

Teaching and Learning during and post COVID-19 pandemic in Nigeria

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ABSTRACT

Coronavirus broke out in China in 2019 and has since spread across the world to become a pandemic that affected all the facets of the world economy, health, education and other social services. To curtail the spread of the disease various measures such as lockdown, closure of schools, international borders among others. While learning was taking place remotely in developed countries during the school closures, such was not the case in Nigeria. The need to ensure resilient education in Nigeria arises by adopting online teaching and learning to complement face-to-face teaching. This paper discussed two major online learning methods namely synchronous and asynchronous; the means of delivering online sessions such as webinar, web-based, live stream. It further examined the various online applications and electronic media used to facilitate learning, benefits, challenges and sustainability is. The paper recommends that ministries of education should imbibe new normal in teaching and learning and ensure sustainability by accessibility to all students, build capacity of teachers/lecturers and students, and provide relevant online infrastructure, provide means of affordability, among others.

Key words

Teaching and learning, pandemic, online learning, synchronous and asynchronous.

INTRODUCTION

History reveals that outbreaks of diseases had been affecting human beings at one time or the other before medical cure were found. Diseases such as cholera bubonic plague, smallpox, HIV and influenza were infectious and contagious diseases that spread across international boundaries (pandemic) that killed people in millions before cure and vaccines were discovered while some such as HIV have no permanent cure yet. Henderson (2009) posited that smallpox killed at least half a billion people in the last hundred years of its existence. According to UNAIDS (2020) globally, since the beginning of the HIV epidemic, around 75.7 million people has become infected and 32.7 million people have died from AIDS (acquired immunodeficiency syndrome) related illnesses while 38.0 million people are living with HIV. This indicates that no permanent cure for HIV has been discovered. The 1918 influenza pandemic was the most severe pandemic in recent history then spread between 1918 and 1919, affected an estimated 500 million people or one-third of the world's population became infected with this virus. The number of deaths was estimated to be at least 50 million worldwide (Centers for Disease Control and Prevention, 2009). Stellino (2020) stated that 3-5 million people and 20-50 million people died of Spanish flu in the first and second wave respectively. Cholera is another disease that affected the world which spread in across the globe in seven pandemics 1817, 1829, 1852, 1863, 1881, 1899 and 1961 respectively and killed millions of people across all continents (Claeso and Waldman, 2019). Zika, Ebola and Severe Acute Respiratory Syndrome (SARS) are other diseases in recent years that have their toll on human health and socio-economic activities but eventually faded out.

The most recent and trending public health disease that cuts across the world is Coronavirus COVID-19. The pandemic was first discovered in December 2019 in Wuhan, China and has since spread across the world, resulting in the on-going health and economic crisis. As of 30th January, 2020 COVID-19 was declared to be public Health emergency of international concern and recognized as a pandemic on 11 March, 2020 by World Health Organisation (WHO, 2020). As at May 03, 2020, Worldometer recorded a total of 3,562,426 confirmed cases of coronavirus and a death toll of 248,101 in 212 countries and Territories around the world. By February 13, 2021, the world has recorded increase in the incidence of the pandemic thus: 109, 061,773 Coronavirus cases, 2,403,138 deaths and 81,049,697 recoveries (Worldometer, 2021). According to the Nigeria Centre for Disease Control (NCDC) number of confirmed cases rose from one in February 27, 2020 when the first index case was reported to 131 confirmed cases with 2 deaths on 30th March, 2020 and by February 13, 2021, it rose to 145,664 confirmed cases, 120,339 discharged and 1,747 deaths (Africanews, 2021 February 13). Thus, the spread of the pandemic has effects on global and national health, economy and social life which have led to putting various measures such as lockdown, partial lockdown, closure of schools, remote working, teaching and learning. In view of these measures, the paper examined impact of COVID-19 on education, teaching methods adopted, the benefits and challenges of the teaching methods, sustainability issue in the teaching methods offered conclusion and recommendations.

