

Exploring the Effectiveness and Challenges of Online Learning Tools Used by Students at a Higher Education Institutions in South Africa

Author 1:

Naledi Lenny Kaeane

naledik@vut.ac.za

Faculty of Human Sciences,
Tourism & Integrated Communications Department

Author 2:

Radiakga Thabang Molokomme

radiakgam@vut.ac.za

Legal Sciences Department

Author 3

Solly Lebelo

sollyl@vut.ac.za

Applied Physical Sciences Department

Vaal University of Technology,

Private Bag X021,

Andries Potgieter Blvd

Vanderbijlpark

1911,

South Africa

ABSTRACT

The integration of online learning tools in higher education institutions (HEIs) has revolutionised the educational landscape, offering new opportunities for flexible and accessible learning. However, in the South African context, this shift has unveiled significant challenges, particularly for students from socio-economically disadvantaged backgrounds. Despite the growing reliance on digital platforms, gaps remain in understanding how these tools impact students' academic experiences, particularly in terms of accessibility, usability, and effectiveness. Using a qualitative research approach underpinned by the interpretivist paradigm, the study employed semi-structured interviews and employed a convenience sampling technique to select readily available students, while also ensuring a purposive approach to focus on participants from various disciplines relevant to the research. The findings reveal that while online learning tools enhance flexibility and provide opportunities for self-paced learning, their effectiveness is hindered by pervasive barriers, such as limited internet access, high data costs, unreliable digital infrastructure, and low levels of digital literacy among students. Moreover, the digital divide exacerbates inequality, with students from under-resourced communities facing greater difficulties in leveraging these tools for academic success. The study recommends strategic interventions, including increased investment in digital infrastructure, partnerships with internet service providers to reduce data costs, and the incorporation of digital literacy training into academic programs. Therefore, this study contributes to the growing body of literature on digital education in South Africa.

Keywords: Online learning tools, Students, Higher Education Institutions, Digital divide, Digital literacy.

INTRODUCTION

In an era where technology is reshaping every facet of life, higher education (HE) is no exception. Digital learning tools have become essential components in modern education, offering innovative ways to deliver content, engage students, and assess learning outcomes (Molokomme, 2024). However, while these tools promise increased accessibility and flexibility, there is an urgent need to evaluate their actual impact on student learning, particularly in South Africa. According to Mafenya (2022) the adoption of online learning tools in South African universities accelerated during the COVID-19 pandemic, pushing institutions to adapt to remote learning environments. Yet, despite the growing use of these tools, there is a limited understanding of their effectiveness, and the challenges students face in utilizing them, specifically at a UoT in South Africa.

According to Rafiq, Iqbal and Afzal (2024), online learning tools refer to digital platforms and technologies that support teaching and learning T&L. These include learning management systems (LMS) such as Moodle and Blackboard, virtual classrooms, online assessments, digital libraries, and collaborative platforms like Google Classroom and Zoom (Namada, 2021). Rafique (2023) alludes to the fact that these LMS tools are central to course delivery, communication, and enhancing student engagement. Therefore, this study explores the effectiveness and challenges of online learning tools used by students at a higher education institution (HEIs) in South Africa. As these tools become integral to the learning experience, it is critical to understand their actual impact on student outcomes and the barriers that may prevent their optimal use (Namada, 2021).

Online learning tools, while offering numerous benefits, also present significant challenges that hinder their full effectiveness. Molokomme (2024) posits that the challenges include technological barriers such as unreliable internet access, particularly in rural or underserved areas, which can prevent students from fully participating in online learning. Additionally, Schmidt and DeSchryver (2022) state the lack of digital literacy among some students is another issue that makes it difficult for

them to navigate complex platforms or engage effectively with online content. Socio-economic disparities further exacerbate these issues, as students may not have access to personal devices or the necessary resources for a successful online learning experience (Chari, 2024). Moreover, it is worth noting that the absence of face-to-face interactions may lead to feelings of isolation and disengagement, reducing the overall quality of the learning experience (Molokomme, 2024). Thus, it can be deduced that these challenges underscore the need for tailored solutions to ensure that all students can benefit equally from online learning tools.

