



The Impact of Covid 19 on Teaching and Learning Amongst First-Year Entry Learners at Institutions of Higher Education

M. M. Sikwela^(✉), V. Khumalo, and B. Y. C. Mvuyana

Department of Public Administration and Economics, Mangosuthu University of Technology,
Umlazi, South Africa

{sikwela, khumalo.vuyani, mvuyana}@mut.ac.za

Abstract. The impact of coronavirus (Covid-19) in 2020 has had devastating effects on the higher education system in South Africa and beyond. More specifically to previously disadvantaged universities that had to change the mode of class delivery to first-year students. The study investigated the impact of Covid-19 amongst first-year entry learners in the use of technology in teaching and learning at previously disadvantaged universities in South Africa. A systematic review approach using relevant legislations, acts, government publications, newspapers and journal articles to examine the challenges brought by the Covid-19 pandemic on first-year entry learners in previously advantaged institutions. The findings of the study indicated that first-year entry learners had a challenge in adapting to the new normal. Computer illiteracy, poor connectivity, and limited access to proper devices for academic learning were identified as challenges causing poor performance of learners and less attendance in universities. The study recommends that the government through the Department of Higher Education and Training (DHET) develops a model to be adopted by all institutions which will ensure effective teaching and learning for first-year entry learners. The model should capacitate both academics and learners to mitigate the pandemic issues in teaching and learning.

Keywords: Covid-19 · Teaching and learning activities · ICT infrastructure · Technology

1 Introduction

Education in higher learning institutions in South Africa has evolved over time and technology has become an important aspect of the classroom environment for teaching and learning activities (TLAs). Some decades ago, teachers used chalk and black/green boards to teach their students and so many changes have taken place since then. Teaching has transformed immensely from overhead projectors to current digital projectors. One characteristic of technology is its continuous progress and evolution [1]. The higher education sector has had to make major transformations to adopt technology and enhance teaching and learning in Institutions of Higher Education (HE). The main challenge

facing the higher education system is academics are technologically challenged and this has cascaded down to first-year learners who are already struggling with technology adoption.

2 Background of the Study

Technology acceptance in South Africa especially in HE has changed since 1994, from predominantly computer-assisted technology up to 1998 and the introduction of ICT infrastructure in institutions of higher learning (learning management systems) in 2003 [2]. Since then, technology has continued to evolve with some emerging technology becoming subtler for most old school academics, especially in previously disadvantaged universities. Globally, it is said that the HE sector is at the precipice of being disrupted by newer technologies such as Artificial Intelligence (AI), Virtually Reality (VR) and Augmented Reality (AR) [3]. As a result, researchers state that the rapidly changing technologies coupled with changing socio-cultural factors are transforming the nature of education and how it is delivered [4]. Socio-culturally, in higher education institutions must now allow digital natives to engage with technology in their everyday lives [5].

In emphasis, studies have shown that today's students (the digital natives) are far different from the people, the educational system was designed for [6]. However, in the midst of having to teach digital natives and the effects of disruptive technologies on education, studies are concerned about the failure of higher education institutions and academics alike to effectually fit in these current technologies to enhance their teaching and learning activities [7]. Academics that use technology are guilty of the shiny-tech syndrome; that is, using technology capriciously because they can access it but without any understanding of the pedagogical benefits of using it. This transformation in the educational sector has had mixed reactions amongst academics and learners. Hence, a paradigm shift is needed for academics and learners to be at par with the current state of technology. As a result, Ng'ambi et al. [8] note that academics who fall trapped in this syndrome often fail to contextualize the acceptance of technology, leading to its limited use. As a solution, the author draws from Cole's (1999) garden-as-culture metaphor and the Cultural-Historical Activity Theory (CHAT) to propose a way to appropriately adopt technology to achieve transformative teaching/learning in HE.

Transformative learning results from interactions with people, resources and technology around [9]. Technology comes in as a resource mediating the transformation of teaching and learning through their various affordances that can be used to increase time on task, levels of interactions promote cognitive acceleration and increase the self-management of students, entrapping students into deep and meaningful learning [10, 11]. The integration of technology in higher education has transformed teaching and learning among other things. Research on technology posits that the integration of technology enables teachers to create dynamic, collaborative education and improve students' learning experiences [12, 13].

