Mobile Learning for Colleges of Education Pre-Service Teacher during COVID-19 Pandemic

Dr. Aina, J.K.

School of Science Education, College of Education (T) Lafiagi, Kwara State, Nigeria

Abstract The article is on mobile learning for Colleges of Education pre-service teacher education during the coronavirus pandemic in Nigeria. Mobile learning is when mobile technologies are used to learn anytime, anywhere, and at the learners' pace. Teaching in these colleges is primarily by the conventional method of face-to-face in classrooms, not mobile learning. The emergence of the pandemic has made most countries shifted from traditional approaches to online learning paradigm. The paper highlighted some lessons Nigerian should have learned from the emergence of COVIDI-19 as it conceptualizes mobile learning using social and mass media. The script concludes by recommending mobile learning through social and mass media for pre-service teacher education as the pandemic resurface in the globe.

Introduction

Due to the higher demand for knowledge worldwide, teaching and learning are no longer limited to classrooms' four-wall [40, 11, 5]. Teaching and learning have evolved so that it can occur in any geographical location outside any specialized classroom where the technologies are available. Mobile learning has been in existence before the emergence of COVID-19. M-learning is when mobile technology is used to learn anytime, anywhere, and at the learner's pace [5]. Several mobile devices are available everywhere today to make m-learning fascinating for different categories of learners. Therefore, m-learning should not be the challenge of pre-service teachers in colleges of education due to the emergence of the COVID-19 pandemic.

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 [35, 2]. The College of Education programs' objective is to produce teachers who will teach at the primary school and the basic junior secondary schools [7, 37]. 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. The mode of teaching in these colleges is primarily by the conventional method of face-to-face in classrooms. A few of the colleges go online for selected courses on rare occasions: however, the colleges do not often explore mobile learning. Therefore, the pandemic disrupted the academic programs of the colleges in an unprecedented manner.

COVID-19 caused disruptions to the world system; according to [18], 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 [40]. Social distancing has been considered adequate to curb the virus's spread [14]. Social distancing is a step taken to reduce physical contact with other individuals [20]. 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 [46]. Teaching and learning are done remotely using different technologies without prior preparation [22]. Most countries shifted

teaching and learning to different virtual modes. According to [38], the COVID-19 pandemic crisis makes it mandatory for schools globally to switch to e-learning. According to [44], the technological, education/literacy background, and socioeconomic challenges are significant issues in developing countries. The COVID-19 emergence came unexpected to educators and, leave some lessons for everybody to learn.

Lessons Learned from the COVID-19 Pandemic

The coronavirus's emergence gave the world terrible impressions of its negative consequences without conceiving some suitable lessons from the pandemic. However, there are few lessons that every country, including Nigeria, should have learned from this pandemic. The first lesson Nigerian should know is about the National Policy on Education (NPE). The policy has cardinal objectives for teacher education. One of these objectives is to provide teachers with an intellectual and professional background adequate for their assignment and adapt to changing situations [36].The stakeholders in teacher education could not adapt to the changes brought by the COVID-19, which brought the closure of schools for an extended period. This is an indication that the NPE was not fully implemented to guide teacher education. The government must learn how to strictly follow the National policy on education (NPE) because the world is changing; policymakers should also prepare to change.

Teacher education is globally evolving, and most developed, and some developing countries are inventing on their teacher education to develop it. Given this, the impacts of COVID-19 on these countries' teacher education [48] are not so severe as that of Nigeria. It is an established reality that the COVID-19 crisis had impacted teacher education worldwide [31]. The Nigerian government and other Africans must learn from this and be sincere in developing their teacher education. The government should know that inventing on teacher education through research and development is critical to quality education. Many countries have shifted from the conventional way of learning to more research-based paradigms before the pandemic. For example, many universities in Australia have already established online and mixed course delivery modes before the pandemic [8].

Similarly, in the U.S., there was already digital networking before the COVID-19 that makes teacher and teacher education less stressful during the pandemic [27]. A considerable amount of money had been invented on teacher education before the pandemic, and schools' closure have little impact on their education. Nigeria and other Africa should learn from this by budgeting more funds for teacher education. For instance, the concepts of mobile and e-learning were not taking seriously in Nigeria before the emergence of the virus. However, now the focus of the government is on virtual learning at an avoidable high cost.

