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Leveraging Information Technologies for Organisational Learning and Knowledge Management: Enhancing Access and Educational Outcomes for Rural Students

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Purpose: This study investigates the role of information technologies in enhancing organisational learning and knowledge management in South African rural universities. The goal is to improve access and educational outcomes for rural students. The research focuses on how digital tools can create more equitable learning environments and address rural institutions' unique challenges.

Study design/methodology/approach: A scoping review of literature from 2000 to 2024 was conducted, employing the Diffusion of Innovation theory and Social Pedagogy Justice framework to analyse the impact of digital platforms on organisational learning and knowledge management in rural universities. The study examines how these tools can help bridge the gap between rural and urban students and address the challenges of limited resources and digital divides.

Findings: The study finds that information technologies can significantly improve organisational learning processes and knowledge management in rural universities by providing tools that promote inclusion and participation. Digital technologies, when thoughtfully implemented, can help reduce educational disparities by enhancing access to resources and supporting collaboration between students in urban and rural areas. The research suggests that a strategic approach to technology adoption, tailored to the local context, is key to achieving more equitable educational outcomes.

Originality/value: This research provides valuable insights for policymakers and educational leaders on leveraging information technologies to advance social justice in education. By focusing on rural universities in South Africa, the study highlights the importance of addressing infrastructural and resource challenges while using digital tools to foster inclusion and equity. The findings offer practical strategies for enhancing the effectiveness of digital platforms in improving educational outcomes for traditionally underserved communities.

Introduction

Its historical and socio-political context deeply influences South Africa's higher education landscape. The legacy of apartheid has left a lasting impact on rural universities and their students, especially those from historically disadvantaged backgrounds. Often under-resourced and isolated, these institutions have been striving to offer equitable education despite decades of systemic marginalisation. Apartheid-era policies deliberately underfunded rural universities and restricted access for black South Africans, creating a dual system that favoured urban, predominantly white institutions. This history has shaped the challenges that rural universities and their students face today, particularly regarding access to resources, infrastructure, and opportunities for academic growth (Badat, 2009).

Historically disadvantaged students, who predominantly come from rural areas, continue to bear the brunt of these inequalities. For many rural students, the transition to university life is not just an academic challenge but also a socioeconomic one. These students often face barriers such as limited access to digital technologies, inadequate infrastructure, and under-resourced schools, which leave them ill-prepared for the demands of higher education (Letseka, 2013). The digital divide between urban and rural areas further exacerbates these challenges, with

many rural students unable to access the internet, computers, or the technological resources necessary for modern learning environments (Czerniewicz & Brown, 2014).

The concept of rural universities in South Africa is rooted in the establishment of institutions aimed at serving the educational needs of predominantly black communities during the apartheid era. These universities, such as the University of Fort Hare and the University of Zululand, were part of the apartheid government's strategy to segregate higher education along racial lines. While urban universities were designed to cater to the elite, these rural institutions were intentionally underdeveloped, reflecting the broader apartheid agenda of limiting educational and economic opportunities for black South Africans (Bunting, 2006). Despite these challenges, rural universities have played a crucial role in educating some of the country's most influential leaders, including Nelson Mandela, highlighting their importance in the national fabric.

The role of rural universities in post-apartheid South Africa has been a subject of much debate and reform. The government's commitment to redressing past inequalities has led to several policy interventions to improve these institutions' education quality. However, despite efforts to democratise access to higher education, rural universities remain disadvantaged compared to their urban counterparts (Kotecha et al., 2012). The digital revolution has brought new opportunities for these universities to enhance their organisational learning and knowledge management processes, yet the uneven distribution of resources hinders their progress.

In the context of this study, it is important to recognise that rural universities are not just educational institutions but also critical drivers of social and economic development in their regions. They serve as hubs for community engagement, knowledge production, and innovation, particularly in areas where other forms of infrastructure are limited (Cloete et al., 2011). However, their potential is often constrained by a lack of access to information technologies essential for modern academic practices such as digital learning, research collaboration, and knowledge management (Beaunoyer et al., 2020).

The rise of information technologies presents a unique opportunity for rural universities to overcome some of the structural barriers that have historically disadvantaged them. By embracing Virtual Collaborative Learning (VCL) and other digital platforms, these institutions can enhance student engagement, facilitate knowledge sharing, and improve organisational learning processes (Bozalek & Ng'ambi, 2019). For rural students, who often face isolation and limited access to educational resources, these technologies can bridge the broader academic community, allowing them to participate in learning and research that would otherwise be inaccessible (Dube, 2020).

However, the successful integration of information technologies in rural universities requires a strategic approach that considers the unique challenges of these institutions. The Diffusion of Innovation theory, as Rogers (2003) outlined, provides a useful framework for understanding how new technologies can be adopted in these settings. This theory highlights the importance of communication channels, social systems, and the role of change agents in facilitating the adoption of innovations. In the case of rural universities, academic leaders and policymakers must play a critical role in driving the adoption of digital technologies, ensuring that they are tailored to the specific needs of rural students and staff (Hollow & Van der Merwe, 2020).