3 The Impact of Covid-19 on Higher Education

The Corona Virus of 2019 (Covid-19) was a game-changer for most institutions of higher learning in the whole world and South Africa was not spared [14]. The Covid-19 pandemic had a profound and immediate impact on the academic sector and the business environment. Add on, the pandemic crippled several segments of the economy from universities to day care learners. Classes that were initially organised around face-to-face, or contact had to re-adjust their mode of teaching and learning and countries were on lockdown for several months since the 20th of March 2020. These challenges were presented to governments in the case of South Africa it was the Minister of Higher Education, Science and Technology. Lecturers, teachers, students, parents, industry, health departments, strategic leaders and policymakers had to be consulted for an immediate response to the pandemic. It is against this background that the PAN African Virtual and E-University (PAVEU) advocated those institutions of higher learning be technologically advanced. The Africa Agenda 2063 is one of the prominent African Union (AU) flagship projects which contributes to achieving human capital, science and technology and innovation across all African countries through the advancement in technology. In this agenda, international organisations provided an overview of the national responses to the Covid-19 pandemic and related lockdowns. Contact classes or face-to-face lectures were disrupted in almost all countries due to the spread of the Covid-19 in schools, universities and the world of work. Consequently, universities and many other organisations had to switch from formal education to online classes in consideration of extraordinary social, emotional, psychological, health and well-being issues brought by Covid-19.

In this regard, several studies have shown that integrating technology into the education system is most likely to change how students and academics perceive education and reduce the hiccups faced by first-year learners in higher learning [15]. As much as researchers were concerned about the ineffective use of technology for teaching and learning activities, but this has culminated to be rather a challenge for first-year learners than an advantage to them [8]. Then came the Covid-19 pandemic which now forced students and academics to adapt to the new norms of using technology. For instance, studies discovered personal, institutional and technological factors are the ones that encourage or discourage the integration of technology in Higher Education [16]. Most students coming for their first year at universities lack Information and Communications Technology (ICT) and on the other hand academics lack pedagogical skills, institutional ICT infrastructure and culture, and curriculum-related issues that are pertinent to the effective integration of technology. The pedagogical challenge emanates from the fact that academics are employed based on being subject matter experts than technology experts. Thus, most are either pedagogically bankrupt, hence teaching as they were taught [1] or taking time to change to the 21st Century demands. To bridge the pedagogical gap, Albion and Tondeur [4] state that teachers must engage in personal transformation through ongoing learning. Later this must be transferred to first-year learners who are in the midst of learning and have very few technological skills.

Recent studies have also shown that previously disadvantaged universities have institutional problems. They are unable to effectively integrate technology in teaching and learning for academics and first-year learners, due to the ICT, connectivity, network and infrastructure of these universities. Hence, some authors mention that academics' beliefs

and attitudes about the importance of technology are inhibited by the above-stated challenges to educational progress. To add on, the PAN African Virtual and E-University (PAVEU) and the Sustainable Development Goals (SDGs) of 2013 try to encirclement every academic and learner with technologies in ICT for example the use of computers, the internet, smart cell phones and laptops to ensure digital learning and eliminate the digital divide amongst learners. It has become a huge challenge to first-year learners as some of them come from poor communities and technology at the first glance is a serious issue and adaptation can take a while before they become techno-savvies. For instance, it was found that some academics are failing to keep up with ever-changing technology while some were failing to use the current technologies [17]. Then it becomes a challenge for first-year learners to adjust quickly to these changes. Worse with the impact that Covid-19 had on learners, the pace at which students had to learn, was devastating and it had so many problems with it. Institutionally, limitations such as internet connection, classrooms and school culture were also mentioned as factors affecting the successful adoption of ICT in teaching at universities by both students and learners during then pandemic.

In insomuch as we can concentrate on teacher and institutional related factors, it is also trite that we also evaluate student-related factors, which is the focus of this article. Interestingly, there is a considerable amount of literature on the use of technology in higher education [18, 20]. It is imperative to focus on first-year learners by looking at student-related factors of technology integration. Studies have concentrated on students' preparedness to use technology for learning, perceptions and proficiency in using technology as critical to the integration of ICTs in HE. However, in most previously disadvantaged universities in South Africa and the rest of Africa, which serve the most disadvantaged students, it would be naïve and insensitive for one to ignore these factors. Some students when they come to the university, see a computer for the first time and some do not even have a clue what is a mouse when they come to university, some have access to technology but are not prepared for its use for e-learning platforms (a cultural issue in many cases) and some even if they learn to use technology for learning, they simply cannot afford it. It is, therefore, important that such factors are recognized and addressed in the best possible way to enable the successful adoption and integration of technology.

