on learning and teaching skills and experiences

S/No	Facilities	YES	%	NO	%
1	Do you think the use of multi-media technology have impacted the learning and teaching positively during the lockdown	216	96%	9	4%
2	Did you agree that the use of Multi-media learning technology during COVID-19 lockdown has helped to prevent the spread of the pandemic.	167	74%	58	26%
3	Do you think the use of Multi-media learning technology during COVID-19 lockdown has not in any way helped to improve teaching/learning during that period.	45	20%	180	80%
4	Were you trained on the effective use of e-learning and M-learning platform of multi-media technology after the lockdown	194	86%	31	14%
5	Has the use of multi-media learning technology improve your ICT practical skills as it concern the use of computer hardware and software effectively	167	74%	58	26%
6	Do you feel the impact of the support that your school management offer in the use of e-learning or M-learning platform of multi-media technology	117	52%	108	48%
7	Did your location during lockdown affect your access to internet via your mobile phone negatively	72	32%	153	68%

Source: field survey 2020/2021

Table 7 shows the question item that was deduced from the research question. Among other questions, 79% of the total sample sizes agreed that the use of multi-media technology have impacted the learning and teaching skills as it has actually change the mode and method of learning and teaching during COVID-19 lockdown.

Analysis of Research Question 2: What is the awareness and perception of teachers and students on the use of multimedia technologies?

Table 8: Awareness about the use of multi-media technology for learning and teaching

S/No	Facilities	YES	%	NO	%
1	Are you aware about the use of multi-media learning technology in the selected secondary schools before COVID-19 lockdown	22	9.7%	203	90.3%
2	Have you ever learn or teach via any online platform before lockdown	18	8%	207	92%
3	Are you comfortable using Computer or your mobile phone for 2hrs and above without been bored	210	93.3%	15	6.7%
4	Do you have ICT practical skills as in use of computer hardware and software effectively	124	55.1%	101	44.9%
5	Are your teachers helpful in using and adoption of e-learning or M-learning during the lockdown	185	82.2%	40	17.8%
6	Do you have access to facilities like bandwidth and electricity supply for keeping you online for 5hrs per day	51	22.7%	174	77.3%
7	Did your current location during lockdown affect your access to internet via your mobile phone negatively	140	62.2%	85	37.8%

Source: field survey 2020/2021

According to the table 8, (8%) of the respondent say YES to have ever teach or received learning online before COVID-19 pandemic while 92% respond to NO. 90.3% of the respondent agreed to be aware about the use of multi-media learning before COVID-19 lockdown while 9.7% of the respondents were not aware. 93.3% of the sample sizes are comfortable using computer or their mobile phone for 2hrs and above without been bored. This shows that students and teachers are ready to adapt to any multi-media gadget that will facilitate e-learning and m-learning. 55.1% of the respondent does not have ICT skill which shows the gap of computer literacy. 44.9% of the respondent lack facilities like bandwidth and electricity supply that can keep the students and teachers online for 5hrs per day.

Analysis of Research Question 3: What are the learning platforms used by teachers and students to facilitate learning during the lockdown?

Table 9: Identifying the e-learning and m-learning platform for learning and teaching during COVID-18 lockdown.

Mention the multi-media learning platform and it category through which your learning and teaching takes place during COVID-19 Lockdown				
S/No	Multi-media platform	Category	Frequency	Percentage
1	Broadcasting Radio	m-learning	93	41.3%
2	Whatsapp	e-learning	59	26.2%
3	Google classroom	e-learning	191	84.9%
4	Broadcasting Television	m-learning	167	74.2%
5	Zoom	e-learning	130	57.8%
6	Facebook	e-learning	17	7.6%
7	Google meet	e-learning	102	45.3%
8	Study Bridge	e-learning	22	9.7%
9	Google form	e-learning	92	40.9%

Source: field survey 2020/2021

Table 9 shows the response from both the students and the teachers as regards to **the multi-media learning platform and it category through which learning and teaching takes place during COVID-19 Lockdown**. Google classroom platform has the highest percentage of 84.9% follow by broadcasting television with 74.2% and Zoom with 57.8% through which learning and teaching takes place during COVID-19 lockdown.