In addition to technological considerations, the Social Pedagogy Justice framework is also relevant to this study. This framework emphasises the need for education to be inclusive, equitable, and responsive to the socio-cultural contexts of learners (McLaren, 2015). For rural students, who often come from marginalised communities, it is essential that digital learning platforms are designed in a way that acknowledges their diverse linguistic, cultural, and

socioeconomic backgrounds. This approach enhances learning outcomes and promotes a sense of belonging and empowerment among students (Hugo & Wiles, 2021).

This study explores how information technologies can be harnessed to enhance organisational learning and knowledge management in rural universities in South Africa. By drawing on the Diffusion of Innovation and Social Pedagogy Justice frameworks, the study aims to provide insights into how digital platforms can be used to address the challenges of the digital divide, promote inclusive education, and support the development of historically disadvantaged students. The findings will contribute to ongoing discussions about the role of rural universities in South Africa's higher education system and their potential to drive social and economic development in rural communities.

Theoretical Framework

This study draws on two key theoretical frameworks to examine the role of information technologies in rural universities: Rogers's *Diffusion of Innovation Theory* (2003) and the *Social Pedagogy Justice Framework*. These frameworks provide a comprehensive lens through which we can analyse the integration of digital tools in South African higher education, particularly in rural contexts. By applying these theories, the study seeks to understand how digital technologies can bridge the divide for historically disadvantaged students while promoting inclusive and equitable education.

The *Diffusion of Innovation Theory* offers a well-established foundation for understanding how new technologies spread within social systems. According to Rogers (2003), adopting innovations, such as information technologies in education, follows a process in which early adopters play a crucial role in influencing others within their community. In the context of rural universities, this theory helps explain the varying rates of technology uptake among students and institutions. The challenges of limited access to resources, infrastructure deficits, and digital literacy gaps mean that rural universities are often slow adopters of new technologies despite their potential to transform educational outcomes (Dube, 2020).

Rogers' model identifies five stages in the diffusion process: knowledge, persuasion, decision, implementation, and confirmation. This process is crucial for understanding how rural universities can adopt and integrate digital technologies. In the initial "knowledge" stage, it is important that stakeholders—students, educators, and administrators—become aware of the benefits of virtual collaborative learning (VCL) and other technological tools. For these technologies to be effectively implemented, awareness campaigns and training are necessary to persuade users of their value, particularly in under-resourced environments (Bozalek & Ng'ambi, 2019).

The second phase, "persuasion", relates to forming favourable attitudes towards these technologies. This is where leadership within universities and government policies can play a crucial role. Encouraging the early adoption of digital tools by key influencers, such as academic staff, can create a ripple effect that promotes widespread adoption. Evidence shows that when rural universities have strong advocates for digital technologies within their academic leadership, they are more likely to overcome initial resistance and infrastructural challenges (Czerniewicz & Brown, 2014).

The third phase, "decision", is critical for ensuring that the institutional structures of rural universities support the transition to digital learning. Decisions about investments in infrastructure, digital tools, and professional development must be made collectively, with input from all stakeholders. This collective decision-making process is particularly important in rural institutions, where resource allocation is often more restricted, and every investment must be carefully justified. Research suggests that rural universities that engage in participatory

decision-making processes are more likely to succeed in implementing new technologies (Gillwald et al., 2019).

In the "implementation" phase, Rogers (2003) argues that the technology must be effectively integrated into the institution's day-to-day operations. In rural universities, this may involve setting up digital platforms, such as VCL, training educators and students to use these tools, and providing ongoing support to ensure successful adoption. The practical application of these technologies is critical for overcoming barriers to access and ensuring that students can fully engage with their education, regardless of location (Beaunoyer et al., 2020).

The final phase, "confirmation", refers to the long-term adoption of the innovation. Continuous evaluation and adaptation are necessary for digital technologies to be sustainable in rural universities. This is where the role of organisational learning and knowledge management becomes central. Institutions must adopt technologies and develop the capacity to manage and update these systems as technology evolves. Evidence from South African rural universities suggests that without ongoing institutional support, digital technologies are likely to fail in the long term (Hollow & Van der Merwe, 2020).

In addition to the *Diffusion of Innovation Theory*, the study also applies the *Social Pedagogy Justice Framework*. This framework is particularly relevant in South Africa, where historical inequalities continue to shape educational outcomes. The *Social Pedagogy Justice Framework* advocates for education that is inclusive, equitable, and responsive to the socio-cultural contexts of learners (McLaren, 2015). For rural students, many of whom come from marginalised communities, digital technologies must be designed and implemented to acknowledge their diverse needs.

This framework underscores the importance of culturally responsive pedagogy in implementing VCL. In a country with 11 official languages and a history of socioeconomic inequality, it is essential that digital learning platforms cater to the diverse linguistic and cultural backgrounds of students (Hugo & Wiles, 2021). The *Social Pedagogy Justice Framework* argues that education must provide access to resources and foster a sense of belonging and empowerment among learners. This approach ensures that rural students are included in the digital learning environment and feel valued within it (Mbatha & Naidoo, 2017).

