Online Learning in Higher Education during COVID-19: Challenges in a Digitally Divided Society

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Abstract

The COVID-19 pandemic has had adverse effects on all aspects of social life. The pandemic has not spared the education fraternity with methods of teaching and learning being altered, pushing higher education institutions to adopt online or mediated education. Although online education is regarded as the future of education in the era of the Fourth Industrial Revolution (4IR) digital age, the global health pandemic has fast-tracked the pace of digitalisation. The digital divide has highlighted the rapid shift in African societies. In this study, we explored the South African tertiary education landscape using the theory of the digital divide to understand the challenges of implementing full-time online learning among tertiary students. Data for this qualitative study were gathered from a sample of tertiary students at a university of technology from different economic and social backgrounds to find the connections between their situations and their ability to have access to digital learning tools. Semi- structured interviews were employed to extract the perceptions of students regarding online learning during the COVID-19 pandemic.

Keywords: COVID-19; digital divide; digitalisation; education; online learning

Introduction

The coronavirus (SARS-CoV-2) outbreak was reported in Wuhan, China in December 2019 and rapidly spread across the globe (Mututwa and Matsilele 2020). Although the African continent initially had fewer cases than Europe, Asia, and the United States, South Africa reported the first case of COVID-19 on 11 March 2020 (Staunton, Swanepoel, and Labuschagne 2020; World Health Organisation 2021). This prompted the South African government to declare a national state of disaster on 23 March 2020, effective on 27 March 2020, and a series of measures limiting the rights of South Africans, including travel restrictions (Staunton, Swanepoel, and Labuschagne 2020). By March 2020, South Africa had registered 61 confirmed cases with no deaths. From then, fluctuations in numbers were reported, attributed to the contagiousness and mutating nature of the virus (Worldometer 2024). In response to the lockdown measures, the nation showed remarkable unity as the president implemented severe measures aimed at “flattening the curve” (Van Bruwaene et al. 2020) .

The education sector was one of the most severely affected sectors, not only in South Africa but globally. The danger of COVID-19 contamination triggered institutions to move their courses online. Even though online learning has many benefits, there are drawbacks for a continent where only 24% of people have access to the internet. These include inadequate connectivity, high expenses, and frequent power outages (Matsilele 2021; Tamrat and Teffera 2020a).

This study explored the extent to which COVID-19-induced online learning exposed the challenges faced by South African tertiary students in accessing and using digital technologies for online learning. According to Mhlanga and Moloi (2020), there are underlying digital disparities between South African tertiary institutions, with some having far superior resources and experience than others. There are also disparities between students within the same institution, with wealthy students living in urban areas and impoverished students in rural areas barely able to afford internet access where and when it occurs.

On 5 May 2023, the World Health Organization declared that COVID-19 was no longer a health emergence of international concern (Sarker et al. 2023). Looking back at tertiary institutions' responses to COVID-19 measures, Kupe (2022) opined that one of the silver linings of the pandemic was the fast-forwarding of the use of new technology in teaching and learning. The fast-tracked technology adoption permanently changed the learning culture in many tertiary institutions and the COVID-19 experiences can be lessons on navigating the digital landscape in South Africa. This study concludes by pointing out that the COVID-19 crisis has provided an opportunity to all higher education institutions to take advantage of the technological affordances of the Fourth Industrial Revolution (4IR) and quickly improve and maximise their information and communications technology (ICT) operations.

Impact Of COVID-19 Lockdowns on Higher Education in Africa

COVID-19 lockdowns have had far-reaching consequences on education globally. By May 2023, when the pandemic was officially declassified as a public health emergency, approximately 1.5 billion students and 630 million educators had been negatively affected across two hundred countries, spanning from early childhood to higher education (Dyvik 2024). In an education sector already paralysed by socio-economic challenges, the lockdowns triggered the digitalisation of the education sector in many African countries whose impact will linger for a long time (Mhlanga and Moloi 2020). In the higher education sub-sector, some universities implemented online learning through recorded lectures and online platforms, while others postponed online learning because of a lack of IT infrastructure for students and teachers (Frith and Lloyd 2020). Existing literature shows that the digital divide is most pronounced among vulnerable university students with poor digital skills and limited access to the hardware and connectivity for distance learning during campus closures (Mohube, Mokwena, and Ilorah 2021; Woldegiorgis 2022).