Analysis of Research Question 4: What are the challenges faced with the use of multi-media technologies to learning and teaching on secondary education during COVID-19 lockdown?

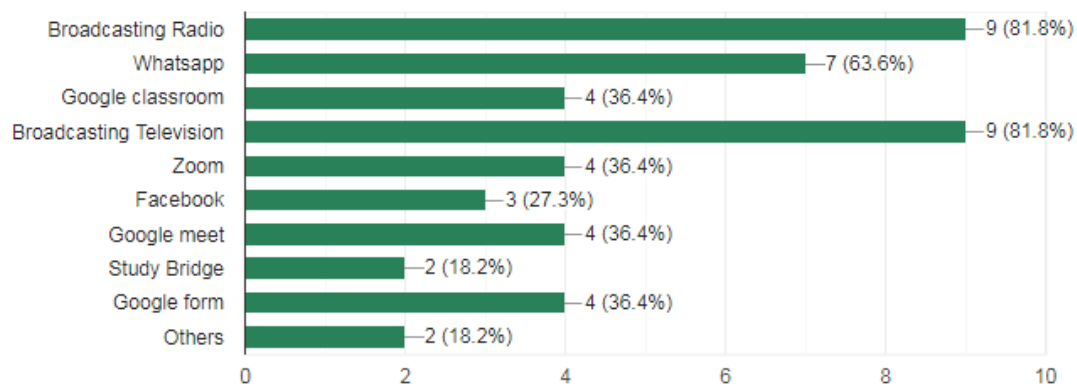
Table 10: Student's and Teacher's knowledge about the challenges face with the use of multimedia learning technologies during

S/No	Facilities	SA	%	A	%	D	%	SD	%
1	Secondary schools in FCT Abuja are not well equipped with the required ICT facilities to support multi-media learning technology during COVID-19 lockdown?	178	79	45	20	2	1	0	0
2	The use of multi-media learning technology should be encouraged in schools as Part of learning/teaching methods even after COVID-19 lockdown	155	69	38	17	0	0	2	1
3	Subscription/Penetration of broadband and tele-density data in Nigeria and the use of Multi-media learning technology has help to improve learning during COVID-19 Lockdown	225	100	0	0	0	0	0	0
4	Availability of regular Bandwidth data and access to internet service is required for effective participation on multi-media learning and teaching	115	51	108	48	2	1	0	0
5	Not having modern Computer, Laptop, mobile phones and other multi-media devices does not pose any challenges to learning during the lockdown	0	0	0	0	9	4	216	96
6	Unavailability of e-library platform in secondary schools that can be accessed online also posed challenges to teaching and learning during the lockdown.	209	93	16	7	0	0	0	0

Source: field survey 2020/2021

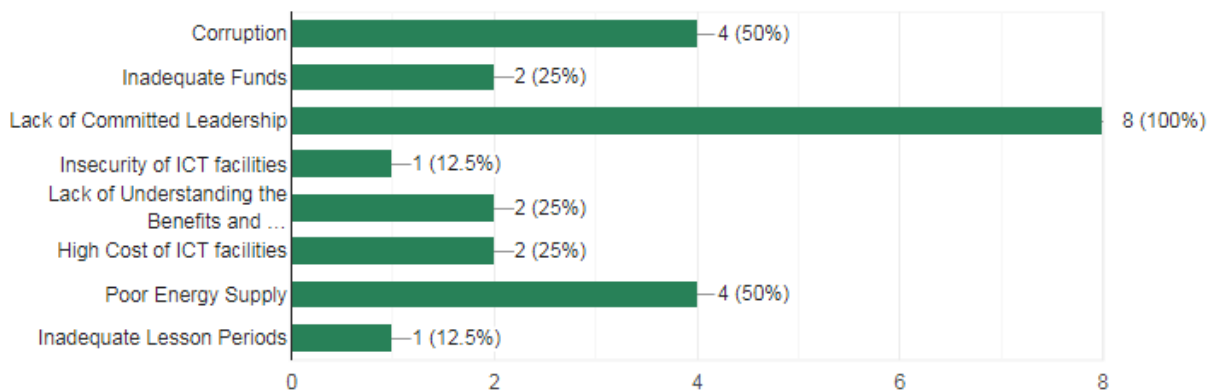
Table 10 shows the question item that was deduced from the research question as it concern the challenges faced with the use of multi-media technologies to learning and teaching on secondary education during COVID-19 lockdown. Among other questions, 79% of the total sample sizes agreed that the secondary schools in FCT Abuja are not well equipped with the required ICT facilities to support multi-media learning technology during COVID-19 lockdown?