The application of the *Social Pedagogy Justice Framework* within rural universities can be seen in the push for greater digital inclusion, particularly through culturally tailored educational content. Research shows that when rural students see their cultural and linguistic identities reflected in the digital tools they use, their engagement and learning outcomes improve significantly (Ngugi & Adigun, 2021). Therefore, VCL and other digital platforms must be designed with cultural inclusivity, promoting academic success and social justice.

This framework also highlights the importance of social collaboration in learning. VCL, as a pedagogical tool, provides an opportunity for students from diverse backgrounds to work together, fostering mutual understanding and social cohesion. By promoting collaboration across different socioeconomic, linguistic, and cultural groups, VCL aligns with the principles of social justice, which seek to create a more equitable and inclusive education system (Redecker & Punie, 2017).

Conversely, integrating the *Diffusion of Innovation Theory* and the *Social Pedagogy Justice Framework* provides a comprehensive theoretical foundation for understanding how information technologies can enhance learning in rural universities. The *Diffusion of Innovation Theory* explains the technology adoption process and key influencers' role in driving digital transformation. At the same time, the *Social Pedagogy Justice Framework* emphasises the need for inclusivity and cultural responsiveness in education. Together, these frameworks offer

valuable insights into how rural universities can overcome the challenges of the digital divide and create equitable learning environments for historically disadvantaged students.

By applying these theories, this study aims to develop actionable strategies for integrating information technologies into rural universities, ensuring that all students, regardless of their socioeconomic background or geographic location, have the opportunity to succeed in higher education.

Literature Review

Integrating information technologies into higher education has garnered significant attention, particularly when students face systemic disadvantages. Rural universities in South Africa, characterised by historical underdevelopment and limited resource access, are central to this discussion. The digital divide, exacerbated by apartheid's legacy, continues to hinder equitable access to education for rural students. In addressing these challenges, scholars have examined various approaches to fostering inclusive learning environments through digital tools and organisational learning, focusing on the role of Virtual Collaborative Learning (VCL) in overcoming barriers in education (Czerniewicz & Brown, 2014).

One of the primary barriers faced by rural universities in South Africa is the lack of adequate infrastructure to support digital learning. The digital divide, defined as the gap between those with access to information technologies and those without, remains stark between urban and rural educational settings (Gillwald et al., 2019). Studies have shown that urban universities benefit from better internet connectivity, digital tools, and access to online resources, but rural institutions struggle with unreliable internet access and outdated technologies (Dube, 2020). These disparities directly impact rural students' ability to engage with digital learning platforms, which are increasingly central to modern education.

A study by Czerniewicz (2018) highlights that rural students are often excluded from the benefits of digital learning due to these infrastructural limitations. This exclusion reinforces existing inequalities, as students from more affluent backgrounds, typically in urban areas, can access the tools needed to succeed in the modern educational landscape. Without intervention, this digital divide will continue perpetuating socioeconomic disparities in higher education, limiting opportunities for rural students to achieve academic success.

In response to these challenges, Virtual Collaborative Learning (VCL) has been identified as a potential solution to bridge the gap between rural and urban students. VCL offers a framework that enables students to collaborate in virtual spaces, regardless of their geographic location (Bozalek & Ng'ambi, 2019). This approach leverages digital technologies to create collaborative learning environments where students can work on projects, share knowledge, and engage in critical thinking. Importantly, VCL can be implemented in ways that require minimal infrastructure, making it an attractive option for rural universities.

The literature on VCL suggests that it promotes active engagement among students, encouraging them to take ownership of their learning. By fostering collaboration, VCL helps develop essential skills such as problem-solving, teamwork, and communication (Bozalek et al., 2013). These skills are particularly important for students in rural areas, where opportunities for such engagement are often limited due to geographic isolation and under-resourced educational environments. Tawana and Kinuthia (2020) argue that VCL when properly implemented, can transform rural education by providing students with the tools and frameworks needed to succeed in a globalised, digital world.

However, the success of VCL in rural universities depends on more than just technology; it also requires a pedagogical shift towards culturally responsive teaching. South Africa's diverse

cultural and linguistic landscape necessitates a teaching approach that includes all students, particularly those from historically marginalised communities. The literature shows that VCL can be adapted to foster culturally responsive pedagogy by integrating multilingual support and culturally relevant content (Mbatha & Naidoo, 2017). For example, the University of Johannesburg has successfully implemented VCL platforms that accommodate the linguistic diversity of its students, enhancing engagement and inclusivity (Hugo & Wiles, 2021).

Jaffer, Ng'ambi, and Czerniewicz (2007) argue that culturally responsive pedagogy is critical for creating equitable learning environments. By ensuring that digital learning platforms reflect students' cultural and linguistic diversity, educators can create more inclusive spaces that encourage participation and engagement. VCL, with its focus on collaboration and interaction, provides an ideal platform for this kind of inclusive pedagogy. However, for VCL to be truly effective in fostering inclusivity, educators must receive training in how to develop culturally relevant content and facilitate collaborative learning in diverse contexts (Ngugi & Adigun, 2021).

