Journal of Innovation in Psychology, Education and Didactics
ISSN: 2247-4579, E-ISSN: 2392-7127
http://www.jiped.ub.ro/
Covered in : EBSCO, CEEOL, ProQuest, DOAJ, Scipio,
International Innovative Journal Impact Factor, CiteFactor,
EuroPub database, Open Academic Journals Index, ResearchBib,
Universal Impact Factor
2021, Volume 25, Issue 2, pages: 131-142, doi:10.29081/JIPED.2021.25.2.02

Disposition of Nigerian Secondary School Students to E-Learning Technology during COVID-19 Lockdown

Titus O. AJEWOLE [1]*, Sunday B. ADEYEMI [2], Tobi E. AMOSSOU [3], Adedotun S. ALONGE [4]

Received: 22 May 2021/ Accepted: 22 June 2021/ Published: 31 August 2021

Abstract

Deployment of on-line teaching-learning method in Nigerian secondary schools during COVID-19 lockdown period has been criticized as not well-embraced by students. This study therefore evaluates students' perception of the method, using the educational terrain of a Local Government Area in the country as a case study. Structured questionnaire was administered to 150 randomly selected students and their responses analysed using statistical tools. While 57.3% claimed having proper arrangements with their school on the on-line classes and 54.6% received appropriate information about the used e-teaching platforms, 30% suffered lack of facilities and 69.4% requested that topics taught on-line should be repeated in-class at schools' resumption. In overall, a grand mean score of 2.69 on a benchmark of 2.50 on a scale of 5.00 indicates the students were fairly well-disposed to the virtual learning technology. It is, however, recommended that as the lockdown eases out, there should be make-up physical classes to remediate the deficiencies of the virtual classes.

Key words: COVID-19 lockdown; disposition; E-learning; effectiveness; teaching-learning; virtual schooling, secondary schools

How to cite: Ajewole, T.O., Adeyemi, S.B., Amossou, T.E., Alonge, A.S. (2021). *Disposition of Nigerian Secondary School Students to E-Learning Technology during COVID-19 Lockdown*. *Journal of Innovation in Psychology, Education and Didactics*, 25(2), 131-142. doi:10.29081/JIPED.2021.25.2.02

[1] PhD, Associate Professor, Department of Electrical and Electronic Engineering, Osun State University, Osogbo, Nigeria, E-mail: titus.ajewole@uniosun.edu.ng
[2] PhD, Associate Professor, Department of Arts and Social Science Education, Osun State University, Osogbo, Nigeria, E-mail: sunday.adeyemi@uniosun.edu.ng
[3] MSc Student, Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Nigeria, E-mail: amossoutobi@gmail.com
[4] M.Ed., Facilitator, Ilesa Study Centre, National Teacher's Institute, Kaduna, Nigeria, E-mail: alongeadedotun@gmail.com
* Corresponding author.

1. Introduction

For the boundless benefits it offers, education is generally regarded as highly essential to the continual existence of humanity. It is the cornerstone for building human capital, thus irrespective of culture or background it is considered a fundamental right of everyone to be educated. Formal education is a form of systematically structured learning that is offered by standardized educational institutions. Standards are set for the process, which must be complied with by the institutions. Children's schooling across the globe contributes very importantly to both the social and the economic development of nations (Kazeem, Jensen and Stokes, 2010). However, global educational system is dynamic and changing, for which reason the system has passed through a number of significant reforms in the last two decades, often occasioned by discontentment with structure, scale, efficiency, quality and speed of the existing educational system (Lao, 2020). Thus e-learning has steadily become significant tool in instructional process, with the rapid advancement of Information and Communication Technology (ICT) in the twenty first century (Hwa, 2018).

In Nigeria, oversight function on formal education is accorded to the respective Ministry of Education in each of the federating states, with the Local Education Authorities directly supervising the school, and the Federal Ministry of Education being the unifying umbrella for the state ministries. Nigerian education system is, at present, structured as 6-3-3-4; meaning six years of primary school, three years each of junior and senior secondary schools, and four years in tertiary institutions. Being the link between primary and tertiary, secondary school is a very pivotal level of education (Ige, 2011). It prepares learners for higher learning in tertiary institutions. Therefore, to ensure that the purpose of secondary school level of education is not jeopardized, the system has being striving to keep the educational level from any form of disruption.

