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Paradox of online and physical lectures: charting a way forward

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Abstract
The wave of COVID-19 pandemic brought in a paradigm shift from the traditional method of physical or face-to-face to online lectures and in some cases e-assessments. This paper focused on the impact of online lectures and e-assessments in the advent of COVID-19. Two research questions and three null hypotheses guided the study. A two-part, self-developed instrument was used in the collection of data. Results showed that majority of the students preferred online classes to face-to-face classroom interaction Furthermore, findings showed that there were no significant effects of location, sex and possession of Android phones on the combined dependent variable of modes of assessment, F(2, 233) = 0.158,p = 0.854; Wilks' Lambda = 0.999; partial η 2 = 0.001; F(2, 233) = 0.901,p = 0.408; Wilks' Lambda = 0.99; partial η 2 = 0.008 and F(4, 468) = 0.374,p = 0.827; Wilks' Lambda = 0.99; partial η 2 = 0.003, respectively. Recommendations were made.

Keywords: Online lectures, physical lectures, assessments, residential location, possession of android phones

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Introduction

The study focuses on online lectures in tertiary education vis a vis its usefulness as a means to help cater for the shortage of physical lectures created as a result of COVID-19 pandemic and perhaps, inadequate infrastructural facilities. The pandemic is caused by the outbreak of the novel Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2), (Shereen, Khan, Kazmi, Bashir & Siddique, 2020). The World Health Organization (WHO) declared the new wave of infection with predominantly respiratory system symptoms a pandemic on March 11th, 2020 with most countries reporting increasing numbers of morbidity and mortality rates (Cucinotta, & Vanelli, 2020). According to the WHO (2020), the major drivers of the outbreak are both symptomatic and asymptomatic persons infected with SARSCOV-2 from whom the virus can spread via droplets or direct contact with contaminated surfaces. This led to the enforced lockdown of many countries in the world. In combating the virus, WHO recommended a multi-prong preventive approach that includes physical distancing, hand washing with soap and water for at least 20 seconds and respiratory etiquette as mitigating measures in addition to the lockdown to restrict on-going community spread of the virus (Whitworth, 2020).

The resultant effects of these stringent public health actions led to enormous economic losses, disruption of the usual physical and social contacts, massive loss of jobs and means of livelihood as well as increase in mental health issues (Torales, Higgins, Castaldelli-Maia & Ventriglio, 2020). The outbreak of the pandemic impacted greatly on human activities in almost all spheres of life. The encroachment and enervation of the world activities due to the pandemic, resulted to partial closure of schools in order to contain the spread of the deadly disease. By the middle of April 2020, approximately 1.7 billion learners were reported affected due to school closures in response to the COVID-19 pandemic (Mustafa, 2020). It was also reported that about 191 countries, Nigeria inclusive implemented nationwide closures which had an impact on 98.4 percent of the world's student population (UNESCO, 2020). Educational sector at various strata adopted different approaches to ensure the sustainability of fundamental human right to quality and equity education. Different technological alternatives were employed to mitigate against the loss of instructional

process due to the COVID-19 pandemic. UNESCO (2020) reported that some countries simply put resources on their website, and made available more products, but not necessarily online classes, some asked teachers to prepare online contents and offer online classes, while some found it difficult to reach all students equally.

Adopting technological digital classes requires adapting a system of education built around physical schools in order to cater for all learners of diverse characteristics. Vulnerable learners such as those from low-income backgrounds, ethnic minority, learners from remote communities and learners of special education needs could be denied those interaction activities and access to physical learning opportunities. In order to mitigate against these shortcomings, Organisation for Economic Co-operation and Development (OECD), suggested employing digital pedagogical media and virtual instructional process between learners and teachers, and among learners, to deliver education as schools shut down (OECD, 2020). Online classes were adopted by tertiary institutions to replace face-to-face classes worldwide. This required leaners to adapt to the new approach of learning.

Some Nigerian tertiary institutions adopted the use of online classes although, with some challenges spanning from possession of internet devices, internet accessibility, learning platforms, reaching out to learners in the rural areas, funds in procuring data, to electricity. Internet connectivity and electricity were barriers to online classes as an average of 91% of the students had challenges with effective navigation while using smartphones for online lectures, inadequate data to access the internet, finance to buy internet data and internet connectivity (Etobro, 2020). Adeoye, Adanikin and Adanikin (2020) argued that most rural areas in Nigeria where some students are resident are not even connected to the national grid and as such, students may experience difficulty in utilizing the online platform effectively. In responding to the challenges countries face, specific and innovative initiatives were put in place. In mitigating against backdrop of digital technological resources and ensuring provision of equitable and inclusive access to education, governments and some non-governmental organisations provided learners and instructors with computers or tablets along with internet connectivity, as well as organising teaching through television, social media, phones or radio.

