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Exploring the sustainable teaching and learning in Nigerian schools with focus on emergency remote education

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ABSTRACT

The global pandemic was a great challenge to delivering education in Nigerian schools. This undoubtedly came with a sudden shift to remote learning when teachers and students alike had to adapt to emergency remote education. Although, the prediction of international organizations on the effect of school closure during pandemic perhaps stimulated the emergent of remote teaching and learning (RTL) globally and particularly, in Nigeria. However, it was observed that the innovation and reformation has provided opportunities for transformation through borderless learning which is actually apt for situations like the COVID-19 pandemic. This article therefore, utilized naturalistic observation strategy to explore the impact of this shift on sustainable teaching and learning in schools in Ekiti State, Nigeria. It discusses the concept of emergency remote education as it relates to Nigerian education system. More importantly, it exposed the technology usage in classroom practices in Ekiti State, Nigeria vis a vis, the experiences of teachers and students in emergency remote education, highlighting the platforms employed, successes recorded and challenges encountered in the process. It was concluded that stake holders in Nigerian education system have been navigating unexplored territory to ensure continuous learning. Recommendations were made on how to improve the practice of remote education in Nigeria.

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1. INTRODUCTION

Teaching and learning in Nigerian schools have evolved significantly with advent of emergency remote education. The unexpected circumstances however, forced practitioners to switch from traditional classrooms to a new kind of pedagogical practices that can measure up with the current situation as it is being practiced globally. Pandemic such as COVID-19 crisis is sensitive, and it is a challenge to governments all over the world because it has changed everyday activity in some unprecedented ways. Particularly, Nigeria education system has embraced technological innovations to avert the effect of the pandemic to ensure sustainable teaching and learning in schools in Nigeria. However, it is worthy of note that governments cannot shy away from several changes that could follow a hasty shift from face-to-face classroom-based learning environment to face-to-screen online teaching and learning. It therefore, necessitated actions and reactions by governments and policy makers to face the new reality in order to build more equitable and resilient education systems that can stand the test of times and as well sustain teaching and learning in schools in Nigeria.

Moreover, the kind of education that will meet up with emergency situation may differ at all levels and by age, maturity and socio-economic status together with its corresponding challenges and framework for implementation [1]. It also involves availability of infrastructure, curriculum design, teaching and learning resources, reorganization of school activities, reordering the mindset of the teachers, learners and parents. Additionally, there is a need for provision of supportive environments and information communication and technology gadgets that will be capable of delivering education remotely. The shift to online learning is becoming more popular in education systems in the world, but with adoption or adaptation of various technologies according to educational objectives of the people using it.

The implementation and integration of technology to teaching and learning will depend on the teachers' perspective on teaching as well as the quality of interactions between teachers, students and technology. Although, Harasim [2] show that there are ways in which online learning can be implemented but its aim will be to learn irrespective of space, context and time. Particularly, the teacher will only plan, organize and evaluate the contexts with a focus on learning, and this has drastically increased the use of didactic materials for effective communication between the teacher and the learner. In addition, as suggested by Jamerson and Mitchell [3], the implementation of online learning will the need online resources such as blogs and websites, collaborative tools and social network applications with predominant usage of video conferencing for effective communications among stakeholders in education.

This kind of situation calls for adoption of emergency remote education to complement the face-to-face traditional engagement in schools, as suggested by Moore and Kearsley [4]. Moreover, United Nations Educational, Scientific and Cultural Organization (UNESCO) [5] recommended the use of distance learning programs, open educational applications, and platform for schools and teachers to reach learners remotely. These in line with Jimoh [6] could include integrated digital learning platforms, video lessons, massive open online courses (MOOCs), and broadcast through radio and television. Emergency remote education according to Bates [7] and Weller [8] is technology based and so its effectiveness is bound to depend on factors such as power supply, access to the internet, expertise, digital skills, and readiness of stake holders. Moreover, Hodges *et al.* [9] suggested a design process and decisions for adoption and implementation of emergency remote education which more often could be difficult in most underdeveloped and developing economy. Therefore, if properly managed, emergency remote education can be a better alternative for transformation and sustainability of education programs in case of uncertainties.

