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EDITORIAL

STEM Journal of Anambra STAN (STEMJAS) is a publication of **Science Teachers Association of Nigeria, Anambra State Chapter.** STEMJAS is developed to disseminate information on Science, Technology, Engineering and Mathematics (STEM) to teachers, teacher-trainers, researchers and other interested persons. Articles that are of relevance to STEM education are published in this journal.

We are grateful to the contributors and hope that our readers will enjoy reading these contributions.

Prof. Ebele C. Okigbo

Editor-in-Chief

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THE NEW NORMAL OF E-LEARNING: A CRITICAL REVIEW AND FUTURE OUTLOOK IN NIGERIA EDUCATION SYSTEM

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Abstract

The out brake of covid-19 pandemic coupled with the present digital age launched the unavoidable use of e-learning in Nigeria education system. Thus, every stake holder in Nigerian education system is expected to painstakingly turn a new leaf to harness the potential of e-learning for an improvement in Nigerian education system. This discourse critically evaluates the progress of e-learning as a new normal in Nigeria education system from the period of COVID-19 and made recommendations capable of checkmating the present challenges and potential shortcomings in embracing e-learning. The discourse covers the following sections: the concept of e-learning and digital technology as the new normal in education; theoretical background of e-learning; the advent of e-learning in Nigeria; the progress of e-learning during covid-19 pandemic in Nigeria; benefits of e-learning in education; the extent of the use of e-learning in Nigeria education system; challenges of e-learning in Nigeria; implications of the review; recommendations and conclusion. The recommendation made include curriculum planners should revisit the curriculum with a view to updating it to synchronize with the demands of the digital age thereby making the curriculum more relevant for producing young citizens equipped through education to be capable of providing sustainable developments in the society.

Keywords: New normal, E-learning, Education system

Introduction

Education is a veritable platform for human and society development. The level of development in a given society/nation is a testimonial for the quality of education bequeathed to the citizens (Nnoli & Okafor, 2020). For education in Nigeria to remain relevant in the present age of digital technology, the mind set and practices of the stakeholders in education should be consciously transformed to embrace the new normal of utilizing the digital technology in education. E-learning is a hallmark in application of digital technology in education. Consequently, the need for a turnaround and complete focus of navigating Nigerian education through e-learning cannot be over-emphasized.

The Concept of E-learning and Digital Technology as the new normal in Education

With the changing necessities of the 21st -century, the 21st-century learners need certain essential skills and competencies to keep abreast with the real life exigencies. This demands for a great focus on ICT (information and communications technology) skills and information literacy (Ilupeju & Aigbedion, 2020). The need for the world focus on ICT was advocated through the declaration of the UnitedNations 2030 Agenda for Sustainable Development Goals in 2015 and the 2015 Incheon World Education Forum (UNESCO, 2015). In both contexts, ICT was seen not only as a digital resource but also as a means to "strengthen education system, knowledge dissemination, information access, quality and effective learning, and more effective service provision" (UNESCO, 2018, p. 13). Graham (2013) positedthat ICT makes valuable contributions to education, primarily in terms of enhanced pedagogy and access, as it allows flexibility in teaching and learning. ICT cuts across knowledge acquisition for academic excellence to work place productivity globally (Ilupeju, & Aigbedion 2020).

The present global challenge in education involves expanding new trends in technology innovations and advancement in teaching and learning. Such global technologyinnovations in teaching and learning brought new normal in education. E-learning and use of digital technology are aspects of the new normal in education (Bubou, & Job, 2021). Consequently, stake holders in Nigerian education system should endavor to adapt to the new circumstances of e-learning and digital technology.