Another area of focus in the literature is the impact of VCL on student engagement and academic performance. Research indicates that students who engage in VCL demonstrate higher levels of motivation and critical thinking than those in traditional learning environments (Bozalek & Ng'ambi, 2019). The asynchronous nature of VCL allows students to participate at their own pace, making it particularly beneficial for those who may not have stable internet connections (Redecker & Punie, 2017). This flexibility is crucial for rural students, who often face challenges related to unreliable connectivity.

At Rhodes University, for example, VCL has been integrated into the curriculum to enhance student engagement in the social sciences (Waghid & Davids, 2017). Students reported feeling more connected to their peers and more confident in their academic abilities due to participating in virtual group projects. This aligns with global research on the benefits of collaborative learning, which suggests that working in teams helps students develop critical life skills, such as communication, empathy, and resilience (Bozalek, 2013).

Despite the potential benefits of VCL, significant infrastructural challenges remain. Many rural universities lack the basic resources to implement digital learning platforms effectively (Gillwald et al., 2019). In addition to unreliable internet access, rural institutions often face issues such as power outages, a shortage of digital devices, and limited technical support. To address these challenges, some universities have begun developing mobile-friendly VCL platforms that allow students to access learning materials via smartphones, a more accessible option for many rural students (Van Zyl, Els, & Blignaut, 2018).

Moreover, partnerships between universities and telecommunications companies have been explored as a way to reduce the costs associated with digital learning. For instance, some institutions have negotiated free or subsidised data packages for students, allowing them to access VCL platforms without incurring prohibitive costs (Czerniewicz, 2020). While these solutions have mitigated some of the barriers to digital access, the literature highlights the need for sustained investment in digital infrastructure to ensure that all students, regardless of their location, can benefit from VCL (Tawana & Kinuthia, 2020).

The theoretical frameworks guiding this study, including Rogers' *Diffusion of Innovation Theory* and the *Social Pedagogy Justice Framework*, provide important insights into how VCL can be successfully implemented in rural universities. Rogers' theory helps explain the varying technology adoption rates in different educational contexts. At the same time, the *Social Pedagogy Justice Framework* emphasises the importance of creating inclusive learning environments that are responsive to all students' needs, particularly those from disadvantaged backgrounds (Rogers, 2003; McLaren, 2015).

The *Diffusion of Innovation Theory* is particularly relevant in understanding how digital tools are adopted in rural universities, where infrastructural limitations often delay the uptake of new technologies. The literature suggests that early adopters, such as academic staff who champion digital learning, play a crucial role in promoting the wider use of VCL in these contexts (Bozalek & Ng'ambi, 2019). Similarly, the *Social Pedagogy Justice Framework* argues that technology must be implemented in ways that address socioeconomic disparities, ensuring that rural students are not left behind in the digital revolution (McLaren, 2015).

In conclusion, the literature highlights the potential and the challenges of using information technologies to enhance learning in rural universities. While VCL offers a promising solution to the digital divide, its success depends on overcoming significant infrastructural barriers and ensuring that digital tools are implemented in culturally responsive ways. By drawing on established theoretical frameworks and real-world case studies, this study seeks to contribute to the growing body of research on how digital learning can promote inclusivity, equity, and academic success in South African higher education.

Methods

This study adopts a qualitative approach to explore how Virtual Collaborative Learning (VCL) can address educational disparities, particularly in rural South African universities, and foster inclusive and equitable learning environments. Qualitative research is well-suited to understanding the complexities of social phenomena, especially in education, where factors such as culture, resources, and individual experiences play significant roles (Creswell & Poth, 2017). By employing a scoping review of the literature published between 2000 and 2024, the research draws on diverse sources to identify patterns, challenges, and opportunities related to VCL in higher education, particularly in contexts where students are historically disadvantaged.

Research Design

This research employs a scoping review methodology, ideal for mapping out the breadth of research on a given topic and identifying key themes, gaps, and future directions (Arksey & O'Malley, 2005). Scoping reviews are particularly useful in emerging fields where knowledge is dispersed across different areas and approaches. In the context of this study, a scoping review allows for a broad exploration of the integration of VCL in South African higher education, highlighting its role in bridging the digital divide and promoting inclusive learning practices.

The study follows the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) guidelines to ensure rigour and transparency in the review process (Tricco et al., 2018). The review focuses on literature published between 2000 and 2024 to capture the evolution of VCL and its application in education, particularly in the South African context. This timeframe also allows for an examination of changes and developments post-apartheid, which have significantly impacted the country's higher education landscape (Czerniewicz, 2018).

Data Collection

The data collection process involved a comprehensive search of electronic databases, including Google Scholar, JSTOR, PubMed, Scopus, and Web of Science. These databases were chosen for their extensive collections of peer-reviewed journals, books, and conference proceedings relevant to the fields of education, technology, and social justice. Keywords used in the search included "Virtual Collaborative Learning," "South African higher education," "rural students," "digital divide," "information technology in education," and "organisational learning." Boolean

operators (AND, OR) were employed to refine the search results and ensure the inclusion of relevant studies.

