

Pre-Service Teacher Education and Technology Integration amid COVID-19 Pandemic in Colleges of Education

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Abstract: The paper focuses on integrating technologies for instruction in pre-service teacher education during the COVID-19 pandemic in Nigerian Colleges of Education. The emergence of COVID-19 occasioned the shifting paradigm of teaching in schools worldwide to online methods. The script discussed that pre-service teachers in Nigerian Colleges of Education is facing the challenge of integrating technologies into classroom instruction. The article stressed the importance of ICT to achieve quality pre-service teacher education in Colleges of Education. Integrating technologies into pre-service teacher education and the challenges COVID-19 poses to pre-service teacher education was discussed. The author averred that mobile learning through WhatsApp, Facebook, YouTube, and Google Classroom during the COVID-19 would provide sustained education. The conclusion was that teachers and students should explore mobile learning's full benefits through WhatsApp Instant Messaging, Facebook, YouTube, and Google Classroom during the pandemic.

Keywords: COVID-19, social distancing, technology, mobile learning, Google Classroom.

I. INTRODUCTION

Colleges of education are tertiary institutions that specialize in the training of professional teachers in Nigeria. The College of Education's educational program duration is three years, and the certificate awarded after passing prescribed exams is the Nigerian Certificate in Education (NCCE, 2012; Adetayo, 2016). The College of Education programs' objective is to produce teachers who will teach at the primary school and the basic junior secondary schools (Akindutire & Ekundayo, 2012; Oritsebemigho, 2014). The National Commission for Colleges of Education (NCCE) is by law responsible for coordinating these colleges' academic programs. Most teachers in Nigerian schools are the products of these colleges. However, in the last three decades, teachers' cohorts cannot meet the 21st-century teaching requirement due to gaps in the teacher education program. Critical among these gaps is the challenge of the integration of technologies into classroom instruction.

Integrating ICT globally into teaching and learning remains the key to sound education in all learning institutions (Nordin, Davis & Ariffin, 2013). Lawal and Braimoh (2018) observed some gaps in teacher education in Nigeria; one of these is the lack of ICT knowledge to personalize the curriculum and help support trainees for problem-solving activities.

Quality teacher is fundamental to quality education (Aina & Olanipekun, 2015). However, studies show teachers should integrate technologies into teaching in the 21st century for effective teaching and learning (Abdalla & Ali, 2017). For teachers to be successful in their careers, it was argued that such teachers must evolve themselves in pedagogy, content, and technology knowledge (Sahin, 2011).

Integrating technologies into teaching has many benefits for teachers and students (Gur & Karamete, 2015). It helps students to create interest in learning (Sahin, 2011). It enables the teacher to change how they think about teaching (Gur & Karamete, 2015). However, studies indicate that many schools are yet to use these advantages (Kafyulilo, Fisser, Pieters, & Voogt, 2015). Empirical studies show that many Nigerian teachers' knowledge is indigent in using computers in the classroom (Aina & Olanipekun, 2018). Countries like Tanzania have made ICT use in their educational system a matter of policy (Kafyulilo, Fisser, Pieters, & Voogt, 2015). Despite the availability and accessibility of computers in many schools, particularly in Nigeria, most teachers do not use them to teach (Hosseini & Kamal, 2013). The emergence of the COVID-19 pandemic had further exposed the technology's challenge in the pre-service teacher education in the country's educational system. COVID-19 caused disruptions to the world system; according to Drake and Reid (2020), this includes teachers and students.