Impact of COVID-19 pandemic on education

COVID-19 pandemic affects all facets of the economy including health and education across the world. African Union (2020) stated that because of the continent's openness to international trade and migration, it is not immune to the harmful effects of COVID-19, which are of two kinds: endogenous and exogenous. Accordingly, the exogenous effects come from direct trade links between affected partner continents such as Asia, Europe and the United States; tourism; the decline in remittances from African Diaspora; Foreign Direct Investment and Official Development Assistance; illicit financing flows and domestic financial market tightening, etc. It describes the endogenous effects as those that occur as a result of the rapid spread of the virus in many African countries. On one hand, they are linked to morbidity and mortality. On the other hand, they lead to a disruption of economic activities. This may cause a decrease in domestic demand in tax revenue due to the loss of oil and commodity prices coupled with an increase in public expenditure to safeguard human health and support economic activities. Nigeria as an African country is affected by the endogenous and exogenous impacts.

On education, the scale of the COVID-19 pandemic's impact on education systems and on children and young people's learning and wellbeing increased daily. This is a global crisis which is preventing children and adolescents in every country, including those affected by conflict and displacement, from fulfilling their right to quality, safe and inclusive education. With Sustainable Development Goal 4 (SDG4), the global community committed to realising the right to quality education for all children and adolescents by 2030. The COVID-19 crisis puts this promise into jeopardy more than ever before (Inter-agency Network for Education in Emergency). As of early April, 2020, most countries have introduced nation-wide early childhood care, school and university closures affecting nearly 91% of the world's student population – more than 1.5 billion students (UNESCO, 2020). This was an attempt to reduce the spread of COVID-19. In other words, at the outbreak of the COVID-19 pandemic in Nigeria, schools and all learning facilities were closed in order to safeguard the health and general wellbeing of children, youths, teachers, and educational personnel. By August 2020, COVID-19 curves began to flatten in most countries leading to removal of restrictions culminating into gradual return of normalcy in economy as well as education. However, the breakout of second wave led to increase in confirmed cases and deaths, a scenario that again led to closure of schools in many countries including Nigeria that could not resume in January as planned. Thus, as of 12 January, 2021, approximately 825 million students were affected due to school closures in response to the pandemic. According to the UNESCO Monitoring, 23 countries are currently implementing local closures, impacting about 47 percent of world's student population. 112 countries schools are currently open.

School closures impact not only on students, teachers and families but have far-reaching economic and societal consequences. Schools closure in response to the pandemic have shed light on various social and economic issues, including student debt, digital learning, food insecurity and homelessness as well as access childcare, health care, housing, internet and disability services. The impact was more severe for disadvantaged children and their families

causing interrupted learning, compromised nutrition, childcare problems and consequent economic cost to families who could not work (Bjork Lund and Salvanes, 2011). The effects of COVID-19 might also lead to conflict as a result of resource limitations and protracted exposure to stressful circumstances. In these circumstances,

In response to school closure, UNESCO recommended the use of distance learning programmes and open education applications and platforms that schools and teachers can use to reach students remotely and limit the disruption of education. Colleges have scrambled to find creative solutions to teaching students online, in person but socially distant or in a hybrid format (UNESCO, 2020). According to Federal Ministry of Education (2020) The Guidelines for Schools and Learning Facilities Reopening after COVID-19 Pandemic Closures outline key strategies for safe and equitable plans for school reopening and operation which include attendance, social distancing, hygiene, cleaning, and non-pharmaceutical interventions for safe and healthy school activities and programs. In this regards, the education response needs to be innovative while adhering to standards that support impactful programming. Accordingly, education sector specialists need to work with their existing skill sets for crisis-responsive programming but also need to develop new skills since we are all working under new conditions - specifically driven by social distancing parameters. In line with this, the Federal Ministry of Education is working to promote distance learning for schools based on the existing curricular by establishing ICT base in 16 focal states. Thus, the new knowledge and skills for teachers to teach in crisis-sensitive condition and ensure sustainable education delivery are discussed in the subsequent section.

