E-learning: A Perfect Solution During the COVID-19 Pandemic in Nigeria

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Abstract: The latest COVID-19 epidemic has had an impact on the global economy as well as the Nigerian school system. It caused significant gaps in the academic calendars of many academic institutions at all levels. Globally, governments are transitioning away from the conventional technique of face-to-face instruction and toward an online form of instruction known as e-learning as a strategy to alleviate some of the consequences on education. Nigeria's education system is now trapped in the traditional mode of teaching and learning, making the transition to an online mode of teaching to mitigate the impact of the pandemic on her education system a huge problem. Some of the difficulties to the integration of e-learning into the Nigerian educational system include a lack of infrastructure, a comprehensive e-learning policy, and the expensive cost of devices and internet access, among others. This article explores the potential that may be driven if e-learning is incorporated into the Nigerian education system during and beyond the COVID-19 term, as well as some solutions that may be used to ameliorate some of the problems impeding the success of e-learning in Nigeria.

Keywords: E-learning, COVID-19, Education, Information and Communication Technology

1. Introduction

Towards the end of 2019 comes the emergence of a viral disease called COVID-19 which spreads rapidly across the globe. This virus was first discovered in Wuhan, China and Nigeria confirmed its first case of the virus in Lagos State on the 27th of February, when an Italian citizen who works in Nigeria returned on 25 February from Milan, Italy through the Murtala Muhammed International Airport and fell ill. He was subsequently transferred to Lagos State Biosecurity Facilities for isolation and testing and later confirmed to be positive [1]. The World Health Organization (WHO) declared COVID-19 as a pandemic on March 11, 2020, after assessment of the rapid spread and severity of the deadly virus across the globe with the additional announcement of social distancing as a means of curbing the spread of the pandemic. As of today, according to WHO, the coronavirus disease has affected 218 countries across the world with over 79 million active cases and recorded more than 1.7 million death. The pandemic has forced the global physical closure of businesses, sports activities, and schools. It became a tragedy that has shaken up the entire education sector of Nigeria and forced almost all schools and colleges to close temporarily. It causes fear of losing almost an entire session in various schools in Nigeria due to the nationwide lockdown that follows up the spread of the disease thereby forcing some schools to migrate to e-learning platforms to sustain teaching and learning activities. The entire educational sector is struggling to find a solution to deal with the challenging situation and the circumstances make us realize that e-learning is probably one of the solutions moving forward. According, most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning, and m-learning) have in common on the ability to use a computer connected to a network, that offers the

possibility to learn from anywhere, anytime, in any rhythm, with any means [2]. E-Learning is defined as learning by an electronic means where learners advance their understanding using online learning tools in the virtual learning environment [3]. Furthermore, E-learning is the acquisition of knowledge through the use of technological devices such as mobile phones, laptops, and computers through e-mail, Google scholars, and you-tube as a platform for learning [4]. In other words, it is the use of technologies to add value to individual knowledge. E-Learning is easily accessible and can even reach rural and remote areas. It is considered to be a relatively cheaper mode of education in terms of the lower cost of transportation, accommodation, and the overall cost of institution-based learning. Flexibility is another interesting aspect of online learning; a learner can schedule or plan their time for the completion of courses available online. Combining face-to-face lectures with technology gives rise to blended learning and flipped classrooms; this type of learning environment can increase the learning potential of the students. Students can learn anytime and anywhere, thereby developing new skills in the process leading to life-long learning [5].

2. Place of ICT in Teaching and Learning

ICTs are making changes in societies. They are influencing all aspects and the influence is felt more at schools because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs [6]. Tinio cited in [7] describe the place of ICT in teaching and learning as follows:

