

# **EDUCATION BEYOND COVID-19: CHALLENGES AND OPPORTUNITIES OF DIGITAL LEARNING IN TERTIARY INSTITUTIONS IN NIGERIA**

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## **Abstract**

*The incorporation of digital learning into the Nigeria tertiary education system has always heralded plethora of challenges that has continued to stall such effort. Nevertheless, the year 2020 would always be a point of reference towards surmounting such challenges. It is the year, every education system activated emergency response to mitigate the effect of school closure on the education calendar resulting from COVID-19 pandemic. To continue teaching and learning during the lockdown period, efforts were directed towards online classes, digital learning and various education technological connections between teachers and learners. One big lesson of COVID-19 with respect to education is that learning processes can be innovative. COVID-19 global emergency heralded such an unprecedented shift in education and innovation which hitherto has never been felt simultaneously on a large scale around the globe. Such paradigm shift in teaching and learning during this emergency buttressed this, and would always be referred to in post-COVID education reformation. However, the question now is- judging from the peculiarities of Africa schooling system and technological advancement, how prepared is Nigeria for such reformation? How would we look beyond the challenges of digital learning to the opportunities presented forthwith? It is on this note, that this paper, through a descriptive study highlighted some*

*of the challenges and opportunities of incorporating digital learning into the tertiary education system in Nigeria, beyond COVID-19. It further proposed modalities for achieving this. Through the connectivist theory of learning, guidelines for developing digital learning materials were also highlighted. In conclusion, the paper thus opined that beyond COVID-19, there is urgency in the need to incorporate digital learning into the tertiary education system in Nigeria. Such would enable the sector surmount the challenge of similar closure of schools in the future as well as other noted opportunities.*

**Keywords:** *Digital learning, online learning, digital literacy, education, COVID-19 and beyond COVID-19*

### **Background to the study**

Around the globe, the year 2020 would be remarkable for its unprecedented health crisis. The year would figuratively be synonymous with COVID-19 in years to come. The 2019 Coronavirus disease (COVID-19) which started in Wuhan city, Hubei Province of China, constituted a serious health crisis, to the degree that it was declared a Public Health Emergency of International Concern (PHEIC) by WHO. Besides being a health crisis, its intense impact on education was felt. Simultaneously, there was a total lockdown of education activities globally, presenting the largest shock experienced in this present age. This was to curb its transmission. Report has it that as at March 18, 2020, 107 countries have closed their schools (Viner, R., Russel, S., Packer, J., Stansfield, C., Bonells, C., Croker, H., et al (2020). Academic research and activity in tertiary education institutions were also disrupted. According to World Bank Group, (2020:12) "as at April 8, Universities and other tertiary education institutions are closed in 175 countries and communities and over 220 million post-secondary students had their studies ended or significantly disrupted".

To mitigate learning loss resulting from school closures, many countries, Nigeria inclusive, introduced emergency digital learning programs. Efforts were directed towards the use of education technology to support access to this remote learning. Virtual and audio classes were held using smartphones, laptops, tabloids, etc., via various digital platforms such as Zoom, Whatsapp, Google classroom, etc. Furthermore, to take learning to the grassroots, teaching via radio and TV stations were also incorporated into the learning programs. It would be noted that the COVID-19 lesson on education revealed that learning can be innovative and digitally accessible. As a matter of fact, it heralded a new normal in the education system through revolutionizing innovations in digital learning. It introduced a paradigm shift in teaching and learning. By extension, it emphasized the indispensability of digital literacy in the affairs of man. Many countries, even in Africa responded to this education disruption in their own innovative ways. They worked together to surmount various challenges to make learning a reality. For instance, Kenya, an African country rapidly innovated and embraced the new normal. In their submission, the World Bank Group (2020: 48) reporting World Bank (2020) has it that "in addition to radio and TV, education programming is made available as both live stream and on-demand content via EduTV Kenya YouTube channel". In addition, the above source also revealed that Kenya Publishers Association, partnering with the government made available free electronic copies of textbooks on the Kenya Education cloud for all students. It is also recorded in the same source that the Kenya Civil Aviation Authority also in partnership with Alphabet Inc and Telkom Kenya "deployed Google's Loon Ballons carrying 4G base stations over Kenyan airspace" (48) which provided internet connection across an 80km diameter area.

In a similar way, Argentina, in April, introduced "Seguimos Educando Program" where students were engaged in educational activities through 14 hours a day of TV content, and 7 hours a day of radio content. (World Bank Group, 2020:21). More so, their ministry of education created the website Educ.ar where collections of on demand digital learning resources such as videos with recorded

teaching activities were made available to the learners. A section of the website is tagged “the class of the day” (Ibid) which contains a daily plan for students’ lessons accessible to them. In addition to their efforts to continue teaching and learning, they equally delivered learning resources to the homes of those who are without access to connectivity and technology. Rwanda and Senegal also encouraged the school administrators and teachers to support learning activities through live lessons or record Massive Open Online Course (MOOC) styled lessons. They also encouraged the use of TV and radio stations for learning activities (gemreportunesco.wordpress.com cited in Nafungo, 2020). Other countries such as France and China equally did their bid to ensure the continuity of education and its accessibility to all, during the COVID-19 lockdown. On the one hand, France, in addition to lending technological devices to students, provided printed assignments to their identified 5% of students without access to internet. While, on the other hand, China provided computers, mobile data packages and telecommunication subsidies to students from low income families. (gemreportunesco.wordpress.com cited in Nafungo, 2020)

Nations, developed, developing and under-developed introduced varying education learning technologies to mitigate the learning loss brought upon them by COVID-19 lockdown of activities. Digital learning became the order of the day. Although there must have been notable challenges in the quest for digital learning, especially in African counties, some of the challenges elicited vital questions. One of which is whether Nigeria, an African country was prepared for such paradigm shift in teaching and learning. Another one is whether Nigeria is or will be prepared for digital learning transformation in her education sector beyond Covid -19. The above are for both the government and appropriate stakeholders to deliberate on.

Nevertheless, the crux of the matter is that prior to the pandemic, some tertiary institutions in Nigeria had commenced the process of incorporating digital learning in their academic schedule. There were concerted and rewarding efforts of training and incorporating digital learning in the Nigerian university system. For

instance, late 2019 and early 2020, the deputy vice chancellor, Research, Development and Innovation (RDI), of the Federal University of Technology Owerri, engaged the lecturers in online teaching presentation and also developed FUTO e-learning App, amongst other things. It is equally recalled that the process of taking off was met with various challenges peculiar to the Nigeria system, the Afrocentric peculiarity.

