

Applying Technology Innovation to Education to Bridge the Knowledge Gap Occasioned by Covid-19 Pandemic Lockdown in Nigeria

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Abstract: This paper considered applying technology innovation to education to bridge the knowledge gap occasioned by COVID-19 pandemic lockdown in Nigeria. The paper qualitatively discussed challenges that technology innovations have had during the pandemic hence the design adopted for this study is descriptive research. Since the outbreak of the novel coronavirus, its pandemic status and the consequent introduction of lockdown measure to forestall its further spread, several societal sectors have been negatively affected especially the education sector. With regards to how the COVID-19 pandemic lockdown negatively affected the education sector, it is glaring that students and pupils stopped learning; students and pupils were missing the camaraderie; schools lost a whole period of two terms/semesters; intellectual or academic activities which include trade fairs, workshops, seminars, symposia and academic conferences were halted; school proprietors could not pay salaries to their staff because schools were shut-down due to the coronavirus pandemic lockdown measure. The position of this paper is that these adverse effects of COVID-19 on education could be averted if digital education system is being implemented. The study concludes that digital education has the capability of carrying on learning irrespective of distance. In other words, e-learning, online learning, virtual learning, virtual conference, etc. can hold during the pandemic lockdown. To this end, it was recommended among other things that budgetary allocation to the educational sector should not be below 26 percent of the Country's annual budget; devices for digital education should be provided by education sponsors; computer education should be made compulsory at all levels of education in Nigeria.

Key words: Technology Innovation, knowledge gap, COVID-19, pandemic, lockdown.

I. INTRODUCTION

The unprecedented spread of the novel coronavirus was alarming. Besides, the fact that there was hitherto no known cure or vaccine worsened the issue. This condition indeed left the whole world in a state of perplexity. Under this critical situation, the only option to forestall further spread and its attendant death of human beings was to impose lockdown. Moreso, the Peoples Republic of China where the coronavirus originated imposed lockdown in their country and it worked for them. Consequently, Nigerian Government adopted the idea and enforced lockdown on several sectors including the education sector. Lockdown ordinarily mean restriction of human and vehicular movement usually imposed

on a people by the authority for a certain purpose. According to Hornby (2000), lockdown is an official order to control the movement of people or vehicles because of a dangerous situation. Invariably, lockdown entails closure of schools as well as some other societal institutions or systems.

The closure of schools due to the COVID-19 pandemic no doubt, had negative effects on the pupils/students, the teachers especially those in privately owned schools, the schools, the parents as well as the country at large. Invariably, one of the effects of the COVID-19 pandemic is knowledge gap. Considering the fact that 20th and 21st centuries are associated with computer development or more appropriately Information and Communication Technology (ICT), it behoves education providers to bring the ICT to bear in education. Based on the above premise, this paper explores the effect of covid-19 pandemic lockdown, web-based learning (e-learning, online learning or tutoring), pupils/students technology savvy, state of e-learning facilities in Nigeria, and the necessity of applying the new technology (digital or ICT) to education to bridge the gap occasioned by the COVID-19 pandemic lockdown in Nigeria.

II. EFFECTS OF COVID-19 PANDEMIC ON EDUCATION

In the first place, schools were closed abruptly. The sudden order by the government that schools should be closed down did not allow for proper closing procedures. For example, the Governor of Rivers State, Chief Nyesom Wike pioneered the closure of schools in Nigeria. He ordered the closure of schools in Rivers State before other state governors followed. Giving credence to the above assertion, the national Secretary of the Coalition of United Political Parties (CUPP) Mr. Ikenga Imo Chinyere viewed thus

... we wish to direct our governor to immediately shut down their land/sea borders to stop interstate movement, close down their airspace working for the Federal Government especially FAAN and stop all public gatherings, burials, close down motor parks, cinemas etc. and impose a 14 days stay at home during which those already with the virus will manifest and be isolated and treated thereby wiping the virus (Odiakose, 2020, p.19).

The bottom line in the abrupt closure of schools was that some schools started to conduct second term examinations but could not conclude. Some schools conducted examination on only core subjects while some schools did not conduct examinations at all.