Fig 1: Multi-media platform through which teaching and learning takes place during COVID-19 lockdown in FCT Abuja.



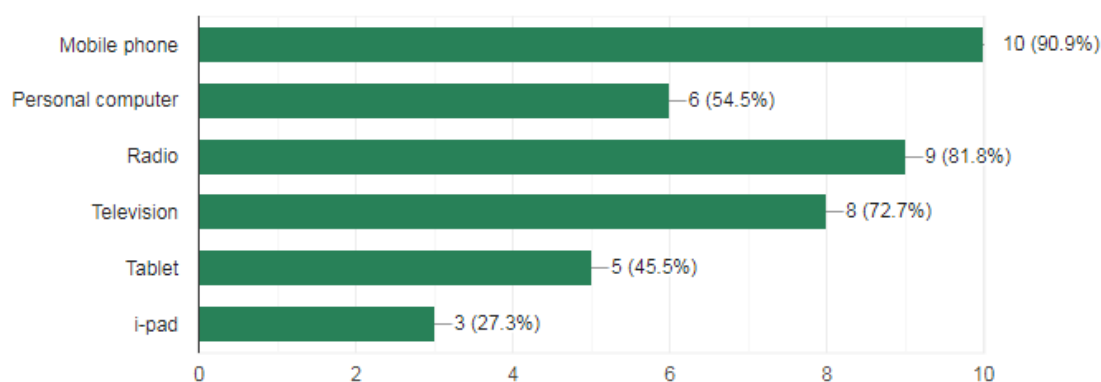
The result from **Fig. 4.1** is a bar chart that shows the multi-media platform through which learning and teaching takes place during COVID-19 lockdown in FCT Abuja. Broad casting radio and television was the highest m-learning platform with 81.8% follow by Whatsapp with 63.6% among e-learning platform. Google classroom, Google meet, Zoom and Google form follow among the e-learning platform with 36.4%.

Fig 3: Why secondary schools in FCT Abuja are not equipped with the required ICT facilities to support multi-media learning technology during COVID-19 lockdown?



The result from **Fig 3** is a bar chat that shows why secondary schools in FCT Abuja is not equipped with the required ICT facilities to support multi-media learning technology during COVID-19 lockdown. 100% of the respondents agreed that lack of committed leadership is the reason behind that while the second highest reason was agreed to be corruption and poor energy supply with 50% each.

Fig 4: Multi-media electronic gadgets that was used for teaching and learning during COVID 19 lockdown FCT Abuja



The result from **Fig 4** is a bar chat that shows the multi-media electronic gadgets that was used for teaching and learning during COVID 19 lockdown FCT Abuja. Mobile phone has the highest percentage of 90.9% among the gadget used. This shows that Mobile phone becomes the saving grace because it is a single electronic gadget that has the capability to link student to learning activities in both e-learning and

broadcasting m-learning multi-media technology facilitation. The irony of the situation is the fact that before the lockdown, mobile phone use to be prohibited as a distraction within the four walls of the physical classroom and it is now the centre stage for both multimedia e-learning and broadcasting m-learning.

