

**ACCELERATED UTILIZATION OF ELECTRONIC LEARNING IN NIGERIA TERTIARY INSTITUTIONS IN THE POST COVID-19 ERA: IMPLICATIONS FOR NEUROEDUCATION**

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**Abstract**

*The usage of e-learning has received increased utilization in post lockdown occasioned by the outbreak of covid19. E-learning mostly appeals to the cognitive domain of learning. Thus, the neurological effects of e-learning usage need to be examined. This paper focused on the accelerated utilization of electronic learning in Nigeria universities in the post covid-19 era: implications for neuroeducation. Specifically, this paper discussed the following: concept and types of e-learning, e-learning enhanced utilization and covid-19 outbreak, concept of neuroeducation and Neuroeducational implications of enhanced use of e-learning in post Covid 19 era. It was recommended, among others, that both lecturers and students should be exposed to seminar on the neuroeducational implications of enhanced use of e-learning in the post Covid 19 era.*

**Keywords:** *Traditional classroom learning, E-learning, covid19, neuroeducation, cognitive domain*

**Introduction**

The outbreak of coronavirus in Wuhan, China in 2019 led to the death of thousands of Chinese within fifty days (United Nations Educational, Scientific and Cultural Organization, 2020). The novel virus was named Covid-19 by the Chinese scientists. In a shorter period, this covid-19 spread worldwide. The outbreak has changed the operating conditions all over the globe within a month. Almost all countries of the world and Government ordered the close down of all schools across all levels as an emergency measure to stop spreading of Covid-19. Most Universities in Nigeria resorted to on line for teaching and administrative activities. E-learning was used to sustain the continuity of learning activities. E-learning encompasses the use of the internet and other important technologies to produce materials for learning, teach learners, and also regulate courses in an organization (Fry, 2001). Thus, an unexpected accelerated shift from face-to-face learning to online learning activity is inevitable a novel operation of brain for learning by the students. This is because e-learning dwells more on the cognitive domain of learning. Understanding and improving the neuroeducational implications of the fast imbibing e-learning on students in Nigerian universities is imperative. Neuroeducation is concerned with the study of the activities that occur in the brain when individual learns and the application of this knowledge to improve the classroom practices and optimise curriculum design (Bassett & Mattar, 2017). Effective learning through e-learning by the students in Nigerian universities cannot be effective or rather have cognitive side effects on the students, if the considerable attention is not given to the e-learning effects on the cognitive prowess of the students.

**Concept of E-learning**

The inevitable roles e-learning plays in the field of education have attracted the attention of the scholars in education to conceptualized it based on their knowledge background. Ordinarily, e-learning is a joint word of electronic and learning. Fry (2001) saw e-learning as the delivery of training and education via networked interactivity and a range of other knowledge collection and distribution technologies. Tao, Yeh and Sun (2006), on the other hand, emphasized that e-learning focuses on the electronic networks that allow learners to receive individualized support and have separate, flexible learning schedules.

E-learning refers to the use of information and communication technology (ICT) to enhance and/or support learning acquisition. This encompasses an ample array of systems, from students using e-mail and accessing

course materials online while following a course on campus to programmes delivered entirely online (Harasim, 2012).. E-learning refers to using electronic applications and processes to learn. E-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. E-learning can also be referred to as the delivery of learning content via the internet, intranet/extranet, audio or video tape, satellite television, and CD-ROM (Almosa, 2002). According to Tao et al (2006), this new environment for learning that is centered on electronic networks has allowed learners in universities to receive individualized support and also to have learning schedules that is more suitable to them as well as separate from other learners. This facilitates a high interaction and collaboration level between instructors or teachers and peers than traditional environment for learning. E-learning in academics which is characterized by the use of multimedia constructs made the process of learning more active, interesting and enjoyable (Liaw, Huang and 2003).

