Assessment of Smartphone Usage Among Students for Effective Learning During Covid-19 Pandemic Lockdown in Senior Secondary Schools in Ogun State, Nigeria

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Abstract
This paper assessed the use of smartphone for effective learning during Covid-19 pandemic lockdown among senior secondary schools in Ogun State. It compared the difference that exists between the gender, age and location of the students during Covid-19 lockdown. The study was conducted using a descriptive research method. Three (3) research questions and hypotheses were formulated and one hundred and fifty (150) respondents were sampled using simple random technique. The instrument for data collection was researcher's designed questionnaire. Five (5) experts in the field of Educational Technology validated the0 instrument to ensure content and face validity of the instrument. Cronbach's Alpha was used to find out the value of the reliability of the instrument and it yielded 0.80. Data collected were analyzed using mean, standard deviation and ANOVA to test the hypotheses formulated at 0.05 significance. The study concluded that smartphone can be effectively use for learning regardless of the gender, age and locations. It was therefore recommended that curriculum planners should incorporate the use of smartphone into the school curriculum and that the government should provide necessary facilities and infrastructures for the use of smartphones in schools.
Keywords: Covid-19, gender, age, location, smartphone and infrastructures

Introduction

Information and Communication Technology (ICT) have changed the outlook of managing information during crises with regard to warning, preparedness, effect and response. It is used in recording, preserving information, recording expenses and experiences from pandemic and emergency situations. And it helps easy distribution of information to large audience within a short span of time (Boobala & Pichandy, 2016). In such situations, when there is free flow of information, social media allow users to mobilise, share and spread the messages.

ICT has boosted learning process by making it cheaper, faster, and easily accessible, which were not possible before. The collaborative learning atmosphere provided by ICT brings about better performance (Boobala et al. 2016). Technology use for interaction is positively correlated with students formal and informal peer interactions, with their sense of belonging in the school environment (Mohamed & Oesein, 2017). Speed and accessibility of the internet among students enable them share study materials anytime and anywhere (Ayelaagbe, 2019). As the fastest growing industry of the 21st century, ICTs offer scope for students to learn, develop skills and knowledge and are increasingly becoming the common place where e-learning, e-commerce, e-banking and so on are frequently mentioned.

The Coronavirus Diseases 2019 (COVID-19) started in early January 2020, but the reality hit when the number of infected and dead started increasing all over the world in Nigeria. The preventive measures are washing of hands regularly, social distancing and the use of face masks. The World Health Organization (WHO) declared the Coronavirus outbreak as a Public Health Emergency of International Concern (PHEIC). In response to Covid-19 pandemic, Nigeria Government has been forced to impose lockdown orders to prevent community transmission of Covid-19. There was a lockdown in Lagos and Ogun States and the Federal Capital Territory ((FCT) for four weeks' effect from March 30th 2020, with restrictions on inter-state travels throughout the country (Maunya et.al 2020). Then a relaxed lockdown began on May 4, 2020, replacing the total lockdown with a curfew from 8pm to 6am. Both the lockdown and the curfew exempted workers in essential services (health workers and security personnel) and those involved in the movement of essential commodities (food

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and drugs). The lockdown and curfew were put in place with the hope that people would adhere to the basic safety guidelines of social distancing, hand washing, and the use of face masks in public places (NCDC, Nigeria Centre for Disease Control, 2020). The lockdown affected all levels of schools in Nigeria and necessitated the need for alternatives for students to learn at home. These learning medium include ICT platforms such as video platforms which includes, zoom, skype, face time (iPhone), audio platforms such as telephone calls and text platforms such as messaging, chart mode.

Smartphone is a newer class of cellular telephone with an integrated computer technology and other features such as an operating system, web browsing, and the ability to run software applications. They are called 'smart' because they can provide information when you need them at the touch of your fingers and this can be used in a useful way. Recently, smartphones are equipped with features such as camera, video conferencing, Global Positioning Service (GPS) navigation, and games, sending and receiving Electronic mail (email), web search applications for various purposes (Karthirkeyan et.al 2020)

Smartphone has influenced education greatly in the area of training, workshops, seminars, conferences and other academic activities (Karthikeyan et.al. 2020). The goals of the United Nations Education for All Policy aims to provide equal opportunities for education, regardless of gender, by the year 2015 (United Nations Educational Scientific and Cultural Organization, (UNESCO) 2013). One of the greatest opportunities is to facilitate informal education to compliment formal education by using smart phone. Features used are different among age and gender (UNESCO, 2013).