Fig 5: Class level when students were first exposed to the use of multi-media learning technology.

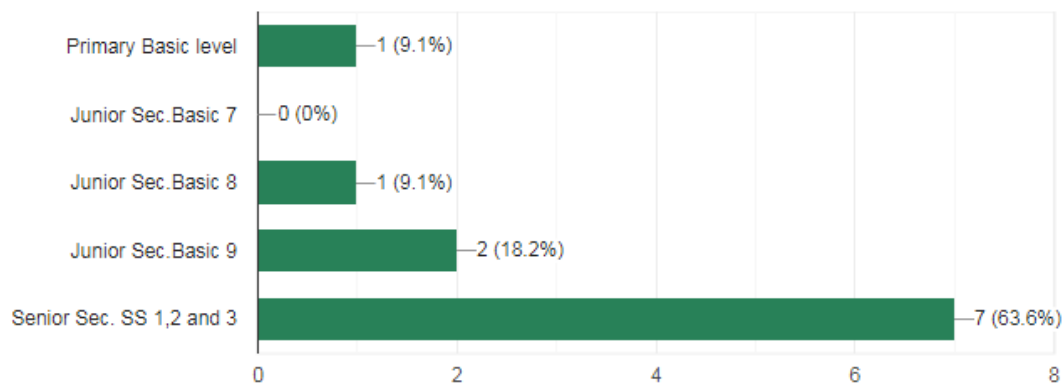


Fig. 5 represents the class level when students were first exposed to the use of multi-media learning technology and senior secondary (SS1,2 and 3) was the highest percentage with 63.6% of the total respondents.

Fig 6: Response to whether students have been trained on the use of e-learning platform before COVID-19 lockdown

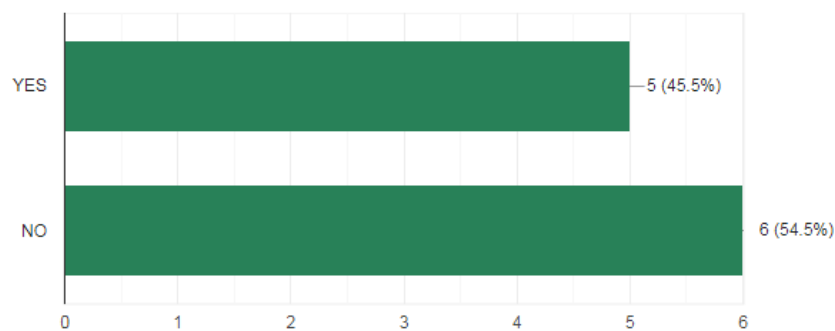


Fig. 6 represents the response to whether students have been trained on the use of e-learning platform before COVID-19 lockdown where 45.5% of the respondents respond YES while 54.5% respond NO

Fig 7: Response whether the uses of multi-media technology during COVID-19 lock did not in any way improve teaching and learning during the period.

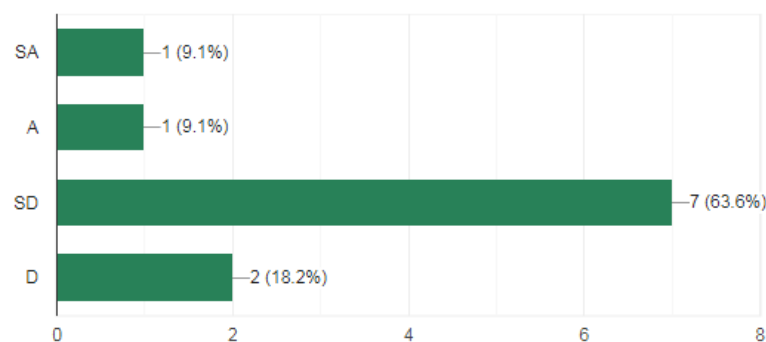


Fig. 7 represents the response on whether the uses of multi-media technology during COVID-19 lock did not in any way improve teaching and learning during the period and 63.3% of the respondents strongly disagree with that.

