

# New Education Technologies in Higher Education: E-Leadership Perspectives on South African Student Learning During and Post-Covid Reality

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## Abstract

The study's main focus was to investigate the e-leadership perspectives on new educational technologies that were deployed/implemented during Covid-19 and whether it helped close the digital divide in South African public universities. The study adopted a systematic review to achieve the study objectives. The findings showed that access to appropriate technology and internet speed or even access to the internet at all was a significant challenge, reflecting, again, deep inequalities between students, especially in rural communities. Some institutions of higher education were forced to close due to a lack of access to technology. The study results revealed that higher education institutions had to navigate the storm of Covid-19 through various means, such as migrating their courses online, taking different measures in their administration processes, and prioritizing their responsibilities. The results indicated that the majority of educators did not receive financial support for teaching and learning tools. Numerous opportunities came along with the introduction of the World Wide Web, one of which is electronic learning. The study's findings also showed that post-Covid-19, institutions of higher education have made steady progress in implementing hybrid and blended teaching and learning. In conclusion, institutions of higher education should embrace a culture of change, using the post-Covid-19 moment as an opportunity to experiment and innovate to meet the changing needs of their students, including the rural ones, to bridge the gap.

**Keywords:** Covid-19, digital divide, education technologies, higher education, South Africa.

## 1. Introduction

Nearly all South African state institutions have relied on face-to-face instruction since the inception of higher education, from the age of colonization to the era of decolonization (Mgqwashu, 2020). Jansen (2004) contended that face-to-face learning is thought to be traditional and excludes students' experiences because it takes place with the lecturer depositing knowledge for students in a delineated classroom, using traditional methods (lecturer-centred) and traditional resources such as textbooks,

chats, chalkboards, and others. It has been a challenge for higher education institutions (HEIs) around the world to explore educational technology to increase access to education and learning outcomes while also enhancing social progress and quality of life. The adoption of technology, particularly during the Covid-19 pandemic, has brought to light the terrible gap in digital literacy that exists not only in South Africa but also in many developing nations. In higher education, digital literacy is regarded as a crucial skill that students must demonstrate and use to view digital content on a variety of digital devices.

Additionally, a global publication by WAHED showed that Covid-19, the breadth of the digital divide, and the socio-economic disparities sustain obvious discrepancies among countries (Atherton, 2020). It is crucial to take into account policies at the national and institutional levels that aim to achieve fairness in higher education for students from low-income families, female students, and members of racial and ethnic minorities. This applies to both HEIs and the students themselves. In South Africa, the pandemic has hastened the long-standing concerns of tuition affordability, perceived exclusivity, and issues of access and change. Professors and students urgently need to be proficient in online teaching and learning.

Some public universities in South Africa tried online learning during the #FeesMustFall demonstrations in 2016–2017 (Mavunga, 2019). HEIs in Qatar have been increasing their capacity for virtual education due to the blockade that had been endured. Students from disadvantaged populations struggle more than usual in developing nations. Opportunities for online learning are expected to be severely limited in poor countries with limited internet access and inadequate broadband capability, especially in rural regions.

Recently, the practice of leadership in the virtual realm has become an important part of the daily work of managers. The use of new forms of communication technologies together with the geographical expansion of the activities of firms has increased the need to lead via digital channels (Darics, 2020). Responding to these changes, organizational scholars have introduced the concept of “e-leadership” to refer to those leaders who conduct many of the processes of leadership largely through electronic channels (Zaccaro & Bader, 2003). The word “leader” is a very familiar term. The shift in the economy has opened up a window for a new word, “e-leader”, thanks to technological advancement.

From an academic point of view, even if the call for the study of the relationship between technology and leadership was initiated quite a long time ago (Avolio et al., 2015), the discussion on how leadership has been affected by the digital revolution has so far not been adequately developed, as would be reasonably expected. Indeed, while the practice of e-leadership is expanding rapidly (Van Wart et al., 2019) and inevitably, either due to the technology itself or the role leadership is expected to play in organizations, the academic contribution to the field is still limited (Venkatesh, 2013). In recent years, different constructs such as “digital leadership” have been included in the debate and considered synonymous with e-leadership (House, 1999). While the

term e-leadership started to become popular in the early 2000s, the term “digital leadership” is a relatively recent one in the domain investigating the relationship between leadership and new technology at work. Indeed, according to our research carried out on the Web of Science (WOS), 67 out of a total 89 academic works produced in the last 20 years were published in the period 2016–2020 (Johnson, 2020).