Be that as it may, this paper argues that in as much as COVID-19 heralded challenges in the education sector, in the course of its paradigm shift in teaching and learning, it is high time, the concerned stakeholders converted these challenges to opportunities. To this end, the paper in its research questions asks: What are the challenges and opportunities of digital learning made prominent by the COVID-19 crisis? To advance this course, what are the modalities of institutionalizing digital learning in tertiary institutions, beyond COVID-19? For the records, most discourses on digital learning and its implementation have always been met with more of pessimism rather than optimism. Researches have even identified and categorized three types of central arguments when it comes to debates on online learning. Anderson (2004) in Pratibha (2020:41) postulates that the argumentative voices inherent in three schools of thought when it comes to such discourses are the Utopians (Advocates), Dystopians (Critics) and the Utilitarians (Skeptics). Exploring these concepts, while the Dystopians and Utopians criticize and hail online learning respectively, the Utilitarians are neutral. The point to note here is that, while the Dystopians focus on the encountered challenges, the Utopians look at the opportunities it heralds and advocate for its use as the latest approach to education.

Responding to all these, this paper features the challenges and opportunities of digital learning buttressed by COVID-19 crisis. Succinctly put, the objective of the study is to highlight the various challenges facing digital learning. It would also highlight the opportunities therein while proposing modalities for incorporating digital learning in government owned tertiary education institutions beyond COVID-19. The paper discoursed that eventually there would be resumption of schools and also a post COVID-19 period. It then

becomes paramount to look beyond these challenges to their opportunities as soon as schools re-open. Just like the Utopians, it envisages the education sector rising above these challenges to embrace the opportunities. The COVID-19 lessons to education remind us to modify the pre-COVID-19 system of education, build towards a technologically driven and accelerated learning. Considering the immediate response outcome of remote learning during the lockdown period, it clearly depicts that we can build upon what we have to make our education system stronger and position it take care of future uncertainties.

The outcome of this study if given due attention would be very relevant and significant to the consolidation and continuity of our education system. It would also be significant to the learners and teachers, for it would better reposition them to participate with their contemporaries in the new world order with wide range of opportunities. The outcome of this study would also be significant to teaching and learning because it would ensure the right blend between offline and online method of education for quality education outcome. Lastly, but probably may not be the least, it would equip stakeholders in the government sector and tertiary education sector with the needed guide towards coming to terms with the Utopians online learning school of thought.

The methodology this study would adopt is the descriptive survey method where there would be an asynchronous analysis and review of related concepts through scholarly and up to date literature sources. The literature and data collection of the study are from published books and journals of good repute, as well as a first hand experienced on the process of digital learning in Federal University of Technology Owerri. It also includes e-books, e-reports of renowned government and private agencies, newspapers, etc.

### **Review of Related Concepts**

The following concepts would be explored in other to elucidate the perspective of this paper. They are: modern pedagogy to education, the concept of e-pedagogy, and digital literacy competence for digital learning.

## **Digital Literacy Competence for Digital learning**

Digital learning is equated with similar terminologies such as e-learning, distance learning, computer assisted learning, online learning, virtual learning, internet learning, online education, blended learning, remote learning, etc. Be that as it may, the underlying fact remains that in all, learning is done from a distance (no physical contact) and via the use of technological facilities. For the purpose of this paper, they would be used interchangeably here.

Digital learning is the new normal in education globally. However, the operational demands of it present numerous challenges to many African countries owing to their peculiarities. Nevertheless, the COVID-19 pandemic has proved that access to digital learning is now a necessity irrespective of one's country or continent. Digital learning entails the incorporation and use of specific digital devices and applications in the pedagogy of education. One must be digitally literate to be capable of using these digital devices and applications in learning processes. By implication, digital literacy is a pre-requisite for teaching and learning on the digital space. If one must acquire digital literacy for productive digital learning, it then behooves on this paper to succinctly expound the concept of digital literacy and competence. Digital literacy is an aspect of literacy that has come to be influential in all facets of human activities. Judging from its usefulness in computer-mediated communications to its pride of place in digital learning, digital literacy is very pivotal to the current education needs in tertiary institutions. Having mentioned that digital literacy is a branch of literacy, it would be appropriate to briefly talk about literacy before we get back on track.

Literacy traditionally denotes the ability to read and write. As a matter of fact, it comprises the acquisition of the skills of reading, listening, speaking, writing and numeracy. This places literacy in tandem with language because reading, writing, speaking and listening constitute the four basic language skills. Well, that is by the way. The Green Paper publication, 2015, has it that, the concept of literacy, "300 years ago meant being an effective public speaker" (7). Therefore, a history of literacy is incomplete without reference to spoken and written language skills for effective communication. The

use of spoken and written means of communication was accompanied by the use of images, visuals to communicate meaning thus yielding the concept of visual literacy. At the heels of visual literacy is the information literacy which was heralded by the need to acquire competencies in the search and evaluation of information on various data bases. Be that as it may, literacy needs of today, as a result of revolutions in technology have presented the world with a dimension of literacy known as digital literacy. Again, since Nwachukwu and Ahumaraeze (2014:6) posit that “literacy is the ability to understand and use a concept to achieve a set goal” therefore, the ability to understand and use digital devices and applications to achieve the set goal of learning in education could be referred to as literacy, in a narrow sense of it, digital literacy.

