Remote Learning Access, Readiness, and Support in South African Higher Education Institutions Post-COVID-19

Tinayeshe Shumba
https://orcid.org/0000-0002-6818-6935
The Independent Institute of Education, South Africa
tinashumba2000@gmail.com

Tunika Munkuli
https://orcid.org/0009-0000-8085-6455
The Independent Institute of Education, South Africa
tmunkuli@rosebankcollege.co.za

Fanny Saruchera
https://orcid.org/0000-0002-2139-1966
University of the Witwatersrand, South Africa
Fanny.saruchera@wits.ac.za

Abstract

The COVID-19 pandemic precipitated unprecedented disruptions in higher education globally, compelling a swift transition from traditional classroom instruction to remote and, subsequently, hybrid learning models. This study investigates the access, readiness, and support structures for remote learning in South African higher education institutions (HEIs), with a focus on adapting to post-COVID-19 educational needs. There is a lack of specific studies that focus on remote learning access, readiness, and support in rural provinces of South Africa; hence, the study intends to close the gap. Utilising an interpretivist research approach, comprehensive data were collected through semi-structured interviews with lecturers in higher education institutions in the Limpopo province. The analysis revealed significant challenges impacting the efficacy of remote learning, notably inadequate internet connectivity, frequent power disruptions, and scarcity of essential technological devices. These factors significantly contributed to poor attendance rates in synchronous learning sessions and heightened reliance on asynchronous sessions, which students found more accessible and flexible. The study proposes targeted strategies for HEIs to effectively bridge the digital divide, bolster infrastructural support, and enhance remote learning access, readiness, and support. The study recommends that senior managers and policymakers develop policies and frameworks that

UNISA university of south africa PRESS
Progressio
Volume 46 | 2025 | #17437 | 25 pages
https://doi.org/10.25159/2663-5895/17437
ISSN 2663-5895 (Online), ISSN 0256-8853 (Print)

facilitate remote learning best practices in the evolving landscape of higher education.

Keywords: digital divide; educational resilience; hybrid education; remote learning; student engagement

Introduction

Global pandemics have recurrently challenged humanity, precipitating profound changes in social systems and institutions. The outbreak of the novel coronavirus (COVID-19) has been particularly disruptive for educational systems worldwide, forcing an abrupt shift from traditional in-person teaching to online and hybrid learning modalities. This transformation has been rapid and widespread, affecting higher education institutions (HEIs) across the globe, including those in South Africa (Marinoni, Van't Land, and Jensen 2020). In South Africa, the pandemic has exacerbated existing disparities in access to digital technologies and highlighted the urgent need for robust digital infrastructures in education (Bozkurt et al. 2020). This study focuses on examining the access, readiness, and support for remote learning within South African HEIs. It aims to explore how these institutions have navigated the shift towards sustainable teaching and learning methods in the wake of the pandemic's challenges. The "new normal" brought about by COVID-19 has catalysed a re-evaluation of educational practices and risk management strategies, emphasising the need for resilience and adaptability in educational models (Watermeyer et al. 2021). Integrating information and communication technology (ICT) into teaching and learning processes has become beneficial and essential, reshaping educational delivery and expectations.

This study addresses critical questions regarding how remote learning access, readiness, and support have impacted the efficacy and sustainability of higher educational initiatives in South Africa. The guiding research question, "What is the impact of remote learning access, readiness, and support in South African HEIs?," seeks to uncover the broader implications of these shifts for student success and institutional throughput rates. Given the extensive reliance on digital platforms induced by the pandemic, HEI management and policymakers are at a pivotal juncture. They must devise and implement strategies that address immediate educational challenges and pave the way for long-term improvements in educational delivery and equity (Czerniewicz, Trotter, and Haupt 2019). Thus, this study is positioned to offer insights that may help refine policies and practices, ensuring that remote learning is both effective and inclusive.

Literature Review

The literature review focuses on understanding how remote learning access, readiness, and support influence HEIs in South Africa. Access to technology and internet connectivity serves as the pillar to remote learning post the pandemic as noted in the literature.

Remote Learning Access

Remote learning access has been found to be related to underlying social issues beyond the control of institutions, which need consideration when delivering remote classes (Cowden, Mitchell, and Taylor-Guy 2020). Technological integration in higher education institutions affects remote learning access due to the widening gap in accessing digital technology and the internet (RRIF 2020). While there is a lack of a clear definition of technological integration in education due to the ever-changing nature of technology, it can be described as the process that contributes to the teaching and learning of students in HEIs. Notable definitions of technology integration describe the concept as the sustainable and ongoing change in social systems of schools because technology helps students in the structuring of information (Belland 2009).

