

Challenges of Virtual Instruction during the COVID-19 Pandemic in Accounting Classrooms

M. Skhephe^{1*} and C. D. Mantlana²

¹*Faculty of Education, North West University, Mahikeng Campus, South Africa*

²*Faculty of Education, Walter Sisulu University, Ibika Campus, South Africa*

KEYWORDS Accounting Classroom. COVID-19 Pandemic. Emergency Remote Teaching. Online Teaching. Virtual Classroom

ABSTRACT The purpose of the study was to explore challenges of Virtual Instruction during the COVID-19 Pandemic in Accounting Classrooms. A qualitative research approach and a case study design was used. 10 Accounting teachers were purposively selected. Thematic data analysis was used. The study shows challenges of virtual classroom like lack of teacher readiness, and ready infrastructure to support the virtual learning. The study concludes that rural schools and those that are in semi-urban areas needs to be priorities when technology resources are distributed. Teachers who are in rural and semi-urban areas needs to be up-skilled with technological skills. The study recommends that Network companies should partner with education sector in order to supply data, connectivity, and accessibility by zero- rising then to support virtual classroom learning. After the COVID-19 all teachers should be encouraged to attend various forms of online workshops in order to improve their understanding of online teaching.

INTRODUCTION

The study explores challenges of virtual instruction during the COVID-19 pandemic in Accounting classrooms in selected high schools of the Eastern Cape, South Africa. In the Eastern Cape Province, virtual teaching is confronted by socio-economic factors, since the majority of schools and learners are from disadvantaged backgrounds therefore, they cannot afford data to access the internet unless supplied. According to Mehtar et al. (2020), on March 11, 2020, the World Health Organization declared coronavirus 2019 a pandemic. Furthermore, there was turbulence all across the world following the declaration, resulting in severe changes all over the world. A slew of harsh measures, including total lockdown, stay-at home campaigns to preserve lives, and travel and movement restrictions, were enacted around the world (Adu et al. 2020). Adu et al. go on to say that all schools in the country have been told to close, and that students and instructors, as well as those non-teaching personnel whose services are not required,

have been told to work from home. As a result of this practice, all educational institutions have no choice but to adapt to online instruction (Adu et al. 2020). The president of the country, Mr Ramaphosa, and other educationists in the country have underlined the importance of implementing alternate means of utilising online teaching and learning and other distance learning techniques (Jacob et al. 2020). For the first time in the country, the cancellation of face-to-face teaching contact sessions was replaced by an online teaching technique (Jacob et al. 2020). According to Dhama et al. (2020), the coronavirus first appeared in Wuhan, Hubei Province, China in 2019 as pneumonia of unknown origin, and it has since spread to numerous nations around the world. Dhama et al. (2020) point out that in recent decades, more work has been put towards developing vaccines against human coronavirus (CoV) illnesses such Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS). MERS and SARS, on the other hand, have yet to be treated with an approved antiviral or vaccine. The pandemic coronavirus epidemic has been labeled a global health emergency because it has become traumatizing and unsettling in every way (Dhama et al. 2020). Prior to the outbreak of COVID 19, there was a call in the country's education and other sectors to embrace the usage of modern information and communication technology facilities as a result of the 4th Industrial Revolution

**Address for correspondence:*
M. Skhephe
Faculty of Education,
North West University,
South Africa
Cell: +27787567858
E-mail: sikepemk@gmail.com

(Adu et al. 2020). In some institutions, particularly in South Africa, where resources are limited, this request remains a struggle (Adu et al. 2020). As a result, the outbreak of COVID-19 caused widespread consternation at such institutions, which had little choice but to abandon face-to-face instruction in favor of virtual learning, according to the United Nations Educational, Scientific, and Cultural Organization (UNESCO 2020). South Africa is still a developing country, with poverty, unemployment, and illiteracy all contributing to the slow growth of the country (Adu et al. 2020). Adu et al. also contend that there is apparent inequality inside the country in terms of infrastructure and educational opportunities. As a result, some schools are still having difficulty with new technology and internet access, which makes applying the Fourth Industrial Revolution a struggle (4IR). However, certain people are skilled in the use of 4IR, therefore virtual learning is almost seamless in the COVID-19 period.

