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COVID-19 AND EDUCATION: EFFECTS OF INTEGRATING MOBILE DEVICES WITH UNDERGRADUATE LEARNING PROCESS

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Abstract

The Covid-19 pandemic and the social distancing rules and lockdowns that followed have affected all aspect of our societies, including education. In order to keep education running, educational institutions have had to quickly adapt to the situation. This has resulted in an unprecedented push to online learning where mobile technologies are being used for the learning purposes. The study adopted a descriptive survey research method with a study sample of 200 undergraduate students drawn from the two colleges in Afe Babalola University, Ado Ekiti using random sampling technique. The study revealed that Telegram (67%), WhatsApp (64.5%) and Zoom (57.5%) were regularly used by students. Also, the students mostly used mobile devices for research and assignments. Some of the effects of mobile devices on education are access to and provision of current and up-to-date information (90%), access to online lectures being made possible (95%), quick transmission of information (85%), and improved academic performance (80%). Major challenges to the use of mobile devices were slow network problems (95%), lack of consistent training for users (92.5%) and use of personal data (95%) which incur additional costs on the part of students. The study recommended that universities should sustain the integration of mobile devices on education to promote and enhance teaching and learning process amid COVID-19.

Keywords: COVID-19, Education, Mobile devices, Teaching and learning, Academic performance

Introduction

Education is a process through which people are formally and informally trained to acquire knowledge and skills. The formal training comes from established schools right from the basic level to the tertiary level (Okiy, 2005). Education as a process enables people to obtain knowledge and skills through reading. It is this knowledge that allows people to contribute meaningfully to national development (Umar, 2004). Teaching and learning activities have always been taking place in a formal environment where students gather together to learn from their and instructors. However, this has been greatly faltered by the global health crisis known as coronavirus (COVID).

This global infection took the whole world by surprise as it affects virtually all the nations of the world. The effect of COVID-19 pandemic can be felt in virtually all facets of life. In fact, the education sector seems to be the worst hit and most affected sector of the nation. The COVID-19 pandemic has resulted in schools being shut down all across the world and globally, over 1.2 billion children are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching and learning are undertaken remotely and on digital platforms (Li & Lalani, 2020).

UNESCO (2020) lists a number of challenges occurring due to COVID-19 related school closures thus including interrupted learning; poor nutrition for students depending on free school meals; parents unprepared for distance learning and homeschooling; high economic costs; working parents are more likely to miss work to take care of their children; impact on healthcare; doctors and nurses more likely to leave their work due to childcare responsibilities; rise in school dropout rates; increased exposure to violence for vulnerable children including risk of teenage pregnancies; and social isolation among others.

As COVID-19 spreads, schools across 153 countries have been shut. This was an unprecedented shock to the education systems around the globe due to interrupted learning as well as delays and cancellations of end of year examinations for many. As of 20 May 2020, about 1.2 billion learners are not able to attend school or university until COVID-19 related restrictions were lifted (Chebib, 2020). Due to the persistence in the spread of the virus, many nations have been engaging the use of mobile technologies to support teaching and learning.

With this sudden paradigm shift away from the classroom in many parts of the globe, some are wondering whether the adoption of online learning will continue to persist post-pandemic, and how such a shift would impact the worldwide education market. Whether it is language apps, virtual tutoring, video conferencing tools, or online learning software, there has been a significant surge in its usage since the emergence of COVID-19.

The use of mobile smart devices have become vital to students because they use them for several purposes not only for those similar to what the Internet provides, but also to explore applications which provide new functions. These functions allow users not only to communicate with others face-to-face or instantly, which is a perfect way for shy students to communicate with others; but also to enjoy different kinds of entertainment like games. Users can also get information while surfing on the Internet which helps them to escape from uncomfortable situations. As a result, it seems that many students tend to rely heavily on their mobile phones, which will inevitably lead to even heavier usage (Casey, 2012). Hong, Chiu and Hhuang (2012) argued that mobile phones are popular among students because they increase their social communication and expand their opportunities for establishing social relationships. Bakare (2018) revealed that undergraduate students in Nigerian Universities make use of their mobile phones to access applications such as

Facebook messenger, WhatsApp, Google Talk, MSN, WordPress, Blogger in accessing Library resources.