Fig 8: The uses of multi-media learning technology during COVID-19 lockdown has help to prevent the spread of the pandemic during that period.

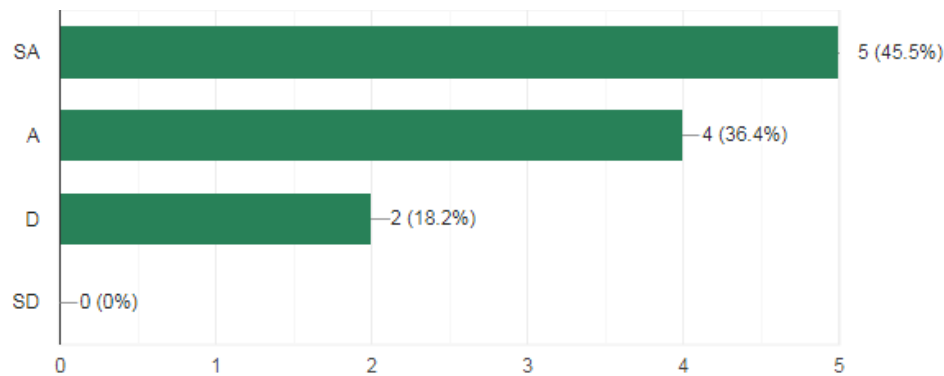


Fig. 8 represents the response as regard to whether the uses of multi-media learning technology during COVID-19 lockdown has help to prevent the spread of the pandemic during that period and 45.5% of the respondents strongly agree with that.

Fig 9: Response to whether students and teachers have unwavering access to bandwidth data, Tele density data and power supply for keeping students and teachers online for effective online teaching and learning

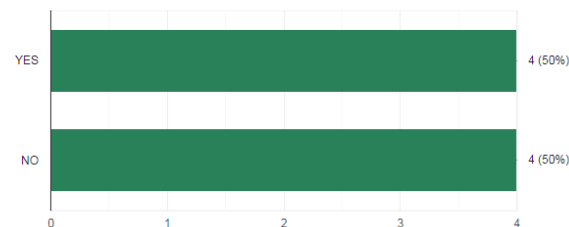


Fig. 9 represents the response as to whether students and teachers have unwavering access to bandwidth data, Teledensity data and power supply for keeping students and teachers online for effective online teaching and learning where 50% of the respondents respond to both YES and NO.

Fig 10: Subscription/Penetration of broadband and tele density data in Nigeria between February 2019 to January 2020.

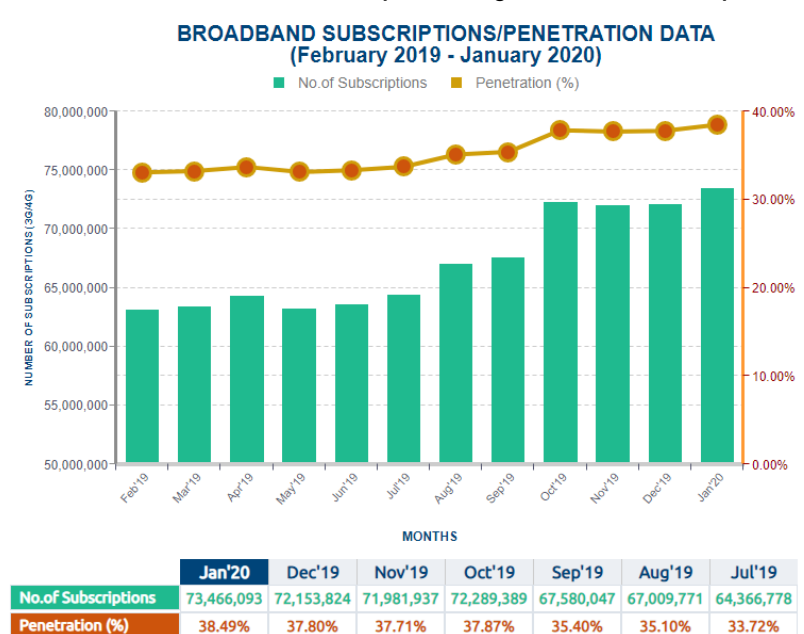


Fig 4.8: (Source: ncc.gov.ng)

