NIGERIAN ONLINE JOURNAL OF EDUCATIONAL SCIENCES AND TECHNOLOGY
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DEPLOYING VIRTUAL TECHNOLOGY IN MATHEMATICS INSTRUCTION DURING COVID-19 PANDEMIC: VOICES FROM NIGERIAN MATHEMATICS TEACHERS

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To cite this article:
Awofala, A. O. A., Malasari, P. N., Adeniyi, C. O. Lawani, A. O. & Udeani, U. N. (2022). Deploying virtual technology in mathematics instruction during covid-19 pandemic: voices from Nigerian mathematics teachers. *Nigerian Online Journal of Educational Sciences and Technology (NOJEST)*, 4 (2), 1-12

Nigerian Online Journal of Educational Sciences and Technology (NOJEST)

Volume 4, Number 2,2022

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Article Infor

Article History

Received:
06 June 2022

Accepted:
1August 2022

Keywords
Virtual technology, mathematics instruction, COVID-19 pandemic, mathematics teachers, Nigeria

Abstract
This study investigated 12 senior secondary school mathematics teachers in Nigeria concerning their practices of instruction with virtual technology during the COVID-19 pandemic. This qualitative research work involved the use of semi-structured interview questions and was pitched towards probing into the accessibility of virtual technology at home, (2) educators' challenges in virtual mathematics instruction, (3) educators' capability to acclimatize during virtual mathematics instruction, and (4) educators' experiences of deploying virtual technology in mathematics instruction. This study sheds light on the influence of compulsory variations in instruction that might have inferences on digitalization of teacher education profession in Nigeria. The interview scrutiny apprises that the mathematics teachers conveyed efforts in virtual instruction during the COVID-19 pandemic by utilizing technology through the challenges of digitally mutable period. Mathematics teachers were mystified with elucidating mathematics instructions in depths during the virtual teaching and significantly identifying which learners have comprehended or not. However, the study showed that learning virtually is mainly a function of Internet connectivity as many mathematics teachers abruptly find their connection disrupted while instruction in mathematics is on. This study recommended that it is important for mathematics teachers to be abreast of the latest internet enabled technologies for effective and efficient online instruction in mathematics.

Introduction

The aftermath of the eruption of COVID-19 in Wuhan city, Hubei province, China, in December 2019, saw the World Health Organization (WHO) warning that the virus is at minimum 30 times lethal than recurrent flu and at minimum ten times more infectious than SARS (Wilder-Smith, Chiew, & Lee, 2020). Consequently, WHO acknowledged that COVID-19 is a global communal health emergency on January 30, 2020. Based on the apparent virus menace, various régimes have executed several defensive actions (Awofala, Lawal, Isiakpere, Arigbabu, & Fatade, 2020). The COVID-19 plague has spread and affected nearly all nations, including Nigeria (Awofala, Lawal, Isiakpere, Arigbabu, & Fatade, 2020). Additionally, COVID-19 influences various facets of life, mostly the system of education (lawal &

Awofala, 2020). The COVID-19 contagion is triggering academic interruptions globally, and academic institutes have deployed numerous categories of virtual learning to block up the vacuum (Awofala, Olafare, Awofala, Ojo, Fatade, Arigbabu, & Udeani, 2021).

Recently, the plague has meaningfully obstructed schooling globally (Stambough, Curtin, Gililland, et al., 2020). The United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared in March 2020 that colossal school closings had impacted over 80% of the learners around the globe with a minimum of 1.5 billion learners in 165 nations. Since the eruption of the pandemic, several teachers have been compelled to engage in virtual teachings, imposing chances to restructure schooling, teacher education, and academic institutes (Lawal & Awofala, 2020). Online teaching and learning assistance issued resulting from the spread of COVID-19 will support educators in deploying this pedagogical method to curtail the effect of academic institute closings on educational advancement (Morgan, 2020). Remote schooling takes care of physical distance and other dimensions that disallow learners from showing up in-person teaching spaces (Singh & Thurman, 2019). Regrettably, because of inadequate training in virtual learning, some educators and learners are having challenges. Because of prior flu plagues, the COVID-19 eruptions are expected to linger on and that nations keep abreast of the likely sporadic reversions of the virus in no distance time (Kissler, Tedijanto, Goldstein, Grad, & Lipsitch, 2020). Thus, remote learning is expected to remain each time public isolation actions are executed.