### **Types of E-Learning**

There are diverse ways of classifying the types of e-learning. According to Algahtani (2011), there have been some classifications based on the extent of their engagement in education. Some classifications are also based on the timing of interaction. Algahtani (2011) divided e-learning into two basic types, consisting of computer-based and the internet based e-learning. The computer-based learning, according to Algahtani (2011) comprises the use of a full range of hardware and software generally that are available for the use of Information and Communication Technology and also each component can be used in either of two ways: computer-managed instruction and computer-assisted-learning. In computer assisted-learning, computers are used instead of the traditional methods by providing interactive software as a support tool within the class or as a tool for self-learning outside the class. In the computer-managed-instruction, however, computers are employed for the purpose of storing and retrieving information to aid in the management of education.

The internet-based learning, according to Almosa (2002) is a further improvement on the computer-based learning, and it makes the content available on the internet, with the readiness of links to related knowledge sources. For examples e-mail services and references could be used by learners at any time and place as well as the availability or absence of teachers or instructors. Zeitoun (2008) classified internet-based learning as assistant or mixed mode. The assistant mode supplements the traditional method as needed. Mixed mode offers a short-term degree for a partly traditional method. The completely online mode, which is the most complete improvement, involves the exclusive use of the network for learning.

Algahtani (2011) described the completely online mode as “synchronous” or “asynchronous.” The synchronous timing comprises alternate on-line access between teachers and learners, or between learners and the asynchronous. This allows all participants to post communications to any other participant over the internet (Algahtani, 2011). The synchronous type allows learners to discuss with the instructors and also among themselves via the internet at the same time with the use of tools such as the video conference and chat rooms. This type according to Almosa and Almubarak (2005) offers the advantage of instantaneous feedback. The asynchronous mode also allows learners to discuss with the instructors or teachers as well as among themselves over the internet at different times (Algahtani, 2011),

### **Enhanced utilization of E-learning and COVID-19 Outbreak**

The Nigerian pre-COVID-19 e-learning history could be traced back to the development of telecommunication which began in 1886. E-cable connections were established by the colonial masters between Lagos and the colonial office in London to transmit information and receive feedback (Ajadi, Salawu, & Adeoye, 2008). Thus a means of communication and information sharing was established. The telecommunication industry gradually grew to welcome the Nigeria Telecommunication (NITEL) that was sole telecommunication services provider until sometimes in the 90's when the Federal Government of Nigeria commenced the liberalization policy of telecommunication industry that gave birth to four (4) private telephone service providers (Mtel–NITEL, Econet now Airtel, MTN and Communication Investment Limited-CIL) licensed to provide General System for Mobile Services. CIL license was later revoked and issued to Globacom (Glo) Nigeria. Following this development, more companies were licensed to provide

internet services in Nigeria. Several internet service providers came into the scene and this gave the opportunity for many Nigerians to be connected to the internet.

In the Nigerian educational institutions, e-learning has been adopted to a limited degree for teaching and learning activities (Chigozie-okwum, Ezeanyej, & Odii, 2018). The limited degree of adoption does not go without facing challenges. Lecture notes have been delivered on CD-ROM which can be played at the learner's convenience. Some institutions employed the use of intranet facilities for online learning. Few institutions in the country had been able to weather the storms of challenges facing e-learning to a reasonable degree. These institutions include University of Ilorin, the Federal Polytechnic, Ilaro, University of Ibadan, Obafemi Awolowo University, University of Benin, University of Abuja, University of Lagos, National Open University of Nigeria, Covenant University, Madonna University, among others. These institutions have the facilities for e-learning. It has been shown in the literature that e-learning methods have a very good prospect in Nigerian higher institutions (Nicholas-omoregbe, Azeta, Chiazor, & Omoregbe, 2017; Odegbesan, Ayo, Oni, Tomilayo, & Okezie & Udenwagu, 2019).

In December, 2019 as alerts sounded on the increasing spread of the COVID-19 infection, the World Bank built up a multi-sectoral worldwide task force team to help nations react and introduced adapting measures. China and some other developed nations began social distancing, putting on of face covers, regular washing of hands, use of hand sanitizers and so on. Due to the increasing number of people infected with COVID-19, there followed the closing down of the schools, offices and other public places. In the meantime, following fourteen days after, over 120 countries (including Nigeria) closed down all schools, regardless of the educational level, across the world to curtail the fast spread COVID-19 (Azzi-Huck & Shmis, 2020).