2. REVIEW OF THE EMERGENCE OF REMOTE EDUCATION

Emergency remote education is a digital classroom situation where students, teachers, and even the source of information are not physical unlike the traditional classroom environment [10]. On the other hand, information is relayed through technology such as discussion boards, video conferencing, and lots more through the internet and electronic media [11]. Additionally, Bao *et al*. [12] highlighted platforms that can be employed to enhance emergency remote education to include Canvas Conference, Zoom, Blue jeans, Ready Talk, Google Meet and video classes, Panoptic, Loom, and pre-recorded lectures. Google Classroom, Pear Deck, Blackboard, Canvas, Edmodo, Flip grid, for text-based lectures, resources sharing and evaluation, Google Form, Survey Monkey, Socrative for self-assessment as convenient, Edpuzzle, Khan Academy for video lectures and real-time assessment.

Emergency remote education is a system of education that matches anyone, anywhere and anyhow. Notably, this kind of system involves among others; open distance learning (ODL), MOOCs, learning management systems (LMS), course management system (CMS) [13]. Moreover, according to Picciano [14], this kind of teaching and learning mostly occur "synchronously" in a real time or live lecture peer interactions and collaboration with teacher and students from different locations such as in educational video conferences, interactive webinars, chat-based online discussions, and lectures that are broadcast at the same time they delivered. It could also be "asynchronously", in self-learning activities in which learners access class materials at different times, and from different locations such as watching pre-recorded video or lessons, and mostly involve educational activities, discussions and assignments that can engage learners to learn at their own pace, and on most convenient time.

Azubuike *et al*. [15] posited that emergency remote education as that kind of educational activities with variety of designs and methods mostly to achieve the objectives of learning. Emergency remote education according to Hodges *et al*. [9] is characterized of activities beyond the four walls of classroom but, teachers here interact with their learners typically through technology, such as video conferencing software, discussion boards or LMS. Furthermore, it is worthy of note that emergency remote education will not just occur without difficulties according to Díaz *et al*. [16], who highlighted some of these difficulties as the lack of digital competencies and attitude towards technologies among teachers, adjustment to change, and emotional imbalance especially in the face of uncertainty.

However, in most cases this kind of situation, according to Azubuike *et al*. [15] are without a previous plan and with inadequate resources, and these are revealed in the process of change and transformation towards remote teaching methods and inequalities associated with digital learning system. Díaz *et al*. [16] have shown that it may not be too easy to adopt or adapt emergency remote education for teaching and learning by developing countries because of perceived inequalities and challenges that may be involved. For instance, there can be a challenge of predominant usage of online LMS, technological applications, and the disposition of parents or relations to virtual homework. Moreover, in situation like this, responsibility lies on every member of the society to adapt or rather adopt the best form of approach to teaching and learning. In addition, there can be a need for educational institutions to complement the available technological means for an uninterrupted teaching and learning.

2.1. The emergency remote education in Nigeria

Remote teaching and learning (RTL) are important to education especially in situations such as pandemic when there can be restrictions on traditions [11]. Further, it confirms the assertion of Oyedotun [17] who submits that emergency situation such as the COVID-19 and its demand developing countries particularly Nigeria to opt for online pedagogy. This has however, exposed some inequalities and challenges that comes with this new paradigm which have now become the new realities in education in Nigeria. However, the Organization for Economic Cooperation and Development (OECD), in a bid to combat inequalities and challenges that comes with this new approach to education suggested that technology in the heart of emergency remote education can give teachers and students access to specialized material, even in multiple formats to enhance effective teaching and learning [18].

Okoye and Omede [19] noted that unstable power supply still constitutes an issue against the usage of technology for teaching in Nigerian schools. In spite of policy drive, students in rural areas who are mostly restricted to radio and television broadcast have been marginalized due to epileptic power supply. In a survey by Ikwuka *et al*. [20], it was discovered that students' engagement in the emergency remote teaching were too low due to inadequate learning activities while, they were distracted to other activities like web browsing, gaming and the likes unlike the face-to-face classes. There is still much to be done in Nigeria to effectively use RTL due to high cost of internet subscription, poor internet services in remote areas which usually result in interruption during classes Zhang *et al*. [10]. Moreover, lack of skills in designing and implementing remote related courses has shown that stakeholders in Nigerian education are not fully prepared for RTL and it was obvious through several parameters during COVID-19 pandemic.

2.2. Appraisal of the emergency remote education in Nigeria

Technology and internet usage during the pandemic have provoked a global thriving in online and remote classes. This however, according to Sobaih *et al*. [21], has created changes in teaching and learning processes which a lot has affected interactions among teachers and students in classroom practices. Technology in teaching can be a great task for teachers considering the social and contextual factors that must be observed, and it is necessary that teachers need to understand the appropriate pedagogical and technological knowledge in utilizing technology in classrooms [2]. Consequently, the opinion of the OECD [18] is obvious that teachers particularly in primary and secondary schools should be involved in training, teaching and preparing materials for use remotely.