It is important to comprehend how remote learning is deployed to elucidate how to advance learners' education (Zorluoğlu, Çetin, Aşık, Gündüz, & Mertol, 2020). Nations specifically inspire or antedate educators having unswerving virtual contact with their learners. Synchronic education undertakings ensue through live video and aural conferencing, with instantaneous response (Kahraman & Subasi, 2022). Educators are anticipated to offer learners with resources and homework via virtual mass media, involving visual and audio. Electronic mail is the greatest common system of virtual communiqué. Web-based podia programmed job times, mobile communications, and work-from-home platforms are some other communication systems (Malkus, Christensen, & Schurz, 2020). Learners will then work autonomously or team up with their guardians, in quest of support from educators during occupational times if they have enquiries (Koh, 2020). Educators become mentors and counsellors, with whom learners connect through video conversation or mobile communication (Bahmani Choubbasti, Mousavi Davoudi, & Rastgar, 2019). Patchy enactment is aggravated by unreliable possession or access to media technology (Al-Mamoory, & Abathar Witwit, 2021). Nevertheless, there are returns to utilizing technology, which include acquiring novel understanding and growing prospects for public interaction (Sabri Ali, 2021). Though automated teaching has long been endorsed in the schooling division (Yelland, 2018), it is foremost deployed in a prolonged time during the COVID-19 eruption.
Preliminary investigations showed that pre-tertiary educational institutions swiftly adjust their syllabuses by delivering virtual education to assist pupils to learn. Virtual education must engross learners in spontaneous communications, sustain communal education, deliver dynamic assistance, offer pedagogical sustenance and advice, and deploy apposite machineries to boost the practice to be active and efficient (Kim, Whitaker, O'Halloran, et al., 2020). Prior research has examined how technologies are deployed to frame specialized education for learners and teachers (Esmaili, Mousavi-Davoudi, & Nasiri-Amiri, 2021) or the deployment of virtual platforms for private pedagogical discourse (Melhe, Salah, & Hayajneh, 2021). Furthermost guardians struggle to have contact with technologies and the Internet for education of their wards. The statistics for internet users in Nigeria as at January 2022 stood at 109.2 million and the country internet penetration rate stood at 51.0% of the total population in January 2022. Mobile devices accounted for over 70% of internet traffic generated in Nigeria. Thus, 49% of Nigeria's total population had no internet accessibility which began in June 1998. Learners who have no contact with the Internet at home are prone to wander around offices with free WiFi to finish their assignment (Başaran, 2022).

Numerous prior investigations have deliberated on the encounters and prospects of educators instructing virtually and facing time burden and bigger job-load through the COVID-19 eruption. Scarpellini et al. (2021) noted that lack of access to Internet for remote learning can affect learners' academic success. Furthermore, (Clark, Nong, Zhu, & Zhu, 2021) stated that learners who were exposed to virtual recordings of lessons from higher quality outside educators achieved better on exams than learners who were exposed to recordings of lessons from educators at their educational institutes. Additionally, (Francom, Lee, & Pinkney, 2021) showed that educators were confronted with myriad of difficulties during the COVID-19 eruption that include challenges connected to learners and guardians, absence of school guidelines, and matters with Internet connectivity and learners' access to computer technologies. Aliyyah, Rachmadtullah, Samsudin, Syaodih, Nurtanto and Tambunan (2020) investigated Indonesian teachers' perceptions of virtual teaching during COVID-19 eruption and upheld four key themes: teachers' motivation, pedagogies, difficulties, and support. This result revealed the experimental datum that virtual teaching achievement in Indonesia is reliant on

several circumstantial elements that sustain each other. Atmojo and Nugroho (2020) examined the execution of virtual teaching in English classes and how 16 EFL educators steer the difficulties encountered during practice. Using a qualitative approach, the investigation showed that the respondents encountered much difficulties in instructing virtually oscillating from learners and guardians' minor participation to dearth of groundwork and scheduling.