Research on the smart phone among children and young people (5-15years) revealed gender differences (Ofcom, 2013). It was revealed that boys like digital games and girls like talking. Girls are more likely to use their phone on a regular basis to listen to music and to take photos, they prefer uploading or sharing photos on a website.

A study carried out by a team from Alabama University surveyed about 1,000 students aged from 11-13 (Cotton et. al 2020). It was revealed that boys scored higher than girls for using their mobile phones for sending emails, playing games, listening to music, and sharing pictures and videos. Boys are often taught to explore and be more creative with technology, they tend to use mobile devices as a gadget. Girls traditionally have perceived themselves as less skilled in term of technology (Cotten et al., 2020).

A survey research was carried out involving 2,500 children age 9-16 and their parents, refer to gender differences in the daily use of smartphones, which are very low within the single countries, notable difference are figured out when comparing the different countries (Norris et. al 2011). In higher education males show higher positive attitude toward using mobile phones for learning than female (Yau & Cheng, 2012).

A research study carried out by Ayelaagbe (2019) revealed that there was a difference in the performance of adult male and female learners taught using mobile phone application for learning basic literacy and numeracy skills. It was also revealed that there was difference between the performance of male and female adult learners using blended mobile phone application for learning basic literacy and numeracy skills.

Junco (2012), also observed that female college students sent more texts and talked longer on their mobile phones than their male counterparts. To them, the females perceive ICT as a means of maintaining and fostering relationships whereas, men view such technologies as sources of entertainment. Also, Kuss and Criffiths (2011) found that female adolescents tend to use social media largely to communicate with their friends and families more than male adolescents.

Yau and Cheng (2012) in their research on gender differences in having confidence in using technology concluded that male students have more confidence in use technology for learning than to female students in higher education in Hong King. Johnson (2011) investigated gender differences in the use of internet activities with digital natives and found no gender difference in the school-based activities. Her premise was that this has to do with student being digital natures and the closing of the technology gender gap leading to gender

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equity in school-based use of the internet. Also, Blasco (2016) in his study on the use of educational technology between genders, also found no significant difference between males and females stating that male and female students studying applied foreign languages are equal in their use computer technology. It was concluded that male learners are better user's technology for learning than female learners.

In a similar study, Economides and Grousopoulov (2008) discovered that there was only small differentiation between the gender when researching on the volume of phone calls made. They stated that female students appear to make more phone calls than male students and that they take more photos and record more sounds than their male peer. Wang, Wu & Wang (2009) found that when it comes to gender differences, women's main mobile device use in socializing, whether it be via SMS, social media or sharing photos, while men prefer communicating through email, listening to music and watching videos. Druin (2009) states that the children of the present generation, whom are refer to as i-children, can easily adapt to and manipulate all type of new technology and screen-based design. However, the educational needs, skills and interests of these i-children, who have a high capacity to adapt themselves to new technologies, differ.

Prensky (2020) reveals on inequalities by age, gender and socio-economic in relation to the quality in the take-up of online opportunities and social media among 9 – 19years old in UK. Their findings indicate that girls use the internet in a greater variety of ways than boys at a younger age (9 – 15) years, but that boys make broader use of the internet at an older age (16 – 19years). Livinstone and Nelsper (2015), stated that boys, older children and middle-class children all benefit from more and better-quality access to the internet than girls, younger and working-class children. Ito et.al (2018) opined that mobile phone is the most prevalent mobile device according to recent K-12 survey-data from Project Tomorrow; 89% of grade 9-12 students access a smart phone, 66% a laptop and 39% a tablet. Ofcom (2013) conducted a survey and the detailed results shows that among 8 – 11years students school work/homework is