3. METHOD

Naturalistic observational strategy was utilized by three researchers to examine sustainable teaching and learning practices in Ekiti State, Nigeria. It was presented as they naturally occurred during the COVID-19 pandemic, with the advent of emergency remote education, without manipulating variables, thereby capturing real-world experiences, behaviors, and contextual challenges in authentic educational settings. In addition, the study covered the three senatorial districts of Ekiti State (Ekiti South, Ekiti Central, and Ekiti North), with each of the three researchers representing and conducting observations concurrently within one senatorial district to ensure balanced geographical coverage.

4. RESULTS

The new situation as observed compelled teachers and students to adapt and become familiar with new scheme of things in classroom practices. This kind was driven by digital platforms which is characterized by the use of modern technology as tool for knowledge acquisition, effective communication, creativity in teaching and learning processes and much more. Moreover, the usage of digital tools creates opportunity for students to interact and collaborate with one another in a borderless classroom practice.

For instance, the digital tools employed across Nigeria to improve classroom practices in emergency remote education are Google Classroom, Zoom, WhatsApp/Telegram, radio/television, and YouTube.

Google Classroom was of immense benefits in teaching and learning processes during the emergency remote education. It was easily accessed, free and unique for opportunity to add links, insert images, write, collaborate and edit documents on devices, for example, Google Classroom allows teachers to interact with students in a live streaming mode by sharing messages and information simultaneously to improve students' participation and learning. In addition, there were opportunities for teachers to upload educational materials such as quizzes, assignments, videos, audios, PowerPoint presentations that creates room for learner to access teaching and learning materials as convenient, and from different locations. However, the major challenge of Google Classroom was the inability of teachers who serves as the administrator to regulate or manage comments in order to ensure data protection and to prevent cyberbullying just like all other digital platforms.

Zoom application provided students with opportunity to participate and collaborate in video conferencing from different locations. It gives room for small and large audiences with opportunity to split into different units or groups where and when necessary, it allowed interactions and motivations through chat or waiting room, screen sharing of information or materials with recording and transcription of classroom processes. Although, Zoom at times was exposed to security issues in situations when password was not adequately protected. Additionally, imposition of time limits on the free version of Zoom was frustrating because it ends after a period of 40 minutes. Moreover, timely subscription was often a challenge to most users in Ekiti state, Nigeria, and teachers who assumes the host more often lacked complete control over students, such as the inability to remove an erring participant or mute their microphones permanently. Classes on Zoom were often disrupted due to background noise and participants sometimes experiences Zoom fatigue perhaps because it does not provide tools for effective classroom management.

WhatsApp/Telegram are both messaging applications that benefits teaching and learning especially as a teacher students' communication tools in emergency remote education. There were opportunities for class schedules, upcoming assignments with conducive environment for teachers to create groups, share important information and resources when and where necessary. They were useful to help students who were unable to meet up with face-to-face classrooms due to scheduling conflicts and other circumstances beyond the immediate control. In addition, with WhatsApp and Telegram, teachers were able to conduct quizzes and tests, assigned projects and monitor them appropriately. It should be noted that none of these tools was perfect in itself because, they both have some features which gives one an edge over the other in teaching and learning processes especially in emergency remote education.

WhatsApp supports widgets, one is able to export to email, drafts are automatically saved, the read and delivery notification, maximum file size is 100 MB. Telegram has a built-in browser, tablet optimized, privacy of the users contact number is guaranteed because it can be used anonymously, it has limitless storage, there is image preview feature, media compression, multi-platform support, maximum file size is 2000 MB, user can send a contact stamp, uses global positioning system (GPS) to meet people, uses two ways opt-in and contact any app user. However, the challenges encountered with these digital tools involved vague learning instructions from teachers, digital eye strain that often led to ocular muscle fatigue, distractions, copying and pasting of homework and assignments, message flooding coupled with manual searching of old posts as a result of laborious process filled with overloaded information, passivity in learning circle as against the usual in the ordinary use of these tools.