4 Research Approach

Secondary data in the form of reviews was collected, and systematic analysis was done to come up with the results and conclusions of this study. Articles for this study were found on the library's database and these articles that included those that were close to topic and some articles were excluded since they were not relevant to the study (Table 1). The researchers used many search engines to locate the crucial articles that were useful for this study. Google Scholar, Perlego, Government websites, EBSCOhost, Science direct and, Sabinet African journals.

The researchers used the following words "teaching and learning" AND "technology use" and a total of 3,917,484 articles came up on the search engines. These had to be screened to a manageable number since the researchers only wanted relevant articles.

Table 1. Inclusion and Exclusion Criteria.

Inclusion	Exclusion criteria
Articles within the last 5 years	Journal Articles published over 5 years ago
Articles on the impact of Covid-19 on T&L	Articles not including teaching with technology
Teaching and learning in the 21 st century	Literature not based on institutions of higher learning
English articles only	Non-English articles
Peer-reviewed or authentic articles including government publications	Non-peer-reviewed
Research articles on higher education	Articles that do not focus on digital natives
Pedagogical beliefs and transformation issues in HE articles	Papers do not that discuss Covid-19 and teaching in HE

The following words “teaching and learning” AND “technology use”, the researchers added the Boolean operators such as subject “AND”, “OR” and “NOT” and the articles were reduced to 156 479. Academic journals results were 29768 and peer-reviewed papers were 5603. The researchers put more keywords, “technology” AND “Learning in Higher education” AND “Africa” AND “Covid19” AND “transformation AND Higher education ACT 101 OF 1997” and produced 3124 results. The next step was to identify English language papers only and recent articles ranging from 2019 to 2022 and this produced 131 results. A total of 131 research articles were the considered relevant for review in this study.

The researchers read the abstracts and conclusions in the first instance to locate the relevant articles. The papers were placed into different classifications, such as primary and secondary research papers, government publications and documents from the Department of Higher Education. The identified 131 research papers; included 35 secondary research, 45 primary research papers, 18 government articles and 33 documents from the Department of Higher Education and amongst these articles they either had one or more of the themes. Surprisingly, some articles did meet the criteria while some had to be excluded due to some papers not meeting the objectives of the study based on challenges faced by learners at institutions of higher learning. The remaining 29 papers had repeated themes such as Covid-19, teaching and learning, technology and disadvantaged institutions of Higher learning. However, the researchers developed interesting arguments in their results discussions.

In order to stick to the purpose of the study, selected peer-reviewed articles and articles that addressed essence of the study were considered. The objective was to avoid deviating from the main topic and have an informed analysis of the situation in South Africa and many other disadvantaged universities.

5 Results

The main aim of this section is to provide a discussion of the results and methodological approach to this study. There are numerous articles that have been on the use of technology in universities. The availability of such data in different sources of academic literature is essentially needed to inform a particular clinical decision in academia. Before presenting the results of this study perhaps the point of departure is “Who is to blame?” for all the challenges that first-year students are facing with the adoption of technology. Going back a few years, the literature identifies people through different generations X, Y and Z. To answer the above question, most teaching and learning activities in the olden days started with a blackboard and some chalk. Then later technology was introduced to use the overhead projectors until in the early or late 1980’s computers were used by academics for teaching and learning. Technology has continued to evolve over the years and both academics and students have been caught on the brink of not knowing if they are compatible with the current changes in technology. For us to answer the above-stated questions it is important that “we are all equally to blame”. Advances in technology are always changing every second and for academics and students to be at par they must constantly be on the lookout for these changes.

Historically black universities have been affected greatly by unequal access to educational resources. Recent studies have shown that students from previously disadvantaged universities have limited access to computers, laptops, eBooks, textbooks and study materials they needed to study during the Covid-19 pandemic. Hence, an extensive literature has highlighted those institutions of higher education were ill-prepared when the countries were affected by the Covid-19 pandemic in March 2020. Institutions of higher learning had to make drastic changes to their teaching and learning activities [21]. Particularly, the first-year levels were the most affected since most of them came from previously disadvantaged backgrounds. Most studies in South Africa and beyond have shown that resources in higher education are negatively skewed or inclined to white universities. Several studies have shown a significant deficit in digital competence and knowledge of the use of ICT by both students and academic professionals. This is confirmed by Fraser when she talks about the imbalance between black and white universities [22–24]. Predominantly, black universities have struggled to cater for the needs of first-year learners because of the socio-economic and political status of these universities. On the other hand, Onyema et al. [25] argue that despite all these challenges first-year learners have not had proper induction into the ICT world when they get to universities. They must struggle on their own and as well as academics to be competent with the use of these new technologies. About 63% of academics must teach themselves to use most of the software used in blended learning and about 17% go through short courses while the rest get it via shared knowledge on various educational platforms such as YouTube and Google.