E-learning known as electronic learning is on-line derivation of information, knowledgeand skills. It is online instruction organized by a teacher, the learners join and complete assignments at their own pace and on their own schedule using electronic gadgets (Adebisi & Adebisi, 2016). This implies that e-learning is self-paced. The learner interacts with the teacher online. E-learning comprises technologies used for collecting, storing, editing and passing information, knowledge and skills in various forms (Hanell, 2018). It involves sharing of pedagogical material in kinds of formats such as videos, slide shows, word documents and PDFs (Khouri**,** Fontana, Dias, Maciel, Filho, Adriano & Mariano, 2021). Conducting webinars (live on line classes), use of e-library, instruction via chat message, forums are aspects of e-learning available to users.

E-learningaffords learners the opportunity to be part of an instruction at any time for a lesson from different geographical regions. This bridges the geographical gap and makes the learner though at adistant feelsthat he/she is inside the classroom. E-learning is an affordable solution that provides the learner with the opportunity to embrace learning during an engagement thereby allowing even the busiest person to further a career and gain new qualifications (Wang, Han, Gao, & Liu, 2021). It takes a good e-learning tool for education to be virtually facilitated from anywhere. E- learning is organized through different Learning Management Systems (LMS) and methods which allow for instructions to be delivered. Such LMS include Google Class, Edmodo, Spogelab and ATutor. With the right digital tool, various teaching-learning processes can be automated.

Increase in awareness and usage of digital technology globally makes available veritable tools for effective e-learning programs in education. Accessibility to the use of computers, smart phones, text messaging,use of message boards, e-mail, WhatsApp chats and voice messages, face book and other socialmedia, and electronic media are some of the various means available for online instruction.

Launch of the internet has resulted to manifestation of some important breakthrough in education such as the e-learning. In the current trend in digital technology, the available technology to make acourse of study new and exciting are always changing and the course content should beupdated quickly to give students the very latest information (Goldsin, 2011). This demands for constant update by the teachers, curriculum planners and other education stake holders on current digital technology application such as the use of e-learning for suitable upgrade and transformation in education (Enawaty, 2023).

Consequently, e-learning is a viable tool for moving the frontier of knowledge through education inthe present digital technology age as it is effective in implementing educational programs (Adelakun, 2020). Adebisi & Adebisi (2016) concluded that e-learning is a necessity in enhancing teaching and learning sciences and recommended that e-learning technology be provided in schools. Makena, Mpiti, Nqoma & Ginyigazi (2021) confirm that e-learning encourages readability in learners. However, Ebohon, Obienu, Irabor etal (2021) maintained that e-learning might be faulted in areas of learning assessment, instructional management especially in the area of practical instruction and l earners' collaboration.

Theoretical Background of E-learning

E-learning uses multiple digital media therefore it is theoretically based the theory of cognitive multimedia learning propounded by Richard Meyer (1977). Meyer propounded two channels of mental representations, use of words and pictures necessary to enhance learners' memory for effective learning. By the ideas of the cognitive multimedia learning, e-learning grants learners' opportunity to partake in the learning process by organizing materials into visual and verbal models to capture the different mental abilities of learners (Davis & Norman 2016). Furthermore, e-learning is pro constructivists' ideas of learning such as the Banduara Social Cognitive ideas. The child does not learn in isolation therefore through effective e-learning, the teacher creates room for cooperation and collaboration amongst learners for effective cross-fertilization of ideas and knowledge irrespective of distance and location. E-learning provides learning platform that transcends over socio-cultural backgrounds and geographical locations.

The Advent of E-learning in Nigeria

Until recent time, education was in a classroom of students with a teacher who led the process. However, the declaration of COVID-19 as a pandemic by theWorld Health Organization (WHO) on 11th March, 2020 which led to a lockdown in social gathering and restricted movement coupled with the availability of digital technology led to the demand for instruction that avoids people coming together (Wu & Teets, 2012). This began to popularize e-learning in Nigerian education system. On 19th March 2020 the Federal Ministry of Education, Nigeria announced the temporary closure of all schools in the country with effect from 23rd March 2020. Schoolsin Nigeria were closed for about twenty-one to thirty weeks. UNO (2020) expressed the feared that about twenty-four million learners were at the risk ofnot returning to school due to the economic fallout of the COVID-19. This was confirmed by Ebohon, Obienu, Irabor etal (2021) who affirmed that the policy of schools' closure during COVID-19 pandemic sent many students out of school. E-learning according to Uba & Spangenberg (2020) became a possible platform to mitigate the effect of school closure during the COVID-19 era. There was abrupt