However, while some studies have explored the integration of online learning tools in South African HE (Mtebe, 2018; Prinsloo & Slade, 2020), there is a scarcity of research specifically examining the effectiveness of these tools from the student's perspective. Existing research often focuses on technological infrastructure or faculty adoption, with limited attention to student challenges or the direct effects of these tools on learning outcomes (Molokomme, 2024; Mhlongo, Mbatha, Ramatsetse & Dlamini, 2023). Therefore, this study seeks to fill this gap by investigating the experiences of students at a South African HEI, identifying both the strengths and the limitations of these tools in the context of local challenges.

Moreover, the significance of this study lies in its potential to provide valuable insights that can inform policies, practices, and future research. By understanding the strengths and weaknesses of online learning tools, HEIs in South Africa can make more informed decisions about how to improve digital learning experiences. These insights will be beneficial for educators, administrators, and policymakers, ensuring that the digital tools used for T&L are effective and inclusive. Furthermore, the findings contribute to the global discourse on the future of online education, offering context-specific insights into the challenges faced by students in developing countries such as South Africa.

The rationale for this study is based on the pressing need to evaluate the real-world impact of online learning tools on students in South Africa. While digital learning is often seen as a way to increase access to education, it is crucial to assess whether

these tools enhance learning outcomes (Bender, 2023). As HEIs across the world continue to embrace digital tools, it is important to ensure that students are prepared to benefit from these tools and that barriers to their effective use are identified and addressed (Molokomme, 2024). This research provides valuable insights into the factors that influence the success of online learning tools and help drive more effective and inclusive educational practices.

EMPIRICAL LITERATURE REVIEW

The integration of digital tools into HE has yielded several advantages, particularly in terms of accessibility and flexibility in learning environments. However, numerous challenges have emerged, particularly around issues of access, infrastructure, and resources (Molokomme, 2024). A significant challenge identified across the literature is the digital divide, with students from economically disadvantaged backgrounds facing barriers due to inadequate internet access and limited access to digital devices (Francis & Weller, 2022). This is a critical issue for many students, particularly those from rural and remote areas, where technology access is minimal and often exacerbated by power outages such as load shedding (Arshad, 2021; Madzimure, 2022). Scholars such as Madzimure (2022) argue that these students' home environments often lack the necessary infrastructure for effective online learning, and without proper support, these students struggle to engage meaningfully with the digital learning environment.

HEIs in South Africa have attempted to mitigate these issues by providing data bundles and laptops to students, which addresses some of the access disparities and promotes digital equity (Molokomme, 2024). However, the gap remains wide, particularly in areas where internet infrastructure is poor, and where economic challenges prevent students from acquiring the necessary technology. For example, a lack of data and computers has resulted in interruptions to learning and teaching, leaving many students unable to engage in online learning consistently (Murphy, Eduljee & Croteau, 2020; Ferri, Grifoni & Guzzo, 2020). The importance of initiatives

such as data provision and digital device allocation is underscored by scholars, as these measures help reduce barriers to online education (Francis & Weller, 2022).

While technological tools such as LMS have been identified as effective in centralizing course materials, assessments, and student-instructor communication (Zalite & Zvirbule, 2020), challenges related to internet connectivity persist. The shift to online learning during the COVID-19 pandemic highlighted the need for robust digital infrastructure, particularly for HEIs in South Africa (Syakur, Sugirin, Margana, Junining & Sabat, 2020). Despite these challenges, the widespread use of platforms like Blackboard, Moodle, and Google Classroom allowed institutions to maintain academic continuity and foster interaction in an online setting. In the post-pandemic era, the continued reliance on LMS and digital tools is evident, as they offer flexibility in learning by enabling asynchronous learning, and interactive features like quizzes and discussion forums (Toquero, 2020; Valeeva & Kalimullin, 2021).