Teaching methods (e-learning) approach

Conventional face-to-face method of teaching had been in vogue for long and later distance learning became another learning mode. Distance learning is the education students who may not always be physically present at a school receives. In the past, this involved correspondence between an individual and an academic institution by mail. At present, due to improvement and application of technology, distance learning involves learning through online tools and platforms. TopHat (2020) asserted that a distance learning program can take place entirely in online learning environments, or a combination of distance learning and traditional classroom instruction (called blended or hybrid). Massive open online courses (MOOCs), offering large-scale interactive participation and learning resources, are more recent developments in distance learning. During the COVID-19 pandemic and subsequent closures of schools, face-to-face teaching could not be used and as a result educators and institutions relied heavily on distance learning methods to complete education programmes and maintain sustainability of teaching and learning. Two most common types of online learning (distance learning) are synchronous and asynchronous (Hrastinski, 2008; Er and Arifoglu, 2009; Simonson, Smaldino, Albright and Zvacek, 2012 in Higley, 2013).

Synchronous learning

Kokoulina (2020) define synchronous learning as any learning activity in which all learners are simultaneously participating. It can happen either online or offline; in both cases, it is highly time-related, highly interactive, and very social. Traditional synchronous learning typically has learners gathering, participating, and getting hands-on experience in a face-to-face setting with an instructor. Two of the most common synchronous formats are: live classroom sessions and on-the-job coaching. The main difference between online and traditional learning is the setting. With synchronous online learning, instructors (teachers/lecturers) and students are in different locations and meet in the virtual environment with the help of computers, mobile devices, and specific software tools. Online sessions can be hosted as a webinar, a web-based class, or a live stream. It has a less flexible learning plan because the classes are conducted on a set schedule using videoconferencing or live online webinars.

Fixed-time online courses: These are the most common type of distance education. Students sign into their online educational portal to access distance learning resources, including live class video streams. Using this method, students and instructors make use of live chats and discussion boards for communication.

Video conferencing: This takes advantage of tools and platforms, like Zoom, that have expansive capabilities and can be used globally. Video conferencing provides learning opportunities for students by allowing them to see their instructors and peers in real time, creating a sense of community in the virtual classroom.

Web-based classes: This format is almost the same as the classroom training, with the exception that the participants are not physically present in the same room. Still, remote teachers and students can freely interact with each other by asking and answering questions, sharing learning materials and demonstrating how to do various tasks.

Webinars: In a typical webinar, only an instructor (teacher/lecturer) has the right to speak; learners use text chat to send their questions and give feedback. Therefore, it is often more of a talking-head lecture in which screencasts, slides, polls, and chat feedback might be included.

Live streams: This is the most informal approach of this list, since learning occurs outside of class time and enters the arena where people communicate and have fun – social media. For instance, think of Facebook Live, Instagram Stories, YouTube Live streaming, or Twitch. With the support of these services, students can watch experts doing their job in real-time. Apart from watching, students can also comment, like, or even donate some money.

Asynchronous learning

Mayadas (1997) referred to asynchronous learning as a general term used to describe forms of education, instruction, and learning that do not occur in the same place or at the same time.

This combined network of learners and the electronic network in which they communicate are referred to as an *asynchronous learning* network. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people..

According to Bourne (1998) Online learning resources that can be used to support asynchronous learning include email, electronic mailing lists, online discussion boards, blogs, threaded conferencing systems and wikis. Course management systems have been developed to support online interaction, allowing users to organize discussions, post and reply to messages, and upload and access multimedia. Bourne (1998) stated that asynchronous forms of communication are sometimes supplemented with synchronous components, including text and video chat, videoconferencing, telephone conversations and even meetings in virtual spaces such as Second Life, where discussions can be facilitated among groups of students. Asynchronous learning allows the students to work at their own pace, and normally has a very distinct syllabus, with weekly deadlines for homework and other assignments. Students have regular access to their peers and their instructors, although this is typically managed through email and discussion boards.