In an attempt to mitigate against the threats of school closures, which in turn could derail the achievement of the SDG4 in the provision of inclusive and equitable quality education for all, online classes were embarked upon by education sector. In some cases, assessment of learners was also perhaps done online. According to Adelakun (2020) many assessments such as Cambridge IGCSE, Cambridge O Level, Cambridge International AS & A Level, Cambridge AICE Diploma were simply been cancelled. In Nigeria, unified examinations were put on hold.

The temporary closure of schools was eased out in August, 2020 when many learners in terminal classes (Primary 6, JSS3, and SS3) were asked to resume physical classes to complete their specific terminal and transitional exams (Adelakun, 2020 & CSEA, 2020). However, in September, 2020 the government approved a phrased reopening of schools. The reopening of schools in the light of threat of the announcement of second wave COVID-19 had to contend with two challenges. First, according to the Centre for the Study of Economies of Africa (CSEA) is coping with reopening schools with strict adherence to COVID-19 protocols and secondly, coping with lost grounds in learning and improving on the pre-pandemic learning levels that plagued Nigeria's educational system (CSEA, 2020).

School managements at all levels were enjoined to adhere strictly to the reopening conditions, in order to contain the spread of the pandemic. The measures as highlighted by CSEA (2020) include:

dividing learners into cohorts (i.e. by class) and assigning different cohorts, different days to go to school: staggering start, close, and break times of the school day to reduce learners-staff interaction with each other; limiting interactions among teachers; and restricting movement of al and sundry within schools. Furthermore, institutions of higher learning adopted hybrid teaching, as well as assessment of learning outcomes.

Challenges often faced with physical testing such as congestion violates one of the COVID-19 protocols. E-assessment permits social and physical distancing thereby containing the spread of the pandemic. The major purpose of the United Nations Sustainable Development Goals is ensuring no student is left behind. The pandemic had great impact on learners of different cadres worsening already existing inequalities and creating new ones. School closures truncated the normal physical contact during instructional process due to the current COVID-19 pandemic. This means that students from diverse locations and backgrounds who are more at risk of increased vulnerability according to OECD (2020) are less likely to receive the necessary support needed to mitigate against the loss of learning. The lockdown

conferred on the female cohorts perhaps the responsibilities of household chores, thus limiting them to online educational activities.

According to CSEA (2020), phone surveys conducted by Nigeria's National Bureau of Statistics (NBS) in 2020 on different platforms of used to sustain learning amidst the pandemic reported huge and far reaching loses of learning. It further reiterated that the percentage of learners who engaged in one form of educational activities during the crisis fell from 64% to 57% which was statistically significant, with less than one percent of learners engaged in online learning. These are indications that learners were largely disconnected from the formal school system as a result of the crisis.

Instructional process requires evaluation of learning outcomes utilizing different media platforms including e-assessment. Most educational institutions adopted online learning to mitigate against the loses in learning caused by the schools' closure due to the COVID-19 pandemic. There is need to assess such learning outcomes in the advent of the pandemic. In this study, online measures to assess learners' achievement levels were put in place to determine learners' achievement levels and to examine whether learners were on track. In ensuring equity in the assessment, adequate awareness was created by giving a two week of notice, requesting the students to get their online devices in good order with enough internet data and locate positions where internet connectivity was strong. With this, vulnerable learners would have been taken care. However, questions still remain unanswered. How many students have access to good devices and internet to access the online assessment tool? Does the variation in accessibility due to location affect performance? This study assessed the paradox of online and physical lecture activities with emphasis.