The higher institutions of learning in Nigeria introduce courses through online portals. Furthermore, they were adopting the technologies available such as digital Video conferencing platforms like Zoom, Microsoft platform, and Webex Blackboard and Google Classroom (Stoel & Lee, 2003). This will be enhancing E-learning globally (Baytiyeh, 2018). The lecturers in Nigerian universities, like their counterparts, in the universities in the developed nations, have more than ever before, begun to deliver online teaching to their students (Azzi-Huck & Shmis, 2020). Previously, they were using only the delivery through face-to-face teaching. However, the shift to online mode has raised many queries on the quality of education (Rossi, 2009). Technologies have changed the traditional way of education to the modern way of learning, like artificial intelligence (Rosenberg, 2001). Thus E-learning is covered under a larger term of technology-based learning through websites, learning portals, video conferencing, YouTube, mobile apps, and thousand types of free available websites for blended learning tools. Currently, E-learning is enhancing students' knowledge, even the academic staff and professional and industry people skills through the internet (Smedley, 2010). Most of the higher education and universities are providing online courses for their students within and off campuses.

### **Theoretical Backup**

Online Collaborative Learning Theory (OCLT): Online collaborative learning (OCL) is a theory proposed by Linda Harasim in 2012. The theory was based on the facilities of the internet to provide learning environments that foster collaboration and knowledge building. The theorist describes OCL as: a new theory of learning that focuses on collaborative learning, knowledge building, and Internet use as a means to reshape formal, non-formal, and informal education for the knowledge age. According to Picciano (2017), Online Collaborative Learning Theory sees the benefits of moving teaching and learning to the internet and large-scale networked education.

In some respects, in OCL, there exist three phases of knowledge construction through discourse in a group:

1. Idea generating: the brainstorming phase, where divergent thoughts are gathered
2. Idea organizing: the phase where ideas are compared, analyzed, and categorized through discussion and argument.
3. Intellectual convergence: the phase where intellectual synthesis and consensus occurs, including agreeing to disagree, usually through an assignment, essay, or other joint piece of work. In summary, as emphasized by online collaborative learning theory, students are encouraged to collaboratively solve problems through

discourse and where the teacher plays the role of facilitator and the students constitute the learning community members (Picciano, 2017). This theory was adopted for the study because of the relationship which is established with the focus of this study. E-learning facilities have created a learning avenue where the teacher and students converge basically for learning activities.

### **Concept of Neuroeducation**

Learning occurs in the brain and the brain changes with learning, bidirectional collaboration between neuroscience and education is crucial to understand how students learn. Neuroeducation is a new interdisciplinary field that aims to link brain research with educationally relevant behaviors. The goal of neuroeducation is to advance our knowledge on neural mechanisms underlying diverse learning processes and development over the life span to ultimately design an optimal learning environment. Neuroeducation focuses on what, when, how, and why the brain learns and suggests evidence-based pedagogical approach to enhance learning cognitively (Ansari, 2008). Neuroeducation is the study of the activities that occur in the brain when individuals learn and the application of this knowledge to improve classroom instructional practices and optimize curriculum design. This emerging field represents the intersection of the broader areas of neuroscience, psychology, and education, integrating research on neuronal functioning with educational improvement to understand how the brain enables learning, working memory, intelligence, and creative thinking.

Neurosciences are developing investigations focused on the neural bases of learning, memory, emotions, and different functions of the brain, the results of which have high applicability in the field of learning [30]. This is because the foundation of neuroeducation is a concept called brain plasticity, which is the brain's ability to physically change to adapt to stimuli and habits in ways that are useful to the individual. In this sense, learning and emotion are very close. Thus, in meaningful learning, relevant information is linked with sensations and feelings linked to pleasure that make us internalize them earlier.

Neuroeducation as a discipline relies on the contributions of neuroscience, cognitive psychology, and education sciences to create a better understanding of how a human being is capable of learning and how this information can be applied to create teaching methods as well as plan more effective study and educational policies. Neuroeducation deals with the study of the different stimuli that the student perceives in the teaching-learning process, through the senses, to give rise to meaningful learning.

