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OPPORTUNITIES AND CHALLENGES OF OPTIMIZED METHOD OF TEACHING USING VIRTUAL CLASSROOM INSTRUCTIONAL TECHNOLOGY DURING COVID-19 PANDEMIC IN PUBLIC SECONDARY SCHOOLS IN NIGERIA

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Abstract
This study examined the opportunities and challenges of optimized method of teaching using virtual classroom technology during COVID-19 pandemic in Nigerian public schools. The study adopted a descriptive survey research design. The population of the study is 9789 students and 3251 teachers. The samples were drawn using random sampling technique in selecting fifty-six (56) teachers and one hundred and thirty-seven students (137) within North central geo-political zone in Nigeria. Data was collected using a validated questionnaire for teachers. The instruments were validated by experts. The instrument contained affirmation questions to ascertain the validity of the response of teachers on instructional technology with a reliability coefficient of 0.68. Two research questions were formulated to guide the study. Chi square was used to analyze the data for the research questions and tested at 0.05 level of significance using statistical package for social sciences (SPSS) Version 25. The findings revealed teachers did not utilize virtual classroom technology and that they were faced with a number of challenges which include but not limited to lack of expertise in the use of these gadgets, lack of stable power supply, inadequate finance to purchase etcetera. The study recommended that school administrators should collaborate with various stockholders to put all virtual classroom infrastructure in place to encourage teachers to employ virtual classroom technology when needed, School principals should collaboration with various stakeholders in organizing training and symposium for teachers on the use of virtual classroom technology.
Keywords: Opportunities, Challenges, Optimized Method, Teaching Virtual Classroom, COVID 19.

Introduction
The advent of technology in our daily lives has seen improvement in almost every sphere of human endeavor. Technology in the 21st century has made it easy for most of the work we carry out today with increase in innovative technology. Most developed countries of the world today experience efficiency as a result of improvement and application of advanced technology in almost every aspect of their economy. Lazar (2015) describe instructional technology as the stimulator in education because it uses information and communication technology to enhance teaching and learning. The author further stated that schools must employ instructional technology to enhance teaching, make teaching more interesting and also to catch up with the global standard of education. Similarly, Makinde and Shorunke (2013) conducted a study on the influence of

teachers' information needs on ICT use in secondary schools in Nigeria. The study concluded that the largest percentage of computer users (57.26%) reported to be monthly users, the largest percentage of multimedia users (52.56%) reported to be occasional users, and the largest percentage of projector users 125 (53.42%) reported to be occasional users.
The outbreak of corona virus has exposed many lacunas in the educational sector of most underdeveloped countries because they were displaced during the outbreak of the Covid-19 pandemic. This virtually stalled everything concerning education in most developing countries including Nigeria. Ajadi, Salawu and Adeoye (2008) observed that the most common type of e-learning adopted in Nigerian schools was in the form of lecture notes on CD-ROM

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which can be played whenever the learners desire.

Dargham, Saeed and Mcheik, (2013) describe virtual classroom as an extended form of classroom teaching where learning, either online or offline is facilitated by the use of computer and other telecommunication devices like projector, video recorder, networks, and storage ⅃ facilities. The authors further explained that the delivery of information is usually very interactive in nature and one of the benefits of virtual learning system instead of the traditional method is that it helps learners to develop communication skills quickly and also their personal skills such as autonomy, analytical perception, abstraction and others.

Electronic teaching and Learning can be used to support the traditional method of teaching in times where the physical instructor cannot be physically available. The use of virtual learning in secondary schools will a long way in reducing the uncertainty with regards to any unannounced circumstance or other form of natural disasters. Mohssen Hakami (2017) stated that e-learning can be used to support face to face method of learning (blended learning) and that it can further be used to overcome some of the challenges faced by formal and informal teaching. That is why Pardemean and Suparyanto (2014) concluded that computer skills had a strong correlation with student academic achievements. The authors therefore, advise to consider computer skills on student achievement when implementing ICT into the learning process. Ivan and Sinisa (2019) stated that mobile phones are recognized as the primary source of where student engage themselves in online discussion. The authors further concluded that mobile phone subscription and penetration increased during the period of covid-19 and the same appears to be true for Nigeria, the largest economy in Africa. Analysis from NCC shows that Since 2012, mobile phone penetration has shown nearly linear growth, reaching 83% in 2020.