Education is an engine that drives all other economies, and it should not be left alone in the hand of the government. This is another lesson that should be learned from the COVID-19 pandemic crisis. It is, therefore, essential that the government should partner with family for a quality education. Besides, the public school should also partner with privates schools. Many homes in Nigeria lacked access to internet connections, and many students during the pandemic have no access to the classroom as government introduce virtual learning. The partnerships will help many homes to have access to digital networking through government intervention. The alliances will also bridge some of the inequalities existing in education. During the pandemic, only students from wealthy homes have access to the internet because they could afford the high cost of browsing data. Most private schools could not do anything because they lack experts and money for virtual education. The partnerships will provide synergies that could help students from poor home backgrounds and those in private schools at a time of crisis in education like the COVID-19.

The emergence of COVID-19 provides a lesson that many teaching paradigms are inadequate in times of pandemic. Stakeholders in education should focus better on teaching strategies that do not essentially require teachers and students' physical presence. This is a digital age where the talk-and-chalk method is no longer the best for our education. One of the lessons learned is the realization of the weakness of the talk-and-chalk method of teaching. Besides, stakeholders in education have also known that interactions in schools is no longer teacher-student-physical classroom. Most developed countries are already operating teacher-student-technologies interactions in their education system. This is why COVID-19 did not affect the education system of these

countries as it affected Nigerian education. In light of this, the mobile learning could be a solution to the challenges COVID-19 poses to pre-service teacher education in Nigeria.

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 [21]. According to [48], 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 [47].

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 [34], especially the pre-service teacher education. Many teachers and students possess mobile digital devices that could be explored at this time, but they could not because of inadequate knowledge.

Teacher Education during the COVID-19 Pandemic through Mobile Learning

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 [3], a quality teacher who is an active user of ICT for teaching is indispensable to any quality teaching and learning process. [13] considered technological expertise as the general knowledge of technologies, such as software, smart devices, and social media, which require specific skills to operate for learning with no geographical location restriction.

Mobile learning takes place in any geographical location, using portable technologies [11].Mobile learning (m-learning) is an example of online learning [43] that could be explored during COVID-19 lockdown. During the last lockdown, most students and teachers possessed mobile devices such as cell phones, tablets P.C., iPad, and PDAs [43, 41, 11],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 [33]. It is portable, convenient, affordable, which both teachers and students could explore to promote teaching and learning [5, 41]. M-learning is convenient because it is accessible virtually anywhere: it provides access to all the different learning materials [11]. The paper looked at WhatsApp (W.S.), Facebook (F.B.), YouTube (Y.T.), Twitter (T.W.), Education Televise (EDUTV), and Radio Education Learning (REL) in light of m-learning.

WhatsApp (W.S.) offers the users the opportunities of text, image, video, and voice messages depending on their expertise [5]. WhatsApp is prevalent among students in schools as a means of instant communication. Table 1 shows how the University's student in a particular region of the globe 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: [9]

F.B. is the largest social network, one of the most visited website in the world by students [30, 1]. According to [29], Facebook is a tool utilized to enhance academic practices in the developed world. Facebook becomes an interesting subjectamong researchers, and several studies were published[15]. Stakeholders in education should make maximum use of this App for educational purposes during the COVID-19 as against the typical usage for entertainment.

Y.T. is recently receiving attention as an educational tool for teaching and learning from researchers and teachers [32].Video is a powerful learning tool in classrooms as part of online technologies supported and influenced by YouTube [45]. The use of YouTube in m-learning enhances authentic learning, which most conventional classroom learning may not be able [5]. Y.T. is a source of online material that plays a vital role in the teaching and learning field [10]; at any location, the internet connection is available

T.W. allows learning to take place and provide opportunities for students and teachers to share information, knowledge, and classroom experience [39]. Twitter could be used to support learning to avoid the challenge of time-wasting in the traditional classroom teaching [17]. The use of Twitter for learning in developed countries has been established. Still, it's just beginning in developing nations [16]. Research suggests that teachers use Twitter to facilitate students learning in multiple ways [24]. Teachers could tweet through text, video, and voice messages, which students could read and download for their learning at any time and location during the COVID-19.