Considering the rapid shift to remote learning spurred by the COVID-19 pandemic, the scrutiny of teaching quality and learning outcomes has intensified. Wagner et al. (2024) detail the challenges and adaptations at Wits University during the pandemic, highlighting the shift towards blended learning models and the critical need for flexible educational practices that can respond to unexpected disruptions. This experience is reflective of broader trends across global higher education institutions, where the integration of technology in teaching and learning processes has become a pivotal element of educational strategy (Miller, Sellnow, and Strawser 2021). The adoption of online learning platforms and the transition to hybrid models signify a major transformation in educational delivery. Online learning comprises modern information technologies and the internet, which collectively facilitate the digital delivery of educational content. This evolution has been significantly influenced by the advancement of technology and social media, which have become integral in enhancing the accessibility and efficacy of online education (Abdulrahim and Malbrouk 2020). The pandemic notably accelerated this transition, presenting both challenges and opportunities for pedagogical innovation, as discussed by Miller, Sellnow, and Strawser (2021), who explore the dynamics of communication in remote, HyFlex, and BlendFlex courses.

Oliver (2022) posits that higher education is failing to keep pace with current technological advancements, particularly the changes ushered in by the Fourth Industrial Revolution. This revolution emphasises automation, advanced analytics, and connectivity, profoundly influencing educational methodologies. The Fourth Industrial Revolution continues to transform traditional educational paradigms by introducing sophisticated technologies that enhance both the logistical and interactive aspects of education. For instance, the integration of artificial intelligence, virtual reality, and other advanced technologies into learning environments has created more dynamic and personalised educational experiences (Shahzad et al. 2023). These innovations enrich the educational experience while expanding opportunities for access and engagement.

Despite the strides made, there is a persistent concern that HEIs are slow to adapt to technological changes. The COVID-19 pandemic acted as a catalyst, pushing

institutions to integrate technology at an unprecedented pace. However, there remains a critical need to cement these advancements to ensure sustainability beyond the pandemic era (Oliver 2022). Institutions must avoid reverting to traditional approaches, as studies have shown that technology positively affects learning and success when paired with appropriate pedagogical methods (Erbas, Ince, and Kaya 2015; Lei and Zhao 2007). Nonetheless, questions remain about whether the current integration of technology in HEIs is truly optimised to improve teaching and learning outcomes.

Inequities in access to digital resources further complicate the integration of remote learning. Studies indicate that students from socioeconomically disadvantaged backgrounds often face barriers to internet access and digital devices, creating a digital divide that undermines the equity goals of remote learning initiatives (Van Deursen and Van Dijk 2019). Addressing this divide requires collaborative efforts between governments, private sectors, and educational institutions to ensure that digital inclusion becomes a foundational aspect of educational policy and strategy (Gottschalk and Weise 2023; Saruchera et al. 2014). Additionally, policies must focus on providing training for educators to effectively use technological tools, as the success of remote learning depends on both access and the capability to utilise these tools efficiently (Hodges et al. 2020).

Another critical issue in remote learning access is the variation in technological literacy among students and faculty. Research suggests that disparities in digital skills can affect the overall effectiveness of remote learning initiatives (Ng 2012). As HEIs continue to adopt innovative technologies, it becomes essential to provide structured training programmes that enhance digital competencies for both educators and students. Such initiatives could bridge the gap between technological availability and practical usage, ensuring that all stakeholders are equally equipped to benefit from digital education platforms.

Remote Learning Readiness

The literature illustrates a complex landscape where educational quality is influenced by a multitude of factors ranging from technological readiness and infrastructure to pedagogical adaptability and institutional support. As higher education continues to evolve in response to global changes, particularly those prompted by the pandemic, institutions must navigate these challenges strategically to harness the benefits of remote and hybrid learning models. The insights from these studies offer valuable guidance for developing resilient educational systems that can thrive in an increasingly digital world. Samat et al. (2020) note that online distance learning can provide substantial benefits in terms of flexibility and accessibility. However, the effectiveness of these learning models is highly dependent on the quality of ICT infrastructure. Ahmad, Ismail, and Hook (2011) highlight the critical role of reliable telecommunication systems in ensuring seamless online learning experiences, emphasising the need for continuous investment in technological infrastructure.

Additionally, Vanderlinde and Van Braak (2010) describe ICT infrastructure as encompassing the perceived availability and suitability of tools such as hardware, software, and peripheral equipment. This view is echoed by Pelgrum (2001), who notes that the availability of these resources is crucial for effective learning outcomes. Moses et al. (2013) also point out that outdated hardware can significantly limit the potential of online learning, highlighting the necessity for regular updates and maintenance of technological equipment.