After the pronouncement of a nationwide lockdown in response to COVID-19, the South African ministry of communication and digital technologies led an initiative to provide virtual learning, partnering with various sections of the media and internet providers (Mhlanga and Moloi 2020). A few higher education institutions made efforts to offer virtual learning for their students. A major obstacle in the digital migration of universities was the lack of staff skills and training in delivering online lessons (Tamrat and Teferra 2020). Exposing the digital divide, studies reveal that not all lecturers had access to the internet in their homes (Dube 2020; Matsilele 2021; Soni 2020). Moreover, the same digital devices were shared with a spouse or

with children who were being home-schooled. The worst-affected universities were the historically disadvantaged ones in rural areas, which have fewer resources to support their students and teaching staff. The economic impact of the COVID-19 pandemic weighed down on family income, as most non-essential services were grounded (Ndevu 2020). The spiral effect of an economic meltdown in a country where a large percentage of students depend on government grants to survive, where data costs are high and even a mobile connection may not be readily available to all, and where devices such as laptop computers are a luxury, made online learning difficult to sustain (Tamrat and Teferra 2020).

Technical and vocational training (TVET) institutions faced a unique challenge compared with other higher education institutions (Masina and Mawonedzo 2022). TVET colleges place a greater emphasis on the development of occupation-specific practical skills which are acquired through practice (Margo et al. 2020). E-training is regarded as a weak substitute for the practical activities of TVET training (Margo et al. 2020). For instance, activities may require the use of materials or technology that are largely not found at home unless they are simulated digitally. For TVET institutions, migration to online learning negated the acquisition of key industry-related skills (Masina and Mawonedzo 2022). A survey conducted by the Brazilian National Service for Industrial Training (SENA) in partnership with the African Development Bank (2020) to establish the impact of COVID-19 on learning in 12 African countries revealed that the shift to online delivery of training had a negative impact on management, lectures, and students who did not have the skills needed for the online transition. The COVID-19 lockdowns not only affected South African institutions of higher learning but also higher learning institutions in other countries in the region. For instance, in Zimbabwe students and educators who live in rural areas had no access to electricity, depriving them of efficient internet and unrestricted use of digital tools (Masina and Mawonedzo 2022). Mukerekedzi and Mashininga (2020) acknowledged that Zimbabwe failed to fully embrace e-learning as it would prejudice and be discriminatory to persons without internet access or those who could not afford it. The prohibitive cost of internet access negated efforts by universities to offer online learning. Many state-controlled universities faced resistance from their students who complained about the prohibitive cost of data (Maseko 2023). The resistance from students pushed the government to engage mobile network operators to zero-rate university websites, but of the three mobile network giants, only Econet Wireless's Liquid Telecom agreed to the demand (Mukeredzi and Mashininga 2020). The government made efforts to mitigate the excessive cost of data, providing students with data packages. However, poor coordination and lack of adequate resources hampered this initiative as students did not receive the data packages.

Like South Africa and Zimbabwe, Kenya's decelerated economic growth was felt by tertiary students coming from poor, vulnerable, and marginalised households who rely on informal employment and businesses (Ngwacho 2020). Research reveals that tertiary students from low-income households were pushed to income-generating activities to support their families, thus pushing them out of online lessons (Gathuru and Mweyeri 2021). Margo et al. (2020) established that online learning during lockdown exposed the gender divide in Africa. The survey showed that more women (85% compared with 81% of men) were experiencing course interruptions, and women were also reporting higher rates of disruptions in their research activities. The disproportionate effect of the COVID-19 pandemic on women in higher education is further emphasised across age groups and research activities. For instance, younger women in their 20s were more likely to report experiencing interruptions to their learning (90%, compared with 81% of men their age) while women in their 40s reported higher rates of disruption (90% compared with 70% of men in their age group) (Odera, Wachira, and Mugo 2020). The myriad of challenges confronting Sub-Saharan Africa's online education

drive raises fundamental questions about its ability to take advantage of the 4IR to enhance the teaching and learning processes.

Theory of the Digital Divide

A digital divide is the existence of economic and social inequality within a society that cascades down to access, use of, or impact of information and communication technology (Organisation for Economic Co-operation and Development [OECD] 2001).

Steyn (2010) asserts that digital divides between social groups are influenced by economic realities within societies. Steyn offers careful consideration of other factors as the matter of divisions is much more complex. The digital divide manifests at three distinct levels. First, the operational divide concerns the availability of ICT and access to ICT systems (Steyn 2010). This requires an infrastructure for ICT to operate, and devices for access. For instance, laptops or Android mobile phones are necessary for successful online lessons. Second, the cultural divide refers to a social dimension where some groups may not have either technological or social access to dominant social networks (Castells 2004). The digital divide is quite common not only in South Africa but in the rest of the continent (OECD 2001). There are cultural groups which have been slow in accepting technological influence in their societies. The third aspect is the political divide which excludes groups or individuals from communities. This is common in postcolonial societies like South Africa, where the existing divide is a legacy of systematic colonial exclusion of the African from acquired knowledge about information technologies. Access to technologies under the colonial administration was a white privilege. Castells (2004) opines that networks and digital literacy are means to gain a position of power, which of course leads to the dominance of some groups and consequently the exclusion of others.