In Nigeria, investigations involving teachers' pedagogical execution during the COVID-19 pandemic using technologies are unusual (Lawal & Awofala, 2020; Awofala, Olafare, Awofala, et al., 2021). Therefore, in this study, we investigated mathematics teachers' practices of instructing with digital technologies in senior secondary school mathematics classes at this time of COVID-19 eruption. The findings of the present study could serve as a substitute to fill the research vacuums by deploying a model of senior secondary school mathematics teachers in Lagos state, Nigeria. Additionally, this study contributed to the domain of mathematics education via instructional practices achieved from seasoned mathematics teachers to assist as teachings gained for upcoming teacher entrants.

Theoretical Frameworks

The worldwide COVID-19 outbreak has spread globally, touching various facets of life, predominantly the system of education (Awofala, Olafare, Awofala, et al., 2021). Educators are mandated to prepare for schooling requirements, choices, decisions, and variations to engage learners' potentials, teacher education necessities, and the circumstances under which educational institutions function (Assunção Flores, & Gago, 2020). Since the outbreak of the COVID-19 pandemic, several teachers have been mandated to teach virtually, imposing prospects to restructure schooling, teacher education, and schools. Therefore, the head-on pedagogical process must be adapted to house the virtual learning milieu. Practically, virtually learning undertakings are carried out through adopting technologies such as Google Classroom, WhatsApp, Moodle platform, and Zoom (Awofala, Olafare, Awofala, et al., 2021; Lawal & Awofala, 2020). Thus, all educational institutions in Nigeria are presently deploying virtual learning as a substitute platform for mitigating the effect of the pandemic. Because of the rapid evolution time from conventional instruction to online instruction, it is imperative that professionalization of teaching be done digitally. Nevertheless, the adoption of technologies is a goal cherished by global educational establishments (Jolselt, 2019). Educators are mostly spontaneous to integrate digital virtual learning practices into their syllabi (Hamid, Ferdous Azam, & Shukri, 2020), and their sustenance structure is at the infancy stage. Educators are troubled because they lack the shared-emotive aptitudes to confront such conditions (Hadar, Ergas, Alpert, & Ariav, 2020). Beside teachers' unpreparedness in enacting and executing virtual learning in such a rapid change-over time, they must uphold their expert standing. Ability to integrate technologies into teaching is a function of teachers' perception of technology as they go about professionalization of teaching.

Blignaut, Enrique Hinostroza, Els, and Brun (2010), remarked that to copiously participate in ICT-dependent instruction, educators must espouse a lifetime learning disposition. Generally, technology implementation and acceptance require an uncluttered attention. The technology acceptance model (TAM) popularized by Venkatesh and Davis (2000) can be deployed to chart this disposition. The TAM has two principles: the perceived usefulness and ease of use and can forecast educator disposition or actions when executing novel technologies (Venkatesh & Davis, 2000). This model is deployed to create a notional context for the relations among attitude, intention, and behavior and possess experimental support because of its consistency and cost efficiency in forecasting hi-tech reception and espousal. Based on TAM principle, a person's capability to accomplish a specified action is a function of their behavioral intention to commence that action (Awofala, Oladipo, Akinoso, Arigbabu, & Fatade, 2022). The TAM demonstrates that impending technology integration may be forecast by model application to the early utilization of the technology (Turner, Kitchenham, Brereton, Charters & Budgen, 2010). This current investigation examined Nigerian mathematics teachers' instructional experiences with digital technologies during the COVID-19 eruption. Particularly, the purposes of the study have been delineated into four categories which include (1) the accessibility of technology at home, (2) educators' challenges in virtual mathematics instruction, (3) educators' capability to acclimatize during virtual mathematics instruction, and (4) educators' experiences of deploying technology in mathematics instruction. This study results throw more light on the influence of compulsory variations in instruction and might have inferences on digitalization of teacher education profession in Nigeria.