### **Neuroeducational implications of Enhanced Use of E-learning in post Covid 19 era**

The use of e-learning from a neuroeducational perspective would allow greater profitability in terms of learning in the current context of the crisis caused by the coronavirus, in which e-learning is proving to be a feasible solution. The integration of e-learning and the contributions of neuroeducation, help the student to build their own learning strategies through new paradigms that facilitate learning processes in the context of e-learning (Bassett & Mattar, 2017). This is because the significant learning processes are based on brain operations, the results of which change the circuits of the brain. Neuroeducation deals precisely with the study of the optimization of learning based on brain development. This interdisciplinary approach between e-learning and neuroeducation facilitates meaningful learning by creating interactive learning spaces in which the presentation of content through the innovative possibilities offered by e-learning in online teaching offers teacher-student interactivity that arouses the interest of the students. This situation causes the connection between neurons or the neurotransmission process, that is, the transmission of information from one neuron to another neuron, to obtain effective results when explaining the new content.

The use of e-learning involves constructivist-based learning since its use gives students control over their own learning through self-regulatory mechanisms that are set in motion under precise stimulation (Dehaene & Cohen, 2007). When significant learning is carried out through various brain operations, modifications occur at the level of the brain circuits. In this way, neuroeducation provides the necessary tools for the student to optimize the brain's potential more effectively. Despite the fact that e-learning is constantly being updated, most of the traditional platforms are oriented to content, content administration, and the application of teacher-centered methodologies (Dehaene & Cohen, 2007). Hence, a review of e-learning is necessary that is capable of combining technological advances and the principles of neuroeducation focused on students, which can stimulate motivational processes toward meaningful learning.

**Conclusion**

No doubt, the outbreak of COVID-19 has enhanced the utilization of e-learning in Nigerian tertiary institutions more than ever before. E-learning mostly appeals to the cognitive domain of learning. There exist a reasonable connection between utilization of e-learning and neuroeducation in the sense that the students use the brain to think, assimilate, understand, interpret, respond/solve learning problems giving on e-learning platform. The quality of learning an individual receives determines the behaviour disposition of the person. This goes to say that, learning through electronic means should enhance the student cognitive engagement rather than stressing them up. Meanwhile, the university teachers and the authority should work collaboratively to enhance learning through e-learning which is devoid of cognitive stress.

**Suggestions**

From the discussion made in this article, the following suggestions are hereby made:

- i. The post lock-down occasioned by COVID-19 saw the accelerated use of the e-learning platform in tertiary institutions and learning through e-learning concentrate more on cognitive domain. Hence, both lecturers and students should be exposed to seminar on the neuroeducational implications of enhanced use of e-learning in the post Covid 19 era. in order to expose them to the neuroeducational implications of use accelerated use of e-learning.
- ii. The designing of e-learning platform should be carried out jointly by both experts in e-learning and educational psychology in order to be mindful of the likely on line distracters which can inhibit the students' concentration while on e-learning platform.
- iii. In as much as there are variations in the intelligence level and learning style of the students, the lecturers should prepare the learning content to be discussed or uploaded on e-learning platform to suit the cognitive differences in the students. By this, the students who are average or low in cognitive ability will not be discouraged to mentally partake in e-learning activity.
- iv. The lecturers should not upload or discuss complicated learning content which can possibly stress up the cognitive abilities of students; but rather, relevant, clear and meaningful learning contents that will easily be understood by the students.
- v. In a situation when the learning content to be uploaded or taught is in stages, the lecturers should sequentially discussed them (learning content) and be guided by the principle of learning from simple to complex, known to unknown, concrete to abstract, general to specific and so on.
- vi. The use of e-learning platform should be under the thorough supervision of the school authority to ensure that the learning content to be discussed or uploaded is not complex for students' easy understanding.
- vii. Accessing the designed e-learning platform should not be stressful for the students to avoid them being stressed up and discouraged from learning through the e-learning platform.

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