The transition to remote and hybrid learning has highlighted the need for comprehensive strategies that address both the infrastructural and pedagogical challenges faced by HEIs. By investing in modern technologies, providing ongoing training for educators and students, and fostering an environment of continuous improvement, higher education institutions can better prepare for future disruptions and ensure the delivery of high-quality education in a digital age

Moreover, effective collaboration between various stakeholders is pivotal in enhancing remote learning readiness. Government bodies, private sector organisations, and educational institutions must work together to bridge infrastructural gaps and ensure equitable access to resources (Hodges et al. 2020; Vanderlinde and Van Braak 2010). Initiatives such as public-private partnerships can play a crucial role in funding technological advancements and providing training programmes aimed at improving digital literacy. These collaborative efforts can help mitigate disparities and build a more inclusive educational environment (Van Deursen and Van Dijk 2019).

Lastly, continuous assessment and feedback mechanisms are essential for sustaining progress in remote learning readiness. Institutions must establish monitoring systems to evaluate the effectiveness of their strategies and adapt to emerging challenges. These systems should include regular surveys of student and faculty experiences, which can inform improvements in technological infrastructure, pedagogical practices, and institutional policies (Ng 2012; Pelgrum 2001). By fostering a culture of adaptability and continuous improvement, HEIs can position themselves to meet the evolving demands of a digital-first educational landscape.

Remote Learning Support

The level of institutional support has a bearing on the success or failure of integrating technology in HE. Institutional support manifests in how the institution invests in ICT policy development, professional development, and infrastructural development (McGill, Klobas, and Renzi 2014). A study by Maguire (2005) highlights that if there is no concerted institutional support, the adoption of technology in teaching and learning will usually fail. The support from the institution comes in various forms: training and upskilling academics with the required technical and pedagogical skills, investing in infrastructure, and recognising and rewarding those who are doing well. Suppose there is resistance from academics to adopting technology and transitioning to online and hybrid platforms. In that case, institutions must also have mechanisms and strategies to

motivate lecturers to integrate technology into teaching and learning. Academics must also be involved in the planning process as this motivates them to adopt and implement relevant changes (Hardaker and Singh 2011).

Despite the benefits, the rapid adoption of online learning has surfaced several challenges, particularly related to infrastructure, student engagement, and the digital divide. Aljaber (2018) identifies key infrastructural issues, such as the technology gap and the need for robust remote supervision mechanisms. Moreover, Saruchera and Makasi (2017) discuss the role of prior access to modern learning technologies in influencing student success, noting that inadequate familiarity with these technologies can lead to cognitive dissonance post-admission in African universities. This dissonance, exacerbated by the sudden transition to remote learning, underscores the need for comprehensive digital literacy initiatives and support systems within HEIs.

In developing countries, the challenges are often more pronounced due to limited institutional resources, which can hinder the effective implementation of remote learning strategies (Al-Shehri 2010). A clear strategic vision and adequate support from educational institutions help remote learning to be successful. This perspective is supported by Wagner et al. (2024), who reflect on the lockdown experiences at Wits University, suggesting that the future of blended learning in higher education should focus on resilience and adaptability to maintain continuity and quality in education.

Pedagogical adaptability is defined as the ability to modify existing teaching practices and incorporate necessary changes (Loughran 2008). Pedagogical adaptability influences whether academics are flexible and open to new methods and approaches or not. This is a trait that is highly valued among academics as it ensures that HE responds according to external demands. Technological development forces academics to constantly adapt and adopt new platforms and tools that must be incorporated into teaching and learning. It has been argued that older academics are usually not very flexible and are a bit slower to accommodate and adopt new technological changes in teaching and learning (Elsaadani 2013). However, some scholars refute this argument, and further studies have also proved that age is not a factor in technological adoption (Jegede 2009; Mahdi and Al-Dera 2013). All academics must always be ready to implement new technology and ensure that they are not relying on obsolete approaches. The onus is also on HE institutions to invest in upskilling and developing their academics and exposing them to new technology whenever possible.

Providing quality and equitable student support services is not only important to students' success but also a requirement to ensure an effective teaching and learning process in the classroom (Barr 2014). Smith (2005) and Bouchey, Gratz, and Kurland (2021) note that HEIs should provide remote learning support that accomplishes three main objectives: 1) identify the needs of remote learning students, 2) evaluate the delivery of online learning services in higher education institutions, and 3) make

recommendations to higher education institutions and policymakers on remote learning access, readiness, and support.

Research has highlighted significant gaps in the provision of support services for online students in higher education institutions (Cooper, Gin, and Brownell 2019). Addressing these deficiencies has become increasingly critical as remote learners face emerging challenges related to mental health, social isolation, and financial instability (Blankstein, Frederick, and Wolff-Eisenberg 2020). Thelma (2024) underscores the need for targeted interventions to bridge the digital divide and enhance access to remote learning opportunities in higher education. Strategies such as providing digital devices and improving internet connectivity have proved effective in expanding equitable access and fostering a more inclusive remote learning environment.