A study conducted by Belardi (2013) revealed that mobile devices and online activities can help students in studying. They can save time when using these tools. But these can also have a bad influence as revealed by 40% of the students that were interviewed. Mobile technology has changed the way of teaching. It enables people to reach out to students more efficiently and effectively through chat groups, video meetings, voting and also document sharing, especially during this pandemic. Students also find it is easier to communicate through the learning app. During the COVID-19 pandemic, the education system of the world has seriously affected. Many countries of the world have to close down their educational institutions to reduce the spread of this virus (Naciri, Baba, Achbani, & Kharbach, 2020). The scenario is not different for Nigeria as every educational institution in Nigeria including higher educational institutions remains closed since March 2020. So, for optimizing the effects of the pandemic in education sector, some teachers have already started to participate in the online classes to reduce the study gap of the students. At this stage, M-learning might be a helpful tool for both the students and teachers.

Nowadays, Mobile learning (M-learning) has become a popular learning system for education especially higher education all over the world because of its multi-functionality characteristic and effectiveness. Nigeria is one of the developing countries of the world where adoption rate of mobile technology is very high.

Statement of the problem

The rate at which Coronavirus pandemic spread throughout the world today is very unprecedented. The global health emergency has had a devastating effect on Nigeria in which students throughout the country were locked out of school for more than 6 months to a year now. The pandemic has defeated the conventional teaching and learning strategies due to its high rate of infection from person-to-person. Therefore, seeking alternative ways of delivering educational services is the best solution now. However, despite the high adoption rate of technology in Nigeria, there are a lot of students who do not have access to a functional mobile device. Furthermore, there is poor readiness on the part of government and universities to fully adopt mobile learning to bridge the wide gap created by COVID-19. It is on the basis of this foregoing that this study is set out to investigate the integration of mobile devices in the learning process of undergraduate students during COVID-19.

Objectives of the Study

The main objectives of the study is to examine the integration of mobile devices in teaching and learning during COVID-19 by Nigerian universities. Specifically, the paper aims to:

1. identify the various types of mobile applications used by undergraduate students of Afe Babalola University, Ado Ekiti;
2. determine the purpose of using mobile devices by students at Afe Babalola University, Ado Ekiti;
3. examine the effects of mobile application on students' academic improvement at Afe Babalola University, Ado Ekiti;

4. investigate the challenges faced by students of Afe Babalola University, Ado Ekiti when using mobile application for learning.

Literature review

Goundar (2011) described mobile devices as ICT devices, which have greater flexibility and ubiquitous connectivity, combined with the power of desktop computing. The potential impact of using mobile smart devices in education will result in the production of ground-breaking teaching and learning technologies. Teachers can have instructional support at their fingertips in the learning environment. Students can be empowered with access to learning resources with supplementary multimedia for better understanding regardless of time and physical location.

Mobile devices are well known for their long battery life. Once fully charged, they can last for almost 48 to 96 hours. Laptops and netbooks require connection to a network for Internet access, which is available at fixed locations in buildings or wireless access points, again at fixed and confined locations. Mobile smart devices have a network connection available almost (99.999%) of the time in almost every part of developed countries. Mobile devices network availability and penetration is happening at a dramatic pace in developing countries - already there is 68% penetration as at year 2010 with an exponential growth of 10% per annum (International Telecommunication Union - ITU, 2010). This implies that by 2016, mobile device penetration should be around 90% and above.

Mobile devices perform many of the functions of desktop computers, with the advantages of simplicity (being easier to learn and use) and improved access (being usable

anywhere, anytime) (Houser, Thornton & Kluge, 2002). According to Prensky (2005), mobile devices are not just communications devices for interaction between people; they are in fact computers that fit in user's pocket, are always with the user, and are always on. Like all computing devices, mobile smart devices can be used to learn. Therefore, rather than fight the students coming to school carrying their own powerful learning devices, it is better to use the opportunity to discover their educational advantage.