Prior to the novel corona virus disease 2019 (COVID-19) pandemic, implementation of educational policies in Nigeria has been cumbered with setbacks that result in unsatisfying outcomes. Discussed in Ige (2013) are the challenges confronting the achievement of the objectives of secondary school education in Nigeria. The author identifies insufficient funding, decay infrastructure, inadequate and low quality teachers, and students indiscipline as the major things needed to be properly addressed in other to have fulfilling secondary school education. Ike (2017) recommends that what government needs to do for the improvement of secondary school education is to pay more serious attention to moral, vocational and technical re-orientation of both teachers and students. Meanwhile, of high importance is a fact that Nigerian educational system has not been keeping pace with global trend of advancement in educational technology. Usage of ICT in all secondary schools has only been attempted in very few states of the federation and despite expending funds massively on such initiative, success record has been very minimal and non-existent in most cases. Despite increased use of virtual learning environments across the globe, there is no widespread transformation in pedagogic practices.

COVID-19 was first recognized in China during December 2019 and, by 11th March 2020 the World Health Organization (WHO) declared the disease a pandemic (WHO, 2020) for its contagiousness and deadliness (Mehta *et al.*, 2020; Fauci, Lane and Redfield, 2020). As. at the 9th September 2020, Nigeria in particular has had 55,829 and 1,075 confirmed cases of infections and deaths respectively (Johns Hopkins University, 2020). While expectation of COVID vaccines lasted, shutdown of major human activities, social distancing, wearing of facemask, as well as regular hand washing (or sanitizing) have been measures globally practiced to curb the spread of the disease. Across the globe, industrial and commercial domains and activities were shutdown to enhance social distancing. As a result of the lockdown, people, where and when possible, got constrained to performing their cores remotely on-line, and teaching-learning activities at all educational levels, from the pre-primary to post-graduate, were likewise affected by the

lockdown. Most schools and educational institutions were totally closed down. From across the globe, more than 1.5 billion students were affected by the closure (Agbele and Oyelade, 2020), and thus classroom teaching-learning thereby gave way to web-based alternative where possible. Schools and learning institutions were closed down in Nigeria for approximately six months, between March 22 and September 21 of the year 2020. In a study by Aiyedun (2020), the early days of the awareness of the spread of COVID-19 to the country is examined. It is submitted that **a**cademic year was interrupted as teaching-learning activities were brought to abrupt stop, which had tremendous effect on the academic syllabus. Ngogi and Mahaye (2020), as well as Anifowoshe *et al.* (2020) prognosticated that long periods of learning would be lost should the closure of schools to COVID-19 lockdown lasted. Consequent upon this was sudden shift from the traditional in-person classroom to the evolving web-based mode of teaching-learning in secondary and lower level schools. The shifting has been fiercely criticized based on the submission that the students were caught unawares and unprepared, which put the effectiveness of the web-based learning under questioning. More so, in an investigation of the remote learning activities of the lockdown period, Dorn *et al.* (2020) estimates the potential impact of the school closures on learning by comparing the efficiencies of remote learning with that of the traditional classroom instruction. It was found that full-time on-line learning does not always deliver the academic results of the in-class mode of instruction (Hanushek and Woessmann, 2020; Pinto and Jones, 2020; and Hanushek, 2020).

Nevertheless, e-learning being a cloud-based technology that emulates the conventional face-to-face classroom learning, offers numerous advantages (Cheok *et al.*, 2017). It enables access to limitless sources of information and shows the interconnections that exist among subjects, excites critical thinking and thus helps personal learning that brings out the best in students, and helps sharing accountability for learning outcomes (Tunmibi *et al.*, 2015). More so, adoption of e-learning at secondary school level would equip the students for better performance in tertiary education level as tertiary institutions in the country are steadily shifting from the traditional physical schooling to the use of on-line environments like e-portals (for students admission and registration), various e-learning platforms, virtual laboratory, e-library, web-based result processing and management services, and so on.