The search was limited to English literature to ensure consistency in data interpretation. Inclusion criteria required studies to focus on VCL or related digital learning strategies, specifically within the context of higher education in South Africa or similar settings. Given the study's focus on inclusivity and equity, studies examining rural education, socioeconomic disparities, and the digital divide were also prioritised. Exclusion criteria included articles not focused on higher education or those with a primary focus on unrelated fields, such as primary or secondary education.

Participant Selection and Sampling

As this study is based on a scoping review, participant data was derived from existing literature, meaning no direct human subjects were involved. Instead, the reviewed studies served as "participants" in the research. These studies offered insights into the implementation and outcomes of VCL in South African universities, particularly in rural settings. The literature included case studies, programme evaluations, theoretical papers, and empirical research that collectively provided a comprehensive overview of how VCL has been adapted to the needs of South African students.

Given the diversity of the literature, purposeful sampling was employed to select studies that directly addressed the research questions. This type of sampling is common in scoping reviews and allows researchers to focus on sources most relevant to the topic under investigation (Patton, 2015). Studies were selected for inclusion based on their contributions to understanding how VCL impacts equity and access to education in South Africa's rural universities.

Data Analysis

Data analysis followed the thematic analysis approach outlined by Braun and Clarke (2006). Thematic analysis is appropriate for scoping reviews as it facilitates the identification and organisation of key patterns across multiple studies. First, the literature was read multiple times to gain a thorough understanding of each study's content and context. Then, initial codes were generated to categorise the data according to recurring themes related to VCL, digital equity, and inclusive pedagogy.

These codes were then organised into broader themes, including the digital divide, culturally responsive pedagogy, student engagement, and infrastructural challenges. Each theme was developed through an iterative process, where the codes were refined and re-organised to ensure they accurately reflected the data. This approach allowed for a comprehensive synthesis of the literature, providing a clear understanding of how VCL can address the challenges faced by rural students in South Africa.

Trustworthiness and Validity

Several strategies were employed to ensure the review's trustworthiness. Triangulation, which involves using multiple sources of data to cross-check findings, was a key method for enhancing validity (Lincoln & Guba, 1985). By drawing on studies from different fields and perspectives, the review provided a more holistic understanding of VCL in the South African context. Additionally, maintaining a detailed audit trail documented each research process step, from data collection to theme development, ensuring transparency and replicability.

Although typically used in studies involving direct human participants, member checking was adapted in this review by revisiting key sources to ensure that their findings were accurately

interpreted and represented. This process ensured that the synthesis of the literature was faithful to the original studies and their contexts.

Ethical Considerations

Since this study did not involve direct human subjects, no formal ethical approvals were required from a research ethics board. However, ethical considerations still guided the research process, particularly in accurately representing findings and avoiding misinterpretation. All sources were appropriately cited, and care was taken to acknowledge the contributions of the original authors to the field of VCL and digital learning in South Africa.

In addition, the review adhered to the ethical guidelines set out by academic publishers, ensuring that all studies included were from credible, peer-reviewed sources. Using open-access databases also ensured that the review did not violate copyright or intellectual property laws.

Limitations

One limitation of this scoping review is its reliance on published literature, which may not fully capture the nuances of VCL implementation in every South African university, especially in under-resourced rural institutions. Unpublished studies, grey literature, and reports from universities that are not widely accessible may offer additional insights but were not included in this review due to access restrictions.

Another limitation is excluding non-English sources, which may have excluded studies conducted in South Africa's many indigenous languages. While the focus on English-language sources ensures consistency, it may also limit the scope of the findings by omitting studies that reflect the experiences of non-English-speaking students and educators.

The methodological approach used in this study allowed for a comprehensive analysis of the existing literature on VCL and its role in promoting inclusivity and equity in South African higher education. By employing a scoping review, the research was able to draw on a broad range of sources, providing a rich understanding of the challenges and opportunities associated with digital learning in rural contexts. The thematic analysis of the literature underscored the importance of addressing infrastructural barriers, fostering culturally responsive pedagogy, and enhancing student engagement through VCL. The findings of this review offer a foundation for future research and policy development aimed at creating more equitable learning environments in South Africa.

Results

This section presents the findings of the study, organised around five key themes identified through the analysis of literature: (1) Bridging the Digital Divide, (2) Culturally Responsive Pedagogy, (3) Enhancing Student Engagement, (4) Overcoming Infrastructural Barriers, and (5) Empowering Educators through Professional Development. Each theme reflects the core challenges and opportunities of implementing Virtual Collaborative Learning (VCL) in rural South African higher education contexts.

Theme 1. Bridging the Digital Divide

One of the most significant findings is the potential of VCL to address the persistent digital divide that affects rural students in South Africa. The digital divide refers to the gap between those with access to technology and those without, often exacerbated by geographic, socioeconomic, and infrastructural challenges (Gillwald et al., 2019). Rural universities in South Africa, historically underfunded and under-resourced, struggle with limited access to

digital tools and stable internet connections, which hinders students from fully engaging in online learning (Czerniewicz, 2018).

VCL offers a potential solution by enabling students to collaborate virtually with their peers, regardless of location. This flexibility is crucial in bridging the gap between students in well-connected urban areas and those in rural regions with limited technological resources. VCL's asynchronous learning models allow students to participate in learning activities at their own pace, mitigating the impact of unreliable internet connections, particularly in rural areas (Beaunoyer et al., 2020). The literature suggests that while VCL has the potential to narrow this gap, sustained investment in digital infrastructure remains essential (Dube, 2020).