1) Active Learning: ICT enhanced learning by mobilizing tools for the examination, calculation, and analysis of information to provide a platform for students' inquiry, analysis, and construction of new information. ICT promotes learners' engagement.
2) Collaborative Learning: ICT supports learning, encourages interaction and cooperation among students, teachers, and experts regardless of where they are. It provides an opportunity to work with students from different cultures, thereby helping to enhance learners' learning and communication skills as well as awareness.
3) Creative Learning: ICT support and promotes the manipulation of existing information and the creation of real-world products rather than the duplication of received information.
4) Personalization and Content Up-To-Date: Digital environments allow real-time updating of all information and resources in addition it is possible to adjust the tools and content to local and nearby realities.
5) Maximizing the Use of Learning Outside the Classroom: While the extended school closures in spring 2020 have been a huge disruption in the school year, it has also shown that learning can continue through distance education especially by digital means without students' physical presence in schools, even though this entails some challenges. These challenges can affect various aspects of education including the student-teacher relationship that is so crucial for student success in class. Education, therefore, remains necessary, but this must be placed in perspective and adapted to the current situation. Whereas many schools have reduced class sizes or spaced-out student desks, just to curb the widespread of the pandemic.

3. E-learning During the COVID-19 Outbreak

The COVID-19 pandemic caught the Nigerian education system at all levels by surprise. Despite the preceding alarming media coverage surrounding the possible spread of the virus, the total physical shutdown of all schools including primary, secondary, and tertiary institutions was formally announced in March by the Nigerian government through the Presidential Task Force on COVID-19 in collaboration with the Federal Ministry of Health and Nigerian Centre for Disease Control (NCDC) review WHO guideline to reduce the spread of the virus. The hard measures taken by the government caught many of the schools and their heads off guard. The national school closure by Federal and State Governments interrupted academic activities and the year. The online or e-learning activities were initiated by some private high institutions and also some private primary and secondary schools to encourage learning and completion of the syllabus for the academic session [8]. Online learning became the main alternative method of teaching and learning at the peak of the crises because of the numerous advantages and most importantly, it eliminates the issue of physical contact between the students and their teachers. However, despite the immense advantages provided by the e-learning platforms, most Nigerian public schools have failed to embrace it including the universities because of the incessant problems of funding and corruption in the institutions of government. However, some universities particularly the private universities in Nigeria have embraced e-learning as a means to ensure that their academic calendar is not distorted. These universities have devised the use of information and communication technology tools to facilitate learning during this pandemic. Several e-learning platforms have been adopted by universities although these platforms are exhaustive. They include, Zoom, Microsoft teams, Google hangout (meet), Skype, Bamboo learning, Google classroom, Docebo, WizIQ, Adobe captivate, Elucidat, Blackboard learn amongst others. Private universities seem to be at the forefront of e-learning capacity in Nigerian universities as a result of their innovative and flexible operations [9]. One of the universities in Nigeria that fully explore the e-learning method of teaching and learning to its advantage in the cause of the COVID-19 lockdown period is the Babcock university. The university was able to run the second semester to the conclusion and administer their exams to students online. The university was also able to kick start the first semester of the subsequent session with a phased resumption of the

students while online classes were conducted simultaneously. The university also organize a virtual graduation ceremony for the outgoing students in the same period and they were able to do it successfully. National Open University of Nigeria (NOUN) is another institution whose academic calendar does not suffer any form of dislocation occasion as a result of the closure of schools in the face of the COVID-19 outbreak. The university as Nigeria's flagship Open and Distance Learning Institution (ODL) allows learning at a distance as it focuses on open access to education freeing learners from the constraints of time and place. Despite other challenges, NOUN encouraged its students to take advantage of the many learning platforms the university has made available to staff and students. The online learning environment provides opportunities for their students to connect with lecturers using video conferencing technology from their various homes during the lockdown period. Also, the university integrates discussion forums and chat activities in each of the courses offered to facilitate effective interactions within the learning community. Tutor Marked Assessments (TMAs), registration, and some administrative tasks are all being carried out online [10].