The use of collaborative tools such as Microsoft Teams and Zoom has further contributed to creating an interactive learning environment that replicates in-person interactions to some extent (Sintema, 2020). However, these platforms also highlight the digital divide, where access to these technologies is unequal, particularly for students from disadvantaged backgrounds. Despite the advantages offered by these tools, the lack of adequate internet access during peak hours or due to load shedding continues to disrupt learning (Arshad, 2021; Madzimure, 2022). Scholars argue that, for these tools to be fully effective, access to reliable internet must be a priority for institutions, along with increased IT resources to support both students and educators in the virtual environment (Namada, 2021; Crawford, Butler-Henderson, Rudolph, Malkawi, Glowatz, Burton & Lam, 2020).

Additionally, while LMS platforms like Blackboard and Moodle allow for asynchronous learning, some students report challenges in maintaining engagement, often experiencing frustration, boredom, and anxiety due to unreliable internet access and the unaffordability of data (Murphy et al., 2020). These findings are corroborated by Madzimure (2022), who noted that the absence of sufficient data for both students and

lecturers hinders academic success. This frustration is compounded by the recurring problem of load shedding, which affects the reliability of internet connectivity and disrupts virtual learning (Arshad, 2021).

The hybrid learning model, which blends both online and face-to-face learning, has been proposed as a solution to these challenges, allowing students to benefit from the flexibility of digital learning while maintaining in-person interactions (Sintema, 2020; Le Grange, 2020). This model is gaining traction as a sustainable approach for the post-pandemic era, as it addresses some of the inherent challenges of fully online learning, such as engagement and technological access. Institutions like UoTs are also investing in long-term digital infrastructure and strategies to integrate online learning into their curricula permanently, ensuring the continued effectiveness and accessibility of education (Mpongose, 2022; Mseleku, 2020:6).

Furthermore, while digital tools have provided significant opportunities for enhancing education in higher education, challenges related to the digital divide, internet access, and infrastructure remain pervasive (Namada, 2021). Therefore, it is evident that the shift to online learning, accelerated by the COVID-19 pandemic, has underscored the importance of addressing these issues to ensure equitable access to quality education. UoTs' efforts to provide students with laptops and data bundles are commendable, but further investment in reliable internet infrastructure and IT resources is essential to bridge the digital divide and support both students and educators in the transition to a more digitized learning environment (Molokomme, 2024). The continued refinement of digital learning tools, coupled with a hybrid approach to education, holds promise for the future of HE, ensuring that institutions remain competitive on the global stage while providing students with a flexible and engaging learning experience.

METHODOLOGY

A qualitative research approach was chosen as the most suitable for this study, as it facilitates an exploration of the complex and evolving phenomenon of online learning and digital tools (Creswell & Creswell, 2018). Qualitative research prioritises depth

over breadth, enabling the researcher to understand participants' personal experiences, perceptions, and challenges (Chih-Pei & Chang, 2017). This approach is particularly valuable when studying the transition to online education, as it allows for a nuanced understanding of how students at HEIs in South Africa navigate the effectiveness and challenges of online learning tools in an evolving educational environment. (Chih-Pei & Chang, 2017). The flexibility inherent in qualitative research methods is crucial in the post-COVID-19 era, where educational practices and technologies are continuously evolving. By focusing on participants' lived experiences, the study aims to uncover insights that may not be captured by more quantitative approaches (Rivera, 2018).

Research Design

An exploratory case study design was adopted for this research, as it provides an in-depth, contextually rich examination of the effectiveness and challenges of online learning tools used by students at a HEIs in South Africa. The case study design is particularly suited for investigating complex phenomena within a specific context, enabling a thorough exploration of the experiences of students using online learning tools (Yin, 2018). This approach allows for the collection of multiple sources of evidence, such as semi-structured interviews, to gain a holistic understanding of the students' perspectives and challenges in utilising these tools effectively (Baxter & Jack, 2008).

The interpretivist paradigm underpins this research design, emphasising the subjective experiences and perspectives of students in constructing their understanding of online learning tools within their educational environment (Lauckner et al., 2012:26). By focusing on the lived experiences of students, this research aims to uncover the specific challenges, opportunities, and outcomes associated with the use of online learning tools. This perspective facilitates a deeper exploration of student narratives and institutional contexts, offering valuable insights into the implications of online education for HEIs in South Africa.

