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ENABLING TEACHING AND LEARNING ENVIRONMENTS IN A CONTACT-LESS WORLD

Patience E. Idoga[1+]
Ahamed Sani Kazaure[2]

[1]*Cyber Security Department, Federal University Dutse, Nigeria.*
Email: dr.pat@fud.edu.ng Tel: 08166744812
[2]*Information Technology Department, Federal University Dutse, Nigeria.*
Email: askazaure@fud.edu.ng Tel: 07032879532

(+ Corresponding author)

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ABSTRACT

The educational paradigm is constantly evolving; this is largely due to continuous emerging educational tools and technologies. This development has altered the traditional ways of teaching and learning. Present global trends have further increased or forced the adoption of technology in all its ramifications, resulting in a reliance that could have prolonged implications for teaching and learning activities and outcomes. This study discusses the need for enabling teaching and learning environments in the face of swift and continuing technological developments in a post global pandemic era, which has resulted in a contactless world. Metadata and abstracts of reviews on studies were retrieved from science direct database via the search words "enhanced teaching/learning" and "teaching/learning in COVID-19 era", published between the years 2018 - 2020 and the years 2020–2021 for teaching and learning in a COVID-19 era. This search led to the retrieval of articles on enhanced teaching and learning activities and subsequently articles related to the COVID-19 era. The findings from this study reveal that strategic planning of teaching and learning processes have to be reevaluated.

Contribution/ Originality: This study contributes to the necessity of educational technologies in enhancing the future of education in the face of obvious challenges. Additionally, integrating educational tools implies that teaching and learning can be conducted remotely, hence, the need for stakeholders involvement in the enhancement of infrastructure and sustainable teacher training.

1. INTRODUCTION

A teaching and learning environment enhanced by technology is not something new. In-fact, this has been in the literature for quite some time. Several academic institutions in developed countries accepted and implemented technologies in their teaching and learning activities prior to the global COVID-19 pandemic, even though many of these institutions of learning were reluctant to accept this as a necessity at the time. Beginning from the year 2019 and subsequently continuing into the years 2020, 2021 and up till today, the whole world has suffered and is still suffering from the impact of the global pandemic that has ravaged every sector of the world economy. Significant among the sectors most affected is the education sector whereby academic establishments at all levels came to a standstill in the face of a worldwide shut down. The pandemic has had some devastating effects on the academic system. Studies have shown that the pandemic has given rise to is a lack of schooling coupled with clear gender bias in education, resulting in more than two hundred and fifty-eight million children dropping out of school globally in the year 2019 alone. Meanwhile, as the pandemic surged, students were forced out of school especially

in war torn countries such as Afghanistan, Nigeria, Cameron and the Democratic Republic of the Congo. In such areas, many women were prone to suffer the impact of violence and discrimination, with the resultant effect of staying out of school; a situation that culminated in gender bias (Global Partnership for Education, 2019).

Furthermore, in addition to the global pandemic, there is the existing problem of inadequate schools, poor quality education and global learning crises. Recent studies suggest that more than six hundred and seventeen (617) million students worldwide at the end of their elementary studies have learning difficulties, especially, in mathematics and reading; about twenty percent of the population in developed countries is incapable of furthering their studies due to a lack of rudimentary skills. This situation is not different from that experienced in sub-Saharan Africa and South and Central Asia (World Bank, 2018; World Bank, 2019).Consequently, the importance of technology in education took on a whole different meaning as institutions who partially used it prior to the pandemic embraced it fully in all their academic programs at all levels. Similarly, academic institutions which had never integrated educational technologies before put some modalities together and implemented them as a medium of information dissemination for both teachers and students. Hence, the use of technology- enhanced teaching and learning was no longer a method of choice, but one of necessity (Al-Ataby, 2020). However, some institutions of learning especially in the developing countries are not able to fulfill this critical need due to reasons such as inadequate equipment and teaching infrastructure, lack of training and tools for educators to develop wide learning experiences, as well as the inability to apply procedures and resources to carry on with the desired educational processes. To strengthen measures to enable adequate assessment of technology enhanced education during the pandemic, there is a need to ascertain the technological tools used to conduct remote teaching and learning activities. Research papers show the studies by Buentello-Montoya, Lomelí-Plascencia & Medina-Herrera (2021); Christopoulos & Sprangers (2021) and Larchenko & Barynikova (2021) conducted on the integration of educational technology into teaching and learning activities during the COVID-19 pandemic, especially, in the use of novel technological tools and channels. Consequently, there is a knowledge gap in the type of technological platforms employed to facilitate continuous teaching and learning in the face of the pandemic. Therefore, this study is focused on discussing the need for enabling teaching and learning environments in the face of unending technological development in a post global pandemic era, which is envisaged in the formation of a contactless world.