Theoretical Framework

Very few studies focus on remote learning access, readiness, and support in the South African and African contexts. Apart from the lack of research in the area, few researchers have used the theory of planned behaviour to explain remote learning access, readiness, and support in higher education institutions. The theory of planned behaviour (TPB) has its roots in the theory of reasoned action (TRA), which was adapted because of the weaknesses of the original model and its limitations in dealing with behaviours over which people have incomplete volitional control (Ajzen 1991; Tagoe and Abakah 2014). The theory of planned behaviour has three considerations: behavioural beliefs, normative beliefs, and control beliefs. Behavioural beliefs account for a favourable or unfavourable attitude towards a specific human behaviour. When applying the theory of planned behaviour to remote learning access, readiness, and support in higher education, the theory suggests that intention to engage in remote learning, together with attitudes, subjective norms, and perceived behavioural control predict the likelihood of students intending to engage in distance learning in their studies at higher education institutions (Guo et al. 2024). The students are using hybrid learning, and the theory has helped to evaluate remote learning access, readiness, and support in higher education institutions post-COVID-19.

Research Methodology

The case study employed an exploratory research design to investigate remote learning access and support systems within higher education institutions in Limpopo province. The research focused on lecturers as the target population with a purposive sample of 20 participants who incorporated games into their teaching practice. Semi-structured interviews facilitated via Microsoft Teams provided an efficient and cost-effective way to collect data while avoiding travel expenses. Participants were informed of the study's objectives beforehand, ensuring they were well-prepared and understood the context as recommended by Shumba (2024) and Shumba and Saruchera (2023). The interviews were recorded and transcribed verbatim, with the transcription process following the rigorous methodological steps outlined by Braun and Clarke (2006). Thematic analysis

was then applied to extract salient themes, providing a structured interpretation of the data that reflects the complexities of implementing remote learning systems in resource-constrained settings.

Findings and Discussions

The analysis began with the systematic coding of the entire data set, which assisted in generating initial codes on the data set. The related codes were combined, and the process helped produce six themes for the study. Extracted examples from the data set were used to support the identified themes.

Remote Learning Access

The study found that students and instructors in HEIs were able to interact virtually using a variety of platforms, including Blackboard, Zoom, Microsoft Teams, Canvas, and WhatsApp. However, several challenges were identified. One participant noted,

> I find attending my lessons on Zoom and MS Teams easy and the audio clear; however, Blackboard was giving me connectivity issues. Many times, I was kicked out of the course room. (P7/M/34)

Wang and Wang (2021) describe online learning as synchronous interaction, whilst Ali (2020) and Miller, Sellnow, and Strawser (2021) use terms such as "remote learning" and "hyflex learning." In the study, remote learning is used to refer to online teaching and learning methods used by HE institutions. Moore (2021) defines remote learning as "learning that occurs when the learner and the instructor or source of information are separated physically and hence cannot meet in a traditional classroom setting." This includes both high-tech and lower-tech options such as TV, radio, and mail. Remote learning can be synchronous, where instructors and students meet virtually at the same time, or asynchronous, where students access materials at their convenience.

Attendance for synchronous sessions was notably low due to issues such as unreliable internet connectivity, poor network performance, and lack of appropriate devices. Many students preferred asynchronous remote learning as it allowed them to access learning materials when internet connectivity was more stable, typically during the night (Agiomirgianakis, Lianos, and Tsounis 2019). This preference aligns with recommendations for asynchronous learning in emerging countries where internet connectivity is often a significant barrier (Hodges et al. 2020). However, the lower engagement in asynchronous sessions remains a concern, as many students in rural areas struggled to access recorded sessions on time, leading to missed deadlines.

The challenges of remote learning access were compounded for students in rural areas, where limited infrastructure created additional barriers. One participant expressed frustration, saying,

> Sometimes I must walk over 3 km to access a place with reliable network coverage. It becomes even more stressful during exam periods. (P8/F/25)

These issues align with the findings of Hodges et al. (2020), who emphasised the importance of prioritising connectivity in rural areas to ensure equitable access to education. Moreover, inconsistent access to synchronous sessions discouraged engagement. As another participant stated,

> When I miss a session, it's hard to catch up later. The recorded lessons are helpful, but they are often long, and I don't always have enough data to watch them in one sitting. (P10/M/22/)

This is consistent with Ali (2020), who noted that asynchronous materials must be designed to accommodate varying bandwidth capacities. In addressing these challenges, Wang and Wang (2021) recommend prioritising offline and mobile-friendly formats, which can be particularly effective in regions with low internet penetration.

Student Readiness

The concept of readiness in online learning encompasses several key dimensions, initially defined in the Australian vocational education sector by Hung et al. (2010). These include students' preferences for delivery modes compared to face-to-face instruction, confidence in using electronic communication for learning, and the ability to engage in autonomous learning (Warner, Christie, and Choy 1998). Martin, Stamper, and Flowers (2020) and Lin and Hsieh (2001) further identified attributes crucial for student readiness, such as technical skills, time management, self-regulated and self-directed learning, locus of control, and academic self-efficacy.