the most commonly mentioned activity, internet carried out at least weekly with (75%) followed by games (54%) and information (45%). 12 -15years old were using their smartphones for a broad range of activities where homework/schoolwork is the most commonly mentioned internet activity (84%), followed by information (79%), social networking (68%) and watching audio visual content (68%), they go online weekly for communication (66%), for games (54%) and for music (53%). Most common is watching videos or clips posted by other people on sites like YouTube (50%), sending/receiving photos (38%), posting photos or videos on sites like YouTube, Facebook or Instagram (33%). In the annual literacy study in UK (35, 000 children, aged 8 16years) surveyed pupils' writing habits (Clark, 2013) technology-based formats, such as text messages (72%) are figured out as the most commonly written outside the class by a large margin, followed by emails (46%) and instant messages (45%). Compared with boys, girls tend to write more technology-based formats.

Batat (2019) a French researcher aimed to discover how teenagers and young people (14 – 25years) use the symbolic properties of the mobile phone. Mobile phone is increasingly perceived as a multipurpose device for teenagers, who feel comfortable with non-verbal ways of communication. Batat refers to the mobile phone as a social device in the youth subculture; for both girls and boys, a mobile phone is a symbolic of independence of belongingness and self-identity.

Location is an important factor determining the use of smartphone by students in accessing information on academic activities. Findings of Ayelaagbe (2016) have supported the position that location affects the performance of adult learners in using mobile phone application for learning. He concluded that the performance of adult learners in learning regardless of their locations would improve if adult learners are exposed to the use of the mobile phone application for learning. Adult learners in urban areas performed better than those in rural areas and this was supported by the findings of Gallup Surveys (2011) that the mobile phone service and users are

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concentrated in the cities, while those in rural areas have limited spread of the communication networks and irregular or non-existence of electricity supplies are major barriers of the mobile phone in rural areas.

The cell phone is now a precious device for those who live in rural areas but charging at times could be difficult. Inadequate of infrastructure and poverty level does not make it easy for rural dwellers to use mobile phone effectively (Fahanu, 2017). Maher, Smith and Williams (2015) stated that the need for electricity is fundamental in the rural areas and alternatives must be sought after. They pointed out that one alternative that has been introduced to solve the problem of electricity is solar power. This has turned out to be very imperative in the rural areas, as other kind of power sources is not available. Baro and Endouware (2012), in their study, the effect of mobile phone on the socio-economic life of the rural dwellers in the Niger Delta region in Nigeria. It was revealed that the absence of electricity supply in the rural areas in a challenge to mobile phone users in the rural areas in Nigeria. The location could be considered significant of the centres spread in urban and rural setting in all States in Nigeria

Statement of the Problem

Smartphones has made the whole world seem only a short distance apart, in terms of space and time. It has become a way among people to engage with family and friends as well as communicate conveniently, with features like internet, e-mails, gaming, social networking like Facebook, music, radio, books, and dictionary. Smartphones has become need of the hour, especially with the Covid-19 pandemic quarantine. The social distancing that stemmed as a result of Covid-19 has spiked smartphone usage among various categories of people, especially the secondary students who were attached to their smartphones even otherwise (Kadeswaran, Brindha & Jayaseelan, 2020). The Corona Virus (COVID – 19) has had a significant effect in education and training in Nigeria. As a measure to fundamental restrict movement of people, a 21-lockdown was imposed to enhance social distancing as a preventive measure against Covid-19 pandemic in the Nigeria and especially in

Ogun state. With orders to close the colleges, teachers were urged to engage students productively via online teaching methods (Rather & Rather, 2019).

In spite of the advancement in technology that has made the world a global village thanks to smart phones, most educators did not leverage on the availability of smart phones to teach at a time that all schools were closed. This problem succeeded in looking at the role of smartphones is significant in combating the Covid-19 pandemic among secondary school students in Ogun state.

Objectives of the Study

The study was based on the following objectives:

1. To investigate if there is any difference between male and female students using smartphone for learning during Covid – 19 pandemics.
2. To determine if there is difference between urban and rural students using smartphones for learning during Covid-19 pandemic.
3. To find out if there is difference between the age of students using smartphone for learning during Covid-19 pandemic.