Defining digital literacy is a phenomenon that is very much contended with. Researchers agree that getting specific and uniform definition has been a nebulous task. Thus a working definition to address research objectives has always emerged (Gillen & Barton, 2010). There are notable notions of digital literacy which would illumine the aims and objectives of this paper. Amongst these, is that given by The National Curriculum Framework for All, (NCF,2012) which states that being digitally literate entails that one would “acquire skills that include confident and critical use of IT for communication, work and leisure” (cited in Green Paper, 2015:7). The critical IT for communication as mentioned would refer to the understanding, creation and communication of digital contents for education purposes. Again, the Norwegian Ministry of Modernization (2005) cited in (Green Paper, 2015:8) also presented the notion of digital literacy as possessing the digital skills which include “the ability to exploit the opportunities offered by ICT and use them critically and innovatively in education and work. The above source further states that “digital skills also include the ability to be critical to source and assess content”. A notable fact in these definitions is that there is the critical evaluation and creation of digital content for work. These cited definitions of digital literacy would also illumine the conceptual framework of this study. Digital literacy as defined by the University of Illinois, cited in Osterman (2012:4) also involves “the



ability to use digital technologies, communication tools or networks to locate, evaluate, use and create information; the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers; and a person's ability to perform tasks effectively in a digital environment". For quality digital learning, those involved must be digitally literate, so to say, they must possess the ability to critically assess, evaluate, create and consume digital contents for education purposes. Digital literacy as also captured by e-learning department (eLD 2015:10) is "seen as including the more complex skills of understanding and analysis which leads to deciding and selecting the proper digital tools, be they software or hardware, to create a variety of content". This definition further establishes the correlations between digital literacy and digital competence. This is because; it requires not only competence in the use of digital technologies, but also the critical evaluation of digital contents as well as social and ethics of the practice. Reiterating, you require digital literacy for high digital competence. Furthermore, Alex Grech, cited in eLD, 2015:10 put forward what a digitally literate person can do, in other words the various competencies of a digital literate person. They argue that "a digitally literate person can use technology strategically to find and evaluate information, connect and collaborate with others, produce and share original content, and use internet and technology tools to achieve many academic, professional and personal goals". Achieving these goals through digital literacy is the focal point of this study, especially in the sense of the purpose of education attainment.

Digital literacy involves being competent in the critical use of ICT and IT skills in the digital domain. By being digital competent, the e-learning department (eLD) of the Directorate for Quality and Standards in Education (DQSE) in the Ministry for Education and Employment (MEDE) itemized these five areas of digital competence.

- Information: Here, digital competence includes the ability to identify, locate, retrieve, store, organize and analyze digital contents, assessing their relevance and need.
- Communication: Here, digital literacy requires the digital competence for communication in digital space. It also involves linking and collaborating with others in the digital

space, sharing of resources through digital tools, networking and participating in virtual communities.

- **Content-creation:** This involves the creation and editing of digital contents using Ms Word, and other related applications. It also entails producing creative expressions and innovations, media output and programming; knowledge and the application of intellectual property rights and licenses.
- **Safety:** Digital literacy entails the knowledge of data protection, personal and digital identity protection, safe practices and sustainable use, security practices and measures.
- **Problem-Solving:** You have to possess the problem solving capability to be certified digital competent. Such means possessing the ability to creatively use technology, identification of digital needs and resources, solving technical problems, solving conceptual problems, knowing the most appropriate digital tools to use for specific purposes as well as constantly updating one's knowledge and competence. (eLD,2015: 12). There is no gain saying the fact that competence in digital literacy is vital to digital learning in tertiary institutions. Therefore, for a meaningful learning in the digital space, competence in digital literacy is highly required.

To be digitally literate is dimensional. First and foremost, it involves the capacity to identify and effectively use various technological gadgets to navigate the digital space. The gadgets include smart phones, laptops etc. again, it also involves the mastery of locating, identifying and evaluating the relevance and authority of digital contents. In addition, one must be digitally literate enough to critically interpreted and communicate the located contents. There must be a great skill demonstrated in presenting located contents. In digital communication of contents, Paul, Spires and Kerkhoff (2017:6) reporting Thompson state that curating is a needed skill here. Curate as opined by Paul, et al means “to pull together, sift through, select for presentation”, (6). In this, digital literacy is stipulated to involve the ability to surf the net, identify relevant content and analyze them for effective learning. O' Byrne (2012), further reveals that, the ability to curate digital contents contribute towards making learners critical

readers. Another dimension to digital literacy comes in the ability to create digital contents. It is certain that by being able to curate and communicate digital contents. One should be conversant with digital contents creation. Digital contents creation is easily carried out “through multiple media and a variety of Web 2.0 tools” (Paul et al, 2015:5). It is vital to note here that digital literacy is a necessary skill required for online education by not only learners but also teachers as well.

Digital learning requires digital literacy for a productive output. Learning via the digital space promotes creative learning where the students are turned learners and the teachers turned mentors. Teachers as mentors stimulate the learner’s interests and curiosity. They motivate and encourage them to discover their academic potentials by themselves in a most interesting and rewarding experience. In consonance with the above, Paul, et al has it that digital resources enable teachers “to spend more time facilitating student learning and less time lecturing” (2017:5). Digital learning can be adjudged to walk hand in glove with digital literacy. Being literate on the digital tools, applications and spaces enhances quality virtual learning. You must be digitally literate to experience productive digital learning. In conclusion, digital literacy involves the knowledge and incorporation of the mentioned dimensions of digital literacy for productive digital learning in the education system. To this end, digital literacy would be defined here as the attainment of a great level of competence in the use of digital devices and applications to critically curate as well as create digital contents for optimal success in digital learning. While, digital learning is equally conceptualized here as teaching and learning via the online / virtual platforms.

### **Modern Pedagogy to Education: The Concept of E-Pedagogy**

This section would illumine the concept of education, situating it as a formal process of knowledge acquisition. As a formal process, the fact that it involves three things Viz-a-viz content, pedagogy and assessment is brought to fore, with emphasis on pedagogy as it relates to technology and digital learning.

The comprehension of education as a concept basically involves the knowledge of three indices which include: education as a subject, education as knowledge and education as a process. Education as knowledge refers to a particular level of knowledge someone attains, a certain degree, for instance education up to the Master's level. As a subject, education is talked about in the sense of a discipline or course of study in any tertiary institution. In addition as a process, it entails the systematic order of learning which involves pedagogy and a curriculum. These indices play their roles in any discourse on the meaning and definition of the concept education. However, for this paper, education defined as a process is ideal to achieve its objectives. John Dewey's notion of education directly captures it as a process. Education as defined by Dewey is "the development of all those capacities in the individual which will enable him control his environment and fulfill his possibilities", (Kumar and Ahmad, 2019:2). By implication the above definition refers to education which is that process of giving an individual the requisite training with which to develop himself and take charge of his environment. According to Aristotle, the famous western philosopher, "education is the process of training man to fulfill his aim by exercising all the faculties to the fullest extent as a member of society", (Saeed, n.d). Agwuocha (2019:262) posits that "education entails the acquisition of knowledge with which to improve the existence of man and the environment". As a process, Agwuocha (ibid) still maintains that to acquire education "requires going through a formal process, a stipulated procedure". Such formal process comes with defined pedagogical approach to learning. For Smith, (2019), education is a "deliberate process of drawing out learning (educere), of encouraging and giving time to discover"

Education evokes diverse notions to diverse people. For the idealists, it is a means to attaining spiritual development. The pragmatists perceive it as "a process of social progress" (Kumar & Ahmad, 2019:3). In all, the above authors defined education as "a purposive, conscious or unconscious, psychological, sociology, scientific and philosophical process which brings about the development of the individual to the fullest extent and also the

maximum development of the society in a way that both enjoy maximum happiness and prosperity” (3). In as much as this definition tries to capture a whole lot in a swoop, its major preoccupation reveals that education is a process of developing the individual for his prosperity and that of the society. For this paper, education would simply be viewed as the formal and systematic process of knowledge acquisition in any online or offline classroom setting where an individual is equipped to actualize personal growth and contribute meaningfully to the society.