With the insinuation that COVID may stay longer than envisaged, then as social distancing was a measure employed in curbing the spread of the pandemic, partial or dispersed physical class could make a good approach to averting post-lockdown risk of spike in the pandemic. In their study, Igbokwe *et al.* (2019) note that prevention of communicable diseases in Nigerian secondary schools could be achieved through curriculum restructuring. School syllabus would thus need to be adjusted to accommodate remote learning in the post-lockdown and beyond. In a probe into the future of the pandemic, Onyemelekwe (2020) therefore lists e-learning, webinar learning or distance learning, alongside partial or dispersed physical class, as possible curriculum adaptation options for Nigeria.

The criticisms that trail the remote teaching-learning activities of the lockdown period were premised on the suddenness and unpreparedness that ushered in the adoption of the virtual option, coupled with non-availability and in-accessibility of the required facility (Aina, 2020; Igbokwe *et al.*, 2020). In Motaghian, Hassanzadeh, and Moghadam (2013), monetary, pedagogical and technical competencies are presented as major factors that affect successful implementation of any e-learning initiative. Abilities, willingness and commitments of the learners to on-line environments are also very important. An important challenge to educational process in the twenty-first century is how to motivate learners who for reasons might not have or have lost interest in learning process (Ciroma *et al.*, 2014).

One way to instil motivation is by creating atmosphere that can make lessons conducive and enjoyable for learners without hindrance, hence; this study assesses how Nigerian secondary school students were disposed to the web-based learning technology as deployed in the COVID-

19 lockdown days. This paper is organized as follows: next to this introduction is Section 2 that articulates the materials and method of the study; the obtained results is presented in Section 3 with a discussion of the results also provided in the same section; and Section 4 concludes the study with some recommendations.

2. Materials and Method

A structured questionnaire was employed to investigate 150 students on their disposition to the web-based teaching-learning activities of the lockdown period. Five optional text answers were provided for each of the questions in the questionnaire. Statistical tools of sampling and measurement were employed for acquisition and analysis of relevant data. Both junior and senior level students of secondary school were involved, based on their involvement and experience in the virtual schooling. The questionnaire raised fundamental questions on the degree of involvement of secondary schools within the study area in the on-line schooling of the pandemic period; the disposition of the students to the web-based education; and the likely need for make-up physical classes as a remedial for the probable deficiencies of the on-line classes held during the lockdown.

Ife-East Local Government Area (LGA) in Osun State of Nigeria is a metropolitan environment with a sizeable number of functional public and private secondary schools. Secondary method of data collection was adopted to obtain the demographic information of the schools that were operational in the area. The Principals of public schools and the Presidents of the local chapter of the National Association of the Proprietors of Private Schools (NAPPS) were the sources of the information. The school that deployed the virtual method was selected for this study, with stratified random sampling employed. Since it was not possible to reach the target audience remotely, hardcopies of the questionnaire were self-administered to the respondents physically within the school premises. It was ensured that completion of the questionnaire was done under a normal teaching-learning atmosphere. A frantic effort was made to see that the respondents completed the questionnaire independently, without external influence. The traditional practice of streaming senior students into three arms (Sciences, Arts and Commercial) was not operational in the school under study. A two-arm delineation (Science and Arts) was rather practiced, with Arts and Commercial combined as Arts. Both Sciences and Arts delineations were, however, taken care of in the sampling process. Also of equal importance is the fact that as at the time this study was being carried out, the graduating classes of both Junior Secondary School (JSS) 3 and Senior Secondary School (SSS) 3 were not in session, having completed their final examinations. Sample of this study was, therefore, drawn from JSS 1, JSS 2, SSS 1 and SSS 2 classes.

Data obtained through the questionnaire was evaluated to draw inductive inferences. The evaluation was achieved through systematic application of statistical techniques. Numerical values were assigned to the five optional text answers provided for each of the questions in the questionnaire. In Table 1 are presented the numerical points ascribed to each of the options. Information on the dispositions of the participants was processed using frequency and mean statistics. To compute the overall effectiveness of the on-line method, the mean of the numerical score points of the response options was calculated for each of the questions of the questionnaire, then a grand mean was computed. The grand mean was then compared with a pre-selected numerical benchmark to determine the overall disposition of the students, which has been pre-rated as either ‘High’ or ‘Low’ based on the benchmark.