Method

The study adopted a descriptive survey research design. The population of the study was all the 1,562 second year students in Faculty of Education in Lagos State University, who were exposed to digital classes and e-assessment during the lockdown. On reopening the schools, mode of teaching was hybrid-a mixture of both physical and online classes were held for this cohort of students. At the end of the semester, the students were assessed physically. The scores in both assessment modes were merged together. Adopting a simple random sampling technique, 257 students were selected for the study. A self-developed instrument consisting of two parts; part one is the questionnaire and part two which addressed the achievement level of the students in a course taken during the pandemic. Part one requested the students to provide information on their perception about online classes their ICT competency level during the lockdown. The achievement test focused on the topics covered during the online teaching. Among the demographic data requested from the students included: matriculation number, name, course of study and location (based on the strength of internet broadbands, number of network providers in their residential areas during the lockdown) and possession of an effective and good Android device. The choice of location in the instrument was to determine whether there would be differences in the performance of students in the rural and urban areas as well as the vulnerable students.

Parts one and two consisted of twenty-seven and thirty items respectively. The developed instrument was pilot-tested on forty-five students who were in their third year and had taken the course when they were in their year. Item analysis was carried out to establish the worthiness of the items. Adopting Cronbach Alpha, the questionnaire part yielded a reliability index of 0.82; while the achievement test, adopting Kuder-Richardson formula 21 yielded a reliability index of 0.79. After refining the instrument, nineteen and twenty items respectively were retained in parts one and two. The final form of the instrument was administered on the 257 students online through the link: https://forms.gle/y67CzmLsJv9ZdiZW7. The data collected were subjected to mean ranking and Multivariate Analysis of Variance.

Results and Discussion

The students' ICT competency level during the lockdown

Table 1 <Mean Ranking of ICT Competency Level of Students During the Lockdown>

Competent in using internet in	N	Mean	Std. Deviation	Mean Ranking
1. sending or receiving email.	254	3.56	0.631	1st
2. sending instant messaging or chat.	254	3.49	0.699	2nd
3. searching for reference information on internet.	252	3.47	0.670	3rd
4. accessing learning materials.	253	3.43	0.719	4th
5. sharing pictures.	254	3.39	0.713	5th
6. making phone calls (e.g. WhatsApp, Telegram, Skype)	253	3.38	0.754	6th
7. accomplishing class assignments.	255	3.34	0.702	7th
8. receiving virtual/online classes (e.g. Zoom, Google classroom, Microsoft Team, Skype)	254	3.31	0.802	8th
9. accomplishing some leisure activities.	254	3.26	0.741	9th
10. editing a file in Microsoft word programme.	253	3.18	0.824	10th

Table 1 showed that what students do mostly and effectively using internet during the lockdown was sending and receiving email messages. The next most engaged activity by students when using internet is sending instant messages or chatting with a mean of 3.49 and a standard deviation of 0.699. However, accessing learning materials through internet (M =3.43, SD = 0.719); using internet to carry out class assignments (M = 3.34, SD = 0.702); using it for virtual or online classes (M = 3.31, 0.802) and editing files in Microsoft Word programme (M = 3.18, SD = 0.824); were ranked 4th, 7th, 8th and 10th, respectively as shown in Table 1. This implies that students were not using their internet for academic purposes.

The advantages of online classes compared to face-to-face classroom interaction as perceived by students

Table 2 <Mean Ranking of the Perception Of Students On The Benefits Of Online Classes>

Online classes compared to face-to-face classroom interaction…	N	Mean	Std. Deviation	Mean Ranking
solves the challenge of insufficient classrooms for lectures.	253	3.31	0.714	1st
allows students to study at their own pace and convenience.	257	3.21	0.772	2nd
is cost effective as it reduces travel time.	257	3.2	0.794	3rd
is cost effective as it reduces infrastructural development in terms of buildings.	257	3.17	0.749	4th
increases satisfaction and decreases stress.	257	3.15	0.787	5th
solves the challenge of clash in timetable.	254	3.12	0.786	6th
affords students easy access to larger amount of information.	254	3.06	0.788	7th
increases efficiency of the amount of knowledge acquired.	255	2.74	0.839	8th
Prefer online classes to face-to-face classroom interaction.	257	2.66	0.888	9th

Table 2 showed that among the benefits of online classes compared to face-face physical classes include solving the challenge of insufficient classrooms for lectures (M = 3.31, SD = 0.714); allowing students to study at their own pace and convenience (M = 3.21, SD = 0.772); cost effectiveness as it reduces travel time (M = 3.2, SD = 0.794) and cost effectiveness as online classes reduce the cost of infrastructural development in terms of buildings (M = 3.17, SD = 0.749); were respectively rated 1st, 2nd, 3rd and 4th. Furthermore, majority of the students preferred online classes to face-to-face classroom interaction as indicated in the mean of 2.66 and standard deviation of 0.888, compared to the average mean of 2.5 of their responses.

