



EMERGING TECHNOLOGIES IN TEACHING AND LEARNING OF BUSINESS EDUCATION PROGRAMMES IN THE NEW NORMAL IN TERTIARY INSTITUTION IN NIGERIA

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Abstract

Business education is a programme of study that prepares students to acquire practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economy and social life. In the face of COVID 19 pandemic, a lot of transformation has taken place in the delivery of general education programmes including business education, which is a new normal in teaching and learning. This study was carried out to ascertain emerging technologies in teaching and learning of business education in the new normal in tertiary institution in Nigeria. Specifically, the paper examined Ubiquitous Computing (UC); Collaboration Technologies (CT); Extended Reality (ER), Artificial Intelligence (AI) and BlockChain (BC). All the literatures reviewed proved that emerging technologies used in teaching and learning has more advantages compared to other means of learning, including flexibility, mobility, convenience, low cost, and user friendliness. The paper concluded that there is need to integrate emerging technologies in the curriculum of business education programmes. It was recommended among others that business educators and students need to develop new range of digital competence such as information processing, computational thinking and digital learning to cope with the emerging technologies in teaching and learning. Above all, there is need for professional development of business educators in the emerging technologies used in teaching in the new normal.

Keywords: Emerging technologies, business education, new normal

Introduction

All over the world, COVID-19 pandemic has brought new ways of doing virtually everything including teaching and learning and business education programme is not an exception. The year 2020 specifically was a challenging year globally due to COVID-19 which led to changes in teaching and learning with lockdowns of schools and switching from face-to-face teaching and learning to online instructions. This triggered a lot of action research by various stakeholders and educational experts on new knowledge to inform instructional design, assessment, evaluation and educational policies on emerging technologies in teaching and learning in higher education institutions.

New trends in teaching and learning depend on emerging technologies in the new normal brought about by COVID 19 pandemic. Education generally and indeed business education programme is perceived in most countries as a means of preparing students to acquire practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economy and social life. According to ILO, UNESCO and World Bank Group, (2020), emphases are now on future skills and deskilling particularly learning-to-learn skills. This would allow people to adapt to future



changes in the labour market through continued and lifelong learning and improving the responsiveness of educational systems to emerging trends. It also requires close cooperation between education, research and industry to allow institutions of higher learning to provide skills training in emerging areas. Furthermore, there is need for a strong emphasis on technologies in teaching and learning to facilitate adaptation to workplaces where manual tasks are being taken over by digital tasks. It is based on these facts that this paper explored the use five emerging technologies driving teaching and learning of Technology, Vocational Education and Training (TVET) with particular emphasis on business education.

Business education is that aspect of Technical and Vocational Education and Training (TVET) involving, in addition to general education, the study of technologies and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economy and social life (FGN, 2013). Business education is also an educational programme offered in tertiary institutions in Nigeria. The programme inculcates into the students the understanding, values, knowledge, and skills required for the world of work. The need to prepare business education students to fit into the world of work in the 21st century and beyond requires the acquisition of emerging Technologies in teaching and learning of business education programmes. The emerging technologies focused in this paper include Ubiquitous Computing (UC) which enables computing power anytime, anywhere; Collaboration Technologies (CT) that facilitates the ability to collaborate with anyone in real time; Extended Reality (ER) that drives the ability to digitally simulate reality and to integrate digital and physical worlds into teaching and learning; Artificial Intelligence (AI) enables machines to learn on their own, and interact in a human-like manner in the teaching and learning environment and BlockChain (BC) that use computers with guarantees as to privacy and security. Grech and Camilleri (2017) explained that the use of technology in every facet of life is also being advanced as an emerging means of teaching and learning especially in the new normal. The next section illustrates the use of UC, CT, ER, AI and B in teaching and learning.

Ubiquitous Computing (UC) and Teaching and Learning

Ubiquitous is defined as something existing or being everywhere at the same time, which implies that it is constantly encountered, and widespread. Ubiquitous computing according to ILO (2020) refers to the technologies that give people access to information and computing power through the worldwide web from any place in the world. In teaching and learning, ubiquitous computing infrastructure is an important application that enables digital learning. It is used to deliver *any* educational or training opportunities especially in places with little or no educational infrastructure. Ubiquitous technology is often mobile, wireless, and networked, making its users more connected to the world around them and the people in it.