However, he was of the opinion that learners must be motivated and have effective time management for it to be very effective in the absence of social interactive instruction

between the learners and their instructor. This becomes critical especially, when learners study online which has a way of improving their interest in learning. Barbour and Reeves, (2009); Falode (2014) conducted a study on the impact of virtual learning on students' interest, the findings of the study concluded that virtual environments are considered suitable in teaching and learning of science-based subjects. The authors further noted that the effective implementation of virtual classroom has great implication for teaching and learning as it promotes students' interest in learning contents and encourages teachers' efficiency.

The use of virtual instructional technology is complex; it involves integrated processes such as ideas, people, devices and method of evaluating learning outcome. It is also composed of other different processes like, devising, implementing, evaluating and managing solutions to those problems that involve in all aspects of human learning (Xenos, 2018).

Teachers who decide to employ virtual teaching must be creative and innovative. This means that the teacher in question must be information technology IT inclined before he/she can effectively make virtual teaching effective and efficient. Teachers in Nigeria today are faced with many challenges with the use of technology. Some teachers ignore the use of it totally while some just don't have the training to effectively utilize it. Smarkola (2008) explained the consequences of using instructional technology, and further opined that teachers are the pivot who must be competent and have the expertise in utilizing and managing educational technology. By implication, they should be trained with effective utilization skills to handle teaching both physically and virtually.

It was observed that most public-school teachers in Nigeria had to venture into other ways for survival, their services were no longer needed because of the ravaging effect of COVID 19. This was because most of the teachers could not improvise by creating alternative method of passing instruction to their student. This is because most of the teachers might not have the expertise or access

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to instructional facilities to carry out virtual learning just like other countries during the lockdown. It is however observed that, teachers were seen either looking for menial jobs or learning other skills and some were engaged into farming because they were redundant at the place of their primary assignment, while most of them were still paid salary by the government.

Statement of the problem

The breakout of corona virus has virtually ravaged the economy of Nigeria. The country witnessed closure in most of its sector including the educational sector. As teachers were encouraged to be creative and source for alternative of conveying classroom instructions at time when teachers cannot be physically present. The breakout of COVID-19 has exposed some of the weaknesses in Nigerian educational sector where most of its schools were shut down in order to observe total lock down. The aftermath of this virus has devastating effect on the development of education in Nigeria. It was observed that most teachers virtually could not do anything as most of them were displaced and made redundant while some claim to have engaged their students in online classes. The government provided some way out by organizing classroom instruction via TV stations, WhatsApp group and other means, but these were not very effective. Therefore, this paper seeks to determine the opportunities and challenges of optimize method of teaching using virtual classroom instructional technology during COVID-19 pandemic in public secondary school in North central Nigeria.

Theoretical framework

This study is anchored on technology Acceptance model propended by Davis in (1989). Davis developed The Technology Acceptance Model (TAM) to elucidate and understand the factors that affect the acceptance and use of modern technology like computer technology or ICT infrastructure in delivering classroom instructions.

The theory is useful for explaining how digital information resources are utilized and can help to carry out instructions effectively. The model suggests that when users are confronted with a new technology, there are number of factors that might influence their decision of how and when they will make use of it. These factors are called behavioural intentions, attitude and perceived usefulness of the system, perceived ease of use of the system and individual intention given an organization condition. This study has further validated the tenets of this theory.

Objective of the Study

The main objective of the study is to determine the opportunities and challenges of optimized method of teaching using virtual classroom instructional technology during covid-19 pandemic in public secondary school in North central Nigeria. Specifically, the study intends to determine;

1. Determine the extent of using virtual classroom instructional technology by teachers in public secondary schools during COVID-19 pandemic in North central Nigeria.
2. Determine the challenges associated with using virtual classroom instructional technology in public secondary schools during covid 19 pandemic in North central Nigeria

Research Questions:

1. Do teachers in public secondary schools use virtual instructional technology during covid-19 pandemic in public secondary school in North central Nigeria?
2. What are the challenges associated with using virtual classroom instructional technology in public secondary school during covid-19 pandemic in North central Nigeria?
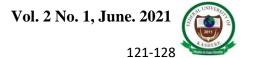
Methodology

The study used descriptive survey research design; the population of the study is 9789 students and 3251 teachers drawn from all the public secondary schools in north central. The sample of the study comprised of fifty-six (56)

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teachers and one hundred and thirty-seven students (137) within the geo-political zone which were randomly selected.