There is no significant difference in the performance of students on the basis of location (rural and urban) in Both Physical and Online Assessments.

Table 3a <Multivariate Tests on Students' Location on Modes of Assessment>

Effect	Tests	Value	F	Hypothesis df	Error df	Sig.	η^2p
Location	Pillai's Trace	.001	.158[b]	2	233	.854	.001
	Wilks' Lambda	.999	.158[b]	2	233	.854	.001
	Hotelling's Trace	.001	.158[b]	2	233	.854	.001
	Roy's Largest Root	.001	.158[b]	2	233	.854	.001

Analysis of data showed that students from the urban location during the COVID-19 lockdown exposed to online assessment with a mean of 30.2 and a standard deviation of 9.996 performed better than their counterparts from rural location with a mean score of 29.9 and standard deviation of 9.919. However, Table 3a showed that there was no significant effect of location on the combined dependent variable of modes of assessment, F(2, 233) = 0.158, $p = 0.854$; Wilks' Lambda = 0.999; partial $\eta^2 = 0.001$.

Table 3b <Tests of Between-Subjects Effects of Students' Location on Modes of Assessment>

Source	Assessment	SS	df	MS	F	Sig.	η^2p
Location	Physical	5.104	1	5.104	.119	.730	.001
	Online	13.901	1	13.901	.147	.702	.001
Error	Physical	10033.306	234	42.877			
	Online	22192.042	234	94.838			

Table 3b showed that analysis of each of the modes of assessment, using Bonferroni adjusted alpha level of 0.025, showed that there was no contribution of location to physical and online assessments, F(1, 234) = 0.119, $p = 0.730$, $\eta^2p = 0.001$ and F(1, 234) = 0.147, $p = 0.702$, $\eta^2p = 0.001$, respectively. This implies that students' performance is not significantly affected irrespective their residential locations.

There is no significant difference in the performance of students on the basis of gender in both physical and online assessments.

Table 4a <Multivariate Tests on Students' Sex on Modes of Assessment>

Tests	Value	F	Hypothesis df	Error df	Sig.	η^2p
Pillai's Trace	.008	.901[b]	2	233	.408	.008
Wilks' Lambda	.992	.901[b]	2	233	.408	.008
Hotelling's Trace	.008	.901[b]	2	233	.408	.008
Roy's Largest Root	.008	.901[b]	2	233	.408	.008

The data analysed revealed that female students during the COVID-19 lockdown exposed to online assessment with a mean of 30.7 and a standard deviation of 9.429 performed better than their male counterparts with a mean score of 29.2 and standard deviation of 10.092. Meanwhile, Table 4a showed that there was no significant effect of sex on the combined dependent variable of modes of assessment, F(2, 233) = 0.901, $p = 0.408$; Wilks' Lambda = 0.99; partial $\eta^2 = 0.008$.

Table 4b <Tests of Between-Subjects Effects of Students' Sex on Modes of Assessment>

Source	Assessment Mode	SS	df	MS	F	Sig.	η^2p
Sex	Physical	73.410	1	73.410	1.712	.192	.007
	Online	.869	1	.869	.009	.924	.000
Error	Physical	10033.306	234	42.877			
	Online	22192.042	234	94.838			

Table 4b showed that analysis of each of the modes of assessment, using Bonferroni adjusted alpha level of 0.025, showed that there was no contribution of sex to physical and online assessments, F(1, 234) = 1.712, $p = 0.192$, $\eta^2p = 0.007$ and F(1, 234) = 0.009, $p = 0.924$, $\eta^2p = 0.000$, respectively. This implies that gender had no impact on students' performance.

There is no significant difference in the performance of students based on the possession of Android phones in both physical and online assessments.

Table 5a <Multivariate Tests on Students' Possession of Android Phone on Modes of Assessment>

Effect	Tests	Value	F	Hypothesis df	Error df	Sig.	η^2p
Possession of Android Phone	Pillai's Trace	.006	.375	4	468	.827	.003
	Wilks' Lambda	.994	.374[b]	4	466	.827	.003
	Hotelling's Trace	.006	.372	4	464	.828	.003
	Roy's Largest Root	.006	.696[c]	2	234	.500	.006

Table 5a showed that there was no significant effect of Possession of Android Phone on the combined dependent variable of modes of assessment, F(4, 468) = 0.374, p = 0.827; Wilks' Lambda = 0.99; partial η^2 = 0.003.