- **Open schedule online courses:** These give students the greatest amount of freedom. All deadlines are pre-set and students are encouraged to be self-sufficient and complete their assignments on their own timelines. Without dedicated class time, students complete their coursework whenever they choose to allot the time to do so. Final exams normally occur at the end of the semester, and are open for several days to provide students with some flexibility as to when they choose to take it.
- **Hybrid distance education:** This combines synchronous and asynchronous methods of online learning. Students must adhere to specific predetermined deadlines for assignment completion. The majority of the coursework is completed online, but in some cases, the student can physically speak with an instructor (teacher/lecturer) in person through live chats or video conferencing. Hybrid distance education may also include attending a physical classroom for certain periods of time. Conversely, it may involve covering specific modules and then returning to distance learning to complete additional modules and assignments.

(1) **Online teaching and learning (Teaching through internet services) tools.** Online learning is an educational medium that allows students to participate in online courses via internet. They do not need to visit lecture halls or class rooms, and they can choose to learn whatever they want from the comfort of their own houses. The following applications can be used for online teaching and learning (Synchronous Asynchronous learning) via the internet services:

- (a) **Zoom:** With this feature, teachers can easily conduct online classes hassle-free. It is equipped with features like screen sharing, whiteboard for presenters, video recording and more, which makes it an ideal companion to your offline learning online. Teachers can set up a class room across the batches with just a click and student can view the recorded lectures.

- (b) **WhatsApp:** The use of WhatsApp for educational purpose is to facilitate communication and at its basic level, education is nothing but communication. WhatsApp can provide a channel through which teachers can achieve faster and more seamless communication with their students. It can also increase level of communication between students and create another venue for learning. Education strategies for WhatsApp: use the group chat feature to create learning and study groups, create audio lessons that can be sent directly to students, send videos to students and teacher stays in contact with parents. It is very cost effective
- (c) **Telegram:** Telegram is a free-ware, cross-platform, cloud-based instant messaging software and application service. The service also provides end-to-end encrypted video calling, file sharing and several other features. Teachers can use the Telegram program to serve his/her teaching materials to his/her students.
- (d) **Virtual education:** It refers to instructions in a learning environment where teachers and students are separated by time or space or both, and the teacher provides course content through course management applications, multimedia resources, the internet, video conferencing etc. students receive the content and communicate with the teacher via the same technologies.
- (e) **Skype:** Skype is a free web-based communication tool which allows people to video conference, make calls and instant messaging. Skype provides a variety of educational opportunities for classrooms. Students can connect with other students, increase their knowledge and interact with other cultures. It can be used to share projects, polish their language skills, exchange information about particular books with students who read the same books. Skype provides students and teachers with opportunity to participate in virtual tours of historical places, communicate with authors and researchers and engage in conversations with classrooms around the world.

Angelo State University (2021) states that Skype is very useful when verbal interaction is required between student and instructor. Activities for Skype include hosting virtual office hours and one-on-one tutoring. Students can Skype with each other sharing their experiences and collaborate in project work. Instructors can instant message to colleagues and students.

YouTube: It is a video-sharing website that provides good quality education that has been developed a lot during the past years.

By using it, a student from one country can have access to education from another country. Learning on YouTube has gained tremendous importance. If a student is not able to understand a concept, he has the option to watch it again. There are no requirements for any classroom, benches or other school materials to learn anything. Only a robust and reliable internet connection and a smartphone are needed.

- (2) **Electronic media (E-media):** Any equipment used in the electronic communication process (e.g. television, radio mobile phone) may also be considered electronic media. They are media that use electronic or electromechanical audiences to access the content.