The study revealed significant barriers to student readiness, illustrating how challenges such as poor time management skills, inadequate network connectivity, and lack of access to necessary technological devices substantially hindered students' ability to participate effectively in online learning environments. One participant highlighted the severity of these challenges by stating,

> I could not join most of the online sessions from home because I don't have a laptop nor a smartphone. (P5/F/23)

Another participant added,

> One challenge I identify in the class is poor time management as all students attempt to join at the same time. This causes some students to be kicked out and join the sessions late. (P7/M/21)

This lack of access underscores the necessity for students to develop robust time management and self-discipline skills to navigate online learning successfully, as noted by Zimmerman and Kulikowich (2016).

Moreover, the findings align with the observations made by Saruchera and Makasi (2017), who discuss the critical role of prior access to modern learning technologies in influencing student success in African universities. They note that inadequate familiarity with these technologies often leads to cognitive dissonance post-admission, as students struggle to reconcile their preconceived expectations of educational processes with the realities of digital learning environments. This dissonance can exacerbate the challenges students face, particularly when asynchronous learning modalities, which require a high degree of self-regulation and motivation, lead to procrastination. As Martin, Stamper, and Flowers (2020) suggest, this necessitates increased monitoring and support from educational institutions to ensure students complete their learning activities timely and effectively.

These insights highlight the intertwined challenges of technical accessibility, cognitive readiness, and behavioural adaptation in online learning contexts. Wagner et al. (2024) provide a compelling examination of these challenges through their study of the students' experiences during lockdown. They discuss the implications for the future of blended learning, emphasising the need for educational institutions to integrate robust support systems that address both the infrastructural and pedagogical aspects of teaching and learning. Addressing these issues requires a comprehensive approach that not only equips students with the necessary technological tools but also supports them in developing the skills and competencies needed to thrive in increasingly digital academic landscapes.

Wagner et al.'s (2024) findings suggest that effective blended learning environments must be adaptable and capable of meeting diverse student needs while also fostering an engaging and inclusive educational experience. This perspective reinforces the importance of strategic planning and resource allocation to ensure that digital education enhances learning outcomes and equips students to deal with the complexities of the modern world.

The technical competence of students, particularly in navigating learning management systems (LMS), was another significant challenge. The study found that many students struggled with LMS navigation despite orientation and training. This issue was especially prevalent among first-year students who were encountering these systems for the first time. Additionally, the quality of student engagement was a concern, with many lecturers reporting low levels of participation during remote learning sessions. One participant remarked,

> I mute my microphone during the lesson as I continue with my household chores and taking care of my kids. I sometimes fail to unmute and talk as the keys do not respond during the online session. (P12/M/20)

This behaviour often gave lecturers a false impression of student participation. Many lecturers observed that students would mute their microphones during discussions, raising suspicions that they were not actively engaged. Hung et al. (2010) developed an

online learning readiness scale to assess students' technical competencies, focusing on their ability to navigate course platforms, basic computer skills, and online communication skills. Effective communication with peers and lecturers on relevant online platforms is crucial for successful online learning (Demir and Horzum 2013). Lecturers who underutilised discussion forums, live chats, and wikis experienced lower student engagement. McVay (2000) and Smith, Murphy, and Mahoney (2003) also explored student readiness, finding a positive relationship between behavioural and attitudinal predictors and successful online participation. These findings underscore the importance of addressing technical, motivational, and logistical barriers to enhance the effectiveness of remote learning in South African HEIs. By focusing on these areas, institutions can better support their students and improve educational outcomes in remote learning environments.

Another barrier to readiness involved cultural attitudes towards remote learning technologies. As a result, one participant remarked,

> Where I come from, people don't take online education seriously. My family thinks I am wasting my time sitting on a laptop all day. (P9/F/23)

This observation echoes research by Saruchera and Makasi (2017), which identified cultural perceptions as a critical factor influencing digital learning uptake in African contexts. They argue that greater community engagement and awareness campaigns are essential to shifting these attitudes. Furthermore, financial constraints exacerbated readiness challenges, as illustrated by another participant's statement:

> I can't afford a stable internet connection, and the university's Wi-Fi is not reliable. I feel like I'm already behind before I even start. (P13/M/25)

These findings align with the work of Zimmerman and Kulikowich (2016), who highlight the interplay of economic and motivational factors in shaping student readiness for online learning.