The search for a universal definition of education is a continuous one. Philosophers, pragmatists, educationists, linguists, economist as well as various great thinkers would also always tailor the definition to their research objectives, thus giving rise to diverse notable definitions. Be that as it may, education is very necessary to the development of an individual and the society at large. It is a very vital aspect and goal of any human civilization and national development. The process of education attainment is followed properly. It has stipulated approaches, methods and curricular which culminate in the achievement of set objectives. In the education process, there are three things involved. They are content, pedagogy and assessment.

Pedagogy can be seen as the vehicle for the propagation of the content of education and eventual assessment. It is very essential to achieving the goals of education. According to Persaud (2019), pedagogy evolved from a Greek word which literally denotes “the art of teaching children”. Pedagogy means the theory and practice of educational system. For Cole, it “comes down to teaching methods”. Meanwhile, Persaud (opcit) opines that, it does not necessarily relate to the materials used in teaching, rather, it is about “the process and the strategy adopted to lead to the achievement of meaningful cognitive learning”. Pedagogy refers to the diverse approaches to learning in education. It involves the inculcation of skills and approaches to learning usually modeled after particular times and events. This is to say that pedagogy approach to education evolves. Pedagogical approach to education defines best processes of inculcating learning to students. It is about adapting learning tools,

learning styles, learning processes and approaches which work best in achieving teaching objectives. Generally, pedagogy refers to the simplest approach to the breakdown of concepts for the learners' easy assimilation and connection of learnt concepts to solve real world problems. However, as an evolving phenomenon, the content, context of use and understanding of pedagogy has changed with time. The 21<sup>st</sup> century which is synonymous with digital/internet age played an important role in this new normal of pedagogy in education. It has brought about modern changes in skills and nature of teaching which connote modernity. It has evolved to include digitalization of education, online learning as well as technologically influenced learning. Modern pedagogy practices and approaches to education gave rise to the concept of e-pedagogy.

According to Baldins (2016), in pedagogical practices, “e-pedagogy is understood as a branch of pedagogy which studies and develops learning technologies, and improves didactic approaches to a successful technological application”. Furthermore, Salmons, W (2009) as cited in Baldins (2016) defines e-pedagogy as “teaching and learning strategies developed specifically for online and/or blended environments”. By implications, e-pedagogy includes the understanding and working with digital technologies, multimedia, virtual platforms and applications in fulfilling the goals of education. There are notable differences between pedagogy of the 20<sup>th</sup> century and that of the 21<sup>st</sup> century. Mynbayeva, Sadvakassova and Akshalova, (2017), opine that “the most observable phenomenon is now the internetization of society and the penetration of digital technologies into learning” Online learning has become the order of the day, the new normal which has brought about change in the traditional classroom setting. Aptly captured, the above authors (2017: 3.3) opine that “in the modern school, we observe serious introduction of multimedia in the educational environment”. The assertion of Cole (2019) succinctly captures the dimension of technology being explored here. In the above, pedagogy in teaching/education “can either be teacher centred or learner centred with low-tech or high-tech approach”. While explicating these concepts, Cole (ibid) asserts that in the student-centre learning, the student becomes an active

participant in the learning process. This aligns with the online learning activities where the student assumes the learner role while the teacher assumes the mentor role. The above author still posit that the high-tech and low-tech approaches refer to how much technology a teacher uses to help teach the content. High-tech includes the use of Google suite, personal devices, web quests and Apps, while Low-tech is more paper-based like worksheets and hands-on projects, Cole (ibid) stated.

The world as a global village is evolving and thus, learning processes have evolved in response to the digital learning. Following this trend, modern pedagogy ensures the ability of the students to learn more independently with the aid of technology and internet. It invariably ensures that educators use new forms of technology to teach, which includes the use of visuals, pictorials, animation, chart, video, audio, and slides. This is the new normal in teaching and learning which the world has come to its reawakening. This paper, as a matter of fact, posits that the modern pedagogy approach to education involves the interaction between teachers and learners beyond the confines of the traditional classroom, which is digitally influenced. It further argues that the future of education is fast knocking on our doors, bringing home the realities of using online/virtual platform and applications in the pedagogy of education. These digital processes, as Persaud (2019) has it, make it easier for teachers to track learning activities and actively play their mentorship role. Having critically examined the above concept in relation to the aim of the paper, it then behooves on it to reiterate that for a 21<sup>st</sup> century education, following the times and events which unfold, the pedagogy approach to education must be modified. The concept of e-pedagogy should be revolutionized because e-pedagogy is vital to digital learning.

### **Theoretical Framework: Connectivist Theory for Online Learning**

As a guiding principle, the tenets of this theory would greatly illumine the needs as well as the processes and technicalities of incorporating digital learning in tertiary education system.

The connectivist theory or connectivism is amongst the theories of learning receiving recent scholarly attention. (Siemens, 2004; Downes, 2006 and Ally, 2008). It is a theory proposed to equip learners with the requisite ability to function in a digitalized and networked age. Downes opines that it is a theory of learning that is online specific, while Ally (2008:34) reporting Siemens posits that it is a theory “for the digital age where individuals learn and work in a networked environment”. In all these, the theory could be deduced as a theory for the age of digital learning which put forward the requisite digital skills for developing digital contents for education advancement in a globalized and networked era.