The concept of ubiquitous computing is also related to mobile and wireless technologies which paved the way to the concept of ubiquitous learning or u-learning. U-learning is the use of portability and immediate communication properties of mobile devices on the learning processes in interacting with peers, accessing resources and transferring data (Huang, et al., 2010). Hsieh, et al., (2011) added that mobile devices and wireless Internet technology enable learners to learn by a variety of digital resources from anywhere in the world at any time which makes learning accessible, easy and more interesting. In a U-learning environment, students are self-directed which facilitates a student centred learning environment.

Further explanations by Chiou, et al., (2010) posited that when students are situated in a u-learning environment, they can utilize information provided both by the real world and the Internet to solve problems in a timely manner. Interaction with experts, instructors, or learning peers and all students' learning activities is made possible through recorded facilities for later review and evaluation. Hwang, et al., (2010) stated that u-learning environment can host learning activities which are student-centered, knowledge-centered, assessment-centered, and community-centered. In ubiquitous learning, ubiquitous computing occurs all around the learner, whether or not they are aware of it. Liu and Chu,



(2010) listed the characteristics of u-learning as permanency, accessibility, immediacy, interactivity, situation, calmness, adaptability, seamlessness, and immersion.

Collaboration Technologies (CT) and Teaching and Learning

Collaborative learning includes student-to-student collaboration, teacher-to-student collaboration, student-to-teacher collaboration, and student-to-machine interaction. If collaborative learning is associated with the halo effect, students can be projected in time to when the event happened and be immersed in another time and place which is very easy to understand. Collaborative learning brings about innovation in teaching and learning methods, facilitating the presentation of learning content among students and teachers. Group or collaborative learning has been recognized as an alternative way of overcoming individual working memory limitations (Paas and Sweller, 2012). People may feel more confident regarding highly complex tasks when working in groups compared to working alone because they can use the processing capacity, expertise, and knowledge of others and because the high cognitive load can be distributed among group members. Collaborative technology that is used as an emerging technology in the new normal include computer-mediated social interaction such as Facebook, Skype, mobile phones, adhoc networks, etc.

ILO (2020) stated that ubiquitous computing and computer-mediated social interaction are playing a role in the education sector today by modernizing the learning environments. Social networks such as Facebook and Google Groups can facilitate collaboration as well as Dropbox, Google Drive, WhatsApp and Skype. Slack is also a smart platform that works on mobile and desktop devices, and allows sending direct messages and files to a single person or a group of employees. Slack also has the ability to organize conversations into different channels (specific projects, general chat, among others) The app supports video calling, and drag, drop and sharing of files with colleagues directly within Slack. It is also compatible with services such as Google Drive, Dropbox and Box.

Extended Reality Technologies and Teaching and Learning

Extended reality (XR) is an effective way to augment traditional forms of pedagogy. Brown et al., (2020) explained that XR education evolves widely in higher education as a field that provides unique hands-on experiential learning and helps motivate students to achieve the desired skills and knowledge. According to Pomerantz, (2019) XR technologies provide the learning tools of the most active fields of innovation and research among the various higher education institutions. It offers learners a unique learning experience that may be unattainable in a traditional educational format.

Among XR are sub-technologies like Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR). VR is the most widely known of these technologies. It is fully immersive; tricking the senses into thinking one is in a different environment or world outside of the real world. Using a head mounted display or headset allows the user to experience a computer-generated world of imagery and sounds, manipulating objects and moving around using haptic controllers while tethered to a console or PC. For example, VR allows 'visits' to 3D-simulated workplaces. AR transfers digital information on real-world elements, either through a headset or a mobile device such as a phone. AR keeps the real world as a central construct, but enhances it with other digital details, layering new strata of perception and supplementing an individual's reality or environment. An example include shared remote control of equipment with a single model of an expensive piece of equipment located within a lab or work context, and students from different locations can log on and use it for specific periods of time which can enhance teaching and learning especially in the new normal. Extended reality (XR) immersive technologies have massive potentials to enrich teaching and learning in Higher education through their abilities to offer a unique hands-on experience that might be unattainable previously with other educational technologies.

Artificial Intelligence and Teaching and Learning



Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems, and therefore it is a set of computational techniques inspired by the way humans use their nervous system and their body to feel, learn and act. (Harkut & Kasat, 2019). AI applications are important in the fields of human endeavours. But of recent it is more important in the field of educational institutions and universities. The mandate of tertiary institutions transcends the traditional function of preserving heritage, identity and education. It is rather required to keep pace with emerging technological development through the creation of new methods of education and teaching.