Infrastructure Support

Technological advancements often outpace the ability of educational institutions to maintain standards, given the costs and infrastructure support required. Information and communication technology support has been proved essential for the effective delivery of online learning. Ali (2020) observes a significant increase in the integration of ICT in academic courses. Research by Becker (2000) and Ruzgar (2005) notes that higher education institutions increasingly provide online resources to complement traditional teaching methods. A meta-analysis by Smith, Kahlke, and Judd (2020) reveals a growing trend in the development and use of multimedia-enhanced content through ICT. Reliable telecommunication systems are crucial, as they provide low-cost channels for searching, gathering, and exchanging information (Ahmad, Ismail, and Hook 2011). Vanderlinde and Van Braak (2010) describe ICT infrastructure as encompassing the

perceived availability and suitability of tools such as hardware, software, and peripheral equipment, which are critical in schools and higher education institutions (Pelgrum 2001). However, Moses et al. (2012) found that outdated hardware significantly limits computer usage.

One student participant highlighted the impact of inadequate infrastructure, stating,

> My desktop is very old and takes a lot of time to restart. I often miss important information during sessions as my computer freezes in the middle of the lesson. (P17/M/22)

This reflects broader issues where HEIs struggle to effectively support students, many of whom cannot afford necessary technological tools such as laptops and routers. Most students incur substantial costs using internet cafes to download content from learning management systems, including recorded sessions they missed. Additionally, students using mobile phones face challenges handling large amounts of data from various learning modules.

Faculty members also raised concerns about outdated institutional infrastructure. One lecturer commented,

> Our university still uses systems from a decade ago. It's frustrating because they can't handle the current volume of online traffic, especially during peak exam times. (P13/F/45/AC)

The need for continuous infrastructure updates is widely documented in the literature. Vanderlinde and Van Braak (2010) stress the importance of integrating scalable and future-proof technologies to support evolving educational demands. Another participant suggested,

> The university should partner with telecommunications companies to provide affordable data plans for students. It would be a game-changer. (P19/M/27)

Such partnerships are increasingly being adopted in other regions, as highlighted by Moses et al. (2012), who pointed to collaborative efforts between HEIs and private sector stakeholders to address digital divides.

Improved Engagement

Student engagement is critical as it enhances satisfaction, motivation, and academic performance (Martin and Bolliger 2018; Zia et al. 2023). This study observes that engaging students through collaborative activities, group discussions, presentations, and case studies provides positive learning experiences. One participant noted,

> I always ask questions on the learning platform, and the lecturer responds, although sometimes they take a long time to respond. (P1/F/42)

This supports findings by Banna et al. (2015), who emphasise engagement as a strategy to reduce student isolation and increase retention, pass rates, and graduation rates. Moore (1989) identified three types of engagement in online learning: learner-to-learner, learner-to-instructor, and learner-to-content, which collectively improve the participation rate of students and lead to higher academic achievement. To further enhance student engagement in synchronous classes, this study recommends the use of interactive tools such as discussion boards, chat sessions, wikis, and blogs.

Learner Satisfaction

The results corroborate those of Lee, Davis, and Li (2022), who found that content mastery, convenience, and enhanced interaction in online learning led to better student outcomes. Students satisfied with synchronous learning generally perform better and achieve superior results (O'Flaherty and Phillips 2015). However, some students reported dissatisfaction with aspects of online learning, particularly when technical issues prevent them from understanding complex subjects or when instructors fail to manage group activities effectively. Additionally, the study notes that heavy workloads, extensive lesson preparation time for lecturers, poor connectivity, and high data costs are significant challenges in synchronous learning environments within HEIs.

> By addressing these technological and pedagogical challenges, institutions can significantly enhance the quality and effectiveness of online and blended learning environments. (P11/M/24/AC)

Hybrid Learning Challenges and Opportunities

The shift towards hybrid learning models in HEIs has introduced a blend of traditional and digital teaching methods that aims to enhance educational flexibility and accessibility. However, this study uncovered several challenges associated with the implementation of hybrid learning environments. An academic participant noted,

> While the hybrid model promises the best of both worlds, we often grapple with the coordination between online and in-person sessions, which sometimes leads to confusion among students about deadlines and participation expectations. (P2/F/30/AC)

This statement highlights the logistical challenges in managing dual delivery modes, which can hinder the smooth transition between online and physical classrooms. Moreover, the integration of hybrid learning necessitated substantial technological upgradation and pedagogical adjustments. As discussed by Wagner et al. (2024), the experience at Wits University during the lockdown underscored the need for institutions to be agile and adapt to rapidly changing educational demands. They suggest that successful hybrid learning requires not only technological infrastructure but also strategic pedagogical planning to ensure that both online and in-person learning components are seamlessly integrated.