2. LITERATURE REVIEW

From times past, the education system has been constantly evolving. This is largely due to continuous and novel emerging educational tools and technologies. This development has greatly altered the traditional ways of teaching and learning. Present global trends have further increased and forced the adoption of technology in all its ramifications, resulting in a reliance that could have prolonged implications for teaching and learning practices. Consequently, instructors and learners are expected to possess some form of digital technological know-how in order to effectively use these tools (Daniel, 2020). To this effect, Deng and Benckendorff (2020) examined the necessity of educational tools on the tourism curriculum. Their perspective was centered around the application of technological tools in areas such as mobile learning, simulations and the Massive open Online Courses (MOOCs) in learning and teaching and their effects on pedagogy. Their findings on assessment practices showed that educational technologies have provided instructors and learners with novel tools for assuring verifiable learning skills. The use of Technology to Enhance Active Learning (TEAL) approach exposes the various techniques by which educational tools can be used. Hassan, Puteh and Sanusi (2018) assessed the components of TEAL to ascertain its rudiments via the thematic analysis procedure. The study, which was based on the compilation of methodical reviews of related literature and the interview of professionals, recognized that the TEAL elements are essential in helping academic institutions promote learners' engagement with active learning so that graduates' technological knowledge can be enhanced and their employability skills increased. In investigating the applicability

of educational technologies amidst the global pandemic from the view point of instructors and learners in various contexts, an effort was made to realize the possibility of teaching mathematics in an educational technology environment. The empirical study concluded that there was a need for a cautious evaluation of prospective educational tool features and their respective environments. Additionally, designers of educational technologies are required to consider the level of gamification as an important aspect of teaching and learning environments since it can negatively affect learners' engagement (Christopoulos & Sprangers, 2021).

Virtual and Augmented Reality (VAR) has also been seen to facilitate teaching and learning, especially in mathematics; which has always been a subject of concern for most students. The study on "The Role of reality enhancing technologies in teaching and learning of mathematics" presented a review and an analysis of studies which employed VAR for academic purposes, for the period 2015–2020. The findings of the study suggest that VAR has been well embraced by instructors and learners. However, the use of this technology could become complicated if there is an uncoordinated approach in the delivery of lectures (Buentello-Montoya et al., 2021).

The study on "Digitalization and education: the current state and prospects," analyzed some facets of educational technologies in the light of virtual and augmented reality technologies, mobile digital learning, digital literacy and robotics training in academic institutions. The study focused on the increasing utilization of educational technologies for teaching and learning in the face of an unending pandemic. The results of the findings indicate that learners are seen to possess enhanced knowledge and skills due to novel digital approaches to educational processes (Larchenko & Barynikova, 2021). Table 1 presents the summary of the literatures reviewed. Literature review:

Table 1: Summary of literature review

Author/Year	Method	Findings
Deng and Benckendorff (2020)	Review of related literature	Educational technologies have provided instructors and learners with novel tools for assured verifiable learning skills
Hassan et al. (2018)	Literature review and interview	TEAL elements are essential in helping academic institutions promote learners' engagement with active learning
(Christopoulos & Sprangers, 2021)	Empirical study	Cautious evaluation of prospective educational tool features and their respective environments
Buentello-Montoya et al. (2021)	Review of related literature	VAR has been well embraced by instructors and learners. However, the use of the technology could become complicated if there is uncoordinated approach in the delivery of lectures
Larchenko and Barynikova (2021)	Review of related literature	Learner are seen to possess enhanced knowledge and skills due to novel digital approaches to educational processes

3. METHODS

The essence of this study is to discuss the need for enabling teaching and learning environments in the face of unending technological development amid a global pandemic resulting in a contactless world. This study utilized the thematic analysis approach to examine various educational and technological tools commonly used in recent times. Thematic analysis was performed on data obtained from the review of related literature.

In order to identify studies related to teaching and learning published during the pandemic, the Science Direct (https://www.sciencedirect.com; accessed on 20th November 2021) database was employed. Metadata and abstracts of reviewed studies were retrieved from Science direct using the search words "enhanced teaching and learning" and "teaching and learning in COVID-19 era," and published between the years 2018–2020 for enhanced teaching and learning, and the years 2020–2021 for teaching and learning in the COVID-19 era. Based on this search, articles on enhanced teaching and learning were first obtained. Subsequently, articles related to COVID-19 era

were retrieved. The literature reviewed in this study encompasses studies that were published between the years 2017 and 20th November 2021. The data were curated in order to eliminate missing data and word-based errors and articles which were retracted were excluded from this study.