It is also important to note that the academic calendar has been affected. The COVID-19 pandemic has altered the academic calendar so much that rather than a new academic session that ought to commence on September, third term is commencing in October in some States and especially the unity schools. At the tertiary education level, students had lost almost a whole semester taking into cognizance that schools were shut down from March to October, 2020.

The lock down imposed, no doubt, has made pupils and students to experience learning hiatus. Staying out of classroom for a period of about six months is quite a tremendous loss. In fact, both pupils and students were missing the camaraderie.

More so, renowned examination bodies such as the Joint Admissions and Matriculation Board (JAMB), the National Examinations Council (NECO), the West African Examinations Council (WAEC), and the National Business Technical Examinations Board (NABTEB) postponed their examination dates or schedules during the COVID-19 pandemic lock down. In line with the assertion above, the Registrar of JAMB, Prof. Ishaq Oloyode as reported in News National (2020:30) informed thus “all candidates and members of the general public should hereby note that the Board has temporarily suspended all its activities that will be requiring physical contacts in all its offices around the country”. Similarly, NECO postponed the 2020 National Common Entrance Examination (NCCE) usually conducted for admission into the 104 unity schools in Nigeria. The examination earlier scheduled for Saturday, March 28, 2020 nationwide was at that period postponed indefinitely due to COVID-19 pandemic.

Giving credence to the above, Otokpa (2020) reported an official statement of NECO’s Head of Information and Public Relations Division, Azeez Sani thus:

The National Examinations Council (NECO) wishes to inform all candidates, guardians and relevant stakeholders of their indefinite postponement of the 2020 National Common Entrance Examination (NCCE) into Federal Unity Colleges earlier scheduled to hold on Saturday March 28, 2020. This decision is in deference to the various measures being put in place by federal and state governments to curtail the potential spread of COVID-19 (P.31).

On account of the same COVID-19 pandemic, NABTEB also postponed the May/June 2020 ordinary level certificate examinations mainly for in-school candidates. The 4th May, 2020 earlier scheduled could not hold (Osauzo, 2020).

Furthermore, several intellectual exercises that usually take place in tertiary institutions were halted. It is factual that tertiary institutions organize and carryout trade fairs, workshops, seminars, symposia and conferences. It is in such activities that exchange of ideas take place. It is where scholars present their researches, show case their talents and inventions or findings for public assessment or scrutiny. In such conferences, especially during plenary sessions, questions are asked, criticisms are made about researches, findings or inventions. At the end the researcher goes back home to effect corrections, conduct further research to improve his work for the service of humanity. Unfortunately, these whole lot of activities did not hold during the pandemic lock down. This is exemplified in such views as follows:

Nigerian cities are in lockdown, activities are at the lowest ebb. Most Government offices are not operational. These are all in the bid to reduce the spread of coronavirus currently ravaging the world ... Even schools both private and government owned are closed. (Jumbo, 2020, p.27)

In line with the excerpt above, teachers in private schools were not receiving salaries during the COVID-19 pandemic lockdown. This is because the source of revenue which is school fees was closed. Parents cannot pay school fees while their wards were at home. Consequent upon that, private school owners (Proprietors/Proprietresses) and even missions could not pay salaries to their workers whereas their counterparts in Government (public) schools were receiving salaries during the pandemic. This discrepancy in salary payment amounts to low motivation among staff of private schools and it has implications for education (the teachers’ efficiency and effectiveness).

III. WEB –BASED LEARNING (ONLINE OR E-LEARNING) AS WELL AS RADIO AND TELEVISION EDUCATION PROGRAMMES

E-learning

The letter ‘E’ in e-learning refers to ‘Electronic’ hence the term e-learning means electronic learning. E-learning is teaching and learning that is delivered, supported, and enhanced via the use of digital technologies and media (Vikoo, 2013, p.489). It is a system of learning where electronic media is used, typically over the internet. In other words, e-learning could be referred to as a learning process which utilizes electronic teaching technologies to access and deliver educational information based on a given curriculum. E-learning is mainly computer network enabled transfer of skills and knowledge which can be operated in a classroom, seminar, conference as well as distance learning programme. In an educational setting, e-learning is used for facilitation, instruction, course delivery and interaction. E-learning applications and processes comprise web-based learning, computer-based learning, virtual learning and digital collaboration (Onyido, 2016, p.145). The content of e-learning is delivered through the internet, intranet/extranet, audio and

video tapes, satellite television and compact disk read only memory (CD-ROM). It can either be self-paced or instructor-led and encompasses media in the way of text, streaming video and audio, animations as well as images (Vikoo, 2013; Onyido, 2016; Hornby, 2000).