Table 1. Numerical Coding of the Optional Text Answers

S/N	Text Answer	Acronym	Assigned Numerical Value
1	Strongly Disagree	SD	01
2	Disagree	D	02
3	Undecided	U	03
4	Agree	A	04
5	Strongly Agree	SA	05

3. Results and Discussion

As can be obtained from Table 2, only 1 out of 79 schools (1.3%) and 770 out of 71,493 students (1.1%) were involved in the virtual schooling across Ife-East LGA. This shows that the degree of involvement of secondary schools within the study area in the e-learning of the lockdown days was abysmally low.

Table 2. Analysis of Schools Involvement in the On-Line Education

Archetype	Number of Schools in the Study Area	Number of Students in the Study Area	Number of Schools Involved in the On-Line Schooling	Number of Students Involved in the On-Line Schooling
Public Schools	15	2,502	Nil	Nil
Registered Private Schools	64	68,991	01	770
Total	**79**	**71,493**	**01**	**770**

Shown in Table 3 is the demographic information of the sample students. The sample (150 students) is 19.5% of the population (770 students) of the study. The table reveals that there were more male student participants (52.7%) in the on-line classes than their female counterparts. It is also noted from the table that an average of 50% of the students were between the age of 13 and 15 years. Both SSS 1 and SSS 2 classes had equal participation of 33.3% each, likewise the participation of the Science and the Arts classes was the same with 50% each.

Table 3. Demographic Information of the Students

Variables	Frequency	Percentage (%)
Gender:		
Male	79	52.7
Female	71	47.3
Age:		
Less than 10 years	-	-
10 – 12 years	43	28.6
13 – 15 years	75	50.0
16 – 18 years	31	20.7
Above 18 years	1	0.7
Present class of students:		
JSS 1	25	16.7

JSS 2	25	16.7
SSS 1(Science)	25	16.7
SSS 1(Arts)	25	16.7
SSS 2(Science)	25	16.7
SSS 2(Arts)	25	16.7
Discipline of study by senior students		
Sciences	50	50.0
Arts	50	50.0
Commercial	-	-

Responses provided to the questions on the dispositions of the students to the web-based learning were analyzed using frequency, percentage and mean statistics. The analysis is presented in Table 4 that shows the mean score computed for each question and, from which the grand mean of the questions altogether was determined. Decision as to the disposition was based on 2.50 benchmark out of 5.00 with grand mean score ≥ 2.50 regarded as 'High Disposition', while value < 2.50 was regarded as 'Low Disposition'.

While 100% of the sample students were involved in the on-line learning during the lockdown; 57.3% agreed that there were proper arrangements between their teachers and themselves on the on-line classes; 54.6% were of the conviction that adequate and appropriate information about the available on-line educational platforms was given to them by their school/teachers; 47.3% claimed to have no challenge at all participating in the on-line learning activities and so were completely involved in the teaching-learning activities throughout the lockdown; and 56.6% were able to receive study materials like: notes, charts, pictures, drawings, *etc*, very clearly, legibly and without any difficulties during the on-line classes. These are indications that despite the suddenness in the adoption of the virtual schooling, there was a moderately high level of preparedness on the side of the school, with a remarkable size of the students carried along in the preparation. Also, the provided facilities for the on-line classes could be regarded as of fairly good standard.

Ability of the students to catch up with the on-line learning is reflected by the proportion that was able to receive assignment and make submission easily on the on-line class platform, which is 46.0%; and the 42.0% conviction that on-line learning is as good and effective as the conventional in-class method. These two are submissions that showcase positive attitude of the students towards the virtual schooling. The 28.0% support of the students for the view that all the subjects were taught in the on-line classes and that they effectively participated in all the subjects, must have come from non-science students; and this same group of students, since they do not involve much in laboratory-based experimental subjects, must have been responsible for the 8.6% submission that laboratory experiments were held and/or demonstrated for students during the on-line classes and that they were able to follow the demos. This could indicate that the science students were deprived in the aspect laboratory experimentations. As regards class interactions, the 35.3% claim of the students that the on-line platform made it possible for them to interact very well with their teachers and fellow students during the on-line classes, could be considered as a fair experience for the starting, which could be improved on.