Despite being in the 4th industrial revolution, some African countries are still left behind and this unequal access to technology has impacted a lot of disadvantaged universities. The lack of access to fast, reliable internet access has been shown to prevent students in rural areas and from disadvantaged families from attending online classes. Several studies proved that lack of proper internet connectivity is the main hindrance to continued learning, especially for first-year students from disadvantaged communities.

Due to the pandemic most universities had to adopt blended learning or hybrid models for all learners at universities to catch up with academic year. Several authors have argued that students without the internet at home found it difficult to attend classes online, especially for students that were enrolled at previously disadvantaged universities [26, 27]. In light of the above, Mahaye [28] and Khan et al. [29] purport that first-year learners have not been exposed so much to the use of technology and adapting to these new learning platforms has been a serious bone of contention.

All institutions of higher learning in the world were affected by Covid-19 [30]. University teaching and learning was compromised with most of HEIs reports revealing that classroom teaching activities were replaced by distance learning. However, the transition from contact to distance teaching was accompanied by challenges. One of the major predicaments was access to technical infrastructure, proficiencies and an adjustment to a set of pedagogies for distance learning and the requirements of specific fields of study.

The other issue that literature has touched base on is the infrastructure in previously disadvantaged universities [4]. Infrastructural development in black universities has not grown at the rate at which technological developments have taken place. Twelve articles used in this study have shown that infrastructure is an inhibitor to teaching and learning in the 21st century. Technological glitches in HEIs are high and affecting especially first-year learners to adopt new changes in academia under the Covid- 19 conditions. While this may be so, three articles highlighted that for students from previously disadvantaged areas if they are to be enrolled in these universities it would take them months before they can understand how to use technology. The misconception about these digital natives is, that we are saying “our first-year learners have never seen or operated a computer in their lives” but then when they come to universities, they are expected to operate computers. Hence, first-year learners must be inducted into ICT skills to enable them to fit into university society.

The next question is trying to find out the impact of Covid-19 on first-year learners. As highlighted by most of the articles that have been written about this issue. Universities and school closures negatively impacted student learning outcomes of most modules studied. It is important to look at this angle and find out how it affected universities, especially first-year learners who had just arrived for the first time at university. It is essential to note that universities provide crucial learning and when universities are closed, students are deprived of opportunities after university since it might take time for them to graduate because of these pandemics. All students are incapacitated leading to delays in their exit from universities. This has both financial and economic repercussions if not addressed immediately. The disadvantages are disproportionate for learners who are underprivileged and who tend to have fewer educational opportunities beyond the university. The closure of universities because of these pandemics has been highlighted by several authors such as Khan et al. [29] and Coman et al. [16] to severely affect the performance and opportunities awaiting learners after graduation. On the other hand, those that failed to access education because of the misfortune of resources such as access to technology had to drop out. For instance, the protracted closures greatly affected disadvantaged, students and for some, they were not able to return to universities after the Covid-19 closures ended. Five articles also postulated that a lot of university students from the first-year level missed out on social contact which was crucial to learning and

development. Hence, this analysis shows that the pandemic grievously affected many people, especially first-year learners who had to endure the pain of being left behind due to technology. Academics too had to find their own ways to pace with the new norm of teaching with technology at universities. Also, academics were negatively impacted by the Covid-19 pandemic as they had to adopt the new learning management platforms of teaching online using MS teams, Google meets, Zoom and many others. Several studies showed that lecturers had signs of stress, anxiety, and depression symptoms through the pandemic. Moreover, it was even worse for first-year learners since they could not attend most classes because of technological glitches [31, 32].