However, the digital divide cannot be solved solely by providing technology. Gillwald et al. (2019) argue that the divide will persist without addressing broader issues of digital literacy and access to affordable, reliable internet. The findings highlight the need for a comprehensive approach that includes both technological investments and initiatives to support students in building the skills needed to engage effectively in VCL environments. This aligns with earlier studies, which emphasise the importance of creating equitable access to education through technology (Hollow & Van der Merwe, 2020).

Theme 2. Culturally Responsive Pedagogy

The second major theme is the role of VCL in promoting culturally responsive pedagogy. South Africa's rich cultural and linguistic diversity presents unique challenges in education, particularly when it comes to creating inclusive learning environments. Many students, particularly from rural areas, speak languages other than English as their first language, and their cultural contexts often differ significantly from those in urban centres (Jaffer et al., 2007). VCL can be adapted to meet these diverse needs by incorporating culturally relevant content and multilingual support, making learning more accessible and meaningful to students from different backgrounds (Hugo & Wiles, 2021).

The findings indicate that VCL when implemented thoughtfully, can foster inclusivity by allowing students from different cultural backgrounds to collaborate and share their perspectives. For example, Ngugi and Adigun (2021) found that when VCL platforms were designed to accommodate students' linguistic and cultural diversity, engagement levels significantly increased. This approach facilitates learning and promotes cross-cultural understanding, a critical skill in an increasingly globalised world.

However, the success of culturally responsive VCL depends largely on educators' ability to create and manage such environments. Educators must be trained to design culturally relevant content and effectively support students from diverse backgrounds (Mbatha & Naidoo, 2017). The literature suggests that professional development programmes focusing on these aspects can empower educators to create more inclusive and equitable virtual classrooms (Redecker & Punie, 2017).

Theme 3. Enhancing Student Engagement

Student engagement is a key factor in the effectiveness of any learning approach, and VCL is no exception. The literature consistently shows that VCL enhances student engagement by promoting active, collaborative learning experiences beyond traditional lecture-based instruction (Bozalek & Ng'ambi, 2019). In South African higher education, where many students may feel disconnected from the learning process due to socioeconomic or linguistic barriers, VCL can provide a more interactive and participatory learning environment.

The findings reveal that students who engage in VCL show higher motivation, collaboration, and critical thinking levels than those in more traditional learning settings (Bozalek, 2013). For instance, Waghid and Davids (2017) report that group projects facilitated through VCL encouraged deeper learning and fostered important skills such as teamwork and problem-solving. These skills are particularly valuable for students from rural backgrounds, who may have limited opportunities for collaborative learning in more conventional settings.

However, the literature also highlights the importance of designing VCL experiences that are engaging and relevant to students' real-world experiences. As Tawana and Kinuthia (2020) point out, VCL platforms that fail to connect with students' personal and professional aspirations are less likely to foster meaningful engagement. This reinforces the need for educators to carefully design VCL activities that are contextually relevant and tailored to the needs of diverse learners.

Theme 4. Overcoming Infrastructural Barriers

Infrastructural challenges remain one of the most significant obstacles to the widespread adoption of VCL in South African higher education. The literature highlights issues such as unreliable internet connectivity, lack of access to digital devices, and frequent power outages, particularly in rural areas (Gillwald et al., 2019). These barriers not only limit students' ability to engage with VCL platforms but also exacerbate existing inequalities between urban and rural students.

Despite these challenges, some universities have developed innovative solutions to mitigate the impact of infrastructural barriers. For example, Van Zyl, Els, and Blignaut (2018) report on the successful implementation of mobile-friendly VCL platforms that allow students to access learning materials on their smartphones, a more affordable and accessible option for many rural students. Additionally, partnerships between universities and telecommunications companies have enabled some institutions to provide students with free or subsidised data packages, ensuring they can access VCL platforms without incurring prohibitive costs (Czerniewicz, 2020).

While these solutions offer promising pathways forward, the literature emphasises that long-term investment in digital infrastructure is crucial for sustaining these efforts. Without reliable internet and access to necessary devices, many students will continue to be excluded from the benefits of VCL, perpetuating the inequalities these platforms aim to address (Beaunoyer et al., 2020).

Theme 5. Empowering Educators through Professional Development

The final theme centres on the importance of professional development for educators in successfully implementing VCL. As the findings suggest, the effectiveness of VCL depends not only on access to technology but also on educators' ability to facilitate collaborative, inclusive, and engaging virtual learning environments. However, many educators, particularly in rural areas, lack the training and resources needed to use VCL effectively (Redecker & Punie, 2017).

The literature highlights the need for professional development programmes focusing on technical skills and pedagogical strategies for using VCL. Educators must be equipped with the knowledge and tools to design and deliver culturally responsive, student-centred learning experiences that leverage the full potential of VCL (Jaffer et al., 2007). Programmes that offer ongoing support and mentorship can be particularly effective in helping educators build confidence and expertise in using VCL platforms.