The emergence of the COVID-19 pandemic had devastating impacts on Nigeria's global educational system. The pandemic's effect is alarming on the nation's educational system (Sahu, 2020). Social distancing has been considered adequate to curb the virus's spread (Blocken, Malizia, van Druenen & Marchal, 2020). Social distancing is a step taken to reduce physical contact with other individuals (European Centre for Disease Prevention and Control, 2020). During this period, as a social distancing measure, students and teachers cannot interact in groups. Schools are closed down for many weeks; thus, teaching and learning are disrupted (UNESCO, 2020). Teaching and learning are done remotely using different technologies without prior preparation (Figg, Lu, Lu & Crawford, 2020). Most countries shifted teaching and learning to different virtual modes. According to Radha, Mahalakshmi, Kumar, and Saravanakumar (2020), the COVID-19 pandemic crisis makes it mandatory for schools

globally to switch to e-learning. However, most developing countries, including Nigeria, could not adequately use this paradigm because of many factors, mostly the teacher education gap previously explained. According to Subedi, Nayaju, Shah, and Shah (2020), the technological, education/literacy background, and socioeconomic challenges are significant issues in developing countries.

II. TECHNOLOGY IN PRE-SERVICE TEACHER EDUCATION

Pre-service teacher education in the 21st century is evolving to include ICT in the preparation of teachers. Davis (2010) cited in Nordin, Davis, and Ariffin (2013) that teachers' preparation in New Zealand and many countries include ICT to enhance teaching and learning. Bhakta and Dutta (2016) observed the significance of technology in education because traditional teaching and learning methods were replaced with new emerging technologies. It is, therefore, critical to ensure that technology occupies a central position in teacher preparation. Teachers are the essential variable for the teaching and learning process (Aina & Olanipekun, 2015) and should be vast in using technologies to teach. Therefore, technology should form part of the pre-service teacher education program. Sahin (2011) said the ICT knowledge would allow the teachers to develop in all areas of their professional job.

Technologies in pre-service teacher education in the 21st century are essential to producing sound critical thinking skills (Sahin, 2011). Teacher Education College in Tanzania was equipped with computers to prepare teachers who can integrate technology into classroom teaching (Kafyulilo, Fisser & Voogt, 2015). Many other countries did the same, but it is worrisome that most pre-service teachers are indigent in integrating technologies into teaching. The primary factor responsible for this may not be unconnected with the previous studies, which show that most teachers in colleges have a poor attitude towards ICT (Sánchez, Marcos & GuanLin, 2012; Aina & Ogundele, 2014; Al-Zaidiyeen, Mei & Fook, 2020). Technology in education is sure to be an area of change that has been challenging (McQuirter, 2020).

Technologies integration in the classroom has many benefits for both the teachers and the students. Previous studies before the emergence of the COVID-19 pandemic confirmed that the integration of technologies in the school is significant to the quality of education (Ibara, 2014; Ghavifekr & Rosdy, 2015; Kilinc, Kilinc, Kaya, Başer, Türküresin & Kesten, 2016; Al-Zaidiyeen, Mei & Fook, 2010).

Integration of technologies into the classroom in pre-service education programs is challenging because the resources are not available. Tools for learning such as Weblog, Wiki, podcasting, instant messaging, social bookmarking, text chat, RSS, and internet forums (Pande, Wadhai, & Thakare, 2016) are wrongly utilized. Several digital devices are available for pre-service teachers, but internet connectivity limits these devices' operation for effective teaching and learning. Given this, Trucano (2014) observed that Nigeria's underdeveloped

broadband infrastructure poses a challenge to e-learning in schools. Therefore, the issue of technologies in pre-service teacher education had severe implications on Colleges of Education during the COVID-19 lockdown in Nigeria.

III. THE CHALLENGE COVID-19 POSES TO PRE-SERVICE TEACHER EDUCATION

The emergence of COVID-19 came with unexpected challenges to the entire world. Universities and colleges were closed for an extended period because of international and national lockdown. Teaching and learning were disrupted because of social and physical distancing. However, many advanced countries shifted from conventional teaching to various types of e-learning with the aids of digital technologies. The outbreak of COVID-19 suddenly changed educators, parents, and students' orientation to the use of technologies for teaching and learning (Fackler & Sexton, 2020). The new paradigm had a different level of success in countries worldwide because the teachers and students are technology savvy. Contrarily, most developing nations had challenges in shifting paradigms because of the problems earlier discussed. According to Wu, Pearce, and Price (2020), the shifting to online instruction has posed multiple challenges for teachers (educators). One of the challenges of shifting instruction during COVID-19 is students' inability to interact physically with peers and teachers (Vasquez, 2020).