E-leadership is the practice of using technology for all leadership-related tasks and activities. Therefore, the operating environment is the primary distinction between the traditional leader and the e-leader. The observed transition to remote working and the emergence of e-leadership has been significantly influenced by the Covid-19 pandemic. Leadership in educational institutions have worked hard to establish ways to ensure that students can continue their studies despite the crisis and social isolation during the Covid-19 pandemic (Moloi & Salawu, 2020). An enormous push towards online learning has resulted from this. In many instances, to ensure that investigations continue, technological solutions have been promptly adopted to combat prevailing challenges. According to Moloi and Salawu (2020), the adoption of instructional technology, however, has been extremely slow and inconsistent in South Africa’s public university sector. Recent years have seen a growing ubiquitous dispersion of information and communication technologies (ICTs) that are fundamentally altering student learning, which has presented leadership inside public universities with a problem. Consequently, the support of these technologies is fostering further leadership development.

To understand how new educational technologies have impacted their HEIs, faculties, and ultimately their students’ learning, many writers around the world have chosen this topic as their main research priority (Marshall & Taylor, 2015). However, the scholarly discussion on the effectiveness of educational technology by Castaneda and Selwyn (2018) has been more circumspect and has cautioned against uncritical trends towards digitalization. Global scholars generally concur that technology may expand information access, but suppliers frequently fall short of their claims.

According to a global assessment released by the Council of Europe in 2021, technology cannot be the lone answer. First, there is unequal access to technology. According to Sehoole (2020), the pandemic has “*revealed fault lines of inequalities*” both in society and in HEIs “*in some regions of the world, for example in South Africa, and elsewhere in Africa*”. Some students were unable to participate in online learning because they lacked the necessary equipment, electricity, and internet access. Some HEIs in other nations, such as Brazil, have chosen to stop all of their teaching activities rather than move them online because they realized that only a very small portion of their student population would have access to infrastructure that would allow for high-quality online learning (Knobel, 2020). Additionally, instructors need to obtain the proper training because pedagogy needs to be thoroughly rethought, which calls for significant time and resource commitments.

The argument that “*education is broken and should be mended by technology*” has a lengthy history (Teras & Suoranta, 2020). Technologization, or forcing deeper societal issues

and challenges on education, is closely related to educationalization, or forcing every conceivable problem onto technology. One should be aware that, depending on their point of view, the phrase “education is broken” might indicate multiple factors. The introduction of internet-based learning and digital tools into the classroom has fundamentally altered how instructors and students acquire, create, and share information. HEIs have developed into enormous bureaucratic organizations where much time is required to execute a new idea and where learning management systems must deal with the learning. The study’s main focus was to investigate the e-leadership perspectives on new educational technologies that were deployed/implemented during Covid-19 and whether they helped close the digital divide in South African public universities. The objectives of the study included: i) identifying the challenges and opportunities of new education technologies induced by the Covid-19 pandemic in HEIs in South Africa; and (ii) assessing the place of the Covid-19-induced new education technologies in the post-Covid-19 reality in HEIs in South Africa.

## **1.1 Theoretical Framework**

As defined by Vinz (2022), “[a] theoretical framework is a foundational review of existing theories that serve as a roadmap for developing the arguments that will be used in your research.” Theories are developed by researchers to explain phenomena, draw connections, and make predictions. A theoretical framework explains the existing theories that support the research, showing that the work is grounded in established ideas (Vinz, 2022). In other words, the theoretical framework justifies and contextualizes later research and is a crucial first step for a research paper, thesis, or dissertation. A well-rounded theoretical framework helps to set the researcher up for success in the research and writing process (Aucejo et al., 2020). This study adopted the activity theory model as theoretical framework to illuminate the many factors of e-leadership perceptions on new educational technologies deployed/implemented during Covid-19.

### **1.1.1 Activity theory**

Activity theory is a well-established and studied theoretical framework by Engeström (1987), grounded in a century of work by both German philosophers and Russian psychologists, including Vygotsky (1978) and Leontyev (1981). Hashim and Jones (2000) interpreted activity theory as a theoretical framework for the analysis and understanding of human interaction through the use of tools and artifacts. According to Murphy and Manzanares (2013), “*Activity Theory is a tool that can help make sense of the complex changes taking place in higher education because of the integration of technology.*” They further argued that, unlike other theories, it allows for a focus that includes elements in the social, cultural, and historical setting in which the technology is used. In addition, it supports consideration of the practices of individual students and educators as well as practices at the institutional level. Furthermore, activity theory perspectives on technology in higher education present a compelling theory that will be useful for researchers, academics, policymakers, administrators, and instructors interested in understanding and controlling the shifts that are occurring in education due to the integration of technology (Murphy & Manzanares, 2013). This research

investigates the activity theory framework to assist in shifting the focus from examining the usability of new technologies to examining their sociability.