Radio/television improves educational quality and relevance during the emergency remote education by lowering the demands for internet, improved access to education particularly in rural areas. These facilities were efficient for their accessibility both in the urban and rural areas and so, educational programs were efficiently broadcasted because they were commonplace in many households and communities in Nigeria. Radio became a source of valuable and reliable information, and this was especially made available by its ability to reach across borders. Radio is cost effective and provides a huge selection of channels based on geographical locations but characterized of audio media without visuals and can be difficult at times to get the proper signals. Moreover, television helped students to watch educational and informative programs and sometimes serves as real-time learning platform or supplement for learning when and where necessary with entertaining break from time to time. However, television gives room to little or no interaction while buying a television could be expensive and can often divert students' attention from activities that helps the brain development. Furthermore, watching television can be addictive, and parents be faced with challenge of enticing children to play in some other ways, it brings difficulties in falling asleep and as well disturb the sleeping patterns of the students coupled with other health issues when engulfed with watching television.

During the emergency remote education, YouTube involved the use of videos to simplify seemingly complex topics, and this was actually entertaining with more opportunity for students to watch repeatedly. Teaching and learning with YouTube allowed teachers to reach their students outside the four walls of the classroom even without benches and other school materials. It should be noted that students were found to be

attentive because through this virtual engagement, and much more with the visual materials on YouTube than those in the traditional teaching environment. YouTube learning resources in emergency remote education were considered to be more versatile in ensuring effective learning, and most especially the virtual classroom of YouTube which can be manipulated by the student. However, without prejudice to potentials of YouTube, it was observed that it promotes individualism while learning and this can be unhealthy to cognitive development of the students. This digital tool was without restrictions, and so abusiveness was inevitable for posts of mystified videos which was considered unhealthy in classroom practices. YouTube was found to be always flooded with unnecessary advertisement intermittently for no just cause to disrupt the process of learning. It also relies on the internet which may not be equally accessible to, and affordable by all categories of students.

4.1. Graphical representation

Figure 1 shows how learners in Ekiti State experienced different emergency remote education platforms, highlighting a mix of enabling factors, structural barriers, and pedagogical or behavioral challenges. Generally, it suggests that as platforms become more digitally complex (from radio/TV to Zoom and YouTube), structural and pedagogical problems tend to increase even when there are some enabling benefits. Analytically, the stacked bars compare five platforms: radio/television, WhatsApp/Telegram, Google Classroom, Zoom, and YouTube across three qualitative components: enabling factors, structural barriers, and pedagogical/behavioral challenges. The lower sections of each bar represent enabling factors (such as access and flexibility), middle sections show structural barriers (like connectivity and cost), and the top sections capture pedagogical and behavioral challenges (such as student engagement and teacher readiness).

Low-complexity technologies: radio/television and WhatsApp/Telegram show relatively larger enabling segments, reflecting their wider availability, lower data demands and familiarity for teachers and students in low-resource Nigerian settings. However, these platforms still carry noticeable structural barriers, including inconsistent electricity and device access, and some pedagogical limitations because they support mostly one-way or text-based teaching. Higher-complexity technologies: Google Classroom, Zoom and YouTube display larger portions of structural barriers and pedagogical/behavioral challenges, indicating that issues like high data costs, bandwidth requirements and limited digital skills become more prominent on these platforms. Even though they offer richer interactive features and potentially more engaging learning experiences, these benefits were often undercut by connectivity problems and uneven teacher capacity to design and manage effective online lessons.