Objectives of the Study

The objective of the study is to give an account of the challenges that come as a result of virtual instruction in accounting classrooms during the COVID-19 pandemic.

Literature Review

An Introspection into Virtual Classrooms

Virtual learning, according to Gallacher (2015), is an online system that enables lecturers to share educational materials and communicate with their students via the internet. Rachiva (2018) and Ferriman (2019) agree with Gallacher and add that because virtual classrooms are both synchronous and asynchronous, they are very similar to traditional face-to-face teaching. Synchronous learning is a method of instruction in which everyone learns at the same time (Racheva 2018; Ferriman 2019). A virtual classroom, on the other hand, is a shared environment in which teachers/lecturers and students work together at the same time (Racheva 2018). Video conferencing, online whiteboards (for real-time collaboration), instant messaging applications, participation controls, and breakout rooms are all frequent features of virtual classroom learning (Racheva 2018). Among other

things, virtual classroom it includes Moodle and Blackboard (Gallacher 2015). Gallacher add that in order to profit from this form of instruction, students must be exposed to both independent learning and Fourth Industrial Revolution activity. However, developing countries, such as South Africa, may have challenges with online learning systems, as mentioned in this research. A Virtual Learning Environment (VLE), according to Loureiro and Bettencourt (2014), is a collection of teaching and learning technologies aimed to improve a student's learning experience by incorporating computers and the Internet into the learning process.

To limit the transmission of coronavirus during the lockdown period, online instruction became an alternate option around the world, and all students were required to have computers, which posed a significant difficulty for children from low-income households (Adu et al. 2020). Adu et al. further reveal that even though not all institutions were ready for virtual learning, South Africa did not fall behind. In the learning process, a VLE primarily incorporates the usage of laptops and the internet. However, virtual learning environment is intended to enhance students' learning experiences by allowing them to be accountable for their own learning outside of the classroom. According to Latif (2016), e-learning is thriving in the digital age of education because it creates a virtual learning environment that allows for more enriched interaction and engagement between teachers and students, resulting in more effective learning. Teachers use the VLE to provide online routes, embed YouTube videos, share articles with students, and more (Sangrà et al. 2012). Furthermore, because the world of 4IR is defined by rapid information processing, the area of education has no choice but to participate. Sangrà et al. (2012) go on to say that one of the benefits of virtual classrooms is the capacity to deliver learning instantly, anywhere and at any time. According to Smythe (2012), when a virtual classroom is used properly, it can help with blended learning, or the use of several platforms to impart information. However, Sangrà et al. (2012), concurs that when blended learning is fully implemented, students may only attend courses for compulsory face-to-face learning sessions with an instructor. More over when blended learning is fully operational, learning does not necessitate.

According to Alajmi (2013), all civilizations are attempting to transform into e-learning communities due to the changes that are happening. Alajmi (2013) goes on to say that virtual classrooms can help students build the skills, knowledge, and expertise they need to unlock the world's ever-changing challenges and become game-changers in society. Kiilu and Muema (2012) confirmed that talent may be produced in virtual classrooms, allowing learners to participate in the global economy and improve their lives. Kiilu and Muema go on to say that when students learn through technology, they become more creative, driven, and willing to push their limits. Many learners, according to Kiilu and Muema (2012), can go on to become technology designers, allowing them to contribute to their country's production and productivity. Keramati et al. (2011) suggest that many technological gains and improvements are related with the new technologies being employed in many industrialized countries, and that these advantages are the result of early adoption of e-learning in the education system. In many underdeveloped countries' schools, a lack of internet connection is a significant barrier (Jacob et al. 2020). The emergence of an information society requires access to the internet as well as adequate bandwidth (Clement 2020). The absence of broadband connectivity, as Clement (2020) points out, is inhibiting extensive use of the internet in education and other sectors of life. However, meaningful access requires that it be inexpensive for schools and individuals, and that teachers and students gain digital literacy and other skills in order to make the most of a variety of platforms.