Method

Research Design

This study deployed a qualitative investigational method using semi-structured interview as the plan (Turner III, 2010; Awofala, Oladipo & Lawal, 2021). The participants consisted of 12 mathematics teachers from six senior secondary schools located in education district III of Lagos state, Nigeria. The study investigates the mathematics teachers' collective speeches on their practices in deploying technology in mathematics instruction during the COVID-19 eruption. Kvåle and Bondevik (2008) contend that interviews permit investigators to reconnoiter respondents' actions, practices, and viewpoints in their language. The interview was adopted as a platform to reconnoiter info connected to participants' background, educational, social, and emotional experiences. In detailing participants' practices, Creswell (1998) recommends eight measures in an interview session: (1) recognizing the respondents in line with the designated sampling process, (2) defining the interview type to be carried out and what data are pertinent resolving the research questions identified, (3) fixing n suitable recording implement, such as a mic for the questioner and respondent., (4) examining the state of the recording implement e.g., the battery, (5) evolving an interview proposal that gives room for respondents' comments, (6) determining a conducive place to carry out the interview, (7) providing informed consent to budding respondents, and (8) the interview items being expounded in line with respondents' feedbacks.

Participant Recruitment

At first, 20 mathematics teachers from 10 senior secondary schools in education district III of Lagos state were arbitrarily and carefully chosen to partake in the investigation via WhatsApp communication. Nevertheless, 8 mathematics teachers pulled out and 12 were ready to contribute. Prior to the commencement of the study, the researcher elucidated the research purposes, approaches, and thinkable risks that the respondents might encounter (Hammersley, Traianou, & Traianou, 2012). All the mathematics teachers that participated in this study articulated their readiness and preparedness to engage in the interviews to communicate lived practices about mathematics instruction involving the deployment of technology during the COVID-19 eruption. All respondents were anonymous and their identity concealed and made private (Widodo, 2014).

Research Procedure

The interview technique was adopted as a plan to resolving the research questions. The activities involving the interview were carried out online via video calls from the WhatsApp application and the interview questions addressed respondents' mathematics instructional practices with technology during the COVID-19 eruption. The interview sessions lasted between 8 and 12 minutes and were recorded with a smartphone. The data collected from the interviews were stored in a file for prompt documentation and sorting.

Data Analysis

Generally, the data collected were categorized into four themes through thematic content analysis (Fullana, Pallisera, Colomer, Peña, & Pérez-Burriel, 2016) and they included (1) the accessibility of technology at home, (2) educators' challenges in virtual mathematics instruction, (3) educators' capability to acclimatize during virtual mathematics instruction, and (4) educators' experiences of deploying technology in mathematics instruction. Thematic analysis is a supple and treasured investigational resource that helps in synthesizing opulent and comprehensive yet multifaceted data documentations (Braun & Clarke, 2006). The thematic analysis helps to locate and identify shared views that cut across an interview (DeSantis & Ugarriza, 2000). The transcripts from the interviews were arranged based on the themes and subthemes that emerged.

Results and Discussion

The study results are described with four evolving themes, which include (1) the accessibility of technology at home, (2) educators' challenges in virtual mathematics instruction, (3) educators' capability to acclimatize during virtual mathematics instruction, and (4) educators' experiences of deploying technology in mathematics instruction.

The accessibility of technology at home. Accessibility to the Internet is a strong factor of virtual learning as it allows associated learning goals to be achieved. Availability of Internet will influence learning coziness endorsed by educators and learners during pedagogical discourse enacted in mathematics at this period of COVID-19 pandemic. Various internet access deployed include smartphones data, Wi-Fi and modems. This is evident in the interview data provided by Lan, Bos, and Ade. They submitted that "I access the Internet using my smartphone, which I carry about anytime and anywhere in checking learners' assignment on WhatsApp and Google Classroom. I deployed the resources at my disposal to buy data to be able to connect to the Internet. Government did not provide us with free data for surfing the net to engage the learners in online learning." (Lan#1, WhatsApp Interview, June 16, 2021). "I engage in online teaching from home by buying data for my modem which I connect to my personal laptop for engaging the learners in mathematics instruction. My school had no Wi-Fi provision. One could have access to Wi-Fi in mass transit buses but usually not strong. Using modem with the laptop, I send and correct learners' assignment from home. Internet access in my home is strong once I load in data into my modem." (Bos#2, WhatsApp Interview, June 16, 2021). "I bought data for my smartphone to be able to engage in virtual teaching from home. The Internet access is quite strong and stable and this made it possible for me to engage my learners in mathematics instruction virtually from home using my smartphone. Unfortunately, many of my learners did not have smartphones to be able to connect virtually. Some of my learners relied on their parents' smartphones for virtual learning in mathematics." (Ade#3, WhatsApp Interview, June 16, 2021).