Research Questions

The study sought and provided answers to the following research questions:

1. Is there any difference between the male and female students using smartphone for learning during Covid – 19 pandemics?
2. Is there any difference between urban and rural students using smartphone for learning during Covid – 19 pandemics?
3. Is there any difference between the age of students using smartphone for learning during Covid-19 pandemic?

Research Hypotheses

The following research hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference between the male and female students using smartphone for learning during COVID-19 pandemic.
2. There is no significant difference between the urban and rural students using smartphone for learning during COVID-19 pandemic.

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3. There is no significant difference between the age of students using smartphone for learning during Covid-19 pandemic.

Methodology
The study adopted the descriptive survey research design to determine the assessment of smart phone for effective learning during Covid-19 pandemic among senior secondary schools in Ogun State, Nigeria. It was descriptive survey because it tries to solicit for students' responses on smart phone usage (Marguerite, et.al. 2006). The sampling technique used for this study was cluster sampling because the study covered the entire population of all senior secondary school students in Ogun State. Ogun State was divided into three (3) senatorial districts, that is Ogun Central, Ogun West and Ogun North and in each of the cluster, simple random sampling was used to select six (6) senior secondary schools and two schools (2) from rural and four (4) schools from urban schools were selected. Also, simple random sampling was used to select sixty-five (65) male and thirty-two (32) female from urban schools. While, thirty-three (33) male and twenty (20) female were selected from rural schools. In Ogun central district two (2) urban schools were selected and twenty (20) males and thirty (30) females. In all one hundred and fifty (150) senior secondary school students in senior schools I – III formed the population of the study.

The instrument for data collection used in this study was a questionnaire, developed by researcher. The questionnaire was tagged Smartphone Usage During Covid-19(SUDC-19) The questionnaire had two sections A and B. Section A was concerned with demographic information while section B sought to know the usage of smartphone for learning during COVID-19 pandemic. The researcher administered copies of questionnaire within a space of six weeks by visiting the schools of students after the resumption back to schools in Ogun State. At the end of the exercise one hundred and fifty (150) valid copies of the questionnaire were retrieved, upon which analysis of the results was carried using mean, standard deviation and Analysis of Variance (ANOVA) was used to analyze the data collected. Five experts from Educational Technology Department from Olabisi Onabanjo University, Ago-Iwoye, Ogun State were consulted to validate the instrument's content and face validity. The experts critically checked the items and statements of the questionnaire and make necessary corrections. The reliability test was carried out in five schools that were not in the sampled schools in urban schools in Ogun state. The experts assessed the appropriateness and adequacy of the content of the instrument. To measure the reliability of the instrument, Cronbach's Alpha Co-efficient was used to obtain the co-efficient of internal consistency with the value of 0.80. The data collected were analyzed using mean, standard deviation, t-test and ANOVA.

Results
The results of the study were presented based on hypotheses

Ho$_1$: There is no significant difference between male and female students and the usage of smartphones during COVID-19 pandemic.

Table1: Summary of t-test showing the difference between male and female students using smartphones for learning

Grouping Variable	N	Mean	Std. D	Df	T	Sig.	Remark
Male	71	26.67	2.16				Not
Female	79	26.68	2.19	148	-.021	.983	Significant

Table1 shows the difference in the usage of smartphones by male and female students for leaning during COVID-19. The table shows that the mean score for male students is 26.67 while that of female students is 26.68. The values of the mean scores do not reveal an appreciable difference. Therefore, there is no significant difference between male and female students' usage of smartphones for learning during COVID-19.

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(df = 148; t = -.021; p > 0.05). Hence, hypothesis 1 is retained. This result implies that the level of usage of smart phones by male and female students is same.

Ho2: There is no significant difference between rural and urban students and usage of smartphones for learning during COVID-19.