Furthermore, not all internet content is appropriate; teachers and students must seek out and use regionally relevant materials and content. To be sure, the internet isn't the answer to every problem that arises in the field of education. Santos (2016), concedes that the internet supports great education in numerous ways, providing access to a variety of information, knowledge, and educational resources, and boosting users' options to learn both inside and outside the classroom. Santos (2016) goes on to say that teachers use internet materials to plan lessons, while students use them to broaden their horizons. Interactive teaching approaches, aided by the internet, enthruse students. Because of the availability of Web 2.0 or "soft software," such as Sakai

and DrupalEd, Moodle, Blackboard, TurnItIn, and others, the vast majority of schools in the United Kingdom are virtual learning environments (VLEs) (Beetham and Sharpe 2007). VLEs are a type of web-based software that allows teachers to search the internet for information on certain topics in a short amount of time. A chatroom, an online discussion forum, daily reminders, and online exams with clear instructions that define what learners must do while completing and submitting such tests are common examples of such learning environments (Beetham and Sharpe 2007). Teachers from a variety of educational fields can use multiple platforms to follow their students' actions in the VLE, as well as access and display syllabus-related information (Beetham and Sharpe 2007). Both professors and students have access to a set of integrated tools on these platforms, which allow the former to lead learning while the latter studies. Even before either participant enters the classroom, these platforms assist in deciding on the best ways to teach and learn a specific topic (Beetham and Sharpe 2007). E-learning systems are increasingly becoming a fundamental aspect of teaching and learning, according to Pituch and Lee (2006).

According to Parasuraman and Colby (2015), a technology readiness index can be used to assess the success of technology-based learning (TRI). An index like this assesses how much people accept and use technology based on their state-of-mind readiness rather than whether or not they have the necessary skills, keeping in mind that a person's digital skills can influence his or her state of mind (Parasuraman and Colby 2015). To this purpose, Parasuraman and Colby (2015) propose four issues that each institution or individual should examine before introducing any type of e-learning, including optimism, innovativeness, discomfort and insecurity, and a rigorous assessment.

Optimism is defined in the TRI as the presence of an optimistic mindset, particularly the notion that one can achieve desired outcomes through the use of technology (Hennessy et al. 2010). Optimism boosts learner engagement and can help students improve their grades as well as their digital abilities (Partin and Lauderdale 2013). In the context of the TRI, innovativeness refers to behaviors such as being the first in a cohort to purchase technology, demonstrating a propensi-

ty to implement and use technology, and being a persistent seeker of new technology information (Falloon 2013). As a result, someone who is inventive is someone who actively engages with sources of information in order to acquire knowledge.

In the context of the TRI, *discomfort* is evident when individuals struggle to understand how technology is utilized, for example (Ifenthaler and Schweinbenz 2013), and when they struggle to adapt such novelties. The authors of this paper wanted to see if learners are bothered by the fact that they are unable to use technology for educational purposes.

Insecurity is viewed as the result of mistrust stemming from concerns about security and privacy, for example (Ampofo et al. 2014). Both learners and teachers' perceptions of technology can be influenced by discomfort and insecurity, limiting the potential value of technology spread. Virtual teaching, which necessitates remote learning both within and outside the classroom, may aid in the development of methods for shifting away from traditional teaching methods and toward current teaching methods (online). Teachers must take on new duties and responsibilities as a result of this process, which may require more than one person to complete (Fowler and Mayes 2004). Teaching a subject online, according to Fowler and Mayes (2004), might include the following characteristics:

- An educator who consistently uses appropriate, available technologies to create appealing content;
- An e-learning instructor who serves as an assistant in class while taking day-to-day responsibility for keeping up with current discussion;