Fig. 10 is a bar chat that represents the subscription/penetration of broadband and teledensity data in Nigeria between February, 2019 to January 2020 as obtained from the official website of Nigeria

Communication Commission (NCC) which shows the data subscription and penetration in Nigeria within the indicated period.

5. Discussion

Out of the nine secondary schools selected for this study, five (5) schools belong to the category of private schools while the remaining four (4) are public schools. In the cause of study, it was discovered that some category of private school did not participate in any e-learning during the COVID-19 lockdown. Over 81.8% learn and teach via broadcasting television which is the highest m-learning platform during the era. Google classroom with 88.4% is the highest e-learning platform during the lockdown. It was also discovered that most schools are not equipped with all the necessary multi-media gadgets needed for some schools to engage the students via m-learning and e-learning. The research also reveals the non-availability of multi-media device needed by the students to connect to learning. These gadgets include mobile phone, personal computer and quality access to internet services and data subscription/penetration and among others. 73% of the sample size agreed that the use of multi-media learning technology have reduced the spread of the pandemic during the lockdown. 96% of the total sample sizes agreed that the use of multi-media technology have impacted the learning and teaching as it has actually change the mode and method of learning and teaching because 87.8% of the sample size said that their school has now integrate the use of learning technology into the teaching and learning during and after COVID-19 lockdown.

6. Conclusion

The principal aim of this study was to investigate the impact of multi-media learning technologies on secondary education during COVID-19 lockdown. This research work also provides an insight on the challenges faced by the students and teachers while undertaken learning and teaching via m-learning and e-learning platforms. The findings of this study provide a representation of opinions on the impact of multi-media learning technologies from both teachers and students. Some of the major findings of this study were that majority of the students indicated that they had learnt either via e-learning, m-learning or both during the COVID-19 lockdown. Based on objectives of this study, it can be concluded that the impact of multi-media to learning is enormous and cannot be over emphasized due to the role it played during the lockdown. The findings indicate that there is a positive attitude among students and teachers when it comes to learning and teaching via m-learning and e-learning platform. However, the methods used in m-learning platforms are one-way and not participatory. This is inadequate and measures need to be taken to improve on this. There are challenges that need to be addressed by all education stakeholders and government to improve on the use of multi-media learning technology.

Before the advent of COVID-19 lockdown, Mobile phone was usually identified as a distraction gadget. But during COVID-19 lockdown in FCT Abuja, Mobile phone becomes the saving grace because it is a single electronic gadget that has the capability to link student to learning activities in both e-learning and broadcasting m-learning multi-media technology facilitation. The irony of the situation is the fact that, the electronic gadget that use to be prohibited as a distraction within the four walls of the physical classroom becomes the centre stage through which learning and teaching facilitation for both multimedia e-learning and broadcasting m-learning takes place.

The challenges that were raised need to be addressed to improve the state of learning via multi-media technologies in our schools both private and public school at that. This will in return bridge the gap between current state of things when we compare both the private and public schools in terms of multi-media facilities to deliver online and broadcasting media learning.

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Conflict of Interest

"The authors declare no conflict of interest."

Data Availability Statement

Not applicable.

AI Usage Disclosure

"No generative AI tools were used."

Author Contributions

Conceptualization, S. H. Eromi and S. A. Olonikawu; methodology, S. O. Onubaye.; analysis, S. A. Olonikawu and S. H. Eromi.; writing—original draft, all authors; writing—review and editing, all authors. All authors have read and agreed to the published version of the manuscript.

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Appendix A. Supplementary Material

Not Applicable