4. Opportunity to Improve Education in Nigeria

Online learning generally has a lot of opportunities available but this time of crisis will allow online learning to boom as most academic institutions have switched to this model. Online Learning, Remote Working, and e-collaborations exploded during the outbreak of the Corona Virus crisis [11]. The crises brought about by the COVID-19 pandemic will bring a new chapter to the use of e-learning and allow people to see the bright side of e-learning technology in Nigeria. Various academic institutions can now grab this opportunity by making and encouraging their teachers to teach the students through the online methodology. The online method will completely reduce the issues of insufficient classrooms for teaching and learning as the student can easily receive their classes online from the comfort of their homes. It motivates students to

interact with others, thereby helping eliminate barriers that have the potential of hindering participation including the fear of talking to other learners. E-learning can center on the learning and other needs of students and take into consideration the individual learner's differences. Some learners, for instance, prefer to concentrate on certain parts of the course, while others are prepared to review the entire course. During the pandemic, some students may be anxious to attend school, and so, this methodology is apt during this period of COVID 19 and post-pandemic Nigeria because of tensions, confusions, trauma, and apprehensiveness in the country created by the pandemic [12]. The application of online learning will test both teachers and learners. It will improve problem-solving skills, critical thinking abilities, and adaptability among the students. In this time of crisis, students of any level can access the online tools and reap the benefits of time and location flexibility associated with online learning.

The knowledge of e-learning will expose both lecturers and students to the reality of the world outside the classroom since the world is a global web. The e-learning exposure will ease the student's integration into organizations where such platforms are operational [13]. Online learning will also increase adequate access to education by eliminating the problem of infrastructure and facilities availability as a determinant factor for absorbing students into the institution of higher learning. According to [14], access to Nigerian education is far from being adequate. The nature of access to university education in Nigeria for example as illustrated in Table 1, according to data obtained from JAMB, indicated an average access rate of about 10.16% of the total number of applicants between the academic years 2003/2004 to 2007/2008 which is very low. Nigeria is having about 172 Universities at the moment taking care of fewer than 4 million students at the university level, it will require about 70 more universities to cater to the higher education needs of its citizen at the rate of about 25 percent of admission from the over 1 million yearly students seeking admissions through JAMB. Online learning will surely go a very long way in mitigating such problems.

Table 1. *Application and Admission via Universities Matriculation Examination, 20003/2003- 2007/2008.*

Session	Application			Admitted			Shortfall	% of access
	Male	Female	Total	Male	Female	Total		
2003/2004	603,176	443,764	1,046,940	59,743	48,117	107,860	939,080	10.3
2004/2005	484,217	353,834	838,051	69,717	52,779	122,496	715,555	14.6
2005/2006	527,180	390,780	917,960	45,256	31,728	76,984	840,976	8.4
2006/2007	521,170	391,180	912,350	70,961	47,095	118,056	794,294	12.9
2007/2008	578,715	455,368	1,034,083	28,475	19,019	47,494	986,589	4.6

Source: Joint Admissions and Matriculation Board; Authors' computations (2021).

E-learning is also cost-effective in the sense that it offers opportunities for the maximum number of learners to learn with no need for many buildings and eliminates learners' need for travel. It helps in compensating for scarcities of academic staff, including instructors or teachers as well as

facilitators, laboratory technicians, etc. All the above-mentioned benefits show that e-learning adoption tends to provide an amazing opportunity for solving many of our educational challenges not only at the time of the COVID-19 pandemic but even post COVID-19 period.

5. The Implication of ICTs to Teachers

1) Schools use a diverse set of ICT tools to communicate, create, disseminate, store, and manage information. In some contexts, ICT has become Integra to the teaching-learning interaction through such approaches as replacing chalkboards and whiteboards with ICT using students' smartphones or other devices for learning during class time and the model where students watch lectures at home on the computer for more interactive exercises [15]. When teachers are digitally literate and trained to use ICT, these approaches can lead to higher-order thinking skills, provide creative and individualized options for students to express their understanding, and leave students better prepared to deal with ongoing technological change in society [16].

2) It enhances teaching: ICT enhances teaching in the sense that, teachers now teach with pictures and videos with the help of ICT tools like computers, projectors, and printers. Before the pandemic, a lot of teachers used to draw images on board or write on board which takes much of their energy and time. The amount of time and energy used in drawing and writing could have been reduced hugely by just downloading images and videos on the internet or by just showing or paying them online for students in order not to waste time. Images on the internet are always going to be better than the ones drawn by teachers. In schools where classrooms are very large, teachers who use the microphone with speakers for what he or she is to say can easily do the teaching online by just sending it to every student's email address. Teachers also do more research online for dynamic and accurate teaching.