Theoretical Framework

The study employs Emergency Remote Teaching (ERT) by Hodges et al. (2020). Due to unforeseen circumstances, emergency remote teaching is a temporary shift in instructional delivery to a different mode (Hodges et al. 2020). It entails the use of entirely remote teaching solutions for instruction or education that would ordinarily be offered face-to-face or as blended or hybrid courses, and that will revert to that format once the crisis or emergency has passed, according to Hodges and colleagues. According to this hypothesis, educational institutions are faced with dilemmas

regarding how to continue teaching and learning while keeping their institutions, employees, and students safe owing to the threat of COVID-19. Many schools have chosen to cancel all face-to-face sessions, including labs and other learning activities, and have mandated that institutes of learning switch their delivery mode of teaching to online to assist prevent the spread of the virus that causes COVID-19, according to the theory. Every day, the number of educational institutions that have made this decision has increased. Moving instruction online can give teachers and students the freedom to teach and learn anywhere, at any time, but the rate at which this transition is required is unprecedented and astonishing. Although some educational institutions have support workers and teams, most do not. In the current situation, these individuals and teams will not be able to provide the same level of assistance to everyone in such a short time frame. Many instructors will obviously find this procedure unpleasant, regardless of how creative a solution is and some really clever ideas are emerging.

METHODOLOGY

Paradigm

The interpretivism approach was applied in this investigation. Interpretivism, according to Creswell (2014), is related with subjectivity and various realities. Interpretivism, according to Creswell, collects data through observations, document and narrative analysis, interviews, case studies, and audio-visual resources. It was chosen because it used an interview schedule and took a qualitative approach. Furthermore, the authors chose interpretivism since conclusions are frequently not generalizable to entire populations, but rather to unique settings and conditions.

Research Approach

The human phenomena, relationship, and discourse were defined, recognized, and understood using a qualitative research approach in this study. According to Creswell (2014), qualitative research is most beneficial in addressing questions about what, why, and how specific occurrences happen. This method was chosen because it provides for a more in-depth knowledge of experiences, phenom-

ena, and context, as well as allowing the researcher to address questions about human experience that are difficult to quantify.

Research Design

A case study research design was used in this investigation. A case study, according to Maree (2013), is a type of qualitative analysis that focuses on giving a detailed description of a single instance or a series of cases. The issues that are faced in the virtual teaching and learning of Accounting in five high schools in the Eastern Cape province of South Africa were investigated using a case study research approach.

Sampling

Ten Accounting teachers made up the study's sample. Because they were performing virtual teaching during the COVID-19 lockdown, these professors were purposefully chosen. They were chosen from a pool of five high schools in South Africa's Eastern Cape province. Participants were interviewed using a semi-structured interview format. Participants were, however, questioned over the phone according to COVID-19 requirements. During the COVID-19 epidemic in South Africa, the participants were interviewed about the difficulties of remotely teaching Accounting.

Ethical Consideration

The acting Superintendent General of the Department of Basic Education gave permission to conduct the research in the Eastern Cape Province. There was no one in the study who was forced to take part in the interviews against their will. The study did not utilize any names that revealed the research participants' true identities. T1, T2, and T3 were the initials of the participants, which stood for teacher 1, teacher 2, and teacher 3. As soon as this paper was finished, the transcribed content was destroyed.

RESULTS

The study is guided by the following research questions and these contributed in the formulation of the interview guide:

- ♦ What challenges do Accounting teachers encounter in the implementation of virtual classrooms during the COVID-19 pandemic?
- ♦ How does the COVID-19 pandemic affect the implementation of virtual classrooms in the teaching of Accounting?
- ♦ What are the benefits of Accounting virtual classrooms during the COVID-19, and what instructional opportunities can be created for the post-pandemic era?

10 samples were purposively selected comprising of 10 Accounting teachers and these were interviewed on the challenges that they face in conducting virtual classrooms during the era of COVID-19. T1 represents the code for teacher 1, T2 for teacher 2 and T3 teacher 3 etc. Themes were generated from the three research questions.