Naturally, e-learning is more appropriate for distance learning. However, it can be used together with face-to-face teaching hence referred to as Blended Learning. Apart from the above, screen casting emerges as another trend in e-learning. The Web-based screen casting tools allow to create screen casts directly from their browser and make the video available online for viewers to view them directly. The one-on-one feature of the classroom shown via the combination of video and audio makes the expert to deliver clear and complete instructions. A big advantage of this screen casting over the conventional classroom is that from the learner's point of view, this technology provides the ability to pause and rewind as well as to move at his own pace. This is quite spectacular (Gee, 2003).

E-learning is both a liberal system of education and student-centered. Considering that e-learning is a programme available anytime and anywhere, it creates room for interested students to be acquiring education along with engaging in other activities (Ayorinde, 2014). Based on the foregoing concerning the importance of e-learning, it is therefore not surprising that the pioneer of e-learning, Bernard Luskin, cited in Hedge and Hayward (2004), posits that the "E" in E-learning must be understood to have broad meaning if e-learning is to be effective. For Bernard Luskin, the "e" should be interpreted to mean exciting, energetic, enthusiastic, emotional, extended, excellent and educational in addition to "electronic". Vikoo (2013:490) views that "e-learning can also refer to educational websites such as those offering learning scenarios, worksheets and interactive exercises for children".

Online Tutoring

The world is wide and the inhabitants are in different locations. It is not easy to travel from various locations to converge in the traditional classroom at a time of study. Even when people plan to meet in the traditional classroom, inconveniences abound such as traffic hold up, police checkpoints and others. It is against this backdrop that scientists started to think and work towards inventing an alternative classroom of which online tutoring is one. Online tutoring is referred to the process of tutoring in an online, virtual environment or networked environment in which teachers and learners are separated by time and space (Vikoo, 2013, p.494-495).

Application of online environment in education entail the used of virtual learning environments such as Moodle, Sakai, WebCT, Blackboard. In online tutoring, the learner or parents of the learner are in most cases expected to pay for tutoring time before the delivery of service unless it is sponsored by the educational institution. The reason being that online

tutoring is either provided directly through the virtual learning environment of a tutoring service or via a link in a learning management system.

Forms of online Tutoring

- i. Many-to-one tutoring: This occurs when a single tutor gives instruction to a group of learners who simultaneously logged in. It is sometimes known as e-moderation.
- ii. One-on-one Tutoring: This involves one learner and a tutor at a time. It is a situation where individual learner purchase tutoring time with a private vendor of online tutoring service. This type of tutoring time can be purchased automatically at the instance of enrollment in a particular school or school system; such time could also be made available through the purchase of an access to a library and even textbook publisher (Benson, 2001)
- iii. Peer Tutoring: This happens when fellow students in certain area of specialization or subject engage in tutoring each other. Peer tutoring is also done as online tutoring over an online conferencing interface (Vikoo, 2013)

Formats of online Tutoring

1. Synchronous online Tutoring: As the name implies, it is a situation whereby both the tutor and the learner or group of learners are online simultaneously and interface. There is the necessity of implementing browser-based software and may or may not require the learner to download proprietary software. Communication is either by video or telephone during the use of some online tutoring services
2. Asynchronous Online Tutoring: This is the opposite of synchronous online tutoring. The learner and the tutor need not necessarily be online at the same time nor share interface. It follows a format in which the learner submits a question and the tutor responds at a later time.