- (a) **Television:** To support formal education, television normally functions as a supportive and reinforcement tool. Learning television is the use of television programs in the field of distance education. It may be in form of individual television programs or dedicated specialty channel that is often associated with cable television in the United States as public education and government access (PEG) channel providers.
- (b) **Radio:** A radio-based approach to learning during Covid-19 may be the best way to reach students during the pandemic and perhaps beyond. With an estimated 90 percent of all students unable to attend school in person because of the Covid-19 pandemic, many countries are using distance learning methodology to reach all their students. Interactive audio instructions (IAI), a technology pioneered by EDC, is one of such method. In remote communities around the world, IAI has been used to deliver high-quality education to students. In an IAI classroom, children interact with each other and with their “audio” teacher during each broadcast. Pauses are also built into the recordings so children can have time to answer questions and perform tasks. This stands in contrast to classic radio education where students are expected to simply sit and listen to lectures.
- (c) **Mobile phone:** One of the original distance learning media still in widespread use. Mobile short messaging services (SMS) along with live telecast can be used to create almost an ideal classroom situation. Mobile phone increases access for those who are mobile or cannot physically attend learning institutions. The portability of mobile technology means that mobile learning is not bound by fixed class times, it enables learning at all times and all places during pandemic, breaks, before or after, at home or on the go. Even on transit, one can utilize the time spent to learn (Christine 2002).

Benefits of online (internet) teaching and learning methods

- (1) Classes can be taken from any place and at the time which students or tutors prefer.
- (2) It ensures quick delivery of lessons. Traditional classroom involves some or the kind of delay whereas, e-learning provides expeditious and exclusive delivery of lessons.
- (3) It promotes active and independent learning.
- (4) E-learning is based upon convenience and flexibility. All the resources for the students as well as teachers are available in one place.
- (5) Global level education: Tutors (Teachers/Lecturers) can provide online education in multiple languages and people from different time zones.
- (6) All students can receive the same type of syllables, study material and train through E-learning.
- (7) Online learning saves time as a student does not need to travel to the training venue. A student can learn at the comfort of your own place.
- (8) A better feedback flop. The facilitator can share feedback on how students are doing in real-time. This allows them to correct mistakes right on the spot and get positive reinforcement of the desired behaviour, performance, or using a ne new skill.

- (9) Synchronous provides better chances to build a community. Synchronous learning assists students avoid the feeling of isolation that may occur in Asynchronous activities
- (10) Synchronous learning provides learning from anywhere or location. Students and teachers can meet in a single virtual environment regardless of where they are and all that they need is a computer or a mobile device with internet access.

Challenges OF online (internet) teaching and learning methods

Online teaching and learning methods have a number of challenges that need be overcoe. These include but not limited to the followings:

- (1) Some students without reliable internet access and technology struggle to participate in digital or online learning (Oreopoulos et al 2006).
- (2) Prone to sense of isolation. Students can learn a lot from being in the company of their peers. However, in an online class, there are minimal physical interaction between students and teachers.
- (3) Online learning requires teachers to have a basic understanding of using digital forms of learning. However, this is not the case always. Very often, teachers have a basic understanding of technology. Sometimes, they do not even have the necessary resources and tools to conduct online classes.
- (4) Asynchronous learning environments pose several challenges for instructors, institutions, and students. Course development and initial setup can be costly. Institutions must provide a computer network infrastructure, including servers, audio/visual equipment, software, and the technical support needed to develop and maintain asynchronous learning environments. Technical support includes initial training and setup, user management, data storage and recovery, as well as hardware repairs and updates (Palmer, Holt and Bray, 2008).
- (5) Synchronous is time-consuming. It requires being online or in class at a certain time which depends on the availability of the internet and electricity that are epileptic in nature. The highly interactive nature of live classes requires spending more time on self-preparation.
- (6) Synchronous learning requires accurate scheduling. Where scheduling is overlooked, there will be a risk that just a few students present which tends to limit participation.
- (7) Synchronous learning is often more expensive than asynchronous learning. The more time a person spends on conducting a course, the more expense is incurred.