Education Televise (EduTV): Learning through television is not new before the COVID-19 pandemic; however, to meet up with the mobile learning framework EduTV is proposed. The proposal provides some vital components of learning missing in the typical television education programs. An m-learning through the television should be a resemblance of a real classroom learning. EduTV is an innovation of the author designed to alternative conventional teaching during national conflict or emergency like the COVID-19 pandemic. Therefore, the author strongly believes that EduTV is an m-learning intended purposely for students learning. It is a television establish or television station dedicating more than fifty percent of its programs for only teaching and learning. The program should be for all subjects. Students are to know when it is time for a specific topic and hook on to it. The teacher in the studio will teach, and students at any location could listen and contribute to the lecture, unlike conventional television teaching, where students cannot contribute. EduTV would create a platform where students could send their questions or feedback as the study continues. The EduTV program could follow the conventional classroom timetable as the case requires.

The students could contribute to learning or ask questions through email and Twitter. The teacher or instructor could respond to the questions students sent as quickly as possible. This platform allows the students to take part in EduTV at any location within the country. However, students' interaction is minimal. Students would not be able to interact maximally with the teachers and their peers during the lecture.

Nevertheless, the student can reflect on their learning. According to [26], there are two types of reflection: reflection during the lecture, and after the course. In EduTV, reflection during the lecture may be challenging because of the teacher and the learners' distance. After the lecture, the reflection is possible for all students, which serves as a springboard for the next class.

The students' reflection should elicit lots of questions students should ask the teacher or instructor in the next lecture. This underscores the constructivism theory. The theory believed students learned through the knowledge they brought into the classroom [23]. Therefore, for students to adequately comprehend, the instructor should attend to the questions or concerns [4] sent through email and Twitter. [29] believed that m-learning students are motivated when receiving immediate responses to their questions. However, in EduTV, not all students can receive an instant answer to their questions because of many factors such as internet connectivity. To solve this problem is to limit the number of students in an EduTV platform: where there are too many students, it will create a problem. The government should establish many EduTV centers in every state, and the maximum number of students should not exceed twenty in every center. A fewer number of students will enhance interaction because, according to [12], social interaction is critical to effective learning.

Radio Education Learning (REL): The use of radio for instructional purposes in developing countries [49] has been on for more than two decades. The use of radio for teaching has been a one-way instructional mode, allowing the teacher to send out information to many learners. For effective learning during COVID-19 required

dual instructions: students should be able to communicate with the teacher also. Conversation between learners and teachers is critical to learning within and across contexts [43]. REL for COVID-19 is a proposal of the author adapted from a conventional radio program where listeners contribute to a live broadcast through phone calls.