There are many studies that discussed the topic of artificial intelligence and its impact on higher education. Fernández, Fernández, and Aburto, (2019) reviewed the impact of artificial intelligence on higher education and the study concluded that the coming period will witness the transition from the traditional roles of universities to new ones such as replacing the traditional language with the digital language, and the development of teaching methods in a new way which will enhance students' skills to adapt to social intelligence applications. The effects of AI on education in general and tertiary education in particular cannot be viewed in isolation. Khare, Stewart and Khare, (2018) stated that there is a positive impact of AI applications on student success. The study of Tuomi, (2018) highlighted the importance of AI in providing rich educational environments and the possibilities of solving traditional problems of education using its applications. Also, Fryer, (2019) viewed the role of robots in developing students' interests in learning and the study of Ma and Siau, (2018) emphasized the importance of AI in developing higher education and changing traditional methods of education. According to Chaudhary, (2017), artificial intelligence is beneficial for both students and teachers because it is used to create an educational environment and provide collaborative learning. The use of AI and modern technologies can help teachers and students gain more educational experience and provide information for teachers in the management of educational practices (Fernández, Fernández, & Aburto, 2019)

Block chain and Teaching and Learning

Block chain (BC) more formally known as distributed ledger technologies, is predicted to offer significant opportunities to disrupt traditional products and services such as the permanence of the BC record, and the ability to run smart contracts. These features significantly distinguish BC technology-based products or services from previous internet-based commercial developments and are also particular interest to the education sector.

Block chain technology is forecast to disrupt any field of activity that is founded on time-stamped ledgers. Within education, activities that could be impacted by BC technology include certification, management of student records, intellectual property management, issuing of payments and student information system architecture. Grech and Camilleri, (2017) stated that BC allows self-sovereignty whereby users can maintain direct control over the storage and management of their personal data; trust, as the technical infrastructure gives people enough confidence in its operations to carry through with transactions such as payments or the issuance of certificates. Transparency and provenance that enables users conduct transactions with the knowledge that each party has the capacity to enter into that transaction and immutability records that can be written and stored permanently, without the possibility of modification. Also in disintermediation there is no more need for a central controlling authority to manage transactions or keep records as parties have the ability to transact directly with each other, without the need for third parties through collaboration.

Implications of the Use of Emerging Technologies in Teaching and Learning of Business Education Programme

Leveraging on new technologies for skills acquisition of business educators in tertiary institutions in Nigeria has some implications in the teaching and learning (Enang & Okute, 2019). In the aspect of Ubiquitous computing (UC) and its application to u-learning, mobile computing



technologies can enhance learning when blended together to engage and motivate learners anytime, anywhere. This type of learning using UC technologies when properly integrated into the teaching and learning of business education would be more advantageous compared to other means of learning in terms of flexibility, mobility, convenience, low cost, and user friendliness. Collaborative technologies such as Facebook and Google Groups can facilitate collaboration as well as Dropbox, Google Drive, WhatsApp and Skype. Slack is also a smart platform that works on mobile and desktop devices, and allows sending direct messages and files to a single person or a group of employees. Slack also has the ability to organize conversations into different channels like specific projects, general chat, among others. The app supports video calling, and drag, drop and sharing of files with colleagues directly within Slack. It is also compatible with services such as Google Drive, Dropbox and Box. These emerging technologies can facilitate effective teaching and learning of business education programme.

When applied in teaching and learning of business education programme, AR and MR brings together real-world and digital elements in the teaching and learning process. It allows interacting and manipulating both physical and virtual items and environments, using next-generation sensing and imaging technologies. MR also allows people to see and immerse themselves in the world around them even as they interact with a virtual environment using their own hands.

AI can furthermore, automate basic activities in business education, such as classification and grading, extra support tailored to students need. It enables students and teachers have the opportunity to provide useful comments for others to benefit and share experiences in personal and professions lives. AI systems specify the areas that need improvement in the study courses, as it helps to improve and fill gaps that can occur in educational courses. It helps to ensure that all students build the same conceptual foundations; instead of waiting for the teacher to listen, students get instant feedback that helps them understand the concept and remind them how to use it in the future. AI can also provide students with a way to learn in a relatively rule-free environment. When properly integrated into business education programme, AI can allow students and teachers to grasp the opportunity to choose the proper places for learning and enhance their educational abilities whether at home, school or other places.