Sustainability issues in online teaching and learning

Sustainability refers to the ability to be maintained at a certain rate or level. Thus, within this context, sustainability is the ability of Nigeria education system to maintain and improve the online teaching approaches when they are fully put in place at all levels of education even when the current COVID-19 pandemic vanishes. An e-learning initiative is considered sustainable when all three of these conditions are met:

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- i. A learning design involving information and communications technology has been developed and implemented within a course or sources of study. It has been through a proof of concept stage and has been judged, on the basis of evidence produced, to be beneficial to teaching and learning.
- ii. The e-learning concept, design, system or resources have proven potential to be adopted and possibly adopted for use beyond the original development environment.
- iii. Maintenance, use and further development of the e-learning concept, design, system or resources do not remain dependent on one or few individuals who created them, to the extent that if their involvement ceased, future respect would not be compromised.

While other definitions are acknowledged, this one reflects a common scenario that challenges the aim to disseminate effective e-learning practice beyond the development context. Many institutions and nationally founded projects fall into this category, along with valuable early adopters (Taylor 1998). The overall aim of sustainable development is to transform teaching, learning and higher education organizations in the way described by Nicol and Draper (2009). Nigeria does not fall into the category of early adopters of online teaching and learning otherwise during school closures and lockdown teaching and learning would be taking place remotely and academic loss time would not arise, similarly, education sector workers and planners would be working at home remotely and delivering on service. Now that Nigeria is adopting online to deliver education in most universities and blended approach in other levels of education, the sustainability will depend on the following issues in line with the three conditions I the foregoing:

Affordability Issue: to participate in synchronous and asynchronous learning environments, students must have access to computers, Android or smart phone and access to internet. Although personal computers and web access are becoming more and more prevalent every day, this requirement can be a barrier to entry for many students yet many students cannot afford it. Where they have computers or tablets of phone, subscription to data for internet services may become a problem due to poverty.

Capacity issue: Students must also have the computer/technology skills required to participate in the online learning programme. Similarly, teachers/lecturers /instructors need to develop learning materials using relevant tools but how many have had their capacity built and prepared to continue using such skills? To what extent are lecturers/teachers capacity enhanced to deliver online lectures/lessons and how effective is this? To what extent are Ministries of Education, State Universal Basic Education Boards, Teaching Service Boards of/Commissions, the regulatory agencies (National Universities Commission, National Board for Technical Education and National Commission for Colleges of Education) and Tertiary Education Trust Fund prepare to encourage, fund and support teachers'/lecturers' capacity on online teaching?

Accessibility issue: Accessibility of students in rural areas to internet and media is difficult and will continue to get excluded from participation in online learning. g. Specifically, one of the fundamental issues is how the education sector will to promote distance learning solutions that will also cater for those in marginalised communities, financially

challenged households, physically or mentally challenged and out-of-school children. Thus, the extent to which no one is left behind in the learning process is germane.

Infrastructure issues: The extent to which Federal and states provide and maintain online platforms, support infrastructures and relevant software, technical support. Stable source of power is very significant in online learning both at the source of delivery and the receiving end. How prepared are the states and institutions in providing the enabling infrastructure?

Policy issue: Most programmes/projects are abandoned when solutions to challenges or government changes hand whereas good practice requires sustainability and improvement. Pandemic or crisis is bound to occur unnoticed anytime hence the need for resilience of the education. The questions therefore are: Will education policy review integrate online teaching in in the schools? Will the education ministries and institutions monitor policy implementation?