Participants and Setting

The target population for this study includes students at a selected HEI in South Africa. The participants were selected based on their direct experience with the use of online learning tools during and post-pandemic era. The study focused on students from various academic disciplines within the institution, ensuring a diverse range of perspectives. By targeting this specific population, the research aims to gather rich, contextually grounded data on the effectiveness and challenges students face when utilising online learning tools (Kimmons & Veletsianos, 2018). This approach provides valuable insights into how these tools impact student engagement, learning outcomes, and overall educational experiences (Wagino, Maksum, Purwanto, Simatupang, Lapisia & Indrawan, 2024).

Sampling

The study employed a non-probability convenience sampling technique, which is appropriate for qualitative research where participants who are readily available and willing to provide relevant information are selected (Golzar, Noor & Tajik, 2022). The sample consisted of twelve students, chosen based on their experience with online learning platforms and methodologies. This sample size was deemed sufficient for capturing a range of perspectives on the effectiveness and challenges of online learning in the post-pandemic context (Creswell & Poth, 2016). The researcher anticipated that if data saturation was not reached, additional participants would be included until saturation was achieved. However, data saturation was attained with the tenth participant. Despite this, the researcher proceeded with data collection by including two additional participants to confirm the saturation and to ensure that the planned sample size was fully accommodated.

Data Collection

A semi-structured interview guide was developed to facilitate the collection of qualitative data from the participants. Semi-structured interviews are an effective method for gathering in-depth responses that reflect participants' personal experiences and perceptions (Creswell & Poth, 2016). The interview guide consisted

of open-ended questions designed to explore participants' experiences with the effectiveness and challenges of the online learning tools.

The interviews were conducted in a conversational manner, allowing participants to express their thoughts freely while guiding the conversation with pre-determined questions. The interviews were audio-recorded, with participants' consent, to ensure accurate transcription and analysis of the data. Additionally, ethical considerations were strictly adhered to where ethical clearance was obtained from the institution in question as well as the gatekeeper's letter which provided permission to conduct this study within the institution and also interview students from their institution. In addition, participants were informed about the study's purpose, confidentiality measures, and their right to withdraw at any time. Consent forms were obtained before the interviews.

Data analysis

The data analysis process followed thematic analysis steps as alluded to by Braun and Clarke (2022), which is commonly used in qualitative research to identify and interpret patterns within the data. The first step in the analysis was transcribing the recorded interviews verbatim. This allowed the researcher to become familiar with the data and begin the process of coding (Deterding & Waters, 2021). Open coding was employed to identify meaningful segments of the data, such as significant phrases or key ideas that emerged from the participants' responses. Each code represented a specific concept or theme related to the students' experiences with online learning tools.

Once the initial codes were generated, the researcher grouped them into broader themes. These themes were refined through a process of constant comparison, where the researcher compared data segments across interviews to ensure the themes were supported by the data and accurately reflected the students' experiences (Braun & Clarke, 2022).

FINDINGS AND DISCUSSION

The findings begin with a table summarising the demographic profiles of the students. Key themes and insights derived from the data are then presented in detail and as raw as they are and quoted verbatim. The discussion section is presented promptly after each theme which connects these findings to existing literature, ensuring alignment between the study's results and prior research. This approach offers a thorough understanding of the challenges and opportunities identified in the study.

Table 1 Demographic profile of student

ID	Department	Level of study	Gender	Digital Tool for Online Learning	Years you experienced online learning	Education al level	Degree
S1	Logistics and supply chain Management	Postgraduate	Female	Blackboard & Teams	2022 - 2024	7 th year	Masters
S2	Education	Postgraduate	Female	Blackboard & Teams	2022 -2024	6 th year	Masters
S3	Education	Postgraduate	Male	Blackboard & Teams	2022 - 2024	7 th year	Masters
S4	Visual arts and design	Postgraduate	Male	Blackboard	2022 - 2024	8 th year	Masters
S5	Visual arts and design	Postgraduate	Male	Blackboard	2022-2023	7 th year	Masters
S6	Visual arts and design	Postgraduate	Female	Blackboard	2022- 2023	6 th	Postgraduate Diploma
S7	Logistics and supply chain Management	Undergraduate	Female	Blackboard	2022 - 2024	4 th year	Diploma
S8	Legal sciences	Undergraduate	Female	Blackboard	2022-2024	4 th year	Advanced Diploma
S9	Legal sciences	Undergraduate	Male	Blackboard	2022-2024	4 th year	Advanced Diploma
S10	Education	Postgraduate	Male	Blackboard & Teams	2020 - 2024	7 th year	Masters