Gaskell and Mills (2010) in a study of mobile handheld devices concluded that there is much evidence that mobile technologies are playing an increasing role in education and the use of mobile technologies is increasing in the developed world in a number of areas, for instance in context related education, and how hand-held devices can be used for basic language, skills, numeracy and health and safety training and some aspects of teaching and learning across the developing and developed world. The use of handheld technologies provides a major opportunity to enhance access to learning and will enable many institutions to develop learner and administrative support and learning opportunities in ways which will build on current methods. Mobile computing went conventional with the release of the iPhone in 2007. With the release of the iPad just one year ago, users are now seeing a significant shift in the dynamics of computer purchase and practice – moving away from desktops and laptops to iPads and other mobile devices (Pinola, 2011).

Mobile smart devices have taken the centre stage all over the world and it is now being used by all and sundry. Warschauer (2011) found that students used the iPads to read free open source Earth sciences textbook, investigate the elements and the composition of the Earth and galaxy via interactive apps, access the school‘s e-learning platform, log and analyse lab data, and produce lab reports. The researchers’ observations suggested that the iPads were particularly helpful for laboratory work as the students carry the devices around

to input data on the move.

Economides and Grousopoulou (2008) in a study of use of mobile phones by male and female Greek students found that students use their mobiles mostly for phone calls and SMS (short message service). They also tend to use their mobiles to take photos and activate the reminder. However, they did not deal with many of the devices' operations. They used their mobiles to communicate (telephone, SMS, email) mostly with their boy/girlfriend, then with their friends. They used their mobiles mostly at home, then at the school.

The new digital environment presented an exceptional array of possibilities for communication, interaction, and information retrieval at the fingertips that was never before available (Montgomery, 2007). It is a general understanding that mobile phones have fastened the society in various aspects through its variety of functionalities. While cell phone expansion is at 'breath-taking speed' (Geser, 2004), SMS through cell phones is pervading 'like a wild-fire' (Vaidyanathan & Latu, 2007).

Warschauer (2011) in an observation of a science class reported that students unanimously stated that they prefer using iPads to laptops due to the tablets' light weight, mobility, touch screen, and apps. Results of a survey among University students revealed that respondents typically used their phones more than 10 hours per week, mainly for making calls (Auter, 2007).

Laird (2012) conducted a study and reported that 55% of students use gaming apps either regularly or as a leisure activity on their smartphones. Cellphones are used while waiting in line at the coffee shop, searching various topics on Google, keeping track of homework assignments and staying connected to friends from school and friends at home.

Chen (2013) researched the educational versus non-educational app usage among college students. Findings include 58% of the college students used their mobile devices for academic purposes and freshman and sophomores tended to use their mobile devices for educational use.

Mobile devices offer a number of advantages for education in comparison to laptops or netbooks. First, their lighter weight and orientation flexibility makes them far superior for digital reading or accessing of content. Second, their instant-on capability and fast switching among applications allows learning activities to proceed with less delay. Third, their touch screen interface allows a high degree of user interactivity. Fourth, they are much more mobile than laptops, as students can carry them inside or outside a room without having to close and reopen the screen and store them in the carry case and can also use them for mobile data collection or note taking. Fifth, since it is inexpensive to develop apps for mobile platforms, there is a rapidly growing amount of free or low-cost apps for mobile devices, many of which are suitable for education. And finally, mobile devices' long battery life makes them more suitable for a school day (Warschauer, 2011).

Bradford (2012) established that technology has rewired the brain infrastructure and hence impacted teaching and learning processes, specifically looking at deep reading. In many cases, students in Africa only read classroom materials whenever there are assignments but do not engage in leisure reading (Kaberia, 2012; Nalusiba, 2010).

Methodology

The survey research design was used for this study. The survey method is adopted because it remains most used in applied social research. The population for the study comprised of university undergraduate students in Afe Babalola University, Ado Ekiti (ABUAD). Two

colleges were purposively selected for this study from which 200 respondents were randomly drawn from the College of Engineering and Medical College. 100 respondents were randomly selected from each of the two colleges using simple random sampling technique.