Many articles identified financial implications as the crucial challenges facing most institutions failing to adjust quickly to the new norm [33, 35]. Fortunately, self-funded institutions of higher learning, but not only, expressed problems about university fee from students and an increased drop-out. The economic crisis brought by the pandemic came with it a lot of uncertainties regarding the time when universities were able to open under the new normal. In some instances, contact teaching was resumed in some institutions that were fully capacitated to effectively utilize technology in teaching and learning activities before the pandemic. Several articles on use of technology in teaching and learning at universities showed a decrease in student registrations was due to financial constraints faced by these disadvantaged institutions [36, 38]. Some challenges highlighted included the failure of students to return to universities after the pandemic due to their financial position. While this may be the case, the long-term effects have grievously affected the financial situation of universities and have resulted in a decline in student numbers at universities. The decline is compounded by the fact that previously disadvantaged institutions lose the income generated from their enrolment. Therefore, this would affect the financial position of these universities in the long run. Private institutions may face a decline in income through a deficiency of tuition fees conversely, public institutions are more concerned about the reduction in support from the government due to the financial crisis that hit all countries around the world. A lot of first-year learners who are dependent on the state/government for financial support could not go back to universities. In South Africa, students' financial support includes tuition, book allowance, accommodation and transport. Until recently, because of the pandemic students have been urged to purchase smart gadgets or laptops to enable them to attend classes online. The unfortunate part is funding from the government has not been enough to cater for all the students. Students all over the country have been on strike because most of them were not able to secure this funding to purchase laptops for online learning.

6 Conclusion

The study sought to understand the impact of Covid-19 on the use of technology by first-year learners in institutions of higher learning. Using a systematic review approach the study explored the challenges faced by first-years in adjusting to the new norm in institutions of higher learning. The question we have is "what can we say about the future of this country with regards to teaching with technology?" Several studies have shown that most universities in Africa and the rest of the world were caught unaware of the use of technology. But what stands out is that there was a need for adjustment

amongst all stakeholders involved in academia. First-year learners must be inducted into this teaching style and blended learning is the way to go. Some institutions of higher learning have been in this blueprint for years now such as the University of South Africa (Unisa) and many others in the UK, Canada, the US and Australia just to mention a few. Hence, South Africa and many developing countries can adopt this change.

African countries were seriously affected by the pandemic and institutions that depended on state resources had the biggest disruption to research and the least support to their students. The support given to these previously disadvantaged institutions did not match the students' numbers. It is also important to note that the impact of Covid-19 on international partnerships lead to previously disadvantaged universities failing to secure funding in the form of a third income stream to support teaching and learning activities. This is basically because most institutions in South Africa and many other developing countries were ill-prepared for the pandemic. The risk associated with this inequality only leads to more problems for African countries without excluding international universities as well in the same predicament.

Universities around the world developed partnerships with both public and private parastatals to increase their working relations with most developed nations such as the USA and European countries. It is noted that, during the pandemic almost 50% of institutions of higher learning were able to explore new opportunities in the world of technology which strengthened them in return. The Covid-19 pandemic crisis exacerbated a lot of inequalities which the global higher education community was not ready for but through the support of society and many businesses around the world especially with national governments, some universities were better positioned than previously disadvantaged universities.

In a nutshell, the literature from these studies has shown that HEIs that were affected by Covid-19 had little support if not none and the governments were the only sources of income. Relevant expertise and consultations had to be done so that institutions that are previously disadvantaged would be supported to overcome the struggles faced by first-year learners. Studies have shown that first-year learners in most institutions will continue to face struggles in adopting new technological changes in universities. On average about three-quarters of institutions in South Africa and most developing countries are trying to address these issues through their leadership or through their research findings to address the first-year challenges in higher education. These results are important as they focus on the importance of higher education, business, the corporate world and its' importance to society.

7 Recommendations

Some articles have proved that this experience has made institutions to be better prepared for future pandemics. Although, institutions are still coping with the current Covid-19 pandemic it also can be a lesson for all institutions to be better prepared for future crises. Covid-19 has been a learning curve for most institutions as blended learning has been adopted to resolve the issue of class attendance by university students.

Another way to deal with this decisive way of thinking is the use affordable technology and come up with technology solutions that are reliable and easy to use for most

learners in these disadvantaged universities. Issues regarding internet connectivity, load shedding, and digital skills of teachers and students should be addressed to accommodate any changes that may result from future pandemics. Universities should introduce various digital learning platforms such as the use video lessons, Massive Open Online Courses (MOOCs), and radio and television classes for learners to comprehend the new pedagogy. Another suggestion/option is to operate like Unisa which is using distance learning programs to reach millions of students around the world.

Blended learning should be used and appropriate approaches to learning must be adopted by learners and asynchronous learning must be encouraged. Due to poor connectivity and the high cost of data, lecturers should try as much as possible to reduce workloads on students and request parents to use sophisticated online applications or platforms at the same time.

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