Interaction in learning is supported by the social constructivism theory (SCT). The theory of social constructivism firmly believes that students create knowledge as they interact with teachers and peers. According to Schreiber and Valle (2013), Vygotsky, who is a proponent of social constructivism, submitted that learning is a social and collaborative task where learners create meaning as they interact. Interaction is essential to learning: thus, Educause Learning Initiative (2005) opined that it should be linked to interaction for learning to be successful. Education remains a process of interaction that allows the learners to develop their understandings by assembling facts, experiences, and practices. According to Kim (2001), through interactions, learners create meaning in learning contexts related to each other.

Most Colleges of Education in Nigeria had drawbacks in their academic calendars. The emergence of the COVID-19 pandemic has provided the opportunity to examine education (Mindzak, 2020), especially the pre-service teacher education. Teaching practice (practicum) programs were adversely affected. Pre-service science teacher education programs were affected severely because teaching and learning of science was difficult due to experiments' involvement. Many teachers and students possess mobile digital devices that could be explored at this time, but they could not because of inadequate knowledge.

The period of COVID-19 lockdown was challenging in the history of Colleges of Education in Nigeria. Few teachers adopted teaching through WhatsApp messaging, YouTube,

and Facebook but, many students could not cope because students do not use the Apps for educational purposes before the COVID-19 pandemic (Aina & Olanipekun, 2018). On several occasions, students have challenges in downloading lecture materials: images, graphics, and video. The outbreak of COVID-19 strengthens the inequality in education among pre-service teachers. Because the government could not provide quality e-learning for these students at this critical time: only those from wealthy backgrounds can meet the cost of this type of learning. The world is brazing up for the second wave of COVID-19. It thus implies stakeholders in pre-service teacher education should be proactive to ensure quality teacher education is sustained.

IV. SUSTAINING TEACHER EDUCATION DURING AND AFTER THE COVID-19 PANDEMIC

Quality teacher education is not negotiable with or without the COVID-19 pandemic because quality teacher is critical to the world economy's sustainability. According to Adhikary (2018), a quality teacher who is an active user of ICT for teaching is indispensable to any quality teaching and learning process. Therefore, both in-service teachers and pre-service must be technology savvy. Bingimlas (2018) considered technological expertise as the general knowledge of technologies, such as software, smart devices, and social media, which require specific skills to operate. In light of this, the teacher's Technological Pedagogical Content Knowledge (TPACK) is imperative. TPACK framework represents teacher knowledge of technology integration in teaching (Barisic, Divjak & Kirinic, 2017). During the COVID-19 pandemic, e-learning remains the best strategy to teach and learn; however, it will be difficult if the teacher's TPACK is inadequate. According to Nordin, Davis & Ariffin (2013), the TPACK provides a model to guide the effective integration of ICT into teaching. Teachers could explore different online learning strategies during the COVID-19 lockdown for pre-service teachers but could not because of inadequate TPACK.

Mobile learning (m-learning) is an example of online learning that could be explored during COVID-19 lockdown. During the last lockdown, most students and teachers possessed good mobile phones, tablets, and iPad, yet they could not deploy them for fruitful educational purposes. Most of these devices contain Apps for educational purposes. These Apps are WhatsApp, YouTube, Facebook, Twitter, and others.

Mobile technologies enhance learning where access to education is not feasible, such as the COVID-19 time (Mehdipour & Zerehkafi, 2013). It is portable, convenient, affordable, which both teachers and students could explore to promote teaching and learning (Aina & Olanipekun, 2018; Sarrb, Elgamel, & Aldabbas, 2012). M-learning is convenient because it is accessible virtually anywhere: it provides access to all the different learning materials (Alsaadat, 2017).

WhatsApp allows the user to send information as text, image, video, and voice messages depending on their knowledge (Aina et al. 2018). WhatsApp is typically used by students in

schools as a means of instant communication. Table 1 shows an example of how the University's student uses WhatsApp for different academic purposes.