IV. SYSTEMS OR MODELS ADOPTED BY SOME SCHOOLS DURING THE COVID-19 PANDEMIC LOCKDOWN

1. School On Radio Programme: Some State Governments had committed some huge resources in the education of her citizens during the lockdown. This was largely to ensure that children in the 21st century catch up with the trends in the globalized world. It is considered that the underlying requirements for success in the contemporary world is to acquire knowledge, skills, talents, passion and ability to think outside the box. Against the above backdrop, the government of Akwa Ibom State engaged her pupils and students in academics during the COVID-19 pandemic lockdown. In line with the above assertion, the state

Governor, Udom Emmanuel as was reported by Samuel (2020) stated that
 we have not relented in ensuring that our children are kept busy even with the COVID-19 pandemic through our hugely popular “School on Radio” programme on AKBC. We have endeavoured to provide a conducive learning environment complete with tools that will enhance, deepen and expand the frontiers of knowledge. We are also maintaining rigorous training of teachers to bring them up to speed with modern approaches to teaching (p.9)

Similarly, during the pandemic the Lagos State Government launched Excellence in child Education and learning (EkoExcel). The EkoExcel training was organized by the Lagos State Government, to build teachers’ capacity and leverage on technology for the improvement of teaching and learning (Ogundare, 2020). Also, the Lagos State Government sponsored some Media Houses for school lessons that helped to reach thousands of pupils who would have been left in the lurch during the COVID-19 Pandemic Lockdown. The Media Houses include Television Continental (TVC), Lagos Television (LTV8), Wazobia Television and Wazobia FM. It is however noteworthy that some of the media houses provided their services free. The Lagos State Education Commissioner, Mrs. Folasade Adefisayo as was reported by Belo-Osagie (2020) stated thus

When it was clear that we had to lockdown schools, discussions commenced with various stakeholders within the educational sector in the State. The private schools talked about setting up online learning system for their students. However, with an understanding of our demographic in the public sector and the challenge faced by most students in having online learning, we began to explore alternative channels to help the students learn seamlessly (P.15)

Apart from the above states discussed, Edo State Universal Basic Education Board (SUBEB) also launched EdoBEST@Home Programme. The remote learning programme encompasses virtual classroom experiences, learning guides, self-study activity packs, digital story books, audio lessons and mobile friendly quizzes where testing what the children are learning can be done by parents and caregivers. The SUBEB chairman, Dr. Joan Osa Oviawe as reported by Education (2020) stated that

the board intends to continue using the e-learning initiative introduced to keep pupils engaged at home during the pandemic to bridge learning gaps. This will allow Edo State to prevent the learning gaps that the interruption of education can cause and increase its resilience to future shocks (p.12)

Also in Edo State, the Edo University, Iyamho has launched or initiated CANVAS-Learning Management System (CANVAS LMS) which they utilized during the COVID-19 Pandemic lockdown to conclude the 2019/2020 academic session online. The university established in 2016 by Edo State Government is among the few institutions in the world where academic activities did not shutdown due to COVID-19 and is in the belief that the university was established to proffer solutions to eventual or contemporary problems (Ehigiator, 2020).

Pupils/Students Tech Savvy

It is not in doubt that children born in this era can be regarded as digital natives. They own the digital age and as such they find it much easier to manipulate. The child as early as two years old is provided with computer toys with which to play. He starts at such age to know the names of various parts of computer. Before such child reaches eight years, he has become vast in computer knowledge. In line with the above, Salami (2020) stated thus

Curiously enough, the students (our children) know what we don’t know, they do not need to be taught. That is why when you buy a phone today, you may end up not mastering up to 25 percent of its features no matter how long you use it. Yet it takes your children little or no time before they master every nook and cranny of the device (Salami, 2020, p.24)

With all indications as well as the excerpt above, children are more tech savvy than we think because in this generation, tech gadgets are now new toys for children. Due to the frequency at which they are exposed to digital devices, nowadays children require little or no supervision to operate handy gadgets like mobile phones, laptops, PlayStation etc. Indeed, improvements in technology have made online schooling a more accessible option for traditional schools. It is based on the above premise that Imisi (2020:26) posited that “online school is a win-win situation for the kids. Children learn how to utilize their cyberspace in the best possible ways, against the backdrop of their regular classroom education”.