From the interview data generated it is expedient to note that most mathematics teachers relied on the deployment of smartphones for internet connectivity and to be able to communicate and engage in virtual instruction in mathematics during the pandemic. The prevalent of smartphones in Nigeria has been researched and most mathematics teachers could boast of at least one functional and internet enabled smartphone for mathematics instruction during the COVID-19 pandemic even though the fear of losing one's phone (nomophobia) is a problem (Awofala & Esealuka, 2021; Awofala, 2020). Smartphone is an easier communication tool than laptop and very few mathematics teachers deployed laptops in virtual teaching of mathematics during the COVID-19 pandemic. The ubiquity of smartphone, its ease of use, efficiency and little data consumption are many of its advantages (Kacetl & Klímová, 2019), which make most mathematics teachers to prefer it to laptop for engaging learners in virtual learning of mathematics. Educators' restricted time deploying computers/laptops is a function of their skills in utilizing technology (Zalat, Hamed & Bolbol, 2021). Educators generally are more skilled at deploying smartphones than computers/laptops in virtual teaching but laptop is more efficient for instance when using the Zoom platform for engaging learners in mathematics instruction. Utilizing a laptop can make it easy for the mathematics teachers to elucidate mathematics contents embedded in Microsoft PowerPoint (Sahlström, Tanner & Valasmo, 2019).

Educators' challenges in virtual mathematics instruction. The social restrictions by the government of Nigeria enable schools to engage in virtual teaching. The consequence of this action is that mathematics teachers are faced with a myriad of challenges in virtually teaching mathematics as depicted in the interview with Lan, Bos, and Ade. "I spent my hard-earned money to buy data to be used for internet connectivity on my smartphone and sometimes the internet may not work thereby causing difficulties for me to engage in online mathematics instruction. The connectivity may be bad when rains fall and some of my learners living in remote areas complained of unstable internet access due to the geographical location of their homes." (Sho#4, WhatsApp Interview, June 16, 2021). "Mathematics is a bit difficult to explain online. Not every aspect of mathematics is amenable to virtual teaching. Aspects that involve hands-on activities are always difficult to teach virtually that causing problems for both the learners and the teacher. More so, with virtual teaching and learning, I find it difficult to pinpoint learners that are getting the understanding and those pretending to comprehend my teaching. This sometimes makes me to inadvertently deliver homework for learners who seem not to understand my teaching." (Edo#5, WhatsApp Interview, June 16, 2021). "In mathematics I find it difficult to engage in the teaching of practical mathematics virtually. For instance, teaching mathematics aspect that relates with graph is sometimes difficult for me. It is even difficult to teach it offline, let alone giving instruction virtually and this makes it difficult for me to attain my learning goals during the COVID-19 pandemic." (Yin#6, WhatsApp Interview, June 16, 2021).

Mathematics teachers criticize the virtual teaching for not being perfect because of Internet connectivity blockades that influence variations in assignment assemblage schedule thereby causing irregularity. Yes, in Nigeria mathematics teachers are now expert at utilizing some technologies for advancing learners' learning outcomes in mathematics, Internet connectivity is still a challenge, particularly in zones where Internet connections are difficult because of terrestrial location (Awofala, Olafare, Awofala, et al., 2021; Atmojo & Nugroho, 2020). The mathematics teachers' restriction in teaching mathematics contents virtually is a problem and this may cause learners not to understand the

content being taught. Learners who have little knowledge of mathematics contents virtually will be restricted in enquiries compared to offline instruction (Saunders & Gale, 2012). Certainly, this action decreases the liveliness of learners in asking probing questions for easy understanding of mathematics. Additionally, deploying virtual technologies for mathematics instruction may be very challenging for some aspects of mathematics that are better taught in face-to-face mode of learning as mathematics teachers can only access practice videos the learners sent, and this a limitation (Baecher, McCormack, & Kung, 2014). However, there is the need to connect mathematics to the language of learners when engaging in online pedagogical discourse as evidence suggests a high relationship between language and mathematics (Awofala, Awofala, Nneji & Fatade, 2012). Although online instruction could lead to individualization of instruction, using cooperative learning strategy (Olabiyi & Awofala, 2019; Awofala, & Lawani, 2020) in an online instruction may be difficult and sometimes many learners may not catch the social skills inherent in face-to-face cooperative teaching. Strategies such as concept mapping and problem solving (Awofala, 2002) may be more amenable to digital technology adoption during instructional activities and may have the tendency to improve learners' critical thinking and conceptual understanding (Awofala, 2017; Okunuga, Awofala & Osarenren, 2020; Awofala & Lawal, 2022) and thus dissuading the wrong beliefs of learners that mathematics is difficult and tiring (Awofala & Awolola, 2011).