Theme 1: Challenges encountered in the implementation of virtual classrooms during COVID-19.

The responses from the teachers are listed below. All of the teachers acknowledged that there are obstacles to overcome when implementing virtual classrooms. The COVID 19 epidemic, it was said, was to blame for some of the difficulties.

T1: To implement Virtual classroom learning is a challenge to me even today. Remember when it comes to teaching, teachers are only aware of face-to-face method. Now I am expected to quickly shift to online without being properly prepared that is the big problem. At the same time I must make sure I am protected from the pandemic that alone is strenuous to me.

T3: I doubt if there is any learner who was aware and ready for the virtual classroom as they are also used to face-to-face just like teachers. In that way you have to make sure that learners are properly prepared for virtual classroom, in our case our learners were never prepared for it and it means it is pointless to as a teacher to say let's have virtual classroom while learners don't know anything about it.

T4: Data accessibility is a big problem in the implementation of virtual classroom. Until issues of data have been sorted then teachers can start to roll out virtual classroom learning.

T 6: Student connectivity and data are still hindering online learning in South Africa"

Theme 2: The ways in which the COVID-19 pandemic affects the implementation of virtual classrooms in the teaching of Accounting.

The responses from the teachers are listed below. Because of the lack of preparedness for both the pandemic and the virtual classroom, all of the participants agreed that COVID-19 had an impact on the deployment of virtual learning.

T2: *In my case I was totally unprepared for virtual classroom since I am used to face-to-face, and when the education officials were opting for virtual classrooms I was so shocked to see many deaths.*

T5: *COVID-19 disturbed me badly to put my focus on how to implement the virtual classroom. I never be afraid of the virus like the way I was afraid of COVID-19. As a result I am still not enlightened on how it is being implement virtual classroom since the time to learn how to implement it was disturbed by the pandemic.*

T7: *Teaching of Accounting and the implementation of virtual classroom was disturbed by the arrival of COVID-19. Teaching and learning was disturbed, implementation of new innovative approaches of teaching our learners were all affected otherwise the virtual classroom is the good thing to implement it especially in the 4IR.*

T10: *To me Corona Virus has robbed us as teachers opportunity to learn new innovative way of teaching our learners. Remember when you implement new dimensions like virtual learning you need to prepare both the teachers and the learners so that the online learning can happen smoothly. Now there was not time to do all those things due to the pandemic and everyone was afraid of the pandemic, meaning there was no time to learn about online learning other than to learn on how to protect yourself from the Virus.*

Theme 3: Benefits of virtual Accounting classrooms during and after COVID-19 pandemic?

The research participants indicated that virtual classroom contains new and attractive ways of teaching especially that we are in the 4IR. However, for these benefits to be gained it needs to be implemented in the correct way than it was introduced due to COVID-19, and teachers are prepared to continue supporting this virtual mode of teaching even after the pandemic is over.

T1: *I can say one of the benefits of virtual classroom is that teaching and learning is happening anytime and anywhere and that was something we were not aware of before.*

T5: *Through virtual classrooms, teaching sessions can be recorded and the record can be*

played later by both the teacher and the learners. That always make the job of learners to be easy since they do not need to take notes instead they can be sent the recordings and they can sure the recordings.

T8: *Virtual classroom is good in the sense that you don't need to be in in front of the learners all the time in order to teach, you can teach them while you are not at school, or record your session and just send them recording.*

T9: *Learners can have a direct access in school work even if they are absent, since wherever they are they can remain online and in that way they access everything that was happening in the classroom. Lastly, both learners and teachers from other schools can share the teaching slides.*

DISCUSSION

Challenges Encountered in the Implementation of Virtual Classrooms during COVID-19

These findings are consistent with Jacob et al. (2020), who state that lack of internet connection is a significant barrier in many schools in underdeveloped countries. Clement (2020) feels that internet access, as well as enough bandwidth, are critical for the growth of an information society. Furthermore, the absence of broadband connectivity prevents widespread internet use in school and other sectors of life. Santos (2016) acknowledges that the internet, which is also required for the deployment of virtual classrooms, improves education in many ways by providing access to a plethora of information, knowledge, and educational materials, as well as broadening users' opportunities.