South Africa has the most extreme levels of inequality in the world and there has been little success in reducing it (Hundenborn, Leibbrandt, and Woolard 2018; Polus, Kopiński, and Tycholiz 2021). The inequalities are attributed to historical circumstances and policy uncertainty and corruption in the post-independence state. Statistics South Africa (2017) estimates that more than half of South Africa's youthful population lives in poverty. Some 27% of the population is at risk of poverty (Du Toit 2017). The rural areas have been by far the most marginalised, complicating initiatives for online learning (Dube 2020). Attempts to address economic inequalities have focused on racial rather than class divides, and the redistributive policies have not reflected the realities facing rural people (Du Toit 2017; Sulla and Zikhali 2018). As a result, the rural areas in South Africa are still inaccessible because of poor road networks, have no reliable mobile phone network, and have no electricity. In institutions of higher learning, students and lecturers from rural settings equally experience the same challenges in accessing and using technology (Ndevu 2020). Therefore, this study analysed the influence of different levels of digital divide on the implementation and results of online education in South Africa during the COVID-19 lockdown.

A Word on Methodology

For this qualitative study, a single case study design was employed to help understand the effects of the digital divide on learning during the lockdown period in institutions of higher learning in South Africa. Creswell (2002, 61) highlights that a single case study is a means to gain an extensive comprehension of a specific problem, event, activity, process, or individuals. As defined by Yin (2003, 13), a case study involves examining a current phenomenon in its real-life setting, particularly when the distinction between the phenomenon and its context is

unclear. The target population were students at a university of technology. The university was chosen based on its demographic profile as it is attended by students from diverse financial backgrounds, races, and cultures. This demographic diversity was important in comparing access to digital technologies for online learning among the different groups. In line with Guarte and Borrios (2006, 277), we adopted purposive sampling in selecting students for this study, a technique that involves randomly choosing sampling units from the population segment with the greatest understanding of the characteristic being studied. Relying on saturation to determine sample size, data were collected from 12 participants. We followed Longhurst's (2003) recommendation of using a semi-structured interview format involving questioning.

To analyse the qualitative data, thematic analysis was employed, which involves identifying and analysing various themes within given data. Braun and Clarke (2019) note that themes are captured aspects of data that relate to the research questions and objectives, representing patterns or meaning within the data set. This study followed Braun and Clarke's categorisation of thematic levels into semantic and latent themes, and it focuses on the latter. Given that semantic themes focus solely on surface meanings and do not go beyond participants' statements or written content, this thematic approach would not apply to this study. Our analysis delved into latent themes to reveal the underlying ideas, assumptions, and conceptualisations that shape the semantic content of the data.

Data Presentation and Discussion

Technical Hurdles and Connectivity Issues

Most of the participants expressed that while they were digitally literate, they faced technical challenges in connecting to the online classes. Online classes were conducted via Zoom, Google Meet, Skype, and WhatsApp but these were fraught with challenges ranging from unavailability of hardware devices such as laptops, reliable Android phones, and earphones. One student commented on challenges with access to hardware facilities, saying:

> As I have pointed out above, I faced several difficulties because of not having a reliable Smartphone and a laptop during lockdown. As a result of these challenges, during level five of the Covid-19 lockdown period, I was behind most of my course work by seven assignments. (Advanced diploma student, personal communication, 12 February 2021)

Another student added:

> I was privileged to have all digital tools and resources I needed for online learning. The only tool I was sceptical of using for online learning was my laptop as it has software malfunctions. (Second-year student)

The study revealed that by moving to online learning, students from disadvantaged backgrounds were disproportionately affected and that this digital divide had far-reaching consequences on the students both in the short and long term. The deficiency of proper learning attitude which is linked to the psychological burden of the COVID-19 pandemic on students, lack of suitable materials for learning, more involvement in classroom learning, and the inadequate learning environment at some of their homes during self-isolation all combined to exclude students from accessing online lessons (Brazendale et al. 2017; Song et al. 2004). Soni (2020) adds that the lack of resources was a major obstacle to the teaching-learning process, as

learners often lacked the proper means to access the online platforms. Consequently, most students who had been used to face-face classes felt that the challenges they faced in utilising online learning contributed to poor academic performance. Furthermore, the unavailability of proper digital tools, poor internet connections, or Wi-Fi connections caused significant challenges, resulting in many students in the global South losing out on learning opportunities (Dhawan 2020).