Among other things, the social status and the financial background of the students did influenced their involvements and performances in the on-line schooling. For instance, while just only 18.0% asserted that they did not have confidence in using the on-line learning method during the lockdown for lack of sufficient knowledge of the method; 30.0% premised their inefficiencies on lack of facilities: computer, laptop, tablet, i-phone, Wi-Fi data, *etc*, to participate appropriately during the on-line classes; and 26.7% were in such locations where either there were no internet services or the available services were irregular and fluctuating. In similarly vein, 24.0% of the

students struggled with either total lack or epileptic electricity supply at their locations during the lockdown. Family status and finances might also responsible for the submission by 20.0% of the students that found it impossible to participate in the e-learning classes because they were engaged in something else; likewise the 18.6% that found it difficult to access the e-learning systems: electronic board, projectors *etc*, provided by the school; as well as 16.7% who for the ineffectiveness of the systems, did not found the on-line class appealing but just felt like they were on vacation during the period; and most strikingly the 10% felt they had lacked good learning environment at home as parents/guardians did not give them support. Better statuses and backgrounds might have engendered better involvement and participation by such students.

In the view of 42.0% of the students, on-line is as good and efficient environment for learning as the conventional physical class; but only 25.3% submits that the on-line method must continue after the lockdown without reverting to the conventional in-class method again. The opinion of the 69.4% that the topics taught on-line during the lockdown need to be repeated physically after resumption, may be upheld as it is most likely that subject requiring laboratory experimentation were not well taught during the on-line schooling. Though, complete stoppage of the on-line method after the lockdown, with the normal in-class method starting fully again, was supported by 62.7%, yet the opinion of 54.0% of the students that after the lockdown the mode of teaching-learning in secondary schools should be a blend of both e-class and in-class, is a pointer to the moderate effectiveness and indication of fairly good disposition of the students to the virtual schooling held during the lockdown.

An overall grand mean score of 2.69 was obtained by computation, which falls within the range of "High Disposition". This means that based on the experiences of the COVID-19 lockdown period, the students of the studied population were fairly well-disposed to web-based learning and that the involvement of the students in the virtual schooling was moderately effective. This result is an indication that irrespective of the shortcomings of the on-line alternatives of the COVID days as compared to the pre-COVID physical classes, the on-line learning can be improved upon and sustained even at post-COVID dispensation.

Table 4. Analysis of the Dispositions of Students to the Web-Based Learning

S/N	Item (s)	SD n (%)	D n (%)	U n (%)	A n (%)	SA n (%)	Mean
1	Before the lockdown, I already had experiences in on-line classes/learning and I had been participating in it	43(28.7)	34(22.7)	7(4.7)	43(28.7)	23(15.3)	2.79
2	There were proper arrangements between my school (teachers) and the students on the on-line classes held during the lockdown	21(14.0)	22(14.7)	21(14.0)	47(31.3)	39(26.0)	3.41
3	Adequate and appropriate information about the available on-line educational platforms was given to me by my school/teachers	20(13.3)	36(24.0)	12(8.0)	47(31.3)	35(23.3)	3.27
4	I had no challenge participating in the on-line learning activities and I was completely involved throughout the lockdown	32(21.3)	34(22.7)	13(8.7)	38(25.3)	33(22.0)	3.04

5	I was able to receive study materials like: notes, charts, pictures, drawings, etc; very clearly and legibly during the on-line classes	28(18.7)	32(21.3)	5(3.3)	53(35.3)	32(21.3)	3.19
6	It was easy for me to receive assignments, and submit my solutions on-line during the lockdown	34(22.7)	38(25.3)	9(6.0)	38(25.3)	31(20.7)	2.96
7	All the subjects were taught in the on-line classes and I effectively participated in all	39(26.0)	46(30.7)	22(14.7)	23(15.3)	20(13.3)	2.59
8	Laboratory experiments were held and/or demonstrated for students during the on-line classes and I was able to follow	76(50.7)	38(25.3)	23(15.3)	8(5.3)	5(3.3)	1.85
9	The on-line platform made it possible for me to interact very well with my teachers and fellow students during the on-line classes	38(25.3)	44(29.3)	15(10.0)	33(22.0)	20(13.3)	2.69
10	I did not have confidence in using on-line learning method during the lockdown, because I had no sufficient knowledge in the method	59(39.3)	43(28.7)	21(14.0)	17(11.3)	10(6.7)	2.17
11	I did not have facilities: e.g. computer, laptop, tablet, i-phone, Wi-Fi data, etc; to participate appropriately during the on-line classes	61(40.7)	41(27.3)	3(2.0)	25(16.7)	20(13.3)	2.35
12	My location during the lockdown did not have internet services and even when available, the internet service was irregular and fluctuating	58(38.7)	42(28.0)	10(6.7)	25(16.7)	15(10.0)	2.31
13	There was no electricity supply in my location during the lockdown, or the electric power supply was irregular	64(42.7)	46(30.7)	4(2.7)	23(15.3)	13(8.7)	2.17
14	Participation in the e-learning classes of the lockdown period was not possible for me because I had some other things that kept me away	62(41.3)	48(32.0)	10(6.7)	16(10.7)	14(9.3)	2.15
15	The e-learning systems provided by my school, like: electronic board, projectors etc: were ineffective and were difficult to access	62(41.3)	41(27.3)	19(12.7)	17(11.3)	11(7.3)	2.16
16	I just felt like I was on vacation during the lockdown and so the on-line classes did	61(40.7)	35(23.3)	29(19.3)	13(8.7)	12(8.0)	2.20