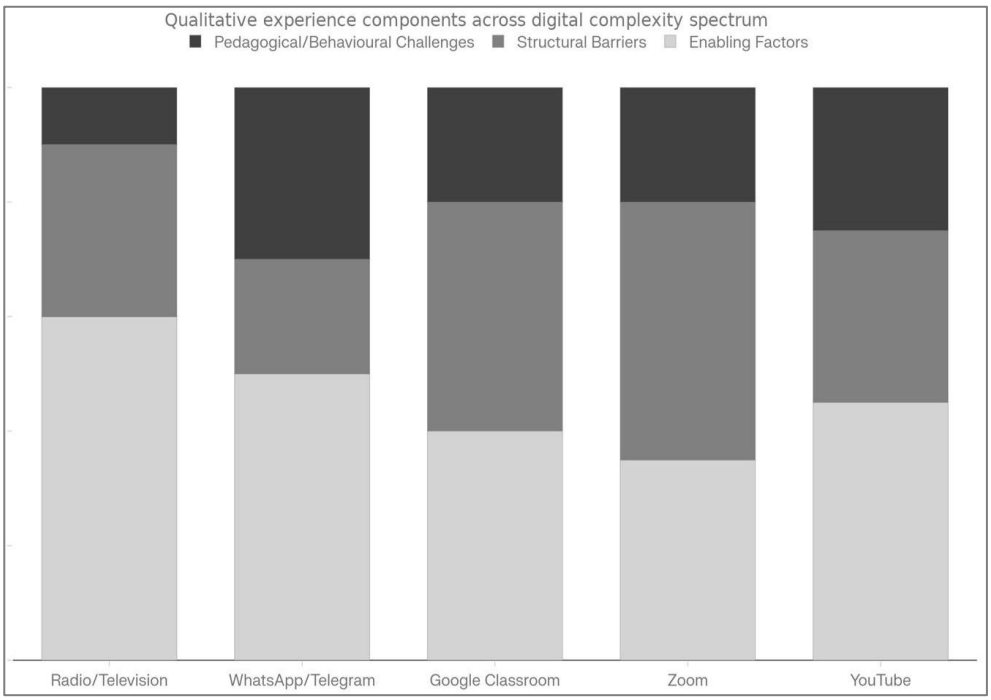

Figure 1. Graphical representation of learners' disposition to emergency remote education

5. DISCUSSION

This work consistently indicate that effective policy and instructional design should prioritize foundational infrastructure and teacher capacity building before expanding the use of complex digital platforms in Nigeria. It has been shown that unreliable electricity supply, high data costs, limited access to digital devices, and weak internet connectivity significantly constrained students' and teachers' participation in online learning during the pandemic [22], [23]. In addition, inadequate digital pedagogy skills among teachers further limited the effective use of platforms such as Zoom and Google Classroom, underscoring the need for targeted professional development prior to large-scale digital adoption [24]. Consequently, scholars increasingly advocate for blended and low-tech–high-tech hybrid approaches, combining widely accessible tools such as radio, television, and WhatsApp with carefully supported use of more advanced platforms to enhance equity and system resilience [25], [26]. This layered strategy is viewed as a pragmatic pathway for sustaining learning continuity in future emergencies within resource-constrained contexts like Nigeria. The implications for practice: the pattern across the graph suggests that policy and design efforts for emergency remote education in Nigeria should prioritize strengthening infrastructure (electricity, affordable data, and devices) and targeted teacher training before scaling up more complex digital platforms. Blended strategies that combine widely accessible tools like radio/TV or WhatsApp with carefully supported use of platforms like Zoom or Google Classroom may offer a more equitable path to resilient remote education in future crises.

6. CONCLUSION

It was observed during COVID-19 pandemic that teachers in Ekiti State, Nigeria charted a new ground by their involvement in emergency remote education but with little or no preparation. They venture into digital platforms for teaching and learning without so much digital skills and this limited their scope in the usage of several digital tools available for teaching and learning in the world today. For instance, a well over 70% of the teachers were not aware that WhatsApp and Telegram can be so used not until the new normal. There were no smart phones or other hand-held devices in the hands of nearly all the teachers in the rural settlements which totally isolated students in those areas from quality education but for government intervention through educational broadcast on radio and television. Teaching and learning processes were destabilized by unstable electricity and there were internet disruptions to effective usage of Google Classroom, Zoom, and YouTube which were used by a few (about 5%) teachers in some parts of the state. In addition, students in this category were caught up in undue posts on WhatsApp and Telegram while activities of scammers nearly frustrated teaching and learning processes in a good number of areas.

However, the recommendations were considered necessary to actualize the practice of RTL in Nigeria: i) improvement on electricity power supply and provision of portable solar educational gadgets like radio, television and record player to complement the available power supply for students in rural areas and the less privileged students in urban areas; ii) the enthusiasm shown by government and steps taken so far can only be sustained with the involvement of all stakeholders (government, business groups, community leaders, teachers, students, conventional institutions, UNESCO, and grassroots citizens); iii) teachers should be well trained on remote teaching to improve their effectiveness and efficiency in remote teaching/learning process; iv) curriculum planners should restructure the basic and secondary level curriculum by introducing better practical computer studies to set solid background for the students before moving up to the tertiary level; v) EdTech companies should support teachers with digital literacy trainings, resources and also provide increased access to online/remote learning resources for students; vi) tertiary education in Nigeria should be further empowered for more research and development into online and distance learning environment; vii) government and regulating authorities should enforce the reduction on the costs of data and tariffs by network providers as solutions for the education sector, because many schools have the hardware and software resources but data for internet connectivity hinders them; and viii) provision for joint funding scheme among governments, private sectors, and educational institutions to ease the burden of funding digitalization of education.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

Data availability is not applicable to this paper and no new data were created or analyzed in this study.

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