3) Easy, accurate assessment and evaluation: Adding, dividing, and finding percentages of students' marks manually to assess their performances either at the end of the term or the year always comes with mistakes because it is very tedious. Excel has made it a lot easier to add, divide and find percentages of figures and also help the teacher to rank the students based on performance during the session.

4) Computer Literacy and Career Opportunities: The introduction of the computer into the education system has allowed teachers and students to become computer literate and prepare them for job opportunities in the future.

5) ICT helps the teacher to learn innovative methods of teaching: He can work with the students on various projects and assignments from home. He may also participate in various in-service training programs and workshops which are essential for his professional development with the help of ICT.

Challenges of E-learning Effective Utilization in Nigeria

E-learning in Nigerian educational institutions is still far from reality because of the very poor state of ICT infrastructure bedeviling the country and other socio-economic factors. The cost of e-learning gadgets such as Personal Computer (PC), mobile phones, MODEMS, and so on are still very high in Nigeria considering the income level of an average worker, it is considered quite expensive. The cost of supporting software for the gadgets together with the licenses required to run them is also high because most are not developed locally in Nigeria. Some of the students that are privileged to afford these gadgets cannot connect to the internet because of the very high cost of data require to connect. Online e-learning services require a large amount of data to run and going by the high cost of data and the volume consumed by the e-learning services, it becomes difficult to afford by the learners and even teachers in most cases. Apart from connectivity cost, network quality is another major challenge. The services provided by the telecommunication operators are very poor and of great concern for running online classes. Where connectivity is poor, it becomes difficult to connect to the platform and interact through video conferencing. Also, downloading learning materials becomes difficult where it is required by the learner. In Nigeria also, not all teachers and students are computer literate. A large number of them cannot operate the system needed to access e-learning services which provide another setback. E-learning also poses a three-dimensional challenge of learners, teachers, and content issues. It is a challenge for institutions to engage students and make them participate in the teaching-learning process. It is a challenge for teachers to move from offline mode to online mode, changing their teaching methodologies, and managing their time. It is challenging to develop content that does not only covers the curriculum but also engages the students [17]. Another major obstacle to e-learning in Nigeria is the lack of a steady power supply especially in most cities and particularly the rural areas where some of the students reside. This epileptic power supply has brought difficulty in powering educational gadgets such as smartphones, laptops, and desktop computers needed for learning. As such, the students in those places will find it difficult to effectively utilize any of the e-learning services provided. The Nigerian government has failed to invest massively in the area of power generation and distribution, and where little investment was made the government has also failed to monitor effective utilization of its resources in that regard. The power challenges became an issue not only to the implementation of e-learning but to the entire economic sector of the country.

Again, government poor investment in the education sector is another contributing factor to the inability of many institutions to embrace and implement e-learning successfully. The budgetary allocation to the education sector is very low and has always been falling below the 25 percent of the country's total budget recommended mark by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Figure 1 shows a chart representing the percentages of budgetary allocations to the education sector in the last ten years. The highest gotten by the sector was 10.7 percent in the 2015 national budget presented to the national assembly. Since then, none of the appropriation bills passed has surpassed that mark.