	not appeal to me						
17	During the lockdown, there were no good learning environment for me at home. Also my parents/guardians did not give support	65(43.3)	47(31.3)	20(13.3)	14(9.3)	1(0.7)	2.01
18	I am convinced that on-line learning is, at least, as good and effective as the conventional in-class method, if not even better	30(20.0)	28(18.7)	29(19.3)	35(23.3)	28(18.7)	3.02
19	For a fulfilling learning experience, topics taught on-line during the lockdown need to be repeated physically when students resume	19(12.7)	18(12.0)	9(6.0)	34(22.7)	70(46.7)	3.79
20	On-line method must continue after the lockdown, without reverting to the normal in-class method again	71(47.3)	28(18.7)	13(8.7)	17(11.3)	21(14.0)	2.26
21	On-line method must be stopped completely after the lockdown and the normal in-class method should start fully again	28(18.7)	19(12.7)	9(6.0)	36(24.0)	58(38.7)	3.51
22	After the lockdown, the mode of teaching-learning in Secondary Schools should be a blend of both e-class and in-class methods	24(16.0)	18(12.0)	27(18.0)	34(22.7)	47(31.3)	3.41
Grand Mean							**2.69**

Educational systems and processes across the globe can never remain the same after COVID-19, thus the Nigerian national educational system has to catch up with the digitalization trend. Universal Telecommunications Access (UTA) must be better strengthened for affordable and accessible internet services to low-income households in urban centres. Challenge of access to electricity is also recognized in this study. Massive deployment of electric microgrid options like rooftop solar photovoltaic picogrids (Adegoke *et al.*, 2010; Oluwafisoye *et al.*, 2010; Omoigui *et al.*, 2011; Ajewole *et al.*, 2020) will tremendously help in alleviating the challenge.

4. Conclusions

This study reveals that 71,493 students from the 79 secondary schools in Ife-East LGA in the south-western region of Nigeria were locked out of their physical schools at the peak of the COVID-19 pandemic lockdown. During the period, a lone school with 770 student population did shift to virtual learning technology as alternative. This shows that the alternative was not well embraced in the studied LGA. Various reasons hovers around this experience, with the most prominent factor being the suddenness and unpreparedness in the shifting from the traditional to the emerging method of education. Other factors are: lack or improper functioning of the required technology and facilities for engaging in remote schooling; financial capacities to earn the learners access to the internet; learning environment and home support for the learners; epileptic electric power supply; and teachers' competence in handling some of the involved processes and application software. Based on this experience, students in the LGA could be grouped into four:

(i) those who received moderate virtual learning; ***(ii)*** those that attempted the remote learning but did not derive much benefit from it; ***(iii)*** students who did not get any remote learning at all; and ***(iv)*** there is possibility of another group that had completely dropped out of school with issues emanating from the lockdown and the consequential adoption of virtual learning environment being the major causative factor.