shift fromin-person or face-to-face teaching-learning to remote or online learning in Nigeria and across the globe (Khouri, Fontana, Dias, Maciel, Filho, Adriano & Mariano, 2021). Thus, use of e-learning became inevitable in teaching and learning enterprise in Nigeria and across the globe.

The Progress of E-learning During COVID-19 Pandemic in Nigeria

COVID -19 from the ongoing resulted to school closures in Nigeria in March 2020. In September of the same year schools were opened under restrictions and control only for Junior Secondary Three (JS3) and Senior Secondary Three (SS3) terminal examinations. Other classes started to open in October, 2020. There was poor learning, unequalaccess to education opportunities and poor skill development. There were a lot of hitchesagainst the e-learning and other programs put in place by the governments.

A survey was carried out in Abakaliki Education Zone of Ebonyi State, Nigeria by this writer on secondary school students' participation on the radio education program mounted by Ebonyi state Ministry of Education called Ebonyi radio teacher to cushion the effect of schools' closure during the COVID-19 era. The result revealed that 91students out of 453 (20%) 2021/2022 academic session SS 2 students of eight schools randomly selected from the seventy-eight schools of the zone participated in the radio programs during the pandemic when they were in JS 3 (Junior secondary school terminal class). This shows extreme poor participation by the students whichcould be due to a number of reasons such as lack of students' interest and control, non-availability of radio sets, poor power supply and poor environmental serenity.

In another study to find out the possibility of students' access to ICT and internet required for e-learning, Ilupejua and Aigbedion (2020) report that availability of computer sets in Bwari Area Council of Abuja, Nigeria during the COVID-19 era at different places was as shown on the Table 1.

Table 1: Place of access to computer

Students' Access to Computer at Different Places

Place	Availability
School	40.1
Home	3.6
Church/Mosque	2.6
Market	17.0
Other Places	36.6

Source: An extract from Ilupeju & Aigbedion, (2020)

The report above shows inadequate availability of technology to support e-learning in Nigeria during the COVID-19 era. This shows non-compliance with UNESCO (2009) agreement that ever student should have access to computer electronics by twenty-first century. Much education could not have taken place during the lock down with the poor digital facilities.

Furthermore, Ebohon, Obienu, Irabor, etal (2021) report that eighty-three percent of the university lecturers claimed that it was difficult to explain difficult scientific ideas and sixty percent of the lecturers admitted that all learning outcomes were covered except laboratory course work. This discredited e-learning in teaching and learning sciences which was the only available teaching and learning platform during the COVID-19 lock down.

From the ongoing, the era of COVID-19 seemed to be an era of education melt-down in Nigeria. There

were such hitches as lack of technology, poor socio-economic factors, lack of adequate personnel and poor e-learning management to support government efforts for education delivery during the COVID-19 lock down. The COVID-19 lock down became an eye opener for government and stake holders in education to get prepared and embrace e-learning.