Two research instruments were used to collect data from the respondents one for teachers and one for students. The instrument used for collecting data from teachers was titled Opportunities of virtual classroom instruction "OVCI" which consist of 10 items drawn from research question one assessing teachers' application of virtual classroom instruction and challenges they encountered. The items were measure on a 4 Likert scale of strongly agree, agree, disagree and strongly disagree. Where the total response is 50 percent and above it means that the respondents agree to that particular item and where it is 49 percent and below they disagree to that particular item. The instrument used for the data collection was titled application of virtual classroom instruction "AVCI" the instrument contained

affirmation questions to ascertain the certainty of the response of teachers on the application of virtual classroom instruction. The instrument was also measure on a 4 Likert scale rating of strongly agree, agree, strongly disagree. The instruments were validated by two experts from department of educational technology University of Nigeria, Nsukka. The instruments were trial tested with 15 teachers and 26 students outside the sampled group and was subjected to reliability test using cronbach alpha and a value of 0.68 was ascertained. Chi square was used to analyze the data for the research questions.

Results

Research Question 1: Do teachers in public schools make use of virtual classroom instructional technology during covid-19 pandemic?

Table 1: Responses about the availability of a computer

Respondent	Agree	Disagree	N	X^2	p-value
Teachers	27	29	56		
	47.4%	52.6%			
Students	43	82	125	3.118*	0.77
	34.4%	65.6%			
Total	61	111	181		

*Significant (p<0.05)

Table 2 shows that the calculated value of X^2 was found to be 3.118 while the p-value is 0.77 which is statistically non-significant (p>0.05).

It indicates that there is no availability of computers for teachers and students.

Table 2: I have a smart phone that can connect to online classes

Respondent	Agree	Disagree	N	X^2	p-value
Teachers	42	14	56		
	75%	30%			
Students	78	47	125	2.747*	0.097
	62.4%	37.6%			
Total	120	61	181		

*Significant (p<0.05)

Table 2 shows that the calculated value of X^2 was found to be 2.747 while the p-value is 0.097 which is statistically non-significant

(p>0.05). It indicates majority of the teachers and students have smart phones that can be connected for online classes.

Table 3: I have availability of regular power supply

Respondent	Agree	Disagree	N	X^2	p-value
Teachers	19	37	56		
	16.07%	83.92%			
Students	51	74	125	0.769*	0.380
	29.6%	70.4%			
Total	70	111	181		

*Significant (p<0.05)

Table 3 shows that the calculated value of X^2 was found to be 0.769 while the p-value is 0.380 which is statistically non-significant (p>0.05). It indicates that majority of students and teachers do not do not have regular power supply.

Table 4: I conduct online classes for students during COVID-19 pandemic

Respondent	Agree	Disagree	N	X^2	p-value
Teachers	9	47	56		
	16.07%	83.92%			
Students	37	88	125	3.734*	0.533
	29.6%	70.4%			
Total	46	135	181		

*Significant (p<0.05)

Table 3 shows that the calculated value of X^2 was found to be 3.734 while the p-value is 0.533 which is statistically non-significant (p>0.05). It indicates that majority of the students and teachers responded that no online classes were conducted during COVID-19 lockdown.

Research Question 2: What are the challenges associated with using virtual classroom instructional technology in public secondary school during covid-19 pandemic in North central Nigeria?

Table 5: Challenges associated with application of virtual classroom instruction

S/N	Statement	Mean	S.D	Decision
1	I cannot afford a laptop for online classes with my students	3.91	2.83	Agree
2	I do not have the expertise and training to conduct online classes	2.38	4.68	Disagree
3	I cannot afford data to sustain my throughout the online classes	2.18	3.33	Disagree
4	There are no regular supply of electricity	3.8	1.45	Agree
5	Students are not interested in online classes	1.82	4.11	Disagree
6	My school does not make provision for any online classes	2.96	3.1	Agree
7.	I do not have strong Internet connection to connect for online classes	3.46	2.98	Agree

Result from Table 5 addresses the challenges associated with application of virtual classroom instruction. From the data above, it showed that the respondents agree to item 1,4,6 and 7 with mean score of 3.91, 3.8, 2.96 and 3.46 while they disagree to item 2,3 and 5 with mean score of 2.38, 2.18, 1.82 respectively.