Table 2: Summary of T-test Showing Difference in Rural and Urban Students' Usage of smartphones for learning

Grouping Variable	N	Mean	Std. D	Df	T	Sig.	Remark
Urban	53	26.89	2.15				Not
				148	.861	.390	Significant
Rural	97	26.57	2.18				

Table 2 shows the difference in the usage of smartphones by urban and rural school students for learning during COVID-19 pandemic. The table shows that the mean score for the students in urban schools is 26.89 while that of students in rural schools is 26.57. The values of the mean scores do not reveal an appreciable difference. Therefore, there is no significant difference between rural and urban students' usage of smartphones for learning during COVID-19 pandemic (df = 148; t = .861; p > 0.05). Hence, hypothesis 2 is retained.

Ho3: There is no significant difference in the age range and the usage of smartphones in secondary schools in Ondo State based on students' age range.

Table3: Summary of ANOVA Showing Difference in the Usage of smartphones by Students based on Age Range

Age Range	N	Mean	Std. Dev.
10-12years	32	25.75	2.15
13-14years	62	27.41	1.87
15-17years	30	26.20	2.18
18years and Above	26	26.61	2.33
Total	**150**	26.68	2.17

Summary of analysis of variance of ANOVA showing difference in usage of smartphones.

Model	Sum of Squares	df	Mean Square	F	Sig.	Remark
Between Groups	68.589	3	22.863			
Within Groups	634.051	146	4.343	5.265	.002	Significant
Total	**702.640**	**149**				

Table 3 shows the difference in the level of usage of smartphones by students in learning during COVID-19. The table shows that the mean score for students between ages of 10 to 12years is 25.75, those between 13 to 14 years is 27.4, those between the ages of 15 to 17 years is 26.61 while that of students between 18years and above is 26.61. The ANOVA results shows that there is significant difference in the use of smart phones during COVID-19 pandemic. ($F_{(3,146)}$ = 5.265; p < 0.05). Hence, hypothesis 3 is rejected.

Discussion of Findings
The finding of the analysis on the assessment of smartphone for effective learning during COVID-19 pandemic lockdown among senior secondary schools was analyzed in the area of gender, age and location respectively.

The t-test indicated that gender does not have significant relationship on students using mobile phone for learning. Therefore, the findings of UNESCO (2000), Blasco (2016), and Johnson (2011) corroborated with the study that smartphone usage provided equal educational opportunities for students regardless of their gender and from the findings the use of smartphones between

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genders has no significant difference between male and female students. This shows that smartphone can be used for educational purposes by both male and female students for learning.

Also, the finding showed that there was no significant difference between rural and urban students using smartphone for learning during COVID-19 pandemic. This result was in agreement with the finding of Fahamu (2017), Maher, Smith & Williams (2015) and Baro & Endouware (2012) who found that location of the students does not affect the use of smartphone for learning. But in their finding, there was one major problem that was found that can disturbed the learners in using the smartphone that is poor electricity. And this was found to be general problems all over (Gallup Survey, 2011)

Also, the finding showed that age of the students does not have significant difference on the use of smartphone for learning during COVID-19 pandemic. The findings corroborated with Ito et al. (2018), Ofcom (2013), Clark (2013) and Batat (2019) submission that age of students does not have significant relationship on the use of smartphones for learning. And that both young and older students benefit more from use smartphones for learning.

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Conclusion
Smartphone is one of the technological tools that can be seen with everyone nowadays. It has its advantages and disadvantages. This study has demonstrated that smartphone was effectively utilized in all its ramifications by students in senior secondary schools in Ogun State during COVID-19 pandemic lockdown for learning. Findings also indicated that gender, age and location have no significant relationship between them and using smartphone for learning during COVID-19 pandemic lockdown.

Recommendations
Based on the findings of this study, the following recommendations are made:
1. The curriculum planners should plan the curriculum to incorporate the use of technology in teaching and learning process.
2. Government should provide necessary facilities and infrastructures in other to enable the use of smartphone for learning easier.
3. The use of smartphone should be monitored by teachers to reduce the abuse of its uses.
4. There should be rules and regulations on the use of smartphone by students in schools.
5. There should be timetable for the use of smartphone and this should be adequately monitored.

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