As put forward in Ally, Siemens put forward these guidelines in support of online learning which are based on connectivism theory. They include:

- Because of the information explosion, learners should be allowed to explore and research current information. Learners of the future need to be autonomous and independent learners so that they can acquire current information to build a valid and accurate knowledge base. Appropriate use of the Internet is an ideal learning strategy in a networked world.
- Some information and procedures become obsolete because of changes in the field and innovation; learners must therefore be able to unlearn old information and mental models and learn current information and mental models. The information that is valid today may not be valid tomorrow.
- The rapid increase of information available from a variety of sources means that some information is not as important or genuine as other information. As a result, the learner must be able to identify important information from unimportant information.
- Learners must have the ability to recognize what knowledge is no longer valid so they can acquire the new knowledge for a discipline. This requires that learners keep up-to-date in the field and be active participants in the network of learning.
- Because of globalization, information is not location-specific, and with the increasing use of telecommunication, technologies



experts and learners from around the world can share and review information. Learning and knowledge rests in a diversity of opinions. As a result, learners must be allowed to connect with others around the world to examine others' opinions and to share their thinking with the world. Mobile learning promises to help learners function in a networked world where they can learn at any time and from anywhere. (2008: 34-35)

### **Challenges of Digital Learning in Tertiary Institutions in Nigeria**

In practice, the offshoot of a new thing always meets with a lot of challenges. It would invariably be the case with the incorporation of digital learning in the education system in Nigeria. The digital learning that took place at the peak of COVID-19 lockdown exposed certain realities about digital learning in Nigeria. The first is that it proved that remote learning is achievable in our education system. Second, is that it exposed the challenges facing the success of online learning thereby re-directing stakeholders to the drawing board on the strategies of surmounting the experienced challenges. Prior to the pandemic, the nation was already faced with challenges on her quest to making giant strides in the education attainment for all. Such included lack of adequate financing, infrastructural decay as well as cultural bias on the need to attain education. However, with the attendant closure of schools, and temporary switch to online learning by specific sectors of the education system, came several challenges which became glaring for all to see and thus resolve to address. Notable amongst these challenges are:

**Digital illiteracy and the Dystopian mentality:** Lack of appreciable level of digital literacy acquired by learners and teachers is a major challenge to digital learning in tertiary institutions. Digital literacy does not end at navigating the internet for information seeking and sharing. Rather, it demands the ability to effectively and efficiently select the appropriate digital tools and applications to critically evaluate, curate, innovate and communicate digital contents. Certain questions are directed to instances where participants are adjudged digitally literate. They include: how many of the teachers are attuned

to the creation of digital contents using web 2.0 tools and multiple media? The Screencast-o-matic application is one of the vital applications for uploading lecture slides, how conversant are teachers with how it is run? How up to date are they with safety practices and security measures which ensure the protection of data and digital identity? Teachers might be literate in MsWord, Excel, Power point, etc., how effortlessly do we use them to innovate and prepare our teaching for lucid interpretation of concepts? These rhetoric questions go a long way to reveal how digitally literate we are in handling digital learning. Again, amongst the learners and teachers are those who may be classified as the dystopians. The dystopians otherwise known as the critics, according to Pratibha (2020:41) see the negative sides and consequences of online learning. They dwell more on its challenges rather than opportunities. They see it as not being feasible. It is certain that we have amongst the stakeholders in this course those who constitute the dystopian category. They only sight the challenges of digital learning in education and decide to stop or dissuade any progress in that line.

Nevertheless, for effective online learning, teachers and learners need to be constantly trained and re-trained. During digital learning, projects and assignments are given to students. Their inability to curate digital contents in response to the demands of such tasks is manifested. Therefore, training and re-training would address the needs of digital literacy as well as the psychological need of re-directing the mindset of the participant from being ‘dystopians’ and ‘Utilitarians’ to becoming ‘Utopians’. During a webinar organized by ORF of Mumbai chapter on the topic- “the explosion of online education in India during the Covid-19 pandemic: What have we learnt?” Sahana Murthy, a professor from the Interdisciplinary Programme in Education, IIT Bombay made useful statements. Her presentation supported the need for training the teachers in effective online teaching. According to Murthy (2020), Prof Sahana explained that “for online teaching, along with the requirement of tools such as online platforms, one needs access as well as trained teachers”. Similarly, Dr Fernandes, Ashwin during his own session as captured in Murthy (2020) maintains that there is the need to “enable a shift in

mindset towards online teaching and learning and conduct a robust training for faculty and students on ed-tech tools”. Hence, in addition to training and re-training, changing their mindset to do away with pessimism, leave their comfort zone to embrace this all important new normal is very crucial for change is forever constant.

**Non-reliable internet connections and low internet speed:** Virtual learning requires the use of internet connections to navigate the digital space. Besides connecting to the web, the speed at which the network serves the user is very important and would be useful for e-learning. However, unreliable internet connections and very snail-like speed of the connections are the hallmark of internet service providers in Nigeria. According to nigerianfinder.com, these internet service providers commonly used to browse in Nigeria has the following internet speed, MTN Nigeria has 8.73 Mbps while GLOBACOM LIMITED has 5.48 Mbps. EMTS LIMITED/ ETISALAT Nigeria has 4.96 Mbps, while GLOBACOM LTD has 2.40 Mbps. COOL LINK has 6.46 Mbps, while VODACOM BUSINESS Nigeria has 6.87 Mbps and SPECTRANET has 7.74 Mbps. This record is against more than 25 Mbps internet speed seen in countries like South Korea, Sweden, Japan and USA, Pratibha (2020) reports.

Furthermore, the Cable, a UK-based price comparison website cited in Adesoji (2019) opined that Nigeria’s internet download speed is ranked 176<sup>th</sup> of 207 countries measured in the world. It is stated to be one of the lowest in the world and it took a down turn from 95<sup>th</sup> in 2017 to 176<sup>th</sup> in 2019. To illumine the low internet speed peculiarity of African countries, the above author while reporting Cable reveals that amongst the top 50 countries with fastest internet speed, only one is an African country, while amongst the 50 slowest, 25 of them are African countries. The slow internet speed rate if not checked can defeat the opportunity of digital learning in Nigerian tertiary institutions beyond COVID-19. Account has it that Nigeria rank 7<sup>th</sup> on the highest number of internet users in the world list (Adesoji, July 16, 2019). Quoting the internet world stats, the above author has it that Nigeria’s total internet users stood at 111.6 million out of about 200 million Nigerians, as at March, 2019. Although, this is low if

compared with the level of internet penetration in the world. The point of note here is that the above reading would lead to the realization that with majority of the country's population using internet facilities, it would help achieve the goal of digital learning as proposed here.