Table 1. Distribution of the University students' uses of WhatsApp for educational purposes.

S/N	Purpose	Daily (%)	Weekly (%)	Monthly (%)
1	Communicate classmate on courses requirement	39.6	22.7	18.2
2	Communicate instructor on courses requirement	10.4	19.5	19.5
3	Publish courses announcements	22.7	18.8	16.2
4	Discuss with instructor on courses related issues	23.4	17.5	20.8
5	Seek help from old students on courses requirement	26.6	16.2	26
6	Post links related to topics and resources on courses	23.4	14.9	24
7	Formation of students groups for education purpose	24.7	22.7	18.2
8	Organize meetings with classmates on assignment & project	21.4	16.9	20.8
9	Get feedback from course instructors	21.4	16.9	20.8
10	Organize time of study	26	16.9	12.3
11	Discuss ideas with classmates on course-related issue	24	22.1	20.8

Source: Al-Mothana (2017)

Facebook is a tool utilized to promote academic practices in the advanced world (Ligi & Raja, 2017). Facebook becomes an interesting subject among researchers, and several studies were published (Capua, 2012). Stakeholders in education should use WhatsApp in schools during the COVID-19 for learning instead of entertainment. Video is a learning tool in schools supported and influenced by YouTube (Tamim, 2013). The use of YouTube in mobile learning promotes authentic learning, which is absent in many classrooms (Aina et al., 2018).

At this critical time in the global history of education, it's time to incorporate these Apps to the pre-service teacher education program in developing countries like Nigeria. Adopting this learning mode is cost-effective because almost all students have mobile learning devices; they could learn anytime and anywhere. One good advantage of this paradigm of learning is that it allows students to reflect on their learning tasks. Reflection is one essential element of authentic learning, allowing students to revisit learning tasks at any time (Herrington, Reeves & Oliver, 2010). The students can replay the recorded audio lectures or replay the videos several times for comprehension. Figure 1 conceptualized mobile learning using WhatsApp Instant Messaging, Facebook, and YouTube

Figure 1 shows that the exploration of m-learning through the WhatsApp Instant Messaging, Facebook, and YouTube promote collaboration and reflection in learning. Collaboration is critical to teaching and learning (Har, 2013). Collaboration would be vital at this period of the pandemic for

both teachers and students. Therefore, stakeholders in education should make fair use of WhatsApp Instant Messaging, Facebook, and YouTube at this critical period. Besides, many students are familiar with searches on Google but not familiar with Google Apps for Education.