Benefits of E-Learning in Education

Researchers such as Primasari, Suparmanto & Imansyah (2019); Abdullah, Danial & Anwar (2021) have attested to the numerous benefits of e-learning in education are which can be articulated as follows;

- Flexibility: E-learning offers the leaner opportunity to indulge on other engagements while learning. Again it gives the learner opportunity to revisit learning materials or stop at will to perform additional task.
- Less capital intensive in reaching learners at different locations: E-learning is convenient for the teacher/instructor to rich wide audience with the same learning materials at the same time without additional cost in bridging differences in geographical location.
- Serves leaners' with different abilities: The gifted and slow learners have equal opportunities to learn as each learns at his/her own pace.
- Self-driven and self-paced: The learner acquires self-satisfaction through e-learning by participating in the lesson at a personal rate. This promotes intrinsic motivation for learning
- Enhances self-assessment and feedback: The learner can undergo personal assessment and obtain immediate personal feedback using available automated instrument. This can ensure convincing objectivity in assessment and report.
- Easy record keeping and administration: E-learning allows for an easy digital record keeping and administration as against the difficult analogue system of record keeping and administration in the in-person instruction.
- Exposition to twenty-first century technology: Through e-learning maximum use of the century technology is used for education through constant interactions with digital technologies which make young citizens vibrant in technology.
- Mixed-class interaction: E-learning allows for interaction of learners from different socio-economic background.
- Accessibility to experts: The learner gets the opportunity to interact with experts and people with varied experience.
- Community building: People from across the globe easily collaborate to form a community with common education goal and focus.
- Use of different pedagogical interventions to tackle instructional problems: Some content packages like videos, notes, infographics, games and effective teaching modes like simulations, audio-visual, flipped classroom are easily used to enhance instructional engagements.
- Recognizes individual differences in learning and encourages individualized instruction.
- Enhances of assessment and evaluation: Different effective assessment tools like quiz and case studies for both formative and summative evaluations are employed with immediate feedback.
- Development of new skills: E-learning enhances development of new skills such as digital literacy, critical thinking and problem solving among the teachers and learners.

- Wide spread connection and standardization: Variety of opinions and ideas which allow for comparison and selection of the best for standard are easily available.

In the present global world with fast development in digital technology, e-learning has to be embraced in for national development and sustainability.

The Extent of the use of E-learning in Nigeria Education System

The use of e-learning is not globally new. In countries such as the United Kingdom, theUnited States, China and New Zealand distance education was regularly implemented through e-learning even before the COVID-19 pandemic (Khouri, Fontana, Dias, Maciel, Filho, Adriano & Mariano, 2021). In Nigeria, before COVID-19 pandemic, education was majorly in-person. However, some online strategies of teaching such as use of e-mail, internet and electronic teaching were in use in some higher institutions of learningand private schools. Nigeria has open and distance learning under the auspicesof the National Open University operated through e-learning to provide more access to quality education (FGN, 2014). The National Open University according to Onyegegbu & Onu (2021) is the only university that provides exclusive e-learning program in Nigeria.

The conventional settings of schools in Nigeria were disrupted during lockdowns as necessitated by COVID 19 pandemic.Educational institutions suddenly were met with a post COVID 19 new normal (Adelakun, 2020).The education systems in the old normal were not successfully meeting the needs of the new normal. The priority was for all those who play a role in education to adopt a mindset of flexibility and change, identifying and supporting approaches, both old and new, that can strengthen education and training. Like schoolselsewhere, Nigerian schools moved to a blended model of learning. This model includean online teaching plat form initiated during the lock downs, mixed/blended with the old school-based in-person activities when lockdowns were lifted. Though online education is not new, the unprecedented outbreak has made it the predominant mode of education during lockdowns (Ilupeju& Aigbedion, 2020).

Education Management and information System (EMIS) was used by the Ministry of Education to gather information/data on regular basis for purpose of effective planning and implementation of educational program during the COVID-19 era (Adelakun, 2020). Schools in many states in Nigeria used radio and television for academic instructions during the COVID-19 lock down. Ministry of education launched e-learningchannels and satellite networks. However, no arrangement was made for easy access to network required for the e-learning channels.To that effect, Adelakun report that not every parent could afford to the monthly subscriptions of the satellite networks for their children/wards. Mainly the private schoolsand universities could to a certain extent, meet up with the demand while public universities and schools lagged behind.