ID	Department	Level of study	Gender	Digital Tool for Online Learning	Years you experienced online learning	Education al level	Degree
S11	Education	Postgraduate	Male	Blackboard & Teams	2020 - 2024	8 th year	Masters
S12	Education	Postgraduate	Male	Blackboard	2020 - 2024	8 th year	Masters

ID: S = Student

Theme 1: Platforms and tools utilised

Students frequently cited specific platforms and tools used to facilitate their online learning experience. S1 mentioned that, "[w]e have been using an online platform called Blackboard and MS teams for attending classes and Turnitin for submissions." S2 shared a similar experience, saying, "we use Vutela as our digital platform and a laptop as a digital tool." Likewise, S3 stated, "Blackboard (Vutela) is what I use for my online courses." S4 added, "I use Blackboard and MS Teams for different modules, which helps keep everything organised." Meanwhile, S5 noted that, "MS Teams is our primary platform, and we also use Zoom occasionally for virtual classes." S6 explained that "[m]ost of our learning takes place on Blackboard, but we also use WhatsApp groups to communicate quickly with classmates." S7 shared some similar sentiments stating that "we rely heavily on Blackboard for most things, but I also use Google Docs for collaboration with classmates." While S8 mentioned the fact that "our classes are mostly on Vutela, but I use YouTube videos for additional learning when something is not clear." S9 said, "[I] use Vutela and MS Teams, and we also submit through Turnitin." S10 explained, "Most of the time, I'm on Blackboard, but we use Zoom for group work and sometimes WhatsApp to stay connected." S11 mentioned, "I mainly rely on Blackboard, but Google Meet is also used for live discussions." S12 added, "Blackboard is our main tool for lectures, and I use Google Drive to store my notes and assignments so that when my computer crashes, I know that I have backup."

In the transition to online learning at a UoT in the Vaal, various digital tools have become essential in supporting education, particularly post-COVID-19. Findings reveal that platforms like Blackboard, Turnitin, Vutela, and Microsoft Teams are widely

used by students to access coursework, attend virtual classes, and collaborate through tools such as Google Docs and Zoom. This aligns with broader literature, which highlights how the pandemic spurred rapid technological adoption in higher education, exposing infrastructural gaps and driving improvements in online learning tools (Syakur et al., 2020:684). LMS such as Blackboard provide a centralised structure for course materials, assignments, and instructor-student communication, enabling asynchronous learning and enhancing accessibility (Toquero, 2020:12). Moreover, collaborative tools like Microsoft Teams facilitate real-time interactions, supporting an engaging learning environment reminiscent of traditional classrooms (Wea & Kuki, 2021:1842). Mobile applications like WhatsApp further enhance accessibility for students with limited resources, fostering an inclusive approach to digital learning (Mengistie, 2021:11). Although challenges such as unequal access to high-speed internet persist, initiatives such as providing data bundles and digital devices to students at the UoT illustrate the institution's efforts to bridge the digital divide (Molokomme, 2024:396). This continued adaptation underscores the evolving role of digital tools as integral components of academic success in a post-pandemic context (Delcker & Ifenthaler, 2021:125).