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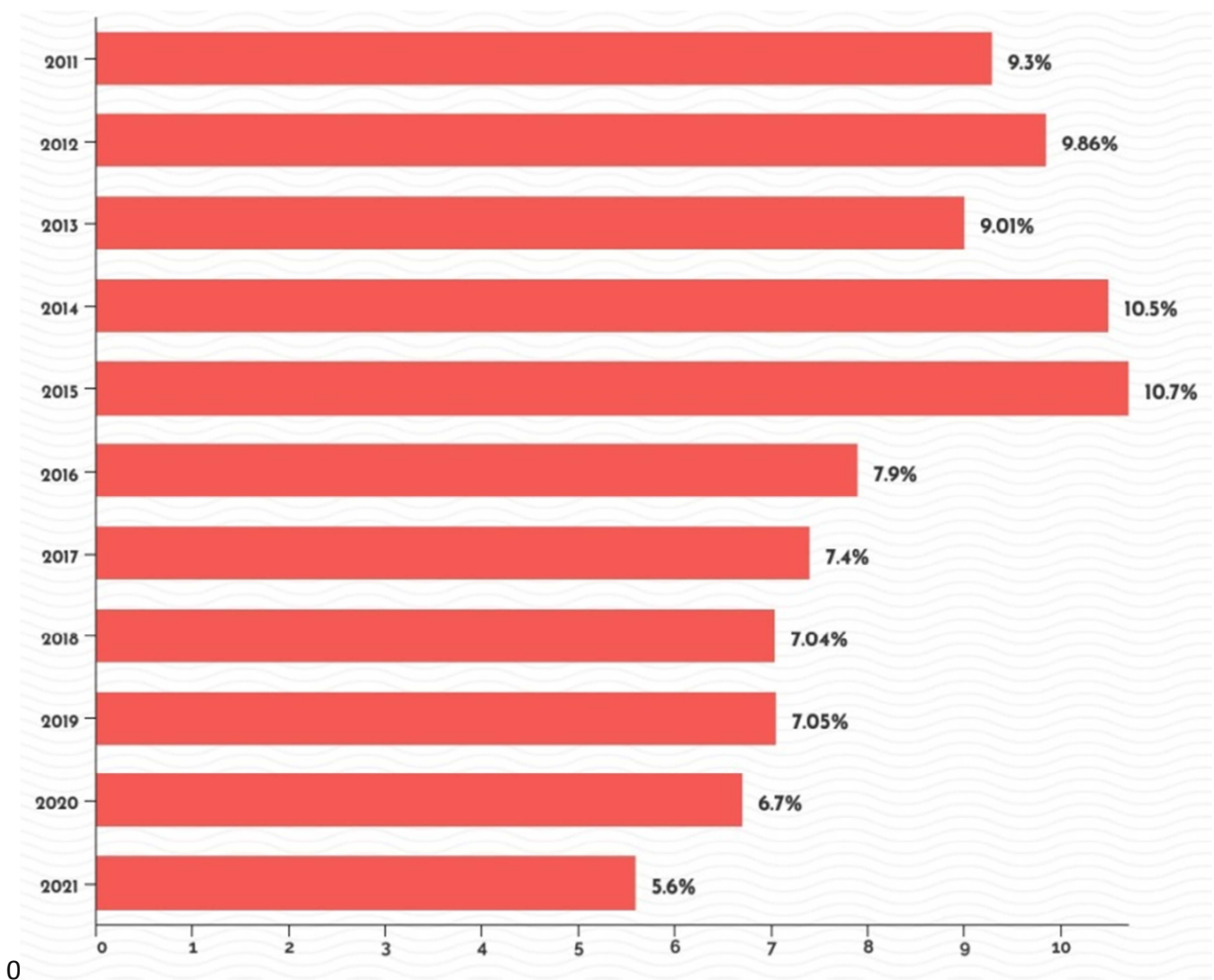
Figure 1. *Percentage of Nigeria's budgetary allocation to Education (2011 – 2021).*

In 2011, the sector was allocated N393.8 billion which is 9.3 percent of the total budget while it got N468.3 billion, which is 9.86 percent of the 2012 budget. N499.7 billion representing 10.1 percent of the total 2013 budget, N494.7 billion, 10.5 percent of the 2014 budget, and N484.2billion, 10.7 percent of the 2015 budget. In 2016, the education sector got N369. 6 billion, 7.9 percent of the total budget, N550. 5 billion was allotted in 2017, representing 7.4 percent of the total budget, N605.8 billion in 2018 representing 7.04 percent, N620.5 billion which is 7.05 percent of the 2019 budget, and N671. 07 billion, representing 6.7 percent in the 2020 National budget. The chart reveals 2021 budget was even the lowest with a 5.6% allocation since 2011 [8]. With budgetary allocations like these comes deficiencies that do not allow for the growth of e-learning and create challenges when institutions try to embrace and implement e-learning.