Conclusion

There is no doubt that the outbreak of COVID-19 has had its impact on school calendar disruption, reduction in economic development of the country which has affected the education finance as well. The pandemic lockdown has led to shortage of funds for the educational system, parents as well are being faced with the reality of having to pay extra cost on their children academic whenever they resume to school. It was envisaged that the pandemic could lead to increase in number of out-of-school children but the Federal Ministry of Education reported reduction in the number from 10.5 million to 6.95 million. Teaching and learning were taking place in more developed countries during lockdown and school closure because of use of deployment and use of functional learning management system via online. For Nigeria education system to be functional during and after the COVID-19 pandemic, governments and stakeholders need to adopt online learning just as the universities are currently doing. The use of synchronous and asynchronous learning has been found useful and should be adopted by all levels of education. During normalcy period, blended learning could be taking place wherein the face-to-face teaching is supplemented with synchronous and asynchronous learning. However, in the course of implementing online teaching and learning mode, sustainability issues such as capacity building of teachers/lecturers, students and support staff need be built, affordability of online learning on the part of governments, instructions and students/parents, accessibility by students across the country including rural areas, difficult terrain, special needs children and out-of-school children, infrastructure support and policy.

Recommendations

Since COVID-19 still remains with us and has no permanent cure yet, observing the new normal becomes imperative. Besides, the county's education should be sustainable and functional in case of future pandemic or emergencies. In the light of these, the following recommendations are made:

It has been observed that there are no proper plans in place to curb the influence of corona virus on the education system, it is highly recommended for the government and Concerned education personnel should ensure there are futuristic plans in case of another similar experience. This is Covid-19, nobody knows what other occurrences will happen in the future and will lead to interruption of the activities of the educational system in Nigeria, therefore plans are to be made in ensuring the future of the education system is secured and not being interrupted with emergence of diseases.

There is need for the Ministries of Education to imbibe the new normal in teaching and learning by deploying online learning/learning management system in order to make education functional always and as well compete with the outside world even in the period of global pandemic lockdown. In this regard, ICT experts should be engaged to design synchronous and asynchronous online teaching activities through social media platforms such as Google classroom which is a free web service that is developed by Google for schools that aims to simply creating, distributing and grading assignment in a paperless way with the purpose of streamlining the process of sharing files between lecturers and students. Other platforms like WhatsApp, Zoom, Blog etc are recommended for learning.

Promoting and adopting online teaching and learning mode requires building of capacity of teachers/lecturers in relevant learning management system by Ministries of Education and relevant agencies as well as institutions of learning.

Government should provide relevant infrastructure to support online learning as well as technical skills. Similarly, provision of staple electricity and solar energy is desirable for functional online learning platforms.

Accessibility is germane in online learning. Strategies need to be put in place to reach those in difficult terrain and rural areas as well as the out-of-school children including special needs. In the same token, provision of taps to students to aid learning including means of connecting to internet services are necessary for successful digital learning. This approach will ensure no learner is left behind.

References

- Africanews (2021, February 13). *Coronavirus – Nigeria COVID-19 update*.
<https://www.africanews.com/2021/02/14/coronavirus-nigeria-covid-19-update-13-february-2021>
- African Union (2020). *Impact of the Coronavirus (COVID-19) on the African Economy*.
https://au.int/sites/default/files/documents/38326-doc-covid-19_impact_on_african_economy.pdf