During the world pandemic shut down in the year 2020, some academic institutions of higher learning and subsequently all categories of learning adopted various means of delivering lectures to students. The techniques of teaching and learning ranged from mobile learning and electronic simulations to the massive open online courses (MOOCs); To ascertain the objective of this study, an evaluation of these teaching techniques and their tools are examined in the light of a contact-less world.

3.1. Mobile Learning (M)

Mobile devices (MDs) are lightweight, portable, pocket-sized, computerized devices with a display screen and an input or output interface like an external or touch screen keyboard with access to wireless network capability. They are channels through which ML is practiced. Categories of mobile devices include smart phones, tablets, personal digital assistants, mobile personal computers and handheld game consoles (Tingir, Cavlazoglu, Caliskan, Koklu & Intepe-Tingir, 2017).

As a teaching tool, MDs permit learners to carry out learning tasks such as reading electronic resources, viewing documented video classes and finishing web-based tests; in addition, MDs can be used either as a communication tool or an instructional instrument, or even both. As a communication device or tool, MDs provide vital learning-related notices and enhance learner-learner and learner-instructor interaction. A crucial advantage of ML is its ability to permit learner-content alliance in real time and remotely since social rendezvous is a dispensable aspect of the learner's involvement in technology-enabled learning environments (Deng, Benckendorff & Gannaway, 2020a; Deng, Benckendorff & Gannaway, 2020).

In the process of teaching and learning various tools have been used to pass and share knowledge with learners. These come in the form of video conferencing, webinars and live online classes. Significant among these tools are the Skype and Cisco WebEx, which have been in use for a long time. In the advent of recent developments, especially the outbreak of the COVID-19 pandemic, however, these three video conferencing tools were seen to be quite influential in teaching and learning. Their popularity, however, was due to their ease of use, cross-platform capability and affordability.

Figure 1 presents a global overview of the different technological tools used in various parts of the world to overcome the adverse effects of the pandemic on education. These tools include the Zoom, Microsoft Teams and WhatsApp. In Nigeria, the Zoom, WhatsApp and the Television were more utilized among institutions of learning adopting a remote channel for delivering lectures during the contactless period.

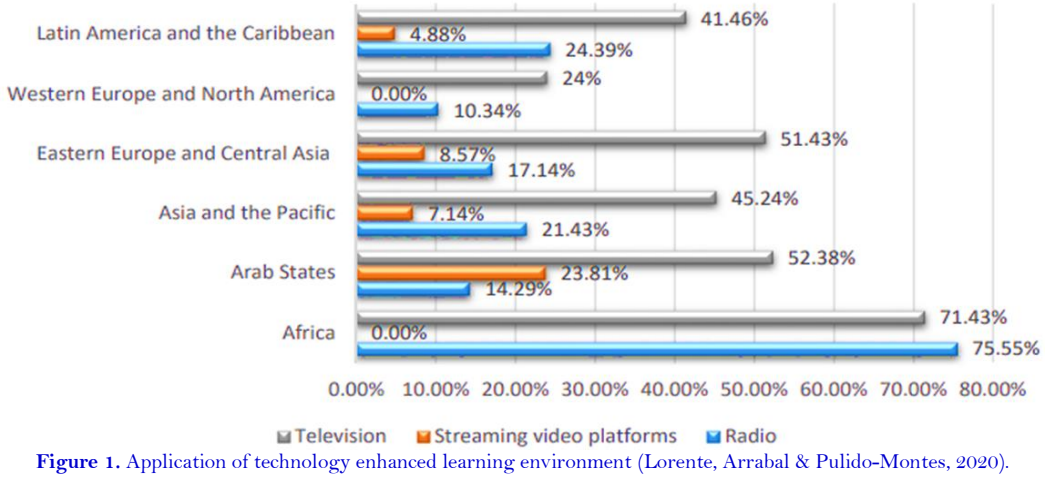

Figure 1. Application of technology enhanced learning environment (Lorente, Arrabal & Pulido-Montes, 2020).