The government could establish radio stations, especially for educational learning. Teachers could teach all subjects while students tone to a designated channel for their lecture at a specified time. Students can listen to the lecture at any location and send their questions through phone calls. The teachers would listen to the phone call and respond to the students almost immediately, depending on the connectivity. REL is not expensive because the radio transistor is a common device in practically all homes in developing countries, which does not all the time require electricity [49]. Interaction in REL is minimal; interaction of the teachers and students requires that the number of students is limited to below twenty in any REL center. The student-to-student interaction is practically limited irrespective of the number connected to a center. Another weakness of the REL is that it involves only the sense organ of hearing. According to [50], Visual aids remain the best tool for making teaching effective and the best dissemination of knowledge. Therefore, the absence of video in REL is a substantial weakness.
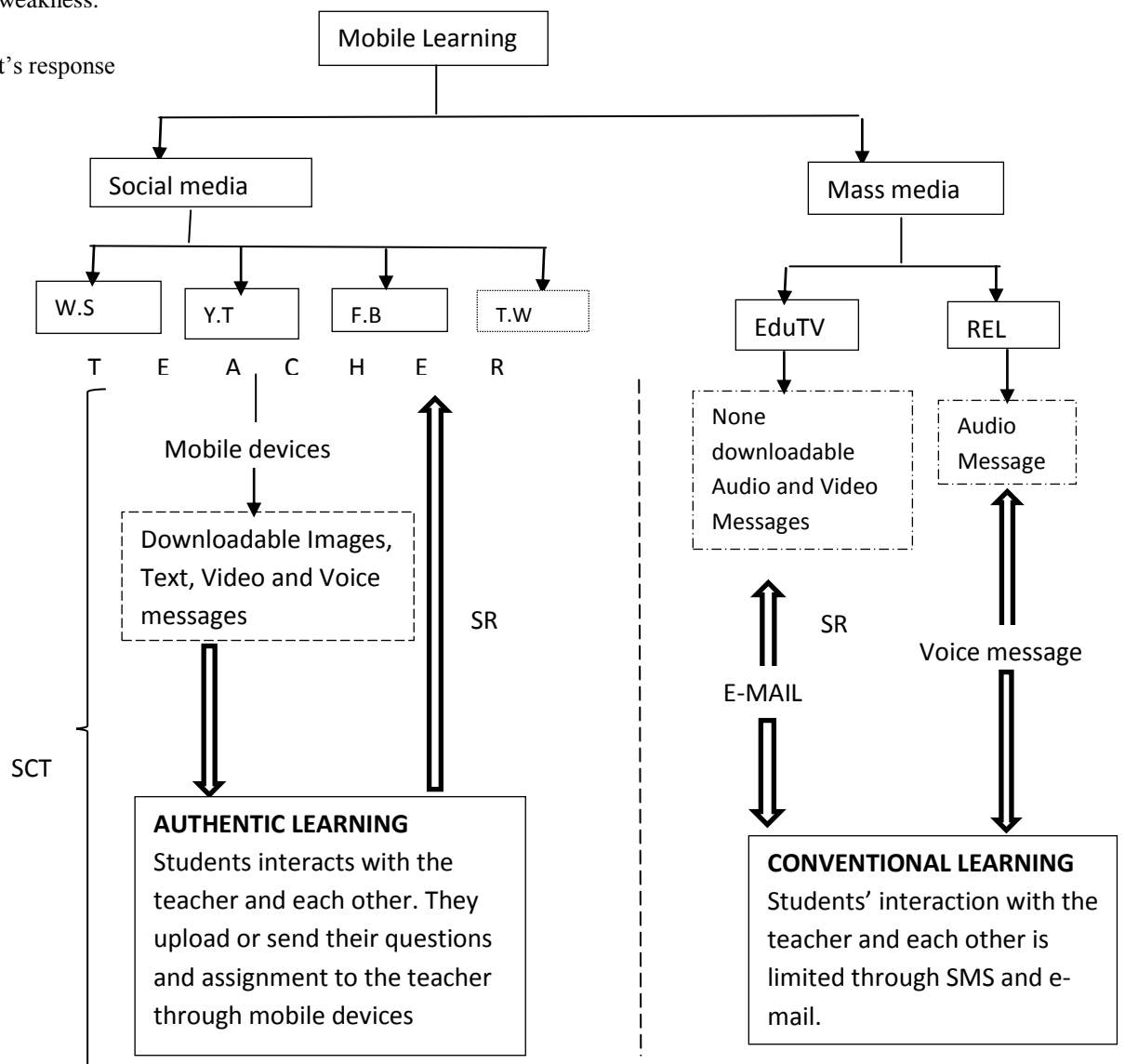
LEGEND

SR: Student's response

Figure 1: mobile Learning Conceptual Framework

At this critical time in the global history of education, it's time to incorporate m-learning 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 [26]. The students can replay the recorded audio lectures or replay the videos several times for comprehension. Figure 1 conceptualized mobile learning using W.S., F.B., YT, TW, EduTV, and REL

Figure 1 shows that the exploration of m-learning through the W.S., F.B., Y.T, and T.W. promotes collaboration and reflection in learning. Collaboration is critical to teaching and learning [25]. 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, YouTube, and Twitter at this critical period.

Figure 1 conceptualize the mobile learning proposed for pre-service teachers during the COVID-19 pandemic.

The figure shows six different means by which students can learn without the traditional face-to-face classroom. These are divided into two, which are social media and mass media. Students' learning through the two platforms is not context-specific; only students in mass media platforms are passive. The teacher/instructor in mass media is restricted to a specific location (Television and Radion stations). Teachers in social media platforms are not limited to any place once there is an internet connection. Students learn best through audio-visual means. They can hear and see what they are learning, which is the best learning form [50]. It is not enough to hear and see but should be able to reflect on what they learn by revisiting the learning task at their convenience [26]. Learning through W.S., F.B., Y.T, and T.W. provides students with images, text, video, and voice messages, which they can download to revisit anytime and anywhere. This is underpinned by the social constructivism theory (SCT) because students have time to interact with teachers and their peers. The theory of social constructivism firmly holds that students construct knowledge through interaction with teachers and peers. Vygotsky, a proponent of social constructivism, averred that learning is a social and collaborative task by which people create meaning as they interact [42]. Interaction is crucial to students' learning. [19] stressed that successful learning is linked to interaction. Learning is a process of interaction through which the learners evolve their understandings by assembling facts, experiences, and practices.