South Africa still struggles to offer its citizens uninterrupted internet connectivity because of problems such as power cuts, poverty, and the unavailability of electric connections, particularly in rural areas. These were pertinent challenges that emerged during the interviews. Students from the rural areas were cut off from virtual learning because of the absence of electricity to charge their devices. As one student who was based in a rural area commented:

> We had classes on digital platforms such as Zoom and Google Meet. WhatsApp was heavily relied on for class consultations. The experience was one characterised by difficulties. For me, I did not have resources like a reliable internet connection, a laptop as well as a reliable smart phone. (Personal communication, 12 January 2021)

Another student commented on the connectivity challenges, saying:

> My challenges with online learning were huge data costs, poor network connection, which made it difficult to attend online classes. As a result, I missed work. Another challenge was that I was sharing my laptop with my sister, which made it difficult to consistently attend the online lessons. (Personal communication, 10 February 2021)

The study found that the excessive cost of internet data in South Africa negatively affected the digital migration of education during the COVID-19 pandemic. In May 2020, South Africa had the highest data costs in Africa, as highlighted in a report by Cable.co.uk (2020), coinciding with the surge of the COVID-19 pandemic. With most respondents indicating that they came from financially disadvantaged backgrounds, the high-cost data alienated them from accessing virtual learning. One student summarised the impediments to online learning as follows:

> The cost of data had a major impact, as it is the only way we connect with our educators and conduct research while doing our assignments. The data was quite expensive which forced me to skip online classes due to lack of data. I feel like I would have performed better than I did if I had enough data. This forced me to sometimes submit mediocre quality assignments because I could not afford to do extensive research. So, there were limitations. (Personal communication, 12 February 2021)

A first-year student added:

> My online learning experience would have been easier if data were cheaper. Not everyone has Wi-Fi at home, and places that offer free Wi-Fi closed during the lockdown, so data was the only way to access the internet, assignments and to make deadlines. (Personal communication, 14 February 2021)

Access to information is a basic human right (UNESCO 2022). However, the prohibitive costs of data have denied students access to the right to education during the pandemic. Viewed in the context of the digital divide, the poor, who make up a significant proportion of the population of South Africa, do not have access to technology as they cannot afford to pay for

the services and technological tools. Jantjies (2020) adds that historical inequalities dating back to apartheid impact on pupils from disadvantaged backgrounds. Therefore, we argue that while the digital transformation of education represents the future of education globally, for South Africa the COVID-19 pandemic exposed the structural weaknesses that need to be addressed if the country is going to fully utilise the 4IR in education.

Assessing the Impact of Interventions to Facilitate Access to Online Learning

There were notable attempts by the government and internet providers to make online learning accessible to students. However, these efforts were fraught with challenges. The participants pointed out that mobile phone companies and internet providers introduced promotions to make data affordable, but the promotions made little impact. In addition, the participants highlighted that some of the internet providers offered huge volumes of data for an extremely limited time frame, thus defeating the essence of the promotion. A student commented on data access, saying:

> Telkom has a promotion that I have been using, the 10gb during the day and 10gb for the night was useful for me. For most of the lockdown, this was the most useful. (Personal communication, 10 February 2021)

Another student who used MTM said:

> MTN offered #MTNRemake data promotions, even though they were valid for one day (expired at 23h59 on the day purchased). The data promotions were useful to a certain extent, though the duration really cost as often, data was lost when the expiry time lapsed. (Personal communication, 12 February 2021)

The negligible impact of data promotions was echoed by another student:

> I am aware of the promotions by the service providers, and they did not make any difference as they can only be accessed fully by those with sufficient funds to purchase the services. My experience with these promotions is that they were even frustrating as the awarded data only lasts for a short while. They are even more expensive and costly to buy than a normal data as they are not sustainable because of their soaring prices and short expiry date. They can also be devastating due to a low-quality reach in accessing internet if you choose a cheaper option. (Personal communication, 10 February 2021)

Although online learning has been complicated for programmes that require firsthand training, universities and TVETs resorted to online interaction as a way of preserving parts of work-based learning (OECD 2020). Mhlanga and Moloi (2020) note that despite efforts to introduce online learning for tertiary institutions through YouTube, Microsoft Teams, Zoom, Skype, WhatsApp, and DSTV, poverty remained one of the biggest impediments to accessing these platforms. Therefore, the piecemeal promotions on data had an insignificant impact in making online learning easily accessible for all during the COVID-19-induced lockdown in South Africa. eLearning Africa (2020) argues that the prohibitive cost of data was one of the major limitations to online learning in Africa. eLearning adds that the ability for students to access the internet depends on the cost. Looking at South Africa's expensive data costs, it is likely to remain beyond the reach of the poor, particularly those in rural communities.