Other faculty members expressed concerns related to student engagement in hybrid settings:

> Students sometimes find it hard to stay engaged during online components of the hybrid model, especially those who thrive on face-to-face interactions. (P15/F/28/AC)

> There are a number of ways that can be implemented by universities to improve service delivery, and these include replacing ageing infrastructure, training lecturers and students on an ongoing process, providing support and investing in research and development. (P10/M/39/AC)

The findings support the previous studies that argue that prior exposure to learning technologies significantly influences students' adaptability and success in hybrid environments (Meda and Makura 2017; Saruchera and Makasi 2017). The lack of familiarity with digital tools can lead to cognitive dissonance as students adjust to new learning modalities. The literature further supports these findings, with Miller, Sellnow, and Strawser (2021) emphasising that effective communication is crucial in hybrid courses to ensure that students are equally engaged across different learning formats. They advocate for the development of specific strategies to enhance interaction and communication in hybrid settings, which can mitigate the sense of isolation and improve student satisfaction and performance. While hybrid learning presents numerous opportunities to enrich the educational experience, it also demands careful consideration of technological, pedagogical, and communicative strategies to address the challenges faced by educators and students. The successful implementation of hybrid models depends on the ability of HEIs to provide robust support systems that facilitate smooth transitions between learning environments and promote consistent student engagement.

The hybrid model also presented unique pedagogical challenges. One academic noted,

> We need training on how to design hybrid courses effectively. Many of us are just improvising, which affects the quality of learning. (P11/F/39/AC)

This aligns with Wagner et al. (2024), who emphasised the need for professional development programmes to equip faculty with the skills required for hybrid teaching. Additionally, students expressed concerns about the workload balance in hybrid settings. One participant remarked,

> Sometimes we get double the workload assignments for both in-person and online components. It's overwhelming. (P6/M/27/AC)

This sentiment supports the findings of Miller, Sellnow, and Strawser (2021), who argue that hybrid course designs must account for workload equity to avoid student burnout. They recommend regular feedback loops to gauge student experiences and adjust course delivery accordingly.

The shift to online and hybrid learning models has brought flexibility and accessibility, but it has also introduced challenges related to academic integrity. A notable concern is the increasing reliance on AI-based tools for writing and content generation, which has led to a rise in academic misconduct. As authors, we argue that while artificial intelligence (AI) tools such as ChatGPT and Grammarly have legitimate uses in supporting student learning, their misuse can undermine the principles of academic integrity. One lecturer shared,

> I've noticed a stark improvement in writing quality for some students, but when probed, they admit to using AI tools extensively without understanding the content. (P9/M/41/AC)

Recent studies highlight the exponential growth of AI use among students and the associated risks of plagiarism and intellectual dishonesty. They argue that the accessibility of these tools, combined with the less supervised environment of online learning, creates fertile ground for misconduct. Veletsianos, Houlden, and Johnson (2024) underscore the importance of redesigning assessment practices in hybrid models to mitigate the misuse of AI tools. We propose integrating reflective assignments, oral defences, and AI-detection software to ensure that students engage critically with their work rather than relying solely on automated systems. As another academic observed,

> Assessments need to evolve. The traditional essay is no longer enough to gauge authentic learning in the age of AI. (P14/F/35/NA)

It is incumbent upon higher education institutions to address these issues proactively. We recommend that institutions establish clear policies regarding the ethical use of AI, coupled with workshops that educate students on the boundaries between legitimate support and misconduct. These measures, combined with innovative assessment designs, can help uphold academic standards in hybrid and online learning environments.

Recommendations

The COVID-19 pandemic was a wake-up call for higher education institutions, highlighting the urgent need for sustainable teaching and learning environments. To ensure continuous quality education, institutions must implement robust online and hybrid learning systems that can withstand various challenges. Based on the findings, the following recommendations are proposed for stakeholders in higher education:

- HEIs must invest in modern infrastructure to support remote and hybrid learning. This includes acquiring digital cameras, data projectors, video cameras, and large smart screens for lecturers and support staff.

- The institutions must provide reliable and sustainable internet service to their students This can be done by partnering with private sectors that provide reliable internet services.

- Higher education institutions must provide ongoing training and development to students, as well as teaching and support staff, which enables them to adapt to changes in the learning environment. Continuous professional development will help educators stay updated with technological advancements and pedagogical strategies, ensuring the effective use of digital tools in teaching.

- The study recommends the timely provision of data and internet resources to lecturers and students. This facilitates the smooth delivery of remote classes and reduces the digital divide, particularly in underserved areas. Government and telecommunications companies should collaborate to provide subsidised internet packages for students.

- There is an urgent need for policymakers to enact laws that make it possible to enforce stringent online safety measures that protect online users from cyber threats. Establishing laws to track and penalise offenders who misuse online data is crucial to creating a safe learning environment.

- The study recommends offering psychological and emotional support, both physical and virtual, to students, lecturers, and staff members in higher education institutions to cope with distress and emotional unsettlement. Incorporating specialists such as psychologists and therapists can provide the necessary support to students, lecturers, and staff members who are coping with the pressures of remote learning access readiness and support. The learning management system must be updated on a continuous basis to enable the utilisation of interactive tools like poll features, discussion boards, and real-time chat sessions, which can significantly improve student engagement and concept mastery. Lecturers must leverage these tools to maintain active participation and provide timely feedback.