Furthermore, Mbatha and Naidoo (2017) emphasise that professional development should be tailored to the specific needs of South African educators, considering the unique challenges they face regarding infrastructure, student diversity, and digital literacy. By investing in the continuous professional development of educators, universities can ensure that VCL is implemented in a way that truly enhances learning outcomes and promotes equity in higher education.

Discussion

The findings of this study provide a comprehensive understanding of how Virtual Collaborative Learning (VCL) can potentially transform South African higher education by promoting inclusivity, equity, and engagement, particularly for students from historically disadvantaged and rural backgrounds. This section critically discusses the identified themes concerning the theoretical frameworks of Diffusion of Innovation (DOI) and Social Pedagogical Justice, exploring how these frameworks help explain and contextualise the challenges and opportunities of implementing VCL in South Africa.

One of the key findings revolves around bridging the digital divide, a challenge that continues to plague rural universities in South Africa. The DOI theory, as outlined by Rogers (2003), provides a useful lens through which to view the adoption of VCL. According to this theory, adopting new technologies, such as VCL, follows a predictable pattern—innovators and early adopters lead the way, followed by the majority and, finally, laggards. In the South African context, rural students, often on the disadvantaged end of the digital divide, are among the "laggards" in accessing digital technologies. Without adequate digital infrastructure, these students are less likely to adopt or benefit from VCL, which creates further inequality in education (Gillwald et al., 2019). The theory emphasises the importance of support structures to facilitate adoption, particularly for late adopters, underscoring the need for sustained investment in digital infrastructure in rural areas (Dube, 2020).

The culturally responsive pedagogy theme aligns closely with the principles of Social Pedagogical Justice, which calls for education systems to be equitable, inclusive, and reflective of students' diverse cultures and identities (Fraser, 2007). In a country like South Africa, where linguistic and cultural diversity is vast, VCL has the potential to promote inclusivity by allowing for content to be adapted to different cultural contexts. The ability to customise learning materials and provide multilingual support ensures that students from various backgrounds can engage meaningfully with the curriculum (Hugo & Wiles, 2021). Social Pedagogical Justice demands that education not only includes all students but also respects and values their cultural contexts, and VCL's flexibility in accommodating diverse learners supports this aim (Mbatha & Naidoo, 2017).

Further, VCL has been shown to facilitate cross-cultural collaboration, a key component of culturally responsive education. By allowing students from different linguistic and cultural backgrounds to collaborate, VCL promotes mutual understanding and empathy, which are essential values in a multicultural society like South Africa (Ngugi & Adigun, 2021). However, for this potential to be fully realised, educators must be equipped to create and manage culturally responsive VCL environments. Professional development programmes must, therefore, focus on empowering educators to design culturally relevant content and promote inclusivity (Jaffer et al., 2007). These efforts can help address historical educational inequalities rooted in the apartheid era, where education systems were segregated and unequal.

The theme of enhancing student engagement through VCL reflects the concept of "perceived usefulness" and "perceived ease of use" from the Technology Acceptance Model (TAM) (Davis, 1989). Students are more likely to engage with VCL if they perceive it as a tool that

enhances their learning experience and is easy to navigate. The findings suggest that students participating in VCL activities are more motivated and collaborative, as the platform encourages active learning (Bozalek & Ng'ambi, 2019). This supports the idea that if digital tools are designed to be user-friendly and relevant to students' real-world needs, they will foster deeper engagement and improved academic performance (Redecker & Punie, 2017).

TAM also emphasises the importance of addressing technological barriers to foster engagement. The theme of overcoming infrastructural challenges highlights rural students' significant obstacles in accessing VCL due to unreliable internet connections and limited access to digital devices (Gillwald et al., 2019). From a TAM perspective, these barriers directly affect students' perceptions of the ease of use of VCL platforms, making it more difficult for them to engage fully with the learning experience. Innovative solutions, such as mobile-friendly VCL platforms and partnerships with telecommunications companies to provide affordable data packages, have been suggested to mitigate these issues (Van Zyl, Els, & Blignaut, 2018). These strategies align with DOI's emphasis on removing barriers to adoption to ensure that more students, particularly those in rural areas, can benefit from technological innovations.

In terms of empowering educators, the findings stress the need for continuous professional development to enable teachers to use VCL effectively. The Social Pedagogical Justice framework emphasises that educators play a crucial role in creating equitable learning environments. Educators must be equipped not only with the technical skills to navigate VCL platforms but also with the pedagogical skills to design learning experiences that are inclusive and engaging for all students (Fraser, 2007). Professional development initiatives focusing on cultural responsiveness and digital literacy are essential to ensure educators can effectively facilitate VCL (Redecker & Punie, 2017). This is particularly important in South Africa, where educators often come from different backgrounds and may have varying levels of experience with digital technologies (Mbatha & Naidoo, 2017).