This study considered activity theory by adopting the new education learning technology as the “tool” in the community of an HEI. The “subject” considered is the student and the “object” the purpose of the task, and the desired “outcome” is more learning for the student. The activity system was drawn by taking the perspectives of e-leadership that considers the “community” leaders from both ICT and teaching and learning environments within public universities. These concepts allow the researcher to explore the consequences and examine different outcomes that have been influenced by the interaction between features of the learning situation. In other words, activity theory views the core as *“a dialectic process between subjectivity and objectivity, learning and doing, individual and collective, technical and social, and also tacit and explicit knowledge”* (Crawford & Hasan, 2006).

Many researchers in education, information systems, and humanities have found that activity theory provides a worthwhile framework for understanding their field of study. Activity theory is useful because it describes activities as hierarchical and provides a model for decomposing activities into actions and operations. It insists that activity is mediated by tools, which helps to explain relationships between the user and the tool. Activity theory views activity not as a simple individual action but as being culturally and historically located. In other words, activity theory stems from its fundamental view of purposeful activity in a cultural-historical context as the fundamental unit for the study of human behavior. Activity theory is an approach which underpins the complex and dynamic human problems of research and practice. Hence, activity theory is geared towards a practice which embodies a qualitative approach that offers a different lens for analyzing processes and outcomes.

## **2. Methods and materials**

This study mainly used the literature review approach, including document analysis and conceptual analysis of secondary sources of data, which included several peer-reviewed journal articles and reports. The sources for the systematic literature review were obtained using documents, images, or artifacts that provide first-hand testimony or direct evidence concerning a historical topic under research investigation. For this study, the literature sources explored and studied for the systematic literature review included electronic publications of reports, theses, conference proceedings, company reports, and government publications. The search was based on keywords taken from the objectives of the study, including Covid-19 and education, higher education, e-leadership, new education technologies, and e-learning. During the search process, an estimated 60 articles related to Covid-19 and general education were extracted from the internet. First, only the title and abstract of papers were reviewed for selection purposes, after which we then read and analyzed the full texts.

### 3. Results

The results were themed according to the objectives of the study. These were: (i) to identify the challenges and opportunities of new education technologies induced by the Covid-19 pandemic in HEIs in South Africa, and (ii) assess the place of the Covid-19-induced new education technologies in the post-Covid-19 reality in HEIs in South Africa.

#### 3.1 The Covid-19 pandemic and impact on higher education

Research conducted within South African higher education by Mkhize et al. (2020) focused on the impact of Covid-19 on higher education, specifically from a curriculum perspective. The research echoed that institutions were required to “*save the academic year*” and notably to ensure “*no student is left behind*” despite Covid-19 disruptions (Mkhize et al., 2020). As reflected by UNESCO, “*9.8 million African students were experiencing challenges due to institutions being closed. The transition to online mode was not feasible as only 24% of the population had access to the internet*” (Mkhize et al., 2020). This raised further concerns in emergency remote teaching and learning, where economic disparities created an obvious digital divide.

#### 3.2 Challenges of new education technologies induced by Covid-19

Covid-19 in 2020 was the first pandemic to strike with virulence in modern times (Tourish, 2020). Educational organizations encountered an immediate shift in their systems and practices to address the disruptions and disjuncture that the pandemic created. Educational leadership and management, with its inherent challenges (Arar et al., 2021), “*becomes a more stressful and challenging task at times of crisis.*” Universities have also had to navigate this storm through various means, such as migrating their courses online, taking different measures in their administration processes, and prioritizing their responsibilities (Tourish, 2020). Yet, such turbulence (Gross, 2014) and crisis require a rapid response (Gurr & Drysdale, 2020) from educational leaders through certain capabilities and skills. This unforeseen crisis has had adverse implications on HEIs, whereas HEI management is inherently a problematic domain (Drew, 2010).

Transitioning from traditional face-to-face learning to online learning can be an entirely different experience for learners and educators, which they must adapt to with little or no other alternatives available. The education system and the educators have adopted “*education in emergency*” through various online platforms and are compelled to adopt a system that they are not prepared for (Kgari-Masondo & Mkhabela, 2020). During the time of the Covid-19 outbreak, globally, different modes of blended learning in emerging hybrid classrooms were already seen.