According to Santos (2016), teachers use internet materials to prepare classes, while learners use them to broaden their horizons. Teachers can pay more attention to individual students' needs while facilitating shared learning thanks to interactive teaching methods backed by the internet (Santos 2016). These findings align with those of Hodges et al. (2020), who found that when institutions decided to cancel all face-to-face classes in order to help prevent the spread of the virus that causes COVID-19, while staff and students were prepared for virtual classrooms, no individual could master all of the new approaches in such a short amount of time due to time constraints. The participant's

findings corroborated Hodges et al.'s assertion that there are some challenges in implementing the virtual classroom process in the education system that have arisen as a result of the COVID-19 crisis; these challenges are related to novel perspectives of online education and their technological complexities. Prior to the outbreak, online education was defined as distance education supplied via open universities. However, in the COVID-19-induced period, remote teaching and learning has become a tremendous challenge to cope with, and stakeholders are not likely to be able to adjust to the abrupt educational change since they are not technologically savvy.

The Ways in Which the COVID-19 Pandemic Affects the Implementation of Virtual Classrooms in the Teaching of Accounting

These findings align with those of Adu et al. (2020), who claim that COVID-19 has ushered in a paradigm change in teaching and learning. Adu et al. (2020) went on to say that students and teachers should think beyond the box and regard teaching and learning as more than just a job. They now require a platform to communicate with one another via various social media platforms, such as WhatsApp, and the usage of technology gadgets such as v-drive, blackboard, internet, computers, smartphones, and other similar devices has become a requirement. We need to become used to using any device that can help us teach and learn more effectively as a substitute for face-to-face communication. Our houses have been transformed into schools, and our neighbors have been transformed into consultants (Adu et al. 2020). Budgetary constraints owing to economic instability, a lack of infrastructure, and, most crucially, the shortage of e-Learning content and trainers with remote training skills are all factors that stymie its rapid adoption, according to the results of Hodges et al. (2020). On the learner side, difficulty to achieve a work-life balance, unfamiliarity with Learning Management Systems, and overall stress/anxiety as a result of the epidemic are all obstacles to digital learning transition.

The impact of COVID-19 on individuals, teams, functions, businesses, industries, educational institutions, and countries, according to Hodges et al.'s theory. It is particularly severe, according

to Hodges et al. for firms that rely heavily on face-to-face Instructor-Led Training (ILT) for staff development, skilling, and training. They're scrambling to find a rapid resolution for the problem at hand while simultaneously future-proofing their Learning and Development (L and D) initiatives due to their lack of preparedness for a modality other than a classroom arrangement.

Benefits of Virtual Accounting Classrooms during and After COVID-19 Pandemic?

These findings back up what Li and Lalani (2020) said about the benefits of virtual classrooms, such as reaching a large audience from the comfort of their own homes, effective communication with their students through chat groups, video meetings, voting, and document sharing, and being on par with advanced countries. The findings support Beetham and Sharpe's (2007) assertion that virtual classrooms provide learning environments that include a chatroom, an online discussion forum, daily reminders, and online assessments with clear instructions that outline what learners must do when completing and submitting such assessments. Teachers can obtain and present syllabus-related material as well as follow their students' activity in the VLE via multiple platforms (Beetham and Sharpe 2007).

Moore et al. are a group of people who work together to solve problems (2020). Learners have the ability to study and finish assignments 24/7 from anywhere and at any time that suits their busy schedule when virtual learning takes place in the classroom, according to these studies. When a student is absent from school for personal reasons, he or she can complete his or her assignments at any time. Moore et al. go on to say that virtual classrooms attract students from all over the world, who bring with them a variety of cultural perspectives. Learners and teachers can work on group projects and collaborate with worldwide peers thanks to the deployment of virtual classrooms. Insights into various business cultures, attitudes, and problem-solving methods might help you better understand your own difficulties and prospects.