Theme 2: Effectiveness of Digital Tools in Enhancing Learning

Many students found these digital platforms and tools beneficial for enhancing their online learning experience. S1 noted that, *"they are very helpful because they contain different spaces within it. You can have discussions and ask questions on those platforms without even having to wait for class."* S2 agreed stating, *"[t]hey are helpful because they get the job done, I can attend my classes online, submit my assignments, and engage with the course material."* Similarly, S3 emphasised, *"Blackboard has been very helpful when it comes to online learning. We can even communicate with our lecturers after class."* S4 shared, *"Blackboard makes accessing course material simple, and I don't have to wait until class to ask questions."* S5 added, *"Teams allows me to interact with my lecturers and fellow students easily, and Zoom is great for real-time classes."* S6 noted, *"Blackboard keeps everything in one place, which makes managing my studies easier, and WhatsApp helps us stay on top of*

assignments." S7 said, "the collaboration features of Google Docs are great for group work, and Blackboard is effective for accessing course content." S8 added, "Vutela is useful, but sometimes I need to go beyond the platform, which is why I use YouTube for additional explanations." S9 shared, "I can easily attend lectures and submit work through Blackboard, and Turnitin helps ensure my work is plagiarism-free." S10 agreed, stating, "Blackboard and Zoom make online learning smoother, especially with the recorded sessions we can review." S11 said, "It's easy to access all my materials through Blackboard, and Google Meet works well for live discussions." S12 added, "The tools we use are effective for organising my notes and keeping track of assignments, and Blackboard is great for keeping everything in one place."

The findings and literature illustrate the significant role digital tools have played in enhancing the learning experience at a UoT in Gauteng Province. Students in the study acknowledged the effectiveness of platforms like Blackboard, Microsoft Teams, and Google Docs for enabling discussions, accessing course materials, and collaborating on assignments, showing that these tools foster engagement and streamline educational processes. These insights align with literature findings indicating that LMSs like Blackboard and Moodle provide centralised spaces for course content distribution, assignments, and student-instructor communication (Zalite & Zvirbule, 2020:297). Additionally, collaborative tools such as Microsoft Teams and Zoom, emphasised by both students and scholars, facilitate real-time interaction, replicating in-class experiences within an online setting (Sintema, 2020:20). Literature on the post-COVID era notes that while these tools have improved learning, they come with challenges, particularly the digital divide, where disparities in internet access affect student participation (Francis & Weller, 2022). However, UoTs, including this one, have countered this by providing devices and data bundles, thus promoting digital equity and maintaining academic continuity. As institutions continue to invest in training and advanced technology, digital learning tools can drive a more personalised, engaging, and accessible education in a post-pandemic academic landscape (Delcker & Ifenthaler, 2021:125).

Theme 3: Key challenges

A common issue raised by students was the challenge of unreliable internet connectivity. S1 expressed, *"There is mainly one huge challenge that I have faced countless times: the lack of internet connection."* S2 echoed this sentiment, saying, *"internet connection, I stay at the main residence, and the internet is bad and unreliable."* Similarly, S3 noted, *"Connectivity issues are a big problem."* S4 added, *"The internet is not always reliable, especially during peak times."* S5 mentioned, *"[i]ssues of electricity in my area make internet to be weak in which it makes it difficult to stay connected during classes."* S6 shared, *"The biggest challenge is connectivity issues, particularly during tests and exams."* S7 stated, *"Unstable internet has been a consistent problem, especially when I need to submit assignments or take online tests."* S8 explained, *"Poor internet is a regular struggle, making it hard to participate in live classes."* S9 noted, *"The internet at my home is unreliable, and that affects my ability to attend lectures and submit work on time."* S10 said, *"The internet can be slow or cut out completely, especially when many students are online at the same time."* S11 added, *"I often experience connection issues that disrupt my classes."* S12 agreed that *"[s]low internet makes it challenging to stay focused during online lectures."*

The findings and literature highlight significant obstacles to effective online learning, with unreliable internet connectivity standing out as a primary challenge. As voiced by multiple students, poor internet access, especially during peak hours or due to power outages, disrupts their ability to attend classes and complete assignments. This aligns with the literature, which identifies internet connectivity as a critical issue exacerbated by South Africa's recurring load shedding, rendering online education ineffective (Arshad, 2021; Madzimore, 2022:47). Additionally, a lack of adequate IT skills and resources hinders both students and lecturers, a trend observed globally yet intensified within South African HEIs due to limited funding for IT infrastructure (Crawford et al., 2020:1). The unavailability of data and the lack of digital devices further compound these challenges, particularly for students from rural or economically disadvantaged backgrounds, making consistent engagement in online learning difficult

(Ferri et al., 2020; Madzimure, 2022:47). Therefore, it can be seen that addressing these challenges would require expanding internet access, IT resources, and support for students and lecturers to navigate the virtual learning environment effectively.