6. Mitigation Strategies to Some of the Challenges of E-learning in Nigeria

Following the numerous challenges that bedevil e-learning in Nigeria, the study highlight some of the strategies that should be adopted to mitigate the numerous challenges and to further promote e-learning usage in Nigeria. The strategies to be adopted include some of the following:

Customization of Solar Energy: Solar power gadgets and human-powered electricity have emerged as a promising solution to the increasing digital divide as a result of the lack of electric supply (Wyche and Murphy 2013). Customization of solar and other energy types that are abundant and cheaply available in Nigeria will go a long way in solving the problem of power supply which has been a major setback to the effective utilization of e-learning in Nigeria. Solar and wind power if harnessed effectively, will be a promising

solution to generating power for e-learning activities particularly in the rural parts of Nigeria without any disruption.

Implementation of comprehensive policies on e-learning: There should be comprehensive policies from the government that will promote and encourage the use of e-learning across all levels of educational institutions in Nigeria. There is a need for the government to come up with a policy that will integrate e-learning into the mainstream of education and training across the country.

Digital literacy support for teachers and students: Adequate training of teachers and students in the teaching and learning process through e-learning platforms is necessary. The training of digital users is instrumental to ensure the successful transition and integration of e-learning platforms [7]. Training has been strongly perceived to be having a beneficial effect on the usage of e-learning platforms. It's a critical factor for successful e-learning and should be made available for both teachers and students. Workshops and training on ICT for e-learning are crucial for users especially teachers, for flexibility in online delivery [9]. Professional development training programs provide teachers with "hands-on" activities, they need to develop ICT competence and technological pedagogical content knowledge for twenty-first-century learning [10]. Also, school leaders can ensure students develop their skills by supporting them during orientation activities on technology, peer learning, and encouraging them to use personal technology [8].

Funding: In addition to the funds coming in from the government as a form of support to various educational institutions, which has been established to be insufficient, other funds can be generated by the academic institution by charging an online special fee or tuition rate from the students offering online learning. Students who prefer the flexibility of taking online classes are charge to pay this extra fee which could then serve as a direct source of funds to the e-learning centers of the institution. Such funds generated should be used strictly for the support of those e-learning centers only. It will improve the capacities of the institution receiving such funds in running e-learning services effectively.

Fostering utilization of mobile phones: School administrators should encourage learners to make use of mobile phones which are relatively cheaper than personal computers (Innocent Igbokwe, Ndidiamaka okekejames 2020). Globalization has made the mobile phone to be relatively cheaper and readily available in the hand of almost every student. The use of mobile phones, particularly on the side of the students in accessing the e-learning services will eliminate the cost of buying more expensive gadgets such as laptops, tablets, etc.

7. Conclusion

The current COVID-19 crisis has shown that the survival of education across all levels in the 21st century has increasingly relied on online learning not only here in Nigeria but across the globe. The COVID-19 pandemic in Nigeria has opened an opportunity to adopt online learning as a means of delivering teaching and learning across the country. Some academic institutions particularly private are now endorsing e-learning as a suitable alternative to the face-to-face mode of teaching and learning thereby making them cover the already created gap in the academic calendar caused by the pandemic. The endorsement of e-learning by some academic institutions during the COVID-19 crisis further exposed some of the challenges hampering the development of such a platform in Nigeria. Some of the challenges include epileptic power supply, high cost of ICT gadgets and internet subscription, poor internet access among others. The applicable opportunities associated with embracing e-learning includes eliminating the issues of the insufficient classroom for teaching and learning, motivate students to interact with one another, and also increase adequate access to education by eliminating the problem of infrastructure and facilities availability as a determinant factor for absorbing students into the institution of higher learning among others. Some of the strategies that can be applied to manage some of the challenges hampering the development of e-learning in Nigeria include customization of solar and wind energy for powering online teaching and learning gadgets, implementation of a comprehensive policy on e-learning among others. Thus, e-learning will help in breaching some of the gaps in the Nigerian education system and further prepare the Nigerian society to be in sync with global systems of education even after the COVID-19 pandemic.

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