Data price seems not to be a problem in all these, because out of 6,313 mobile data plans in 230 countries reported by the Cable; Nigeria is amongst the African countries with the cheapest mobile data subscription rates, (Adesoji, March, 2019). The record has it that Nigeria 11<sup>th</sup> out of the 57 African countries with low data prices. It has an average price of \$2.22 for 1GB. Even though, this record for the sake of digital learning needs to be improved. Besides its benefit to the education sector, the economy would still gain, for the more people to connect to the internet, the greater the ICT sector's contribution to the country's GDP.

Be that as it may, the telecommunication service providers should take cognizance of the already teeming population of internet users which would still increase with the digitalization of education and thereby improve on service delivery. More so, there is need for the Nigerian Communication Commission (NCC) to rise up and ensure that internet consumers get the value of their money on data purchase.

**Poor power supply and high electricity tariff:** Although lack of electricity or epileptic power supply is a common occurrence in low and middle income countries which Nigeria is inclusive. Just as Mcdonnell (2019) citing a UN's report says, 840 million people are without access to reliable electricity, and most of these people are in Africa, live in rural areas and out of the installed power grid circumference. Nigeria, a country with the requisite strength to provide stable electricity supply unfortunately is unable to do so. The above is evident in USAID (2020) which has it that Nigeria is endowed with large oil, gas, hydro and solar resource and it already has potential to generate 12.522 mega-watts (mw) of electric power from existing plants, but most days is only aide to generate around 4,000 mw. With the digital learning, this record, if not improved would pose a serious challenge to the process. More so, James-

Igbinadolor of This Day newspaper reports that “some 55 percent of the population has no access to electricity”. The above author citing a 2015 report by GIZ has it that “2700 MW of power generation capabilities are regularly lost due to gas constraints in a country with one of the largest gas deposits in the world. Up to 500mw are lost due to the line constraints. Perhaps the stakeholders and authorities in the power sector should look into this statistics and look for a way out of the problem.

In Nigeria as well as most African countries, lack of adequate power supply has been an issue. Power generated through electricity or generator is required to give operational energy to the digital devices. However, learners and teachers face the problem of irregular power supply. This affects the ability to give quality attention and sustain digital learning and teaching. The need for regular power supply in education sector has been demonstrated, should there be another pandemic or any other event capable of disrupting education activities, the nation might be faced with the dire consequences of having idle minds that would possibly constitute security threat to the nation.

**Lack of quality digital/technological facilities:** The ability of teachers to innovate during digital teaching and that of the students during learning is dependent upon the availability of technological facilities. The facilities meant here include but not limited to smart phone, laptops, desktops, modern, printer, projector, pointer, interactive board, conference room and digital camera. Digital learning requires not just the availability of these facilities but also the best quality of them for optional function. Where this is not the case, digital learning becomes unachievable. One can posit here that majority of the teachers have smart phones, however, the question is how reliable and digital learning compliant are these tools when it comes to using them to prepare lectures? Even though, students of the tertiary institution embrace technology faster, however, this may only be in the ownership of smart phones. Of course, Nwachukwu and Ahumaraeze (2014:9) in their empirical study discovered that 80% of the study respondents agreed to the ownership of mobile phones

which they use for browsing. Nevertheless, the fact remains that lack of fund would surely inhibit access to reliable and quality smart phones, as well as other facilities like laptop, desktop, etc. Just like Hamilton-Ekeke and Mbachu (2015:10) in their study assert, students are financially unable to buy personal laptops which grossly affected e-learning. Similarly, in Nwachukwu and Ahumaraeze (2014:9), only 25% of the total number of respondents who are students agreed to the ownership of laptop for learning. Be that as it may, learners and teachers to a great extent lack the required digital facilities for quality digital learning.

**Challenge of funding:** The education sector has always suffered the challenge of adequate funding when it comes to infrastructural development to realize set objectives. In the same vein, for a productive and quality digital learning, tertiary institutions require adequate funds to set in motion several modalities for e-learning. This also includes funds for meaningful and productive collaboration amongst institutions in and around the world. Lack of adequate funding of the education sector remains a major challenge to the incorporation of digital learning into the tertiary education curriculum. For smooth operation of digital learning, amongst other things, there should be construction and equipping of digital learning centres, which would require adequate funds.

**Challenge of assessment modalities:** Besides content and pedagogy, assessment is crucial in the education attainment process. Method of ensuring quality assessment of students during online learning may not be familiar to the learners as well as teachers. Critically, these questions need to be addressed. How should learners be assessed? How should quality and fair assessment be ensured? How should the evaluation marks be allotted? These questions constitute part of the challenge which needs to be addressed in implementing digital learning. More so, the fact that both learners and teachers are digitally illiterate or semi-literate in the use of digital facilities in education would affect assessment processes and modalities.

## **Opportunities of Digital Learning in Tertiary Institutions in Nigeria**

Technology has always been a blazing force behind sustainable progress and development globally. Its revolution in the 21<sup>st</sup> century has been felt in the mainstream of education. With the lockdown of education activities as part of the safety measures to curb the spread of the virus, a paradigm shift in teaching and learning is imperative. It is necessary to run offline classes with online classes. Despite the challenges encountered during this process which are peculiar to Africa nations, the opportunities presented evokes the bigger need for digital learning in tertiary institutions today. Just as Pratibha (2020:41) citing Anderson (2004) recounts, amongst the three types of central arguments for online learning, the Utopians recognize these inherent opportunities. They are optimistic about such paradigm shift and thus advocate its incorporation into the education system. We live in a technologically driven world; hence the afro-centric induced cling to the traditional classroom method of teaching should be reformed. To achieve this, the dystopians should reckon with the fact that the world of technology and digital communication is a moving train, which without hesitation leaves the unprepared behind. More so, technology has brought faster and improved ways of doing things, consequently digital learning in tertiary education would herald several opportunities and gains. This study put forward some of these opportunities.

**Accessible teaching and learning at convenience and space:** Digital learning, in its asynchronous mode gives room for learning at one's convenience and space. In this process, teachers prepare their course contents which they upload online on designated platforms. First and foremost, learners are able to access and have a direct experience of the teaching from the lecturer. It would minimize the issue of learners missing their lecturers due to unavoidable circumstances. Secondly, learners can learn from the comfort of their homes, at their own space, in a favourable environment. This addresses the classroom environment peculiar to Nigeria tertiary institutions. It would also yield greater comprehension and assimilation. Just as Cole (2019)

opines, digital learning enables learners and teachers to collapse time and space. This implies that there is easy access to teaching and learning at any time and from any place.