Educators' capability to acclimatize during virtual mathematics instruction. The enactment of online learning by mathematics teachers is a new practice for schools during the COVID-19 pandemic. Prior to this pandemic, schools are noted for face-to-face teaching and learning activities, which is the norm. Nevertheless, the lockdown and isolation policy of the government has made mathematics teachers to transit and adapt to virtual learning mode in short period of time (Dhawan, 2020). Because of the lockdown, mathematics teachers are mandated to acclimatize to learners' very trifling Internet accessibility and teaching periods alteration, which makes it less effective. The interview data collected from Ana, Yew and Fri revealed this. "During virtual mathematics instruction, the Internet signal may be unsteady, thereby causing an alteration in the schedule. I engage in virtual mathematics instruction only in location where there is constant internet connectivity and pleasing to do so." (Ana#7, WhatsApp Interview, June 16, 2021). "Due to poor internet connectivity, I created learning videos before class instruction and are sent to them to deepen their understanding of mathematics during the pandemic" (Yew#8, WhatsApp Interview, June 16, 2021). "Teaching online sometimes necessitated the capability of the mathematics teachers to adapt when there is no internet connectivity. The success of any online teaching is dependent on constant internet connectivity. When internet connectivity becomes bad and learners could hardly hear me teach, I result to the alternative of recording the instruction in mathematics lessons and uploading it to my YouTube platform. This alternative seems good only for learners who have the support of their parents and can afford to buy data to view my YouTube channel because it is data consuming. With this, learners can access my teaching online ubiquitously." (Fri#9, WhatsApp Interview, June 16, 2021). Mathematics teachers sense the ineffectiveness and inefficiency of virtual mode of learning when internet connectivity is a limitation that sometimes affects schedule modifications, which are occasionally erratic (Frei-Landau & Avidov-Ungar, 2022; Prasetyo, Nurtjahjanti, & Ardhiani, 2021). The unsure schedule may decrease learners' learning time and makes learning unproductive. The mathematics teacher adopts and deploys attractive teaching platforms such as learning videos to deliver instruction in mathematics. With this learner can have a sense of belonging and duty that he/she is interacting with the mathematics teacher.

Educators' experiences of deploying technology in mathematics instruction. Development of technologies to cater for educational needs is fast advancing this day (Mustapha, Van, Shahverdi, Qureshi & Khan, 2021) and this is useful for agents of education. Teachers and learners are required to learn and adapt to the modern pedagogical technologies, particularly to continue in their God given assignment during the pandemic. In virtual mode of learning, teachers are at the behest of experience and novel approaches in teaching mathematics to attain learning goals. Interviews data (Ayo, Ash, and Ben) connected with this show that "during the COVID-19 pandemic learners absorbed very little of the mathematics taught to them. Instead of learners concentrating during instruction they are busy surfing online games and checking photos on Facebook and these pose difficulty in engaging learners to understand the mathematics being taught. Very few of the learners are dedicated in following the online instruction in mathematics as many quit for lack of understanding of the tasks before them. Learners are less inspired to learn even during physical classes, let alone engaging in virtual learning from home. This makes learning forgettable for learners." (Ayo#10, WhatsApp Interview, June 16, 2021). "Engaging in virtual teaching is a novel practice for me and sometimes online classes may be rowdy due to learners doing other things in the background. It is quite unique in that it allows for some appealing novel designs and reworkings that involve learners and me to be better equipped to surmount the difficulties of a mutable world" (Ash#11, WhatsApp Interview, June 16, 2021). "At first, I was anxious in deploying technologies for online instruction. Technologies such as Google Classroom and Zoom meetings are difficult for me to use. However, with

constant practice I became familiar with their use and adoption on the job during the COVID-19 pandemic. Now I can hit the ground running using these two applications for effective online instruction in mathematics." (Ben#12, WhatsApp Interview, June 16, 2021).