Nevertheless, for the lone school where the virtual teaching-learning method was deployed, some remarkable level of success was recorded as significant percentages of the students did not only engaged in the web-based learning activities, but also were fairly well-disposed to the technology. The students, however, acknowledged that some learning losses were incurred during the lockdown as the virtual method was unable to adequately substitute the traditional physical classes. Remediation of the deficiencies of the virtual classes was considered necessary by a remarkable size of the students

In conclusion, the secondary school students of the study area could be regarded as having fairly good disposition towards the virtual classes held during COVID-19 lockdown period and that the on-line schooling was moderately effective. This study, however, recommends that the learning losses incurred as a result of the inaccessibility to the virtual class by some students and the learning deficiency suffered by those who involved, should be remediated, so as to ensure that the losses due to the sudden and unprepared adoption of the on-line learning alternative, would not get worsened. Therefore, schools at the resumption should provide compensative physical classes to fill the learning gap for the virtually unpriviledged students, as well as to make-up for the deficiencies encountered by the virtual class students. This would help avert short- and long-term detrimental effects of either. This study is capable of aiding informed decisions on educational policy development and implementation, as clear information on the on-line educational environment of Nigeria could be obtained from the study.

Acknowledgement

This study received no funding.

Declaration of Interest

Authors hereby declare that there is no any conflict of interest on this manuscript.

References

Adegoke, C.W., Oluwafisoye, P.A., Ajiboye, O.K., & Ajewole, T.O. (2010). Operational design parameters in multi-lamp module solar street light system. *Nigerian Journal of Solar Energy, 21, 1-8.*

Agbele, A.T., & Oyelade, E.A. (2020). Impact of COVID-19 on the Nigerian educational system: strengths and challenges of online/virtual education. *Asian Journal of Education and Social Studies, 13(1), 26-35, https://doi.org/10.9734/AJESS/2020/v13i130322.*

Aina, J.K. (2020). Mitigating the impact of COVID-19 on the teaching and learning of science in the Nigerian higher education. *International Journal of Innovation and Learning 4(6), 334-337*.

Ajewole, T.O., Olabode, O.E., Alawode, K.O., & Lawal, M.O. (2020). Small-scale electricity generation through thermal harvesting in rooftop photovoltaic picogrid using passively cooled heat conversion devices. *Environmental Quality Management, 29, 95-102, https://doi.org/10. 1002/tqem.21696.*

Anifowoshe, O., Aborode, A.T., Ayodele, T.I., Akinjo, R.I. & Ogunjemilua, O.D. (2020). Impact of COVID-19 on education in sub-Saharan Africa. *https://doi.org/10.2944/preprints202007.00 27.v1*.

Ayedun, T.G. (2020). Effect of Covid-19 on educational system in Nigeria. *https://www.research gate.net/publication/341549578*.

Cheok, M.L., Wong, S.L., Ayub, A.F. & Mahmud, R. (2017). Teachers' perceptions of e-learning in Malaysian secondary schools. *Malaysian Online Journal of Educational Technology, 5(2), 20-33, http://www.mojet.net//articles/pdf/v5i2//v05i02-02pdf.pdf.*

Ciroma, Z.I., Abubakar, H.A., Kaigama, A.A., & Ciroma, J. (2014). Education for globalization: challenges and prospects. *Journal of Educational and Social Research, 4(7), 144-147, https://doi.org/10.5901/jesr.2014.v4n7p144*.

Dorn, E., Hancock, B., Sarakatsannis, J. & Viruleg, E. (2020). COVID-19 and students' learning in the United States: the hurt could last a lifetime. McKinsey and Company.15th June 2020. *https://www.mckinsey.com/~/media/McKinsey/Industries/Public%20Sector/Our%20Insights/COVID-9%20and%20student%20learning%20in%20the%20United%20States%20The%20hurt%20could%20last%20a%20lifetime/COVID-19-and-student-learning-in-the-United-States-FINAL.pdf*.

Fauci, A.S., Lane, H.C. & Redfield, R.R. (2020). COVID-19 – navigating the uncharted. *New England Journal of Medicine, 382(13), 1268-1269, https://doi.org/10.1056/NEJMe2002387*.