**Learning reinforcement:** Again, in asynchronous digital learning, learning materials, lecture contents are sent online for learners to access at any time. At this instance, learners are at the liberty to access lecture contents and listen to them severally for greater understanding. Learners are able to learn, re-learn and re-in force their learning when education is digitalized.

**Quality content delivery and monitoring of lectures:** Digital learning ensures quality and up to date delivery of education content. A lecturer whose lecture would be delivered virtually or uploaded online would painstakingly leave no stone unturned in the preparation and teaching of course contents. It would bring back on track lecturers who deviate unnecessarily from the learning objectives during lectures. A constituted quality assurance units in all departments would be able to monitor teaching processes and ensure quality lecture and effective time management. The fact that digital learning, be it synchronous or asynchronous can be monitored would mandate the lecturers to do extensive research, innovate and deliver current findings in their subject areas. The various innovations in the use of digital devices and applications to create charts, pictorials, symbols, illustrations etc., would greatly ensure content quality and an engaging experience.

**Digital learning turns teachers to mentors and students to learners:** Another good opportunity of online learning is that in the process, teachers play the role of mentors while students, the role of learners. By being mentors, teachers stimulate the learners' interest, motivate and encourage them. All these are obtainable in the opportunity they have to interact discuss and attend to students questions that are of educational benefits beyond teaching hours.



**Digital citizenship:** Digital citizenship is fast becoming the hallmark of every literate person. Digitalization of education would ensure that participants compulsorily acquire digital literacy skills which, besides their educational needs, would equip them with the wherewithal for a new world of opportunities. Just as Digital Literacy, (2015), asserts “digital literacy is essential if we want our citizens to participate in today’s modern world”. Digital learning would expose participants to the academic networking, webinar, e-conference preparation and participation and so on. It would surely bridge the digital divide between Nigerian students, teachers and their counterparts globally. Many researchers are of similar opinion that teachers who are highly digitally literate engage in all digital resources obtainable to enrich the learners learning experience. In their submission, Kenya Education Network (KENET, 2020) posits that “when teachers are digitally literate, highly order thinking skills become evident in the students”. Therefore, digital learning provides the participants the opportunity of acquiring digital literacy, for with such skill, learning outcome would be greatly enhanced.

**Completion of course content/outline:** In tertiary institutions, sometimes, lecturers battle against odds to cover stipulated course outline. There are usually the learner/teacher unforeseen factors militating against such. There is also the problem of inadequate time allotted to various courses with high units which makes finishing such courses contents impossible. Inadequate infrastructure has always been a major problem facing the education sector which result to lack of lecture venues and halls for learning. Lack of lecture halls for specific class size of students, at the allotted time hinder the completion of course contents in some cases. If digital learning is implemented, teachers should be able to navigate through this problem as they would conveniently and at the required pace prepare and teach students. In the asynchronous learning situation, course contents can be prepared and delivered before their appropriate time, and learners access them at their space.

**Opportunities for distant learning as well as local and international collaboration:** With full implementation of online learning for some courses, opportunities to have distant learners would be opened. Institutions both in Nigeria and beyond can collaborate and run some programmes. Besides the increase in the internally generated revenue from the distant learners, teachers and learners would benefit academically as knowledge, pedagogical approach, syllabus and assessment modalities would be shared amongst collaborating institutions. Already Ahmed and Nwagwu (2006:4) discovered in their research on e-learning that “new forms of local and international collaboration are starting to emerge among countries and private and public sector agencies in Africa for the purpose of educational development”. The collaboration between Kenya and United States in the form of KENET was used to buttress this fact. Local or international collaboration can be done through the establishment of remote satellite campuses and twinning. Twinning means the agreement by institutions in different countries to offer joint academic program. It came from the concept ‘twin’, two institutes act as a team to run the same programme, and the programme is in two parts, each part being offered in either of the institution. The partnership could also involve franchising. Just as Ahmed and Nwagwu (2006) stipulated, franchising is a sort of arrangement where an institution may be in United States approves the partnership of another institution in another country, to offer certain educational programmes. Suffice it to say that reputable institutions can decide to accredit and approve the teaching of some of their courses to upcoming universities. Such partnership would greatly impact the status and standard of the upcoming universities.

**Continuity of learning in the event of unpredicted circumstances:** The last but definitely not the least in the numerous opportunities of digitalizing education in Nigeria is the continuity of the academic calendar whenever it is needed. Digital learning if incorporated into the tertiary education would enable teaching and learning to be continued in the face of future pandemics or other unforeseen circumstances. Digital learning is definitely the way forward in

tertiary education in Nigeria which COVID-19 lessons reaffirm. We would not need to worry about the disruption of academic calendar and by extension the meaningful engagement of the youths in the case of future pandemic. Having itemized a few out of the numerous opportunities which online learning would herald, the next section would briefly propose modalities for institutionalizing digital learning in tertiary education.

### **Proposed Modalities for Incorporating Digital Learning in Tertiary Institutions**

Although proposing the modalities for incorporating digital learning is outside the purview of this study, however, the need to briefly state them here has been identified. It is very necessary, considering the global trend of ‘technovation’ (technology and innovation) in education and the possibility of future pandemics, the future of education in Nigeria needs to be secured. As a matter of fact, the significance of this study if probably taken cognizance of, would require these modalities as guide towards achieving digital learning in tertiary education. To this end, the following dimensions to it are brought to fore. They include: Human capacity structure, institutionalizing and funding of e-learning centres, curriculum development (course content) and course evaluation) pedagogy and funding.

**Human Capacity Structure:** By this, the study proposes the constitution of bodies with the requisite expertise to plan and execute the project. This constituted authority would oversee and bring to fruition the goal of the other mentioned dimensions viz-a-viz institution of e-learning centres, curriculum development etc. They would ensure an enabling environment in tertiary institutions for online education to thrive in.

**Institution and funding of e-learning centres:** Reiterating, the major challenge facing the education industry has been poor funding which has always affected infrastructural development within the sector. In the case of online education, there would definitely be the need for

human capacity development, facilities and structures to run the programme. For instance, e-learning centres need to be built; their offices and laboratories also require equipment etc. In addition, there should be human capacity development which requires training and retraining of teachers etc. More so, the issues of digital facilities, broadband, power supply and so on would be taken care of. These require funds to be established. Digital learning has many prospects; however, it requires a great level of commitment in the infrastructural development and capacity building which requires fund. The government, concerned agencies and good spirited individuals as a matter of responsibility should brace up to the challenge and set the ship sailing smoothly.