A structured questionnaire was used for data collection and was designed to capture the demographics information of the students, the types of mobile applications being used for teaching and learning, the purpose for which smart devices were used by the students during COVID 19, the effects of using mobile devices of students' academic performance and the challenges encountered by students in using mobile devices for teaching and learning. The data was analysed using frequency counts and percentage presented in tabular forms.

Results and Interpretation

The results and interpretation of the findings is presented in this section.

Table 1: Demographic information of the respondents

Gender	**Frequency**	**Percentage**
Male	80	40
Female	100	50
No response	20	10
Total	200	100

Table 1 presents the demographic information of the respondents which revealed that there were more female respondents 100(50%) than males 80(40%) among the undergraduate respondents in Afe Babalola University Ado Ekiti (ABUAD).

Table 2: Distribution of the respondents by College

Colleges	**Frequency**	**Percentage**

Engineering	100	50%
Medical	70	35%
No response	30	15%
Total	200	100%

Table presents the distribution of the respondents by college and it showed that majority of the respondents 100(50%) were from the College of Engineering while 70(35%) of them were from the Medical college. There was no response from 30 of the respondents.

Table 3: Types of mobile applications used by students

Application	**Regularly**	**Occasionally**	**Rarely**	**Not at all**
WhatsApp	129 (64.5%)	21 (10.5%)	40 (20%)	10 (5%)
Telegram	134 (67%)	11 (5.5%)	16 (8%)	39 (19.5%)
Google classroom	26 (13%)	13 (6.5%)	4 (2%)	157 (78.5%)
Zoom	115 (57.5%)	23 (11.5%)	45 (22%)	17 (8.5%)
YouTube	12 (6%)	15 (7.5%)	19 (18%)	154 (77%)

Table 3 showed that majority of the respondents 134 (67%) made use of Telegram regularly, 11 (5.5%) used it occasionally while 40 (20%) rarely used it. WhatsApp was used regularly by 129 (64.5%) respondents, occasionally by 11 (5.5%) and never used by 39 (19.5%) respondents. As for Zoom, 115 (57.5%) used it regularly and 45 (22%) rarely used it. Google classroom 26 (13%) and YouTube 12 (6%) were the least used of the mobile applications, as majority of the respondents never used these applications. The preference for Facebook, WhatsApp and Instagram by undergraduate students was also reported by in related studies (Williams & Adesope, 2017; Kim, Sin, & Yoo-Lee, 2014). This shows that some applications have gained wide acceptance among learners globally.

Table 4: Purpose of using mobile devices

Purpose	**Strongly**	**Agree**	**Strongly**	**Disagree**

	agree		disagree	
Research	180 (90%)	10 (5%)	5 (2.5%)	5 (2.5%)
Assignment	150 (75%)	25 (12.5%)	10 (5%)	15 (7.5%)
Email	110 (55%)	23 (11.5%)	2 (1%)	65 (32.5%)
News	120 (60%)	20 (10%)	25 (12.5%)	35 (14.5%)
To access timely information	125 (62.5%)	25 (12.5%)	20 (10%)	30 (15%)
For online teaching	130 (65%)	10 (5%)	50 (25%)	10 (5%)

Table 4 clearly showed that 190 (95%) respondents agreed to the use of mobile devices for research and only 5% disagreed. Similarly, 175 (87.5%) agreed that they used mobile devices for assignments while 12.5% disagreed. About 140 (70%) of the respondents agreed that they use mobile devices for teaching and learning while 75% used it to access timely information. The result corroborates what has been reported by other researchers such as Wickramanayake and Jika (2018) who revealed that students in Northern Nigeria use social media for educational purposes.