Mathematics teachers increasingly engaged in virtual teaching and learning during the COVID-19 pandemic via the adoption of technologies to surmount the difficulties of the ever-mutable world (Pondee, Panjaburee & Srisawasdi, 2021). Through empirical observation, it is difficult to ascertain the level of understanding of the learners while deploying technologies for online learning because technology cannot pinpoint to who is understanding the concept or who is not (Arkorful, Barfi & Aboagye, 2021). With online learning that is heavily dependent on internet connectivity loss of signal may entail the end of the mathematics instruction as there are no close substitutes during the lockdown. Nevertheless, some mathematics teachers agreed that teaching and learning mathematics can become stimulating by deploying technologies that help in storing mathematics content materials on digital platforms such as the Cloud and YouTube. This day mathematics teachers are being inundated with a lot of digital technologies that can enhance the teaching and learning of mathematics virtually. However, mathematics teachers are required to learn and use digital packages and applications that they are less familiar with to develop a disposition toward utilizing them, and finally helping to ensure their behavioural intention to adopting them for instructional activities (Ahadi, Bower, Lai, Singh & Garrett, 2021). Mathematics teachers who flexibly show external locus of control may benefit more from the proliferation of technologies than their internally locus of control counterparts (Awofala, Awofala, Fatade, & Nneji, 2012). The proliferation of internet-enabled technologies such as Facebook, Google Classroom, Google Meet, YouTube, WhatsApp etc. (Lawal & Awofala, 2020; Awofala, Oladipo, Akinoso, Arigbabu, & Fatade, 2022; Awofala, Olafare, Awofala, et al., 2021) will help mathematics teachers to have a choice in their quest to engage in online teaching. This will reduce mathematics teachers' digital distraction (Awofala, Olabiyi, Awofala, et al., 2020) as these internet-enabled technologies will be used only for instructional purposes.

Conclusion and Implications

In this study, effort was made to investigate the experiences of mathematics teachers teaching by adopting technologies during the COVID-19 pandemic in Lagos Sate, Nigeria. This study looked at (1) the accessibility of technology at home, (2) educators' challenges in virtual mathematics instruction, (3) educators' capability to acclimatize during virtual mathematics instruction, and (4) educators' experiences of deploying technology in mathematics instruction. Results showed that for any meaningful online learning to be accomplished there must be constant internet connectivity. Mathematics teachers in the urban areas can boast of having better internet connectivity than those in the rural areas. Thus, the mathematics teachers progressively adapted to deploying technologies to attain the programmed learning objectives during mathematics instruction that is online dependent. In spite of these, the mathematics teachers were faced with many difficulties during the virtual instruction in mathematics, which include elucidating a lesson in full and perceiving which learners have comprehended the materials. The current study has shown that online learning is heavily dependent on internet access as mathematics teachers may unexpectedly experience a blackout due to signal loss. This study has many implications for different stakeholders including the researchers and educators. To start with, availability of internet enabled technologies significantly fast tracked the transition from face-to-face physical teaching to online pedagogical discourse enacted and espoused by the government during this COVID-19 pandemic. Availability of internet technology ensures the conveyance of mathematics learning materials to the learners and this may make learning goals achievable.

The relatively stable internet connectivity in the urban areas allows mathematics teachers to convey mathematics learning materials easily to their learners compared with mathematics teachers in the rural areas who struggle with connectivity. Additionally, in online teaching it is difficult to monitor learners' learning growth. It is more difficult for mathematics teachers who are less inclined to engage in online instruction and learners with trifling amenities for online learning. Therefore, stakeholders in the education industry such as policymakers should provide training on the deployment of online tools in teaching mathematics and deploy sufficient amenities for learners' virtual learning. Teachers and learners should be supported with free internet facility and public supply of electricity must be made constant. Lastly, keeping abreast of latest technologies for online instructional facilitation and mathematics teachers' integration of these facilities for online delivering of mathematics materials are indispensable. Thus, it is important for mathematics teachers to be abreast of the latest internet enabled technologies for effective and efficient online instruction in mathematics.

Acknowledgments

The researcher thanked all the mathematics teachers that participated and whose voices were heard in the study.

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