3.2. Electronic Simulations (ES)

Online or computer and web-based simulation have been predominant as educational tools in teaching and learning. This is because simulation, when joined with adequately designed knowledge proceedings delivers numerous benefits to students. Studies have shown that simulation provides enjoyment, improves learner's engagement and satisfaction among others and develops useful skills and executive competencies that are of high importance in business, as well as providing reliable Team-Based Learning (TBL) environments for learners (Buil, Catalán & Martínez, 2018; Lohmann et al., 2019).

As simulation learning can be delivered remotely, the tools used are helpful in enhancing students' comprehension skills. It is common knowledge that students often find it difficult to understand abstract and hypothetical ideas. Hence, in order to deal with this predicament, simulation tools come in handy to reduce this complexity. A variety of simulation tools exist, and each is tailored towards a particular field of study. Examples of some of these tools include MATLAB, which offers a robust spontaneous simulation environment; Analogic, which provides a multi-process simulation that facilitates system dynamics, agent-based and distinct event procedures and Simulink, which is a programming software fashioned for designing, simulating and examining dynamic systems (Biolyse, 2018).

3.3. Massive Open Online Courses (MOOCs)

Massive Open Online Learning (MOOCs) is regarded as "open, extensive web-based learning resources modeled and administered by accredited organizations; such that, anyone with a smart device and an access to the internet can benefit irrespective of location, gender and age" (Deng & Benckendorff, 2020). MOOCs are used by educational professionals in various ways such as in utilizing MOOCs learning resources as a supplement to old-style learning, developing MOOCs to replace or complement face-to-face learning and employing learning resources in MOOCs to sustain flipped classroom learning.

Many instructors are utilizing learning resources offered by MOOCs to complement old-style learning methods. Studies have shown that university allied students interact more with MOOCs resources (Watted & Barak, 2018). Using MOOCs in campus-based learning offers advantages such as introducing learners to alternative teaching techniques, supplementing secondary resources and building online skills (Deng & Benckendorff, 2020). MOOCs learning resources include PowerPoint slides, case studies, video lectures, open textbooks, hands-on projects, quizzes, examinations, homework, solved examples, discussion threads and interactive exercises. MOOCs provide instructors with an opportunity to improve on teaching content. With MOOCs, numerous benefits are enjoyed, especially by the teachers, the school and the students. Some notable MOOCs platforms are Coursera, Future Learn, EdX, Swayam and Udacity (Shah, 2019).

4. RESULTS

The resultant effects of the COVID-19 pandemic and subsequent shutdown of activities related to the education sector will have a lasting effect capable of changing the very way instructors carry out teaching engagements. This study reveals that it will no longer be work as usual for educational institutions. However, there is a need for a re-evaluation of strategic planning of the whole process of teaching and learning. Worldwide happenings have established that technology is unceasingly reforming how work and interaction are experienced in academic institutions. The present study's findings have identified three cognitive educational tools as being of crucial necessity in the post pandemic era. In addition, a number of educational thinkers have opined that it is very possible for future teachers to produce professional web-based content that are adopted by students through various learning establishments.

Secondly, it has been established that mobile learning has provided a podium for distribution and curating of learning content. The inference of this for students is that, future curricula can be developed chiefly based on

electronic information conveyed by academic professionals from any part of the globe, with face-to-face classes set aside for events which strengthen learning, thereby creating novel prospects for ongoing expert growth and lifetime learning.

5. CONCLUSION AND IMPLICATIONs FOR EDUCATIONAL PRACTICE

This paper has examined the use of educational tools commonly used in teaching and learning in a post pandemic era. Instructional approaches built on the usage of technology that were used during the world shutdown have also been evaluated. Additionally, the concept of enabling teaching and learning environments is also discussed, and findings from the entire study are presented for further discourse and best implementation practices. Basically, the study presents two theoretical and policy implications for educational practice. In the first instance, the study contributes to the necessity and viability of educational technologies in enhancing the future of education irrespective of obvious challenges. Secondly, since integrating educational tools in education means that teaching and learning can be conducted remotely, there is a crucial need for the government, private sectors and stakeholders to be actively involved in the enhancement of infrastructure and the provision of adequate and sustainable teacher training in addressing remote-based pedagogy (Habibi et al., 2021). Furthermore, in terms of the policy implications of this study, policy makers must reaffirm their allegiance to "Sustainable Development Goals", guaranteeing that young people especially in the third world countries have the right to good quality education to cultivate the skills, knowledge, values as well as attitudes that will enable them to play a part in society's development (Schleicher, 2020). Hence we conclude that policies focused on fairness and wide-ranging educational paradigms are of critical need in order to reinforce and pledge the right to pedagogy.

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