V. THE NECESSITY OF APPLYING TECHNOLOGY INNOVATION TO EDUCATION TO BRIDGE THE KNOWLEDGE GAP OCCASIONED BY THE COVID-19 PANDEMIC LOCKDOWN

Education is regarded as the bedrock of development. It is for this singular reason that nations invest much of their resources in education. Nations that have realized the importance of education always ensure that the sector is given the lion’s share in their budgetary allocations. As a nation that needs to get to our desired destination, Nigeria must give education adequate attention. The standard to allocate at least 26 per cent of each country’s annual budget to education has been set by the United Nations Educational Social and Cultural Organization (UNESCO). Commenting on poor funding as a

disservice to the education sector, prof. Taiwo Edun posited as follows:

the percentage budgetary allocation to education in Nigeria is three times lower than what is recommended for developing nations by UNESCO. In actual fact, among the nine nations housing over half of the world's population and 70 percent of the world's illiterate adults allocate less than 20 percent of their annual budget to education (Wahab and Uwandu, 2019, p.42).

In spite of the above, education was stagnated during the lockdown occasioned by the coronavirus pandemic. This ought not to be. Digital education provides solution to distance barrier. It has the capability of bridging the knowledge gap occasioned by the COVID-19 pandemic lockdown. This is because areas that could not be covered in a traditional classroom can be taken care of in virtual learning. In support of the assertion above, the advantages of virtual learning, has been adumbrated as follows:

It has made a lot of children become more IT savvy.

It encourages research based learning; it is convenient and flexible. From the comfort of your home you can take your class and even write examination online. Students can go on virtual excursions abroad; they don't need to travel again (Orike, 2020, p.24).

From the excerpt above, one would deduce that if digital education system was already established, the negative effects of pandemic lockdown on education would have been averted. Such negative impact include inability of some private schools to pay salaries during the lockdown, inability to pay rents; drop in enrolments, loss of existing pupils and students due to coronavirus and drastic drop in cash inflow (Orike, 2020).

Corollary to the foregoing, applying the use of mobile phones and broadband internet can proffer solution to education problems such as the knowledge gap caused by the coronavirus pandemic. Giving credence to the above claim, the Head of Ventures Unit of Verraki Partners, Kelvin Balogun stated thus:

Across levels, we can develop application that give certificated education, fit-for purpose and pragmatic, while complementing current education realities. Students can access online lectures, compressed for mobile phones with exercises, theory, games, peer-to-peer support, ranking competitions, tests, self-assessment, online resources and incentives for those that complete their classes... Mobile learning brings education to our underserved people and communities, people who would otherwise not have had access (Anuforo, 2019, p.34).

Meanwhile, there is a ray of hope as the government has realized the deficiency and is moving towards amelioration. The special Assistant on Education Interventions to President Muhammadu Buhari, Obafela Bank-Olemoh recently intimated the government's readiness to invest more in digital education. It is expected that more funding in the sector would be in the area of devices for digital learning. Without mincing words, it means that the pandemic has forced stakeholders in education to rethink the workings of the system. The federal and state governments, in collaboration with some development partners, are working to ensure that this lofty idea is achieved. The expected development of digitalizing education in Nigeria would bring confidence in the education industry (Ilo, 2020).

VI. CONCLUSION

COVID-19 pandemic lockdown has indeed negatively affected the education sector ranging from students and pupils experiencing learning hiatus; students and pupils missing the camaraderie; the schools losing a whole term/semester; students/pupils died of COVID-19; major examination bodies postponed their already scheduled examinations; academic/intellectual activities such as trade fairs, workshops, seminars, symposia and academic conferences were all halted, private school owners could not pay their teachers salaries because schools were shutdown due to the coronavirus pandemic lockdown measure. All the above adverse effects of COVID-19 on education could be averted if digital education system is adopted. The digital education is capable of carrying on learning irrespective of distance. E-learning, online learning, virtual learning, virtual conference etc can hold during pandemic lockdown.

VII. RECOMMENDATIONS

Considering the exposition and the conclusion above, the following recommendations were made:

1. Budgetary allocation to the education sector should not be below 26 percent of the country's annual budget.
2. Devices for digital education should be provided by sponsors of education
3. Computer education should be made compulsory at all levels of education in Nigeria.
4. Teachers should undergo comprehensive training on how to manipulate the devices for digital education
5. The government and indeed schools should collaborate with development partners to achieve the vision of digitalizing education.
6. The government and educational institutions should envision occurrence of pandemics and make adequate preparations such as digitalizing education

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