- Angelo State University (2021). Interaction and Collaboration.
<https://www.angelo.edu/live/profiles/8256-interaction-collaboration>
- Bjorklund, A and Salvanes, K. (2011).” Education and Family Background: Mechanisms and Policies”, in Hanushek, E; Machin, S. and Woessmann, L. (eds), *Handbook of the Economics of Education*, Vol. 3
- Bourne, J. R. (1998), "Net-learning: strategies for on-campus and off-campus network-enabled learning", *Journal of Asynchronous Learning Networks*, 2 (2).
- Centers for Disease Control and Prevention (2009). *1918 pandemic (H1N1 virus)*.
<http://www.cdc.gov//flu/pandemic-resources/1918-pandemic-h1n1.html>
- Claeso, M. and Waldman, R. (2019). Cholera – The Seventh Pandemic in the 21st Century. Britannica. <https://www.britannica.com/science/cholera/The-seventh-pandemic-in-the-21st-century>
- Federal Ministry of Education (2020, July 13). *Guidelines for schools and learning facilities, reopening after Covid-19 Pandemic closures*. Abuja: Federal Ministry of Education.
- Henderson, D. A. (2009). *Smallpox: The Death of a Disease – The Inside story of Eradicating a Worldwide Killer*. Prometheus Books.
- Higley, M. (2013). Benefits of Synchronous and Asynchronous e-Learning.
<https://elearningindustry.com/benefits-of-synchronous-and-asynchronous-e-learning>
- Inter-agency Network for Education in Emergencies (INEE). (2020). Technical Note: Education during the COVID-19 Pandemic. New York, NY.
<https://inee.org/resources/technical-note-education-during-covid-19-pandemic>
- Kokoulina, O. (2020). *Synchronous Learning Simply Put: Definition, Benefits, and Tools*.
<https://www.ispringsolutions.com/blog/what-is-synchronous-learning>
- Mayadas, F (1997), "Asynchronous learning networks: a Sloan Foundation perspective", *Journal of Asynchronous Learning Networks*,
- Nicol, D. and Drapers, S. (2009). A blueprint for transformational organisational change in higher education: REAP as a case study.
<https://www.psy.gla.ac.uk/~steve/rap/docs/NicolDraperTransf4.pdf>
- Nigeria Centre for Disease Control (2020, March 3). *Outbreak of Covid-19 case in Nigeria: Situation report*,
<https://m.facebook.com/NCDCgov/photos/a.1045178838878472/3029182443811425>

- Oreopoulos, P; Page, M. E. and Stevens, A.H. (2006). The Intergenerational Effects of Compulsory Schooling. <https://oreopoulos.faculty.economics.utoronto.ca/wp-content/uploads/2014/03/The-Intergenerational-Effects-of-Compulsory-Schooling.pdf>
- Palmer, S; Holt, D; and Bray, S (2008), "Does the discussion help? the impact of a formally assessed online discussion on final student results", *British Journal of Educational Technology*, **39** (5): 847–58, <https://dio.org/10.1111/j.1467-8535.2007.00780.x>
- Stellino, M. (2020, April 25). *Fact Check: Was second wave of Spanish flu worse? Did it kill at least 20 million people? USA Today*.
<https://www.usatoday.com/story/news/factcheck/2020/04/25/fact-check-total-deaths-eas-spanish-flu-wave-unknown/3024648001>
- Taylor, P. (1998). Institutional Change in uncertain times: Lone ranging is not enough in studies in Higher Education. *Studies in higher Education*, 23(3) 269-279711
<https://doi.org/10.1080/03075079812331380246>
- TopHat (2020). *What is Distance? The Benefits of Students Studying Remotely*.
<https://tophat.com.blog/distance-learning>
- Worldometer (2020, May 3). *Coronavirus Pandemic Cases*.
<https://www.worldometers.info/coronavirus>
- Worldometer (2021, February 13). *Coronavirus Pandemic Cases*.
<https://www.worldometers.info/coronavirus>
- World Health Organisation (2020, March, 11). *Virtual press conference on COVID-19. Who-audio-press-conference-full-and-final-11mar2020.pdf*
- UNAIDS (2020, July). *Global HIV/AIDS statistics fact sheet*.
<https://www.unaids.org/en/resources/fact-sheet>
- UNESCO (2020, March, 24). *Covid-19 Educational Disruption and Response*.
<https://en.unesco.org/news/covid-19-educational-disruption-and-response>
- UNESCO (2020). *Distance learning solutions*.
<https://en.unesco.org/covid19/educationresponse/solutions>
- UNICEF Nigeria (2020): Nigeria Education Emergencies Working Group. Nigeria Education Sector Covid-19 response strategy in North East.