**Curriculum development (Course content and evaluation):** For e-learning, there need to be e-curriculum so to say. The course content and evaluation parameters of various courses require reformation to suit the e-learning purpose for quality outcome. Since the study suggests that for a start, online learning can run simultaneously with offline learning, courses which require laboratory experiments can be taking offline. Those without such in their content can go online. It is essential to really develop online education curriculum. In addition to this, the assessment modalities should also be modified. The study proposes the allocation of stipulated percentages of the required grade to offline and online modes respectively. For instance, on the one hand, out of a 100% score, 50% can be allotted to exam, further divided into 30% for theory and 20% for practical. On the other hand, 50% can be for continuous assessment broken down to 30% online Projects, quiz, assignment and 20% offline submission of practical and essay questions.

**Pedagogy:** As stated previously, digital learning requires the incorporation of e-pedagogy in its teaching. Consequently, in addition to the guidelines for developing online learning materials as proposed by connectivism theory, the act and practice of using digital devices and application to teach and evaluate learners should be stipulated and used forthwith.

**Funding:** The beginning of a worthwhile venture is usually met with challenges which finance is a crucial part of. Funding of digital learning can be sourced from three possible angles. Firstly, telecommunication industries, network providers as well as digital facilities merchants should as a matter of their social service responsibilities support institutions with funds for e-learning. Their support can equally come in zero tariff of network to designated areas and packages, and/or at reduced costs of digital facilities. Secondly, good spirited individuals, philanthropists, companies etc. can donate structures and facilities for the good course of e-education. Thirdly government in their responsibility should allocate more funds to the education industry. They can also make and implement laws that would mandate and monitor concerned sectors to live up to their social services responsibilities. The nation stands a lot to gain from incorporating digital learning into the education system. Besides, digital learning would also equip learners with the requisite digital skills with which to contribute positively to these sectors and thus move the nation's development indices upward.

## **Conclusion**

Globally, educators demonstrated commendable resilience and technological innovation in the face of total lockdown of activities and subsequent school closure orchestrated by the COVID-19 pandemic. To mitigate its effect on the academic calendar, there was a paradigm shift in teaching and learning across the globe, African nations inclusive. Online learning became the new normal in the education sector, even though there were challenges encountered in the process which hitherto had been there. However, the process if not for any other gain, demonstrated the need and urgency in incorporating digital learning just as it is done in most western world. Every challenge herald opportunity, it became imperative for optimistic stakeholders in the various scheme of affairs to convert these challenges to opportunities. Beyond COVID-19, educators need to harness the opportunity brought by COVID-19 to reposition the education system for continuity of academic calendar in the face of future pandemics and also to join the globe to embrace the new normal. This study

therefore noted the need to digitalize learning in government tertiary institutions in Nigeria beyond COVID-19. To advance its course, it demonstrated the fact that at some point in the future, literacy definition might change; unless you are digitally literate, you would not be called literate, for you might not be able to participate in the modern world. The study further stated that for digital learning, competence in digital literacy is highly required. Digital learning strives effectively when one is digitally literate. Consequently, the study examined the concept of digital literacy and digital literacy competence and brought to fore their bearing on digital learning, e-pedagogy and e-learning materials put forward by the theory of connectivism.

Subsequently, the study highlighted surmountable challenges to digital learning. Some of them included digital illiteracy and the dystopian mentality, challenge of access to reliable and affordable internet connections, poor power supply, quality assessment modalities and funding for infrastructure and facilities, etc. However, just as the Utopian's central argument on online learning posit, the study looked beyond these challenges to highlight the numerous opportunities derivable from the process. For clarity here, digital learning as the new normal is not advocated as a substitute to direct face to face teaching and learning. It is rather suggested that the offline should for a start be complemented with online learning pending when the institutions would be fully equipped in all ramifications to host online degrees. Simply put, online education should complement offline teaching and learning for it has numerous opportunities and potential of enhancing learning outcomes. The opportunities include making learning remotely accessible to learners at their convenience and space, as well as partnerships with and amongst institutions of national and international repute. It would also make way for continuity of academic activities in the event of future pandemics or otherwise. Furthermore, the paper also x-rayed that digital learning can be both synchronous and asynchronous for quality learning outcome. While we cannot totally do away with offline learning method which involves the association with contemporaries and the school environment designed to nurture critical thinking and

learning, the prospects of online education should still be harnessed to position our graduates to compete favourably in a technologically driven world and economy.

To demonstrate the urgency of this course, in addition to the challenges and opportunities of digital learning put forward here, five-point modalities for the commencement of digital learning in tertiary institutions were proposed. The key lesson from the COVID-19 pandemic for us the educators to take home is that digital learning cannot be divorced from the future of education. It is thus timely to give a serious thought and action to digital learning in tertiary institution beyond COVID-19. The rapid spread of 2019 Coronavirus disease demonstrated the need to be resilient and technologically proactive. The challenges it heralded during paradigm shift in teaching and learning should be turned to opportunities. Even though, digital learning is not widespread however, there have been exponential growths in the number of African countries resorting to its innovation and adoption. Therefore, the paper concludes that the tertiary education system in Nigeria should join the moving train all over the world and incorporate digital learning into their academic curriculum.

### **Recommendation**

Following the urgency in the digitalization of learning in tertiary education system, this study therefore gives the following recommendations.

- The government and concerned bodies should properly fund the education system for such projects.
- Digital learning centres should be instituted in all government tertiary institutions where logistics of online learning would be addressed.
- Human capital development in the form of training and re-training of teachers should be solely or partly sponsored by the government.
- Digital devices, interactive technologies and tools should also be provided free or at a discount rate to the students and teachers.

- Free browsing access to all education platforms for students and teachers of tertiary education should be provided. Where the burden might be too much, considering the effect on the economy, telecommunication industries can be mandated as part of their social services to reduce the browsing rates for users. In addition, the internet browsing speed rate should be improved.
- Regular and improved voltage of the electricity supply should be given especially in tertiary institutions environment. In addition researches by institutions on the provision of alternate power supply should be funded and made a reality.
- Quality assurance units should be properly trained and equipped for effective monitoring of learning activities and assessment of learners.



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