The global lockdown of educational institutions was a result of the coronavirus pandemic that forced many institutions to rethink the mode of delivering their course offerings (University of KwaZulu-Natal, 2020). Sun et al. (2008) reported the significance of online learning in that it avails knowledge to users regardless of time restrictions and geographic proximity, although most students unfortunately might not have access to an internet connection as they come from disadvantaged rural

communities. Williams and Goldberg (2005) documented the benefits of online learning but raised the concern that it continues to exclude students from disadvantaged communities.

The research conducted by Kgari-Masondo and Mkhabela (2020) depicted the inequality stemming from historically colonial and apartheid governments that divided HEIs racially. The impact of these inequalities prevents some students from either accessing, participating in, or succeeding in areas where others flourish. Ruswa (2019) noted that although there have been efforts to address inequalities in South Africa, not much has been done to address inequalities concerning students in higher education. Therefore, this research studies the impact of the new education technologies that were deployed/implemented during Covid-19 and whether they bridged and/or further divided learning.

Mamphiswana and Noyoo (2016) stated that many previously disadvantaged institutions are geographically located in deep rural areas and homelands and are inadequately resourced. According to Badat (2012), literature on the current status of transformation in higher education depicted that transformation is slow and that social, political, and economic discrimination and inequalities of a class, race, gender, institutional, and spatial nature profoundly shaped, and continue to shape, South African higher education. Further research conducted by Tinto (2013) captured the context that most African students in South Africa were faced with challenges during the current pandemic crisis that has hit the world. Hence, this research study needs to understand the full impact of the new educational technology and the impact on student learning under conditions of poverty under which many students live, think, and learn while studying and how these conditions affect their academic success. Jordan (2020) reported that many students living in rural areas lack basic infrastructures such as electricity, water, smart devices, and internet connectivity and this had a negative impact on student learning. UNESCO (2020) indicated that African students from disadvantaged backgrounds were most affected by the Covid-19 pandemic. Jones et al. (2008) outlined that it seems as if HEIs are not willing to accommodate students from disadvantaged backgrounds. Machika and Johnson (2015) also reiterated that it is important for universities to understand the needs of students who are poor to best support their academic needs. This suggests that, within the context of the coronavirus, HEIs have to ensure that no students are left behind in order to ensure social justice and the non-disposal of students due to the social context, which can impede them from engaging in online learning (Kgari-Masondo & Mkhabela, 2020).

### **Opportunities of new education technologies induced by the Covid-19 pandemic**

The use of suitable and relevant pedagogy for online education may depend on the expertise on and exposure to ICT for both educators and learners. Some of the online platforms used so far include unified communication and collaboration platforms, such as Microsoft Teams, Google Classroom, Canvas, and Blackboard, which allow teachers to create educational courses, training, and skills development programs (Tourish, 2020). These platforms include options for workplace chat, video meetings,

and file storage, which keeps classes organized and makes work easy. They usually support the sharing of a variety of content formats, such as Word, pdf, and Excel files, audio, video, and many more. These also allow the tracking of student learning and assessment by using quizzes and the rubric-based assessment of submitted assignments.

### **The role of new education technologies induced by the Covid-19 pandemic in higher education institutions**

The study again espouses the new education technologies that were induced by Covid-19 that influenced the e-learning system usage in a less digitalized economy. The literature review also revealed that “academic innovativeness” and “technological growth & development” have a significant mediating effect on the relationship between the Covid-19 pandemic and the adoption of e-learning strategies. Globally, the novel coronavirus (Covid-19) has arguably brought more meaning to the “e-learning revolution” (Welsh et al., 2021). Numerous opportunities came along with the introduction of the World Wide Web, one of which is electronic learning (e-learning). As cited in Adzovie et al. (2020), transmitting information and instruction over an intranet or the internet to people using computer network technology is referred to as e-learning. Tavangarian et al. (2004) also defined e-learning as

*“all forms of electronically supported learning and teaching, which are procedural and aim to effect the construction of knowledge concerning individual experience, practice and knowledge of the learner. Information and communication systems, whether networked or not, serve as specific media to implement the learning process.” (p. 274)*

There is extant literature on the relevance and need for e-learning solutions. Bhuasiri et al. (2021) therefore stated that there is no doubt that e-learning solutions have been applied in most jurisdictions as backup or alternatives to face-to-face classroom learning.