The implementation of VCL in South African higher education must also address the historical legacies of apartheid and the resulting socioeconomic inequalities. Rural universities, which serve predominantly black and disadvantaged communities, continue to suffer from underfunding and lack of resources, making it difficult to implement digital learning strategies effectively (Czerniewicz, 2018). VCL can help level the playing field for students from these institutions by providing flexible, asynchronous learning opportunities. However, the success of VCL depends on addressing the root causes of inequality, including poor infrastructure and lack of investment in rural areas (Hollow & Van der Merwe, 2020).

Furthermore, the DOI theory suggests that innovation diffusion in education requires institutional support and strong leadership to drive change (Rogers, 2003). South African universities must not only provide the necessary technological infrastructure but also foster a culture of innovation where educators and students are encouraged to adopt new learning tools like VCL (Bozalek & Ng'ambi, 2019). Institutions must prioritise the development of policies that support the widespread adoption of VCL, including investments in digital infrastructure, professional development, and the creation of inclusive, culturally responsive learning environments.

The impact of VCL on student learning outcomes is another critical area that warrants attention. The findings suggest that students who engage in VCL improve critical thinking, collaboration, and academic performance (Bozalek, 2013). These outcomes align with the goals of Social Pedagogical Justice, which advocates for education systems that provide all students with the skills and knowledge needed to succeed in a globalised world (Fraser, 2007). However, to maximise the impact of VCL on learning outcomes, educators must design activities that are meaningful and relevant to students' lived experiences (Tawana & Kinuthia, 2020).

In conclusion, the discussion of these findings demonstrates that VCL has the potential to significantly enhance the quality of education in South Africa, particularly for students from historically disadvantaged and rural backgrounds. However, the successful implementation of VCL depends on addressing key challenges related to digital infrastructure, cultural responsiveness, and professional development. By integrating the theoretical frameworks of Diffusion of Innovation and Social Pedagogical Justice, this study highlights the importance of creating equitable, inclusive, and culturally responsive learning environments that leverage the full potential of VCL.

Educational institutions and policymakers must work together to ensure that the necessary investments are made to support the adoption of VCL, particularly in rural areas. Additionally, professional development programmes must be prioritised to empower educators to use VCL effectively. Ultimately, the successful implementation of VCL can help bridge the educational divide in South Africa, promoting a more inclusive and equitable higher education system for all students.

Implications of the Study

The findings of this study highlight the significant potential of Virtual Collaborative Learning (VCL) in transforming the landscape of South African higher education, especially for students in rural and historically disadvantaged communities. One of the most important implications is the need for targeted investment in digital infrastructure. For VCL to effectively bridge the educational divide, universities must prioritise the development of reliable internet connectivity, access to affordable data, and the availability of digital devices for all students. Without addressing these foundational elements, rural and underprivileged students will continue to face barriers to accessing the full benefits of virtual learning environments, reinforcing existing inequalities in the education system.

Secondly, culturally responsive pedagogy must be integrated into VCL strategies to ensure all students can engage meaningfully with the learning material. This study underscores the importance of tailoring VCL platforms to accommodate South African students' linguistic and cultural diversity. Educators must receive comprehensive training on how to design and deliver content that respects and reflects the varied cultural backgrounds of learners. By doing so, VCL can be used as a tool for collaboration and as a platform that promotes inclusivity and respect for diversity in higher education.

Another key implication is professional development for educators. For VCL to be successfully implemented, educators need the skills to effectively use digital platforms and create engaging virtual learning environments. Continuous professional development should focus on both digital literacy and culturally responsive teaching methods. Equipping educators with these tools will ensure they are prepared to meet the diverse needs of their students and fully harness the capabilities of VCL, leading to more engaging and effective learning experiences for all students, regardless of their socioeconomic background.

Another implication of this study is the need for institutional policies and leadership that support the diffusion of innovation, as outlined by the Diffusion of Innovation (DOI) theory. For VCL to be adopted and sustained across higher education institutions, strong leadership and policy frameworks must encourage its use. Universities should develop strategies that promote the widespread adoption of VCL by providing the necessary technological infrastructure, offering incentives for educators to engage with new learning technologies, and fostering a culture of innovation and collaboration within the institution.

Finally, the potential long-term benefits of VCL for student learning outcomes and equity in education cannot be overstated. As this study shows, VCL offers opportunities for deeper

student engagement, improved collaboration, and the development of critical thinking skills. By providing students from disadvantaged backgrounds with the tools and platforms they need to participate in global learning environments, VCL can help level the playing field in higher education. The successful implementation of VCL in South Africa could set a precedent for other countries grappling with similar challenges, demonstrating that technology can be a powerful tool for transforming education when implemented with equity and inclusivity in mind.

Conclusion

This study underscores the transformative potential of Virtual Collaborative Learning (VCL) in addressing the digital divide, enhancing inclusivity, and fostering engagement in South African higher education, particularly for rural and historically disadvantaged students. By integrating culturally responsive pedagogy, investing in digital infrastructure, and providing ongoing professional development for educators, VCL can bridge socioeconomic gaps and offer equitable learning opportunities. The study also emphasises the need for strong institutional policies and leadership to support innovation diffusion, ensuring sustainable VCL adoption. Ultimately, this research highlights that with targeted efforts, VCL can be a powerful tool in creating a more inclusive, equitable, and dynamic educational landscape in South Africa.

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