An online platform known as "Mobile Classroom" was an intervention package created to give students accessto a pool of video contents by UNICEF in collaboration with HITCH. The platform has five categories namely senior secondaryschool syllabus, tertiary courses, professional courses, vocational studies and international examinations. The content for each subject is based on the Nigerian curriculum as produced by the Educational, Research and Development Council (NERDC). Each subject has 'lecture' content and past WAEC questions. There is a pool of numerous video contentsfor different subjects in support of e-learning. According to the World Bank report, some state governments have their state education intervention plans to prevent learning loss during the COVID-19 period. These include EdoBEST@Home, EduPOS Kwara, OGUNDIGICLASS. This new normal of e-learning hasbeen particularly challenging and has implications to the stake holders in education.

Challenges of E-Learning in Nigeria

Use of e-learning as a new normal in Nigeria education system is bedeviled by a plethora of challenges. These challenges include the following:

Lack of Equipment : The essential equipment for online teaching and learning include computer or a tablet, webcam, android phones or phones running on IOS. Majority of teachers and students do not have the essential equipment (Ilupeju& Aigbedion, 2020; Bubou, & Job, 2021 and Eli-Chikwu, Igbokwe, Ifebude, Nmadu, Iguodala, Uma, Onyeneke & Akudo, 2022). This might result in the students not being able to participate in the onlineprograms.

Non-availability or weak internet signals: Most schools, especially in remote rural areas, have no internet network. In areas withinternet, there is insufficient bandwidth and often signals are weak and results in frustrating attempts to log into websites (Adelakun, 2020).

Inadequate and Epileptic Power Supply: Electricity provision is rationed in most cities in Nigeria. There are areas of the country that may be without electricity for weeks or months (Eli-Chikwu, Igbokwe, Ifebude, Nmadu, Iguodala, Uma, Onyeneke & Akudo, 2022). Some remote areas are without the national grid. For radio and television programs with time frame, lack of power is likely to hinder the student from participating. Inadequate or epileptic power supply can also make it difficult to access the online resources.

High Cost of Data: Internet providers charge for data is expensive. To purchase the data which may be used for a day may not be affordable by a parent or a teacher. Some States have irregular free online programs while some charge for accessing the resources (Ilupeju& Aigbedion, 2020). Accessing the Mobile Classroom platform through the internet requiresstudents and teachers to pay quite a reasonable amount per month. This situation can discourage adoption of e-learning.

Unpreparedness: Adequate preparation for online teaching has not been provided in the teacher education programs in Nigeria (Onyegegbu & Onu, 2021). Most faculties of education in the universities and colleges ofeducation still lack the basic ICT facilities required for e-learning. Onyegegbu & Onu (2021) maintain that prospective teachers' poor perception of technology usage in teaching and learning could be attributed to poor internet facilities at home for learning. This suggests that teachers feel uncomfortable and less confident with the use of e- learning in teaching and learning. Eli-Chikwu, Igbokwe, Ifebude, Nmadu, Iguodala, Uma, Onyeneke & Akudo (2022) asserted that teachers in higher education institutions in Nigeria lack the required requisite experience in use of digital technology furthermore the curriculum is not yet supportive of the use of e-learning. This is a big clog in the wheel of effective use of e-learning since no education program can survive without effective teacher preparation and well planned curriculum.

Poor Funding of Education: There is gross poor funding of education in Nigeria over theyears. Nigerian government has persistently allocated an infinitesimal percentage of its annual budget to education as shown in Table 2 .

Table 2: Nigerian Annual Budget PercentageAllocation to Education 2013-2024

Year	Percentage of BudgetAllocation to Education
2013	10.10
2014	10.50
2015	10.70
2016	7.90
2017	7.40
2018	7.04
2019	7.05
2020	6.70
2021	5.68
2022	7.9
2023	8.8
2024	7.9

Source: Premium Times

From Table 2, Nigeria percentage of budget allocation to education is quite below the UNESCO prescription of twenty percent of budget allocation to education. Again, allocation to education was lowest in 2021 followed 2020 allocation the COVID-19 period. Thus Nigeria could not comfortably sponsor the e-learning programs to cushion the effect of COVID-19 on education.