According to [28], learners create meaning through their interactions with each other and with the context where they live. Meaningful learning could only take place when students are engaged in social activities. Social constructivism believes that both the situation in which learning occurs and the social contexts that the learners bring to the classroom are essential.

The students listen to the teacher's voice, video, and respond appropriately. Images and text messages are sent to the students without any hindrance. The students have the opportunities to collaborate through mobile devices technology. This is authentic learning because students can reflect and collaborate, which are authentic learning elements [26].

The second aspect is EduTV and REL, which also provides students with voice and video messages that students cannot download directly during live broadcast. The broadcast is through the air (electromagnetic wave). The interaction of students here is minimal. Students respond to the teacher/instructor through email, voice calls, and sometimes through Twitter. Students cannot revisit the learning task once the teacher is off the air unless replayed from the studio. This is mobile learning because students are not restricted to a particular location, and mobile devices technology could be employed.

Given this, teaching and learning will be better and comfortable during the COVID-19 if schools adopt mobile learning. However, the challenge of poor internet connectivity may hamper its success in many African countries like Nigeria. According to [6], bandwidth is a significant problem associated with e-learning.

Conclusion

Learning is no more confined to physical classrooms as the quest for knowledge is rising worldwide. The development of education made students' learning possible at any location, anytime, and with technologies. This is mobile learning, which has been in existence for many decades before the emergence of the COVID-19 pandemic. The availability of many mobile devices technology has made mobile learning imperative. However,

Colleges of Education in Nigeria have not been adopting this mode of learning. Colleges Education are teacher training institutions in Nigeria supervised by the NCCE. The emergence of the COVID-19 pandemic may negatively impact humanity; however, there are lessons stakeholders in Nigeria should have learned from the pandemic. Finally, the paper's crux was the conceptualization of mobile learning using social and mass media. The article discussed WhatsApp, Facebook, YouTube, and Twitter for mobile learning, representing social media. The mass media were the Televise Education and Radio Education Learning.

Recommendation

The author believes adopting mobile learning as the second wave of COVID-19 resurface worldwide will help the pre-service teacher in Colleges of Education. Therefore, the author recommends that social and mass media be explored for teaching and learning in Colleges of Education as conceptualized in this article.

References

[1]. Abdulahi, A., Samadi, B., & Gharleghi, B. ((2014). A Study on the Negative Effects of Social Networking Sites Such as Facebook among Asia Pacific University Scholars in Malaysia. *International Journal of Business and Social Science, 5*(10), 133- 145

[2]. Adetayo, J. O. (2016). Teachers' factors as determinants of the professional competence of the Nigeria certificate in education (NCE) teachers. *Journal of Education and Practice, 7*(20), 1-11.

[3]. Adhikary, M. C. (2018). Role of teachers in quality enhancement education and human development. *International Journal of Humanities and Social Science Invention (IJHSSI), 7*(12), 34-41.

[4]. Aina, J. K. (2017). Developing a constructivist model for effective physics learning. *International Journal of Trend in Scientific Research and Development, 1*(4), 59-67.

[5]. Aina, J.K., Olanipekun, S.S. (2018). Mobile-Learning (M-Learning) through WhatsApp Messaging, Facebook, and YouTube, Nigeria. *Education Journal, 1*(4), 111-121. doi: 10.31058/j.edu.2018.13008

[6]. Ajadi, T. O., Salawu, I. O., & Adeoye F. A. (2008). E-learning and distance education in Nigeria. *The Turkish Online Journal of Educational Technology, 7*(4), 1-10.

[7]. Akindutire, I.O., & Ekundayo, H.T. (2012). Teacher education in a democratic Nigeria: Challenges and the way forward. *Educational Research, 3*(5), 429-435.