Above all, the application of emerging technologies into teaching and learning of business education programme can enhance tutoring in academic lecture halls, classrooms, laboratories and interactive study places in colleges, institutes or other educational institutions. There will be no need for the teacher to repeat the explanation of a certain topic or a part of it and spend more time with students to understand that part; the student can now achieve that easily with AI without embarrassment or waste of time. It can facilitate student's grade such that teachers can quit grading to spend more time with students. It will eliminate the classrooms' walls to allow students to share knowledge and participate in different learning global environments

(Boulay, 2016). In a TVET system built out of hundreds of distinct units, AI could be used to recommend educational/training resources; learning opportunities; and personalized career pathways, based on aptitude, educational goals and past performance.

Nigeria's Technological, Economic and Curricular Readiness to Adopt Emerging Technologies in Teaching and Learning

The emerging technologies highlighted in this paper are capable of influencing the process and outcome of teaching and learning process in Nigerian tertiary institutions, especially in business education if properly deployed and applied. This assertion is in line with the work of Oliveira et al., (2019), that technologies have increasingly shaped students' experiences as well as influenced their relationships with natural and physical world. It is also in tandem with assertion of Corinne (2018) that emerging technologies have spawned the exponential development of software and AI-aided, cloud-based technology that aim to adapt learning methods and customize curricula to fit each student's ability to move forward at his or her own pace.



Despite the importance of emerging technology in teaching and learning, Nigeria's adoption of emerging technology is still far from it. There are several challenges that impede the successful integration of emerging technologies in the teaching and learning process. Some of the major challenges identified are epileptic power supply, insufficient skills or expertise, availability and accessibility issues, funding, poor professional development, resistance to change, poor internet connections, and affordability issues. However, these challenges can be surmountable through combination of efforts by actors and stakeholders in education including educators, policy makers, curriculum planners, and students just to mention but a few. This conforms to the finding of Spector (2013), that the challenges of emerging educational technologies are interrelated, and it is not possible to address just one without taking into consideration the others. The provision of appropriate infrastructures/facilities, trainings, funding, enabling environment, and attitudinal change are significant towards the smooth integration of emerging technologies in the teaching and learning process. Also there is need for educators to make deliberate effort towards the acquisition of digital media literacy to enhance their ability and skills to develop, and integrate relevant emerging technologies across content areas, and to fit into the modern and emerging classrooms of the 21st century, which are highly driven by technology. According to Teachthought (2016), countless educators are making move towards the assimilation of emerging educational technologies. Many educators and students are enthusiastic to integrate emerging technologies in the teaching and learning process despite the obvious limitations if given the enabling environment.

Conclusion

New knowledge in teaching and learning on emerging technologies is paramount in tertiary institutions due to the challenges caused by COVID 19 pandemic resulting to a new normal in teaching and learning globally. This paper ascertained emerging technologies in teaching and learning of business education in the new normal in tertiary institution in Nigeria with special interest on Ubiquitous Computing (UC); Collaboration Technologies (CT); Extended Reality (ER), Artificial Intelligence (AI) and BlockChain (BC). Literatures reviewed so far, revealed that emerging technologies used in teaching and learning have more advantages compared to other means of learning, including flexibility, mobility, convenience, low cost, and user friendliness. Therefore, there is need to integrate emerging technologies in the curriculum of business education programmes so that business educators and students would develop new range of digital competences such as information processing, computational thinking and digital learning to cope with the emerging technologies in teaching and learning in the new normal.

Recommendations

The following recommendations were drawn from the study.

1. There is need to develop new range of competencies like Ubiquitous Computing (UC); Collaboration Technologies (CT); Extended Reality (ER), Artificial Intelligence (AI) and BlockChain (BC) on business educators and students to meet up with the realities of the new normal
2. Tertiary institutions should provide avenues for professional development of business educators in the emerging technologies used in teaching in the new normal.
3. There is need for tertiary institutions in Nigeria to update and integrate emerging technologies into the curriculum of business education programme in order to be at abreast with new development in teaching and learning in the new normal globally.



4. Government should provide emerging technology systems in all tertiary institutions so as not to be left out in teaching and learning in the new normal.

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