CONCLUSION

The study looked into the issues of accounting in virtual classrooms during the COVID-19

pandemic in South Africa's Eastern Cape high schools. Teachers at the hand-picked high schools are still lagging behind when it comes to integrating ICT into teaching and learning, especially since some are teaching in impoverished areas. When it comes to distributing technology resources, the study indicates that rural and semi-urban schools should be prioritized. Teachers in rural and semi-urban areas must be up-skilled in technical knowledge. There is little doubt that the entrance of the COVID-19 pandemic has badly impacted their teaching and learning, as the majority of students in these schools come from low-income families who lack access to the technology and internet required to implement virtual classrooms.

RECOMMENDATIONS

According to the report, Accounting teachers should not view teaching as a routine task, and they should take personal responsibility for their own technological development. In order to keep instructors prepared for 4IR, ITC officials in education should continue to support online instruction even after the COVID-19 pandemic. Network firms should be encouraged to engage with the education sector to resolve data, connectivity, and accessibility challenges by using zero-rising data to facilitate virtual classroom learning. All teachers should be encouraged to attend various types of online workshops in the post-COVID-19 era in order to deepen their grasp of online learning. The Department of Basic Education in the Eastern Cape should put in place infrastructure to allow virtual classroom instruction as quickly as possible. Virtual classroom learning is in accordance with the 4IR goals, so students and parents should demand it.

REFERENCES

- Adu KO, Ngibe NP, Adu OE, Duku N 2020. Virtual classroom: Prospects and challenges of COVID 19 pandemic in South Africa. *Journal of Human Ecology*, 72(7): 77-87.
- Alajmi M 2013. *Faculty Members' Readiness for E-Learning in the Colleges of Basic Education in Kuwait*. PhD Dissertation. Texas: University of North Texas.
- Ampofo SY, Bizimana B, Mbuthi J, Ndayambaje I, Ogeta N, Orodho JA 2014. Information communication technology penetration and its impact on education: Lessons of experience from selected African countries of Ghana, Kenya and Rwanda. *Journal of Information Engineering and Applications*, 4(7): 84-105.
- Beetham H, Sharpe R 2007. *Rethinking Pedagogy for a Digital Age: Designing and Delivering E-learning*. Oxford: Routledge.
- Clement C 2020. Internet Access and Education [Online]:7: 230-258. From <<https://www.internetsociety.org/doc/internet-education-africa-sdg4>> (Retrieved on 20 December 2020).
- Creswell JW 2014. *Research Design: Qualitative, Quantitative, and Mixed Methods Approach*. 4th Edition. Los Angeles: SAGE Publications.
- Dhama K, Sharun K, Tiwari R, Dadar M, Malik YS, Singh KP, Chaicumpa W 2020. COVID-19, an emerging coronavirus infection: Advances and prospects in designing and developing vaccines, immunotherapeutic, and therapeutics. *Taylor and Francis Public Health Emergency Collection*, 1-7. <https://doi.org/10.1080/21645515.2020.1735227>
- Falloon G 2013. Young students using iPads: App design and content influences on their learning pathways. *Computers and Education*, 68(3): 505-521.
- Ferriman J 2019. Characteristics of a Virtual Classroom. From <<https://www.learndash.com/characteristics-of-a-virtual-classroom/>> (Retrieved on 17 May 2020).
- Fowler C, Mayes T 2014. Mapping Theory to Practice and Practice to Tool Functionality Based On The Practitioners' Perspective. From <<http://www.jisc.ac.uk/uploaded>> (Retrieved on 30 September 2015).
- Gallacher C 2015. What is a VLE (Virtual Learning Environment)? From <<https://epale.ec.europa.eu/en/blog/what-vle-virtual-learning-environment>> (Retrieved on 16 January 2020).
- Hennessy S, Harrison J, Wamakote L 2010. Teacher factors influencing classroom use of ICT in sub-Saharan Africa. *Itupale Online Journal of African Studies*, 2(15): 39-54.
- Hodges M, Lockee T, Bond A 2020. The Difference Between Emergency Remote Teaching and Online Learning. EDUCAUSE Rev. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning.>> (Retrieved on 23 March 2020).
- Ifenthaler D, Schweinbenz V 2013. The acceptance of tablet-PCs in classroom instruction: The teachers' perspectives. *Computers in Human Behavior*, 29(12): 525-534.
- Jacob ON, Abigael I, Lydia AE 2020. Impact of COVID-19 on the higher institutions' development in Nigeria. *Electronic Research Journal of Social Sciences and Humanities*, 2(16): 126-135.
- Keramati A, Afshari-Mofrad M, Kamrani A 2011. The role of readiness factors in e-learning outcomes: An empirical study. *Computers and Education*, 57(12): 1919-1929.
- Kiilu R, Muema E 2012. An e-learning approach to secondary school education: E-readiness implications in Kenya. *Journal of Education and Practice*, 3(9): 142-148.
- Latif S 2016. Learning engagement in virtual environment. *International Journal of Computer Applications*, 51(16): 201-216.
- Loureiro A, Bettencourt T 2014. The Use of Virtual Environments as an Extended Classroom-a Case Study with Adult Learners in Tertiary Education. *Procedia Tech-*