Table 5: Effect of mobile application on students' academic improvement

Effects of mobile devices	Strongly agree	Agree	Strongly disagree	Disagree
Provision of current and up-to-date information	100 (50%)	80 (40%)	10 (5%)	10 (5%)
Access to online lectures	180 (90%)	10 (5%)	-	10 (5%)
Improved academic performance	120 (60%)	40 (20%)	25 (12.5%)	15 (7.5%)
Access to online voice note	150 (75%)	20 (10%)	15 (7.5%)	15 (7.5%)
Quick transmission of information	120 (60%)	50 (25%)	20 (10%)	10 (5%)
Sending and receiving messages	110 (55%)	60 (30%)	15 (7.5%)	15 (7.5%)

As shown in Table 5, the integration of mobile devices in education has engendered the provision of current and up-to-date information as indicated by 180 (90%) of the respondents. Also, access to online lectures has been made possible as indicated by 190 (95%) of the respondents with quick transmission of information (85%), thereby leading

improved academic performance (80%). It is evident from the result that mobile devices have greatly enhanced the quality of teaching and learning among university students during the COVID-19 period. This result is consistent with what was reported by Goundar (2011) who also highlighted the role of social media in enhancing the quality of education.

Table 6: Challenges faced by students when using mobile application for learning

Problems	**Strongly agreed**	**Agreed**	**Strongly Disagreed**	**Disagreed**
Lack of awareness	10 (5%)	10 (5%)	160 (80%)	20 (10%)
Unfriendly use interface	40 (20%)	10 (5%)	120 (60%)	10 (5%)
Slow network problems	180 (90%)	10 (5%)	5 (2.5%)	5 (2.5%)
Lack of consistent training for users	170 (85%)	15 (7.5%)	10 (5%)	5 (2.5%)
Use of personal data	180 (90%)	10 (5%)	10 (5%)	-

The challenges faced by respondents in the use of mobile APPS in ABUAD are identified in Table 6. Slow network problems (95%), lack of consistent training for users (92.5%) and use of personal data (95%) all constitute the major challenges being encountered by the students in using mobile devices for learning. These challenges are similar to the ones being experienced by students in other parts of Nigeria as reported by Wickramanayake and Jika (2018) who examined the use of social media by faculty of education students in Northern Nigeria.

Discussion of findings

It could be inferred from the result that most of the students in ABUAD preferred using Telegram, WhatsApp and Zoom applications for teaching and learning than any other mobile application. The result implies that the students mostly used mobile devices for research and assignments. Other reasons for using mobile applications are for online learning, to access timely information, for communication through e-mail clients and for accessing news. This finding was supported by Duggan and Smith (2013) which noted that roughly one-third (34%) of smartphone users primarily access the internet with their phone. Hanley (2013) reported 92% of college students use smartphones to send and receive email messages, which may particularly important for web-administered surveys that utilise email recruitment methods.

It is evident from the result that mobile devices have greatly enhanced the quality of learning among university students during the COVID-19 period. Some of the effects are access to and provision of current and up-to-date information (90%), access to online lectures being made possible (95%), quick transmission of information (85%), and improved academic performance (80%). Major challenges to the use of mobile devices were slow network problems (95%), lack of consistent training for users (92.5%) and use of personal data (95%) which incur additional costs on the part of students.

Conclusion and recommendations

The effect of COVID-19 pandemic on education is so devastating such that almost an academic session has been wasted to lockdown. The integration of mobile devices to support the learning process has been very encouraging and innovative. Mobile technologies have greatly impacted teaching and learning delivery among university

undergraduate students during the COVID 19 pandemic. The study established that students are now meaningfully engaged with their mobile devices than ever before the COVID 19 era. Many of them now use mobile devices for educational purposes to enhance their academic performance. In this era of social distancing and where libraries are not yet fully accessible, the mobile devices have helped the students to source for relevant information, do their research and complete assignments among others. The following recommendations were made based on the findings of this study:

1. University administration should endeavor to sustain the integration of mobile devices in education which will promote teaching and learning activities irrespective of space and time;
2. University students on their part should ensure that they embrace the integration of mobile devices in education in order to enhance teaching and learning, so as to make it more interactive.
3. Students should exploit the opportunities of mobile devices to support their academic activities and also improve their overall academic performance.

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