CONCLUSION

This study explored the effectiveness and challenges of online learning tools used by students at HEIs in South Africa, focusing on their experiences and perceptions. The findings revealed a range of both benefits and barriers associated with these tools. While online learning platforms offered flexibility, accessibility, and enhanced engagement, they also presented challenges such as limited digital literacy, unstable internet connectivity, and insufficient institutional support. These issues were particularly pronounced in under-resourced settings, further highlighting the digital divide. The study underscores the critical need for tailored interventions to address the unique challenges faced by students in the South African HE context. By shedding light on the diverse experiences of students, this research contributes to the broader understanding of the effectiveness of online learning tools and the ongoing challenges that hinder their full potential.

However, in improving the effectiveness of online learning tools and mitigate the identified challenges, several actionable recommendations are proposed by the researchers. Firstly, HEIs should invest in robust digital infrastructure to ensure reliable internet access and the seamless functioning of online platforms. Secondly, digital literacy programs should be integrated into academic curricula to equip students with the necessary skills to navigate online learning tools effectively. Thirdly, institutions should establish support mechanisms such as dedicated help desks and peer mentoring systems to address students' technical and academic needs. Additionally, fostering partnerships with service providers could help reduce internet costs for students. Finally, continuous evaluation and feedback mechanisms should be implemented to monitor the effectiveness of online learning tools and adapt them to meet the evolving needs of students. Thus, by prioritising these recommendations,

HEIs can create a more inclusive and effective online learning environment that enhances educational outcomes.

Acknowledgments

We would like to express our deepest gratitude to all the participants in this study, whose contributions were invaluable. Special thanks are extended to the Vaal University of Technology for permitting us to conduct this study.

Declarations

This research was conducted following ethical guidelines and approved by the relevant ethics committee.

Conflicts of Interest

The authors (NL Kaeane, RT Molokomme, RS Lebelo) declare that there are no conflicts of interest in relation to this research. This work was conducted independently, and there were no external influences affecting the design, data collection, analysis, or publication of the results.

Contributions

All authors contributed equally to this study. Each author was involved in the conceptualisation, data collection, data analysis, and writing of the manuscript. The study was a collaborative effort, with all authors providing significant input.

REFERENCES

Aldalur, I., Markiegi, U., Valencia, X., Cuenca, J., & Illarramendi, M. (2022, October). E-Learning Experience with Flipped Classroom Quizzes Using Kahoot, Moodle and Google Forms: A Comparative Study. In *Proceedings of the 14th International Conference on Education Technology and Computers* (pp. 82-89).

Arshad, Q. (2021). *Why does the quality of my YouTube video look bad? Small Biz Club*. [Online]. Available at: <https://smallbizclub.com/technology/why-does-the-quality-of-my-youtube-video-look-bad/> Accessed: 01.10.2024.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), 544-559.

Bender, T. (2023). *Discussion-based online teaching to enhance student learning: Theory, practice and assessment*. Taylor & Francis.

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1-126.

Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative psychology*, 9(1), 3.

Chari, S. G. (2024). Bridging Gaps, Building Futures: Tackling Socio-Economic Disparities Through Education and Technology. *London Journal of Research In Humanities and Social Sciences*, 24(16), 1-12.

Chih-Pei, H. U., & Chang, Y. Y. (2017). John W. Creswell, research design: Qualitative, quantitative, and mixed methods approaches.

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., ... & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Deterding, N. M., & Waters, M. C. (2021). Flexible coding of in-depth interviews: A twenty-first-century approach. *Sociological methods & research*, 50(2), 708-739.

Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. *Societies*, 10(4), 86.

Francis, D. V., & Weller, C. E. (2022). Economic inequality, the digital divide, and remote learning during COVID-19. *The Review of Black Political Economy*, 49(1), 41-60.