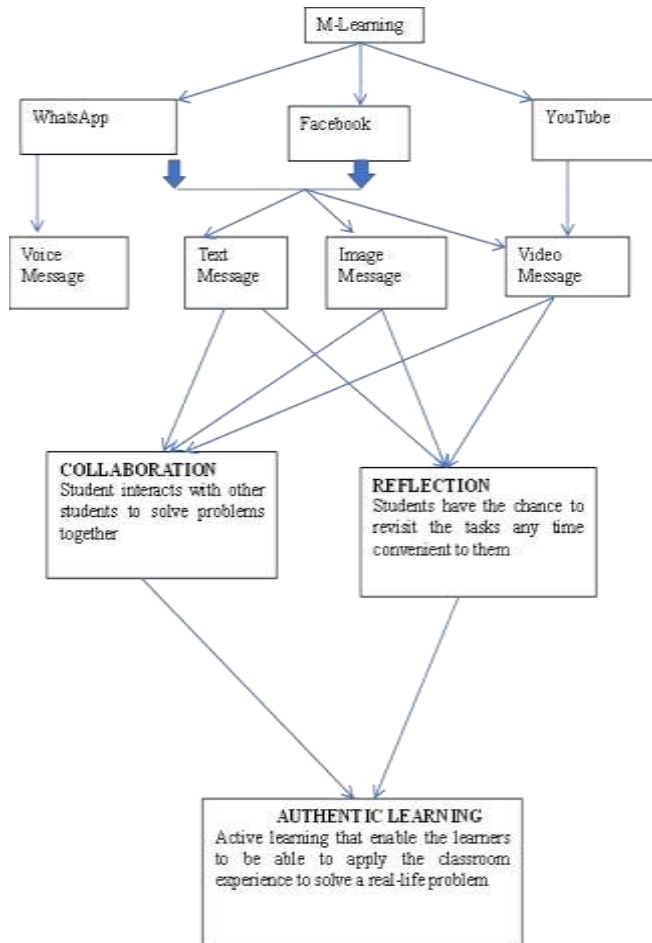


Figure 1: mobile learning conceptual framework (Aina et al., 2018)

Google Classroom is a Google Apps for Education, assisting teachers in creating and organizing assignments quickly, providing efficient feedback, and efficiently communicating with their learners (Shaharane, Jamil & Rodzi, 2016). The application is used as an e-learning mode (Henekh, Rosdianto & Oikawa, 2020). Several earlier studies show that the Google Classroom helps students learn more electronically, and teachers spend more quality time with students than with papers (Basher, 2017; Rabbi, Zakaria & Tonmoy, 2018). As an emerging technology in education since 2014, Google Classroom had impacted teaching and learning in most nations (Shaharane, Jamil & Rodzi, 2016; Basher, 2017; Rabbi, Zakaria & Tonmoy, 2018; Henekh, Rosdianto & Oikawa, 2020).

During this period, the e-learning is the best because it does not necessarily involve physical contact between the teacher and the students (Trucano, 2014). The modes of e-learning could be adjunct and blended e-learning (Arkorful & Abaidoo,

2014). One of the Blended learning mode is Enrich virtual (Eastman, 2015; Bryan & Volchenkova, 2016). Other methods used face-to-face classroom learning with the ICT and online instructions that are not the best during the COVID-19 crisis because of physical distance. The Enrich virtual is more of internet instructions and would be the best for this period. The Google Classroom is a purely online mode that could be in the category of the Enrich virtual.

Many authors opined that Google Classroom promotes learning because it has no geographical limitation (Mafa, 2018; Henekh & Rosdianto, Oikawa, 2020). According to Azhar and Iqbal (2018), Google Classroom is one significant way technology impacts teaching and learning worldwide when launched in 2014. Therefore, literature suggests the online learning like Google Classroom, which does not depend on traditional paradigms, is imperative. The Google Classroom framework would bridge the existing inequality in education (Mohamedbhai, 2014). The classroom context of the Google Classroom is the same for all categories of students.

Given this, teaching and learning will be better and comfortable during the COVID-19 if schools adopt the Google Classroom framework. However, the challenge of poor internet connectivity may hamper its success in many African countries like Nigeria. According to Ajadi, Salawu, and Adeoye (2008), bandwidth is a significant problem associated with e-learning.

V. CONCLUSION

Technology in the pre-service teacher education is essential during the COVID-19 pandemic because of the social distancing, which prohibits physical contact. Due to the emergence of the COVID-19, there is a shift in the paradigm of instructions to online strategies. The article argued that ICT is critical to the teacher education program for the success of the online teaching methods. However, the author identified a gap in technology integration in the pre-service teacher education program in Nigerian Colleges of Education. The paper reviewed previous studies on the significance of teachers' ICT knowledge at this pandemic period, making the teacher's TPACK critical.

The script highlighted a few benefits of integrating technologies to teaching, learning and the challenge of teachers' poor attitude toward ICT in Colleges of Education. Besides, the article discussed the challenges COVID-19 poses to teacher education. To achieve sustainable teacher education, the author discussed mobile learning's imperative using WhatsApp Instant Messaging, Facebook, and YouTube to promote collaboration and reflection in learning. Finally, the Google Classroom as a Google Apps is an Enrich blended method capable of sustaining teaching and learning during the COVID-19. Therefore, teachers and students should explore mobile learning's full benefits through WhatsApp Instant Messaging, Facebook, YouTube, and Google Classroom during the pandemic.

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