Table 5b <Tests of Between-Subjects Effects of Students' Sex on Modes of Assessment>

Source	Assessment	SS	df	MS	F	Sig.	η^2p
Possession of Android Phone	Physical	43.753	2	21.877	.510	.601	.004
	Online	29.434	2	14.717	.155	.856	.001
Error	Physical	10033.306	234	42.877			
	Online	22192.042	234	94.838			

Table 5b showed that analysis of each of the modes of assessment, using Bonferroni adjusted alpha level of 0.025, showed that there was no contribution of possession of Android phones to physical and online assessments, F(2, 234) = 0.510, p = 0.601, η^2p = 0.004 and F(2, 234) = 0.155, p = 0.856, η^2p = 0.001, respectively. This implies that there were no significant differences in the performance of students based on the possession of Android phones in both physical and online assessments.

Discussion of Findings

Findings showed that students were not using their internet facilities for academic purposes. What students did mostly and effectively was using internet facilities during the lockdown to send and receive email messages as well as sending instant messages or chatting. Students were only occasionally accessing learning materials through internet. The finding is in agreement with Almasi, Machumu and Zhu (2017) who reported that although, the use of internet facilities for educational purposes had increased, most of the students used internet for social media purposes such as chatting and socializing, among others. This is also in consonant with Mazzuki (2010) who reported that only a few respondents were able to access internet facilities for academic endeavours. Meanwhile, this finding is not in tandem with the findings of Ani (2010), Adekunmisi, Ajala & Iyoro (2013) and Ajanaku (2019), who reported that students used internet facilities for academic purposes.

Finding of this study further revealed that students from the urban location during the COVID-19 lockdown exposed to online assessment performed better than their counterparts from rural location. Meanwhile, the effect of location on the combined dependent variable of modes of assessment was not statistically significant, that is, there was no contribution of location to physical and online assessments respectively. This implies that students' performance was not significantly affected irrespective of their residential locations. This finding is in agreement with that of Opoku-Asare and Siaw (2015) who aver that, students from urban schools outperformed those from rural and peri-urban schools. However, the finding is not in tandem with the findings of Awodun and Oyeniyi (2018) & Ogunleye and Adepoju (2011) who reported a statistically significant difference in the academic achievement mean scores of students from urban and rural areas.

Also in this study, students preferred online classes to face-to-face classroom interaction due to the benefits inherent in online classes compared to face-face physical classes. Such benefits adduced by the students include solving the challenge of insufficient classrooms for lectures; allowing students to study at their own pace and convenience; cost effectiveness as it reduces travel time and cost effectiveness as online classes reduce the cost of infrastructural development in terms of buildings. This finding is in line with the views of Ferri, Grifoni & Guzzo (2020) who highlighted the advantages of online classes to include

opportunity of students studying from location without time limit, saving some significant sum of money; no hustling for transportation on crowded buses or local trains; as well as saving time.

Furthermore, findings of this study revealed that female students during the COVID-19 lockdown exposed to online assessment performed better than their male counterparts, although, there was no significant effect of sex on the combined dependent variable of modes of assessment. This means that sex had no contribution to physical and online assessments, respectively. The findings confirmed the homogeneous nature of male and female students with respect to academic performance. The finding in this study agrees with the finding of Fabunmi (2004), Dania (2014) and Adigun, Onihunwa, Irunokhai, Yusuf and Adesina (2015), who reported in their study that students' performance is not determined by sex.

There was no significant effect of Possession of Android Phone on the combined dependent variable of modes of assessment. This there was no contribution of possession of Android phones to physical and online assessments, respectively. This implies that there were no significant differences in the performance of students based on the possession of Android phones in both physical and online assessments.

Conclusion

The wave of COVID-19 pandemic brought in a paradigm shift from the traditional method of physical or face-to-face to online lectures and in some cases e-assessments. The study was carried out to assess the paradox of online and physical lectures with the view of charting a way forward. findings showed that there were no significant effects of location, sex and possession of Android phones on the combined dependent variable of modes of assessment. With effective coordination and monitoring, online classes when properly harnessed, would enhance learning and subsequently improve academic performance, irrespective of sex, location and digital devices.

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