- nology, 13: 97- 106. From <[https:// doi.org/10.1016/j.protcy.2014.02.013](https://doi.org/10.1016/j.protcy.2014.02.013)>Get rights and content> (Retrieved on 17 May 2020).
- Maree K 2015. *First Steps in Educational Research*. Pretoria: Van Schaik.
- Mehtar S, Preiser W, Lakhe NA, Bousoo A, TamFum JM, Kallay O, Seydi M, Zumla A, Nachege JB 2020. Limiting the Spread of COVID-19 in Africa: One Size Mitigation Strategy Does Not Fit All Countries. *The Lancet Global Health*. From <[https:// www.thelancet.com/journals/langlo/article/PIIS2214-109X\(20\)30212-6/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30212-6/fulltext)> (Retrieved on 29 February 2020).
- Parasuraman A, Colby CL 2015. An updated and streamlined technology readiness index: TRI 2.0. *Journal of Service Research*, 18(8): 59-74.
- Partin CM, Lauderdale S 2013. *Increasing Student Engagement and Retention Using Mobile Applications: Smartphones, Skype and Texting Technologies*. Bingley, UK: Emerald.
- Pituch KA, Lee YK 2006. Social factors affecting students' acceptance of e-learning environments in developing and developed countries: A structural equation modeling approach. *Journal of Hospitality and Tourism Technology*, 7(10): 200-212.
- Rachiva V 2018. What is a Virtual Classroom? VEDAMO. From <[https://www.vedamo.com/knowledge/ what is virtual-classroom.](https://www.vedamo.com/knowledge/what-is-virtual-classroom)> (Retrieved on 18 May 2020).
- Sangrà A, Vlachopoulos D, Cabrera N 2012. Building an inclusive definition of e-learning: An approach to the conceptual framework. *International Review of Research in Open and Distance Learning*, 13(2): 145-159. <https://doi.org/10.19173/irrodl.v13i2.1161>
- Santos AM 2016. Exploring the e-learning state of art. *Electronic Journal of e-Learning*, 6(10): 70-88.
- Smythe M 2012. Toward a framework for evaluating blended learning. *International Journal of Information and Education Technology*, 3(1): 12-16.
- United Nations Educational and Scientific Cultural Organization (UNESCO) 2020. COVID-19 Educational Disruption and Response. From <<https://en.unesco.org/covid19/educationresponse>> (Retrieved on 7 May 2020).

Paper received for publication in May, 2021
Paper accepted for publication in June, 2021