Golzar, J., Noor, S., & Tajik, O. (2022). Convenience sampling. *International Journal of Education & Language Studies*, 1(2), 72-77.

Kimmons, R., & Veletsianos, G. (2018). Public internet data mining methods in instructional design, educational technology, and online learning research. *TechTrends*, 62(5), 492-500.

Lauckner, H., Paterson, M., & Krupa, T. (2012). Using constructivist case study methodology to understand community development processes: proposed methodological questions to guide the research process. *Qualitative Report*, 17, 25.

Le Grange, L. (2020). Could the Covid-19 pandemic accelerate the uberfication of the university?. *South African Journal of Higher Education*, 34(4), 1-10.

Madzimure, J. (2022). Investigation of YouTube as an online platform used during remote learning forced by COVID-19. *EUREKA: Social and Humanities*, (1), 43-49.

Mafenya, N. P. (2022). Exploring technology as enabler for sustainable teaching and learning during Covid-19 at a university in South Africa. *Perspectives in Education*, 40(3), 212-223.

Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*, 9(6).

Molokomme, R. T. (2024). Unveiling challenges with e-learning faced by academic staff at a University of Technology after COVID-19 pandemic in South Africa. *International Journal of Research in Business and Social Science* (2147-4478), 13(2), 394-404.

Mpungose, C. B. (2020). Is Moodle a platform to decolonise the university curriculum? Lecturers' reflections. *Africa Education Review*, 17(1), 100-115.

Mseleku, Z. (2020). A literature review of E-learning and E-teaching in the era of Covid-19 pandemic.

Murphy, L., Eduljee, N. B., & Croteau, K. (2020). College student transition to synchronous virtual classes during the COVID-19 pandemic in Northeastern United States. *Pedagogical Research*, 5(4).

Namada, J. M. (2021). Learning management systems in the era of e-learning. In *Machine Learning Approaches for Improvising Modern Learning Systems* (pp. 169-190). IGI global.

Rafiq, S., Iqbal, S., & Afzal, A. (2024). The Impact of Digital Tools and Online Learning Platforms on Higher Education Learning Outcomes. *Al-Mahdi Research Journal (MRJ)*, 5(4), 359-369.

Rafique, R. (2023). Using digital tools to enhance student engagement in online learning: An action research study. In *Local Research and Glocal Perspectives in English Language Teaching: Teaching in Changing Times* (pp. 229-248). Singapore: Springer Nature Singapore.

Rivera, K. (2018). Use Your Feelings': emotion as a tool for qualitative research. *The SAGE handbook of qualitative business and management research methods*, 450-467.

Schmidt, L. J., & DeSchryver, M. (2022). The role of digital application literacy in online assessment. *Journal of Educational Technology Systems*, 50(3), 356-378.

Sintema, E. J. (2020). E-Learning and Smart Revision Portal for Zambian primary and secondary school learners: A digitalized virtual classroom in the COVID-19 era and beyond. *Aquademia*, 4(2), ep20017.

Syakur, A., Sugirin, S., Margana, M., Junining, E., & Sabat, Y. (2020). Improving English language speaking skills using "Absyak" on-line learning model for second

semester in higher education. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 3(2), 684-694.

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, 5(4).

Valeeva, R. and Kalimullin, A. 2021. Adapting or changing: The covid-19 pandemic and teacher education in Russia. *Education Sciences*, 11(8), p.408.

Wagino, W., Maksum, H., Purwanto, W., Simatupang, W., Lapisa, R., & Indrawan, E. (2024). Enhancing Learning Outcomes and Student Engagement: Integrating E-Learning Innovations into Problem-Based Higher Education. *International Journal of Interactive Mobile Technologies*, 18(10).

Yin, R. K. (2018). Case study research and applications.

Zalite, G. G., & Zvirbule, A. (2020). Digital readiness and competitiveness of the EU higher education institutions: The COVID-19 pandemic impact. *Emerging Science Journal*, 4(4), 297-304.

Zawacki-Richter, O. (2021). The current state and impact of Covid-19 on digital higher education in Germany. *Human Behavior and Emerging Technologies*, 3(1), 218-226.