[8]. Allen, J., Rowan, L & Singh, P. (2020). Teaching and teacher education in the time of COVID-19, *Asia-Pacific Journal of Teacher Education, 48*(3), 233-236. doi:10.1080/1359866X.2020.1752051.

[9]. Al-Mothana, G. (2017).University students' use of WhatsApp and their perceptions regarding its possible integration into their education. *Global Journal of Computer Science and Technology: G Interdisciplinary,17*(1), 1-11.

[10]. Almurashi, W. A. (2016). The effective use of YouTube videos for teaching English Language in classrooms as supplementary material at Taibah University in Alula. *International Journal of English Language and Linguistics Research, 4*(3), 32-47.

[11]. Alsaadat, K. (2017). Mobile learning technologies. *International Journal of Electrical and Computer Engineering (IJECE), 7*(5), 2833-2837.

[12]. Andrews, T. (2012). What is social constructivism? *Ground Theory Review, 11*(1), 39-46.

[13]. Bingimlas, K. (2018). Investigating the level of teachers' knowledge in technology, pedagogy, and content (TPACK) in Saudi Arabia. *South African Journal of Education, 38*(3), 1-12

[14]. Blocken, B., Malizia, F., van Druenen, T., & Marchal, T. (n.d). Towards aerodynamically equivalent COVID19 1.5 m social distancing for walking and running. Retrieved April 16, 2020, from http://www.urbanphysics.net/Social%20Distancing%20v20_White_Paper.pdf.

[15]. Capua, I. D. (2012). A literature review of research on Facebook use. *The Open Communication Journal, 6*(2012), 37-42.

[16]. Chawinga, W. N. (2016). Teaching and learning 24/7 using Twitter in a university.

[17]. Cohen, A., & Duchan, G. (2012). The usage characteristics of twitter in the learning process. *Interdisciplinary Journal of E-Learning and Learning Objects, 8*(2012), 151-163

[18]. Drake, S. M., & Reid, J.(2020). How education shape a new story in a post-pandemic world. *Brock Education Journal, 29*(2), 6-12.

[19]. Educause Learning Initiative (2005). Interaction: Principles and practice. ELI summer session. Retrieved January 12, 2021, from https://library.educause.edu/resources/2005/1/interaction-principles-and-practice-eli-summer-session-2005

[20]. European Centre for Disease Prevention and Control (2020). Considerations relating to social distancing measures in response to the COVID-19 epidemic. Stockholm: ECDC.

[21]. Fackler, A. K., Sexton, C. M. (2020). Science teacher education in the time of covid-19: A document analysis. *Electronic Journal for Research in Science & Mathematics Education 24*(3), 5-13.

[22]. Figg, C., Lu, C., Lu, O., & Crawford, K. (2020). E-3Cs: A research-based model for effective digital learning for K-6 schools. *Brock Education Journal, 29*(2), 24-29.

[23]. Garbett, D. (2011). Constructivism deconstructed in science teacher education. *Australian Journal of Teacher Education, 36*(6), 36-49.

[24]. Greenhalgh, S. P., Rosenberg, J. M., & Wolf, L. G. (2016). For all intents and purposes: Twitter as a foundational technology for teachers. *Interdisciplinary Journal of E-Learning and Learning Objects, 8*(2012), 81-98.

[25]. Har, L.B. (2013). Authentic learning. The Hong Kong Institute of Education. Retrieved from http://www.ied.edu.hk/aclass/

[26]. Herrington, J., Reeves, T. C., & Oliver, R. (2010). *A guide to authentic e-learning*. New York: Routledge

[27]. Hodges, T. S., Kerch, C., & Fowler, M. (2020) Teacher education in the time of COVID-19: Creating digital networks as university-school-family partnerships. *Middle Grades Review: 6*(2), 1-10.

[28]. Kim, B. (2001). Social constructivism. In M. Orey (Ed), *Emerging perspectives on learning, Teaching and technology*. Retrieved from http://www.coe.uga.edu/epltt/Social Constructivism.htm.

[29]. Ligi, B., & Raja, B.W.D. (2017). Mobile learning in higher education. *International Journal of Research* – Granthaalayah, 5(4), 1-6. https://doi.org/10.5281/zenodo.569363.

[30]. Mahmood, S., & Farooq, U. (2014). Facebook addiction: A study of big-five factors and academic performance amongst students of IUB. *Global Journal of Management and Business Research: E-Marketing, 14*(5), 54-71.