Hanushek, E.A. & Woessmann, L. (2020). The economic impacts of learning losses. *http://www.oecd.org/educ ation/The-economic-impacts-of-coronavirus-covid-19-learnin g-losses.pdf.*

Hanushek, E.A. (2020). Preparing all students to succeed during COVID-19 pandemic. Washington Times. 25th June 2020. *https://www.washingtontimes.com/news/2020/jun/25/preparing-all-students-to-succeed-during-covid-1.*

Hwa S.P. (2018). Pedagogical change in mathematics learning: harnessing the power of digital game-based learning. *Educational Technology & Society, 21(4), 259-276, https://www.jstor.org/stable/26511553.*

Igbokwe, I.C., Okeke-James, N.J., Anyanwu, A. & Eli-Chukwu, N. (2020). Managing the challenges to the effective utilization of e-learning as a response in COVID-19 Nigeria. *International Studies in Educational Administration, 8(2), 28-34*.

Igbokwe, U.L., Ogbonna, C.S., Eseadi, C., Nwokenna, E.N., Nnadi, E.M., Ude, M.S. & Ukwuezhe, P.C. (2019). Viewpoint on re-aligning the Nigerian secondary school curriculum to prevent communicable diseases. *Journal of International Medical Research, 48(1), 2869-2875, https://doi.org/10.1177/0300060519854612*.

Ige, A.M. (2011). Myths and realities of falling standard of education in Nigeria: The way forward. *Nigerian Journal of Professional Teachers, 2, 36-48.*

Ige, A.M. (2013). Provision of secondary education in Nigeria: challenges and way forward. *Journal of African Studies and Development, 5(1), 1-9, https://doi.org/10.58 97/JASD11.058*.

Ike, P. (2017). Problems and prospects of secondary education in Nigeria. *International Journal of Education and Evaluation, 3 (1), 44-51*.

Johns Hopkins University Coronavirus Resource Center. (2020). COVID-19 data in motion: Friday 11 September 2020. *https://coronavirus.jhu.edu/data/state-timeline*.

Kazeem A., Jensen L. & Stokes C.S. (2010). School attendance in Nigeria: understanding the impact and intersection of gender, urban-rural residence and socioeconomic status. *Comprehensive Education Review, 54(2), 295-319, https:// doi.org/10.1086/652139*.

Lao K. (2020) Retrospect and prospect: Overview of 30 Years of education system reform in China. In: Fan G., Popkewitz T. (eds) Handbook of Education Policy Studies, 167-186, Springer, Singapore, *https://doi.org/10.1007/978-981-13-8347-2_8.*

Mehta, P., McAuley, D.F., Brown, F., Sanchez, E., Tattersall, R.S, & Manson, J.J. (2020). COVID-19: Consider Cytokine Storm Syndromes And Immunosuppression. *Elsevier Public Health Emergency Collection, 395(10229) 1033-1034, https://doi.org/10.1016/S0140-6736(20)30628-0.*

Motaghian, H., Hassanzadeh, A., & Moghadam, D. K. (2013). Factors affecting university instructors' adoption of web-based learning systems: case study of Iran. *Computers & Education, 61, 158-167.*

Ngogi, E.M. & Mahaye, E. (2020). The impact of COVID-19 pandemic on education: navigating forward the pedagogy of blended learning. University of Pretoria, South Africa, 5, 4-9.

Oluwafisoye, P.A., Adegoke, C.W., Ajiboye, O.K., & Ajewole T.O. (2010). Development of a 3.5 kW solar power-pack dedicated to laboratory (ultra violet) equipment at UNIOSUN. *Nigerian Journal of Solar Energy, 21, 9-14.*

Omoigui, M.O., Ajewole, T.O., & Ariyo F.K. (2011). Investigation of the transient behaviour of a grid-connected photovoltaic power generator. *Nigerian Society of Engineers Technical Transactions, 46(1), 97-107.*

Onyemelekwe, I.M. (2020). Re-opening Nigerian institutions after COVID-19: issues, challenges and strategies. *https://www.researchgate.net/publication/343513664.*

Pinto, S. & Jones, J.B. (2020). Economic impact of COVID-19: the long-term effects of educational disruptions. Federal Reserve Bank of Richmond. 22th May 2020. *https://www.richmondfed.org/-/media/richmondfedorg/research/economists/bios/pdfs/pinto-jones_covid19_paper.pdf.*

Tunmibi, S., Aregbesola, A., Adejobi, P. & Ibrahim O. (2015). Impact of e-learning and digitalization in primary and secondary schools. *Journal of Education and Practice, 6(17), 53-58.*

WHO (2020). Pneumonia of unknown cause – China: disease outbreak news, January 5, *https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/.opens in new tab*.