According to Valverde-Berrocoso et al. (2021), the educational integration of ICT has been put to the test because of the need to implement emergency remote education as a result of Covid-19. Furthermore, the research objective of the study was to describe the educational integration of ICT and the teacher education model to obtain evidence that contributes to understanding the phenomenon. The results revealed the most frequent types of teaching practice with ICT and the spaces where digital technologies are commonly used. Various weaknesses can be identified in digital competence among teachers, as well as in the initial/continuing training model, which contributes to the understanding of the difficulties encountered during “emergency remote education”. Participation in ICT didactic innovation projects and the performance of ICT coordination are associated with more experiential training.

### **Place of Covid-19-induced new education technologies in the post-Covid-19 reality in higher education institutions**

HEIs need to take care when reintegrating staff and students on campus. It would be important to have a clear return-to-work strategy with the necessary emotional and

social support offered to students and staff. While many universities were still thinking of blended and online learning approaches, the Covid-19 pandemic fast-tracked learning and the execution of remote emergency learning and online learning over several years (Srivastava, 2020). Academic staff demonstrated resilience by fast-tracking online teaching and learning, administrative staff adapted by employing online processes, and students adapted by upskilling and using laptops and software to facilitate learning.

New technologies can improve this ecosystem, while at the same time reconfiguring it in a disruptive manner. Consideration of the impact of the pandemic on education and training in South Africa confirms the validity of this view. Many invaluable lessons have been learned from the pandemic. Looking at what has happened and may still happen through a positive, future-oriented lens suggests that what has been gained as a result of the pandemic outweighs what has been lost. While tertiary training institutions had been making steady progress in implementing hybrid and blended teaching and learning over the past few years, only a handful of learners, predominantly at private schools, were introduced to this new mode of teaching and learning. Given the need to educate learners in a way that equips them with the skills to succeed in occupational contexts in the Fourth (and Fifth) Industrial Revolution(s), the progress that has been expedited by the pandemic should be welcomed. Maree (2020) revealed the need for life-purpose counselling and emphasized the importance of helping traumatized learners understand that career-life journey arcs rise and fall repeatedly. In addition, that each rise and fall comprises yet another transition that needs to be negotiated has been emphasized like never before (Bunting, 2020). Instead of deploring what has happened and yearning for a world that either no longer exists or is disappearing, we are now in a much better position to embrace the future and understand and accept that change is the actual and only “normal” – not some “new normal”.

An interesting share by the University of Johannesburg, Vice Chancellor Prof Tshilidzi Marwala highlighted the nexus between business, technology, and transformation within higher education (Marwala, 2022). He addressed key strategies to invest in human capacity in 4IR, for higher education to understand the relevant tools for virtual reality, and to prioritize a national artificial intelligence center to address and contextualize machine learning in our education curriculum. The key strategy to be explored is to address unemployment through technology to create wealth and to invest technology learning in production. Teaching and learning must invest in technology literacy and infuse ethos of technology in academia. As a developing country, South Africa needs to invest in 4IR infrastructure and law and policy regulators must advance technology inclusivity.

According to the Vice Chancellor Survey of 2021 (PWC, 2021), 14% of the respondents still did not have access to internet connectivity, technological devices, and data, and these were primarily students from remote areas. Furthermore, to overcome these challenges, universities may need to look towards increased investments from the government or private sector to ensure that no student is left behind. A report

published by Amazon Web Services (AWS, 2020) highlighted that teaching models are changing and forcing universities, colleges, and schools to adjust their business and financial models. Declining enrollments, rising health and safety costs, a decline in student enrollment, and cuts in public funding are posing new financial challenges for educational institutions across the world. Despite these challenges, educational institutions have an opportunity to innovate and thrive in this era of rapid change and uncertainty. New technologies are increasingly demonstrating how they can enhance student outcomes, make teaching more effective, and drive collaboration and engagement. To reap the full benefits of technology, educational institutions should embrace a culture of change, using this moment as an opportunity to experiment and innovate to meet the changing needs of their students.

#### 4. Conclusions

The study investigated the e-leadership perspectives on new educational technologies that were implemented during Covid-19 and whether it helped close the digital divide in South African public universities. We conclude that access to appropriate technology and internet speed or even access to the internet at all was a significant challenge, reflecting, again, deep inequalities between students, especially those in rural communities. Some institutions of higher education were forced to close due to a lack of access to technology. We also conclude that post-Covid-19 institutions of higher education have made steady progress in implementing hybrid and blended teaching and learning. In conclusion, HEIs should embrace a culture of change, using the post-Covid-19 moment as an opportunity to experiment and innovate to meet the changing needs of their students, including the rural ones, to bridge the gap.

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