Government and higher learning institutions provided laptop loans to students to mitigate the digital divide. However, the lack of a clear strategy on identification of the needy, vetting processes, and transparency negated these efforts. One student said.

> We were given an opportunity to apply for laptops and I did. Unfortunately, I neither received the laptop nor any feedback from the university regarding my application. (Personal communication, 12 January 2021)

Another described the weaknesses in the laptop application and distribution process, saying:

> Distribution of digital tools and aid from institutions to students needs reviewing. Many students who got laptops were not in need of them as they already had theirs from their bursaries or those they already owned. Some students who really needed them could not access them because they were not enough for everyone, and the privileged ones who already had resources to apply for the same tools they didn't need to submit their applications first. (Personal communication, 10 January 2021)

The South African government's idea to support students with laptops was a very noble one that would reduce the digital divide confronting the education sector. However, the effort was affected by corruption allegations, leading to a prolonged delay in the procurement of laptops for deserving National Student Financial Aid Scheme (NSFAS) students (Mugadze 2020). By the end of 2020, the promised laptops had not been delivered and new timelines had been set to March 2021 (Makupe 2021). Delays in providing vital digital tools have an enormous impact on vulnerable learners who are excluded from the learning process and must rely on colleagues for updates.

Implications of the Findings

The study's findings reveal that the migration to online learning was not a smooth endeavour for most institutions of higher learning, primarily because they were not prepared for large-scale online learning (Dube 2020). In areas affected by loadshedding or lack of electricity and poor internet connectivity, innovation is key to ensure the students are not disadvantaged. One of the innovative ways to address the technical difficulties is prerecording video lectures, testing the content, and having a Plan B available (Dhawan 2020).

The COVID-19 pandemic exposed many countries' deficiencies in digital migration. The pandemic has opened new opportunities for South Africa to take advantage of the momentum already set to fully digitalise the learning processes. Kupe (2020) opines that exposure to technology will benefit the students in the short and long term, even though their access to technology is uneven and data is costly. The pandemic has undeniably clarified that countries throughout the world need to allocate funds for proper training of educators and create innovative accessible learning environments (Soni 2020). This crisis situation showed the urgency of considering the learners' needs. Education materials and pedagogical provisions should be introduced in all emergency curricula, which could keep educators and learners safe and mentally healthy in the pandemic crisis (Pragholapati 2020).

In future, universities must strengthen alliances and produce sector-wide strategies as opposed to disconnected, institution-centred initiatives. One way to achieve this is to share services and programmes but still give institutions their autonomy. Kupe (2020) suggests that institutions can share IT services, and with a huge pool of resources, they can speed up the digital

transformation of education. If social inequalities still exist, the digital divide haunting the South African education sector will linger for a very long time. One area that requires urgent attention is the rural-urban divide, particularly electricity connection and digital infrastructure.

The government and those in charge of universities must thoroughly examine the variety of needs and challenges faced by each student and their resource allocation capacity, and then attend to those needs as opposed to taking a universal approach under the unspoken assumption that these needs can be addressed similarly. This produces generic results. Mathevula and Uwizeyimana (2014) argue that the rural areas will lag in terms of digital migration of education because of limited access to electricity.

Conclusion

The study explored the challenges of using digital technologies during the COVID-19-induced lockdown in South Africa. The lockdown presented an opportunity for South Africa and the entire African continent to accelerate the digital transformation of education, but challenges remain in appropriating digital technologies for online learning mainly because of the digital divide. Despite the government and stakeholders' support for online learning during the lockdown, the study established that numerous hurdles such as internet connectivity, absence of digital tools, the high cost of data, and errors by the government have significantly negated online learning. However, what is encouraging is the reflection that the COVID-19 pandemic was not only a wake-up call, but an opportunity for institutions of higher learning to reposition technology at the heart of teaching and learning if education is to transform the African continent (eLearning Africa 2020). The study concludes by concurring with Kupe (2020) that the COVID-19 pandemic has been catastrophic to nations and citizens but the momentum it has created for the digitalisation of learning remains strong.

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