Findings of the study
1. The study found out that majority of teachers did not utilize the use of virtual classroom instructions to conduct lessons during Covid 19 pandemic.
2. It was concluded that teachers face a number of challenges which hindered their

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use of these technology, among these challenges lack of expertise, inability to afford a laptop, irregular power supply, provision of online learning platform by schools and lack of stable internet connectivity among others.

Discussion of the findings
The finding of the study clearly revealed that most teachers and students do not partake in online classes as a result of some highlighted factors. From research question 1, table 1, it was clearly stated that most teachers do not have computer devices that will aid online teachers' classes, as a result it hindered them from carrying out online classes. This finding is in line with the conclusion of Mumtaz (2010) who concluded the main reason why most teachers don't partake in instructional technology was the unavailability of these gadget and most of them cannot afford it.
Teachers further revealed that no virtual classroom was organized with students during the covid-19 pandemic lockdown, while the students further confirm this position who agreed that there were no responses from their teachers and schools did not make any provision for online classes and by implication they were busy doing nothing throughout this period. The finding of this study also gave credence to the findings of Yekini, Adigun Ojo, and Akinwole (2020) conducted in the Lagos state who concluded that majority of students and teachers could not employ e-learning because of vulnerability to obstacles that couldn't facilitate the use of e-learning like e-content, e-library and other e-learning resources.
On the side of most students who have passion of smart phones, it was revealed that these smart phones were not used for the purpose of attending virtual classroom because the platform were rarely provided for them. This is in line with the findings of Ivan and Sinisa (2019) who concluded that mobile phones are the primary source where students engage themselves in online chating and discussion, but because there was no avenue for teachers to engage students in online classes using mobile phone, they probably be doing other social activities on it.
The study also revealed that most teachers were faced with a number of challenges which hindered their use of virtual classroom technology. Some of these challenges include lack of expertise, inability to afford a laptop, irregular power supply. The finding was in conformity with the study of Sebina (2012) who concluded that failure and epileptic nature of power supply in Nigeria was a major issue to everything concerning electronic devices. She further stated that teachers might be ready to apply some of these technology by are always discouraged when there is no power to power them or in the middle of usage the power just goes off. Yekini, Adigun Ojo, and Akinwole (2020) also stressed on this issue of lack of regular power supply.
Furthermore, teachers gave their opinion on the challenges the faced which has hindered them from applying virtual learning at times when they can't be physically be available. Teachers revealed that among other issues where the lack of fiancé to buy a computer gadget, lack of regular supply of electricity, lack of provision for online learning facilities by schools and lack of stable internet connectivity. This was in line with some of the major findings of Effiong (2015) further affirm in his study that Nigeria is faced with so many challenges when it comes to application of electronic device through in delivering online instruction. He stated that most teachers do not want to use these gadgets because they either ight not be I.T complaint and those who are willing to use it are faced with issues of irregular power supply.

Conclusion
The breakout of corona virus has exposed the gap in the digital world or learning. During outbreak of covid-19, the Nigeria government announced that all schools should be shut down and teachers should make provision of online teaching through virtual classroom technology. But to a large extent, teachers could not utilize this platform as a result of one reason or the other. However, the study concluded that there was no virtually classroom conducted by teachers and by implication students did not

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partake in any online classes during the covid 19 pandemic. Teachers were also faced with some numbers of challenges which include but not limited to, lack of adequate power supply, lack of use of ICT gadgets, inability to afford laptops and what have you.

Recommendations

The findings of the study recommend the following-:

1. School administrators should collaborate with various stockholders to put all virtual classroom infrastructure in place.
2. School principals in collaboration with various stakeholders should also organize training and symposium for teachers on the use of virtual classroom technology.
3. Government should provide rooms for loans to enable teachers to buy laptops to encourage the use of virtual classroom technology.
4. Teachers should be encouraged to source for alternative sources of energy where there are power shortages.

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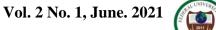Lazer, M. (2015) Digital Divide, Knowledge and Innovations. *Journal of Information,* *Information Technology, and Organizations.* 8(3), 20-28.

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