[31]. Maria, A. F & Anja, S. (2020). The COVID-19 pandemic and its effects on teacher Education.*European Journal of Teacher Education,* DOI:10.1080/02619768.2020.1824253

[32]. Maziriri, E. F., Gapa, P., & Chuchu, T. (2020). Student perceptions towards the use of YouTubeas an educational tool for learning and tutorials**.** *International Journal of Instruction, 13*(2), 119-138.

[33]. Mehdipour, Y., & Zerehkafi, H. (2013). Mobile learning for education: Benefits and challenges. *International Journal of Computational Engineering Research*, 3(6), 93-101.

[34]. Mindzak, M. (2020). COVID-19 and the ongoing problem of educational efficacy. *Brock Education Journal, 29*(2), 18-23.

[35]. National Commission for Colleges of Education [NCCE]. (2012). *Nigeria certificate in education minimum standards for general education*. Abuja, Nigeria: Author.

[36]. Nigerian Educational Research and Development Council [NERDC]. (2014). *Federal Republic of Nigeria National Policy on Education (6th Ed.)*. Abuja, Nigeria: Author.

[37]. Oritsebemigho, T. O. (2014). An appraisal of the revised Nigeria certificate in education minimum standards (English language curriculum). *European Scientific Journal*, Special Edition, 165-171.

[38]. Radha, R., Mahalakshmi, K., Kumar, V. S., & Saravanakumar A. R. (2020). E-Learning during Lockdown of Covid-19 Pandemic: A global perspective. *International Journal of Control and Automation, 13*(4), 1088-1099.

[39]. Ross, C. R., Maninger, R. M., LaPrairie K. N., & Sullivan, S. (2015). The use of Twitter in the creation of educational professional learning opportunities. *Administrative Issues Journal: Connecting Education, Practice, and Research, 5*(1) 55-76, DOI: 10.5929/2015.5.1.

[40]. Sahu P (April 04, 2020). Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus 12*(4), 1-6. e7541. DOI 10.7759/cureus.7541

[41]. Sarrab, M., Elgamel, L., & Aldabbas, H. (2012). Mobile learning (M-learning) and educational environments. *International Journal of Parallel Emergent and Distributed Systems*, 3(4), 31-38.

[42]. Schreiber, L.M., & Valle, B.E. (2013). Social constructivist teaching strategies in the small group classroom. *Small Group Research 44*(4) 395–411.

[43]. Sharples, M., Arnedillo-Sánchez, I., Milrad, M., & Vavoula, G. (2009). Mobile Learning. Retrieved fromhttps://www.researchgate.net/publication/226136346.

[44]. Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., & Shah, J. M. (2020). Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. *International Journal of Science and Healthcare Research, 5(3), 68-76.*

[45]. Tamim, R.M. (2013). Teachers' Use of YouTube in the United Arab Emirates: An exploratory study, computers in the schools. *Interdisciplinary Journal of Practice, Theory, and Applied Research*, 30(4), 329-345, DOI: 10.1080/07380569.2013.844641

[46]. UNESCO (2020). COVID-19 Educational Disruption and Response. Retrieved 13 April, 2020, from https://en.unesco.org/covid19/educationresponse

[47]. Vasquenz, S. (2020). Developing an online learning environment for community college students enrolled in human anatomy & physiology and microbiology courses amid the COVID-19 pandemic. *Electronic Journal for Research in Science & Mathematics Education 24*(3), 53-59

[48]. Wu, S. C., Pearce, E., & Price, J. C. (2020). Creating virtual engagement for pre-service teachers in a science methods course in response to the covid-19 pandemic. *Electronic Journal for Research in Science & Mathematics Education 24*(3), 38-44

[49]. Elliot, V., & Lashely, L. (2017). The effectiveness of Interactive Radio Instruction (IRI) within selected primary schools in region number four (4). *Social Science Learning Education Journal 2*(8), 22-37. http://dx.doi.org/10.15520/sslej.v2i9.38

[50]. Shabiralyani, G., Hasan, K. S., Hamad, N., & Iqbal, N. (2015). Impact of visual aids in enhancing the learning process case research: District Dera Ghazi Khan. *Journal of Education and Practice*, 6(19), 226-233