- Lecturers and other professionals in higher education institutions must join a community of practice to foster collaboration and knowledge sharing among professionals. Such communities facilitate the exchange of best practices, innovative teaching strategies, and support systems, enhancing the overall quality of education.

- Policy, innovation, and broadband infrastructure expansion must be seen as a catalyst for change in higher education. Managers and policymakers must recognise and seize the opportunities for innovation in teaching and learning. Strategic planning and resource allocation are essential to support these initiatives. To address the digital divide, especially in rural areas, government

investment in broadband infrastructure is necessary. Improved internet access will enable all students to fully participate in remote learning, ensuring equitable educational opportunities.

- To mitigate the risks of AI-assisted academic misconduct in online and hybrid learning environments, institutions should adopt a multifaceted approach that includes mandatory training on academic integrity and AI literacy, the redesign of assessments to emphasise authentic learning (e.g., oral defences and reflective tasks), and the integration of AI-detection tools alongside clear policies outlining ethical AI use. These measures collectively foster a culture of integrity, ensuring students engage meaningfully with their education while leveraging AI ethically and responsibly.

By implementing these recommendations, higher education institutions can create a resilient and sustainable learning environment that supports the diverse needs of students, lecturers, and non-academic staff members in a rapidly evolving digital landscape.

Conclusions, Limitations and Directions for Future Research

This study offers critical insights into remote learning access, readiness, and support within South African higher education institutions in the post-COVID-19 context. The findings underscore the pivotal roles of technological accessibility, student readiness, and pedagogical adaptation in shaping the effectiveness of online and hybrid learning environments. Institutions that have embraced digital platforms demonstrated the transformative potential of technology to enhance educational delivery. However, persistent challenges such as inadequate infrastructure, unequal access to technological resources, and insufficient digital literacy continue to hinder many students from fully benefiting from remote learning opportunities.

The research underscores the critical need for ongoing faculty development and robust institutional support systems to ensure the success of remote and hybrid learning models. Comprehensive training programmes for educators must address not only technical proficiency with digital tools but also innovative pedagogical approaches that cater to diverse student needs. These programmes should be supplemented by continuous professional development opportunities that empower faculty to stay abreast of emerging educational technologies and practices. Additionally, consistent upgrades to technological infrastructure are essential to support seamless delivery of online learning. Proactive mental health support for students such as counselling services and wellness programmes should also be integrated into institutional strategies to foster resilience and reduce the psychological burden associated with remote learning. Furthermore, the establishment of academic communities of practice can serve as a platform for collaboration, where educators exchange insights, co-develop innovative strategies, and collectively improve the quality of teaching and learning in digital contexts. Such communities encourage the sharing of best practices, enhancing

institutional capacity to adapt to ongoing challenges and opportunities in higher education.

While this study provides valuable contributions, it is not without limitations. The focus on HEIs in Limpopo province in South Africa limits the generalisability of the findings across the diverse spectrum of South African and African institutions at large. Future research could aim to include a broader demographic and geographic representation to capture the varied experiences and challenges across different types of HEIs. Additionally, as digital technologies and their applications in education continue to evolve rapidly, ongoing research is essential to assess the adaptability, effectiveness, and long-term impact of these tools and methodologies.

A further area of exploration is the rising concern of academic integrity in the age of AI-assisted learning tools. Future studies could examine how institutions can effectively address the misuse of AI technologies while leveraging their potential for enhancing learning. Developing ethical frameworks and innovative assessment strategies can ensure that digital education remains both effective and credible.

In conclusion, as HEIs navigate the complexities of the post-pandemic era, the lessons learned must inform strategic initiatives to improve remote learning access, readiness, and support. Prioritising targeted investments in technology such as reliable internet access, affordable devices, and scalable digital platforms will help bridge existing gaps in infrastructure and accessibility. Comprehensive support systems for both students and faculty must also extend to addressing the ethical challenges posed by AI-assisted tools, ensuring that these technologies are leveraged responsibly to enhance learning outcomes. Adaptive learning models that integrate flexibility, inclusivity, and innovation should be adopted to accommodate diverse learner needs and mitigate disparities in access and engagement. Additionally, further research is needed to examine the long-term impacts of remote learning on educational outcomes, particularly in practical and hands-on disciplines. Understanding these implications will provide valuable insights for optimising digital learning modalities not only for future crises but also as a sustainable component of modern academic ecosystems.

Acknowledgements

The authors would like to acknowledge the study review committee for their contribution to this research. The study received ethical approval (Reference: R.15512) from IIE Rosebank College. There is no funding received for this research project.

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