Students' management factor- In the absence of physical peer interactions and teacher's encouragement/motivation, students may lack the zeal for online academic exercise. This may give the chance for the students to get occupied by other non-academic activities. In addition, there could be language barrier for the learner to comprehend the e-learning instruction due to native language interference and the technical language of the digital technology (Eli-Chikwu, Igbokwe, Ifebude, Nmadu, Iguodala, Uma, Onyeneke & Akudo, 2022).

Implications of the Review

This discourse has implication for the stake holders in education such as the teacher, curriculum planners, teacher educators, governments, the society, students and researchers. Teachers are sensitized to embrace e-learning, discover their weakness its use and seek for redress as this will increase their productivity. Curriculum planners realizes the weaknesses in the curriculum to initiate actions towards an upgrade of the curriculum to suit the demand of the digital age. Teacher educators find out the loopholes in the teacher education programs that hinder the progress of the twenty-first education for a redress. Governments and government agencies to realize weaknesses of the existing education policies and regulations for a redress to support e-learning. Leaners improve in their learning outcomes and realize their life aspirations in the digital age when e-learning is properly used in instruction. The society have young citizens adequately prepared to tackle the society's needs in the digital age. Finally this review becomes an eye opener to researchers on problems and prospects of e-learning for further researcher.

Recommendations

From the ongoing the following recommendations were made;

1. Curriculum planners should revisit the curriculum with a view to updating it to synchronize with the demands of the digital age thereby making the curriculum more relevant in producing young citizens equipped through education capable of providing sustainable developments in society.
2. Government should as necessity increase the budget allocation to education. This will help to funding education better. Teachers need to be properly trained and adequately equipped with e-learning infrastructures for them to acquire the skills and confidence in

the use of e-learning. The training and equipment is impossible without proper funding. Proper funding will also help in conducting research for more result oriented e-learning programs.

3. Government and school proprietors should make adequate provisions for availability of ICT/e-learning facilities in schools to comply with the UNESCO prescription of making ICT available to every child.
4. Policies and regulations that will ensure availability and equal access to e-learning opportunities for all irrespective of location or socio-economic status should be put in place by the government. This could be through encouraging non-governmental organizations and affluent members of the society to partner with government in providing ICT infrastructures in schools.
5. There should more robust expanded training of teachers in use of e-learning in teacher education programs by teacher educators in the faculties of education and colleges of education for adequate training of teachers in e-learning.
6. Researchers to be engaged with more researches on new methods of assessment and evaluation for measuring students' learning outcomes in online environment. Also continuous researches are required for improvement in using e-learning.
7. Seminars and workshops should be organized by government agencies such as ministries of education and non-government agencies such as Science Teachers Association of Nigeria to sensitize, teach and upgrade the servicing teachers on theuse of e-learning.

Conclusion

Education system as a matter of necessity was introduced to a new normal of e-learning during the COVID-19 pandemic. Literature revealed that the skillful integration of online learning such as e-library increased motivation towards learning, making learning fun and interesting. Use of e-learning platforms such as animationand video clip can help in teaching some complex and abstract concepts and processes. Such platforms according to multimedia theory apply to different mental representations of the learner and ensure permanent coding of knowledge and easy understanding. Besides, e-learning aligns with the twenty-first century technology therefore any education system that does not embrace e-learning is likely to be erroneous andunproductive. Considering the critical position of e-learning in the present digital age, every stakeholder in education should advocate and work for effective use of e-learning in education system. Thus, Nigeria should harness the potentials of e-learning to improve its education system and prepare her young citizens for success in the digital age.

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