Re-Imagining Teaching and Learning at South African Higher Education Institutions in the Digital Landscape

Miemie Struwig and Storm Watson
Nelson Mandela University, Gqeberha, South Africa

Miemie.Struwig@Mandela.ac.za
Storm.Watson@Mandela.ac.za

Abstract: The core purpose of teaching and learning in HEIs in South Africa is to provide high-quality education and training that prepares students for success and meets societal needs. HEIs must develop curricula that are rigorous, relevant, and responsive. In the past five years, there has been a significant shift towards focusing on individual institutions' teaching, learning, and research practices. This study aimed to re-imagine teaching and learning within the digital landscape of South African public HEIs and provide recommendations for developing assessments in this context. For this study, primary data was collected through the analysis of the 2021 annual reports and official websites of the 26 public universities in South Africa. Primary data was collected from the 2021 annual reports and official websites of the 26 public universities. Content analysis identified trends and uncertainties impacting teaching and learning. The findings revealed that South African HEIs had experienced a shift towards blended and hybrid teaching, driven by the goal of expanding access to education and improving teaching quality through digital technologies. Several recommendations were developed that educators can follow to ensure that assessments developed in the digital landscape are of high quality and uphold academic standards and integrity. These include that assessments must be designed in such a way that they promote accessibility and equity. Educators should develop their own pedagogical approaches to ensure that they adapt to their students' requirements and that evaluations ultimately help students meet the outcomes required by the various modules and qualifications. Educators should also look for ways to boost student involvement and motivation while creating online tests, as this will benefit the students. Educators are also encouraged to embrace continuous improvement in their own assessment practices, such as approaching assessment design as an ongoing process and iterating and improving depending on data and feedback.

Keywords: Digital landscape, Teaching and learning, HEIs, Environmental scanning, Assessments

1. Introduction and Background

Higher Education Institutions (HEIs) have several responsibilities, which form the basis of their social contract with society (Gornitzka and Maassen, 2007). These responsibilities include producing values and social legitimation, selecting the elite, training the labour force and producing new knowledge (Cloete, Maassen and Bailey, 2015). The last three decades have witnessed dramatic developments in higher education. The changes have reflected increased student numbers, a broadening of curricula, alternative approaches to teaching and learning and many higher educational institutions re-defining their geographical and pedagogical boundaries (Neary, Harrison, Crellin, Parekh, Saunders, Duggan, Williams and Austin, 2010).

The digital revolution has impacted nearly every aspect of human life. More than 4.39 billion people globally have access to the internet and more than 6 billion are estimated to have some sort of mobile device, with half of them being smartphones in the near future (Kemp, 2019). This level of connectivity has influenced how people engage with others, get their news and see the world around them.

2. Research Objective

The primary objective of this study is to explore the future of teaching and learning at South African HEIs within the digital landscape and to develop recommendations for educators to consider when developing assessments in the digital landscape.

3. Research Questions

For Creswell and Plano Clark (2007:103), research questions are shaped by the purpose of a study, which, in turn, informs the methods and the investigation's research design. For this study, the researcher identified four research questions that shaped the study's structure. These research questions included:

RQ_1: What is the current state of the digital landscape at South African public HEIs?

RQ_2: What are the trends adopted by South African HEIs regarding teaching and learning within the digital landscape?

RQ_3: What critical uncertainties do South African HEIs face related to teaching and learning within the digital landscape?

RQ_4: What recommendations should educators consider when developing assessments in the digital landscape?

4. Literature Review

4.1 Overview of Higher Education Institutions in South Africa

HEIs are defined by the Department of Higher Education and Training (DHET) as "any institution that provides higher education on a full-time, part-time or distance basis and which is established, deemed to be established or declared as a public higher education institution, or registered or conditionally registered as a private higher education institution under the Higher Education Act, 101 of 1997 page 9". In South Africa, HEIs are responsible for providing tertiary education to students. These institutions are overseen by the Council on Higher Education (CHE), which is an independent statutory body that was established in 1997 to oversee the quality assurance of higher education in the country (CHE, 2021). The CHE's mandate is to promote and assure quality in higher education, as well as to advise the Minister of Higher Education and Training on matters related to the sector.

The Council on Higher Education (CHE) in South Africa identifies the core functions of HEIs as teaching and learning, research and innovation, and community engagement (CHE, 2021). Simpson and Gevers (2016) identify that these functions are generally interdependent. These core functions of HEIs in South Africa reflect the critical role that higher education plays in promoting economic, social and environmental development, and in shaping the future of the country and the region.

4.2 Teaching and Learning at South African HEIs

The core purpose of teaching and learning in HEIs in South Africa is to provide high-quality education and training that prepares students for success in their chosen fields, and that meets the changing needs of society (Tewari and Ilesanmi, 2020). To achieve this, HEIs are responsible for developing and delivering curricula that are rigorous, relevant, and responsive to the needs of students and society. Over the past five years, higher education teaching and learning in South Africa has experienced a significant shift as the focus has turned inwards to teaching, learning and research practice of individual institutions (Singh, 2015).

Teaching and learning in HEIs are typically structured around a range of programmes and courses that are designed to provide students with a comprehensive understanding of their chosen fields, as well as the critical thinking, problem-solving, and communication skills needed for success in the workforce (CHE, 2021). These programmes may include undergraduate and postgraduate degrees, diplomas, and certificates, and may be delivered through a range of teaching methods, including lectures, seminars, tutorials, and online learning platforms (CHE, 2021).

Overall, the core purpose of teaching and learning in HEIs in South Africa is to provide students with the knowledge, skills and competencies needed to succeed in their respective fields, and to contribute to the economic, social and cultural development of the country.

4.3 Digital Landscape

The digital landscape is defined as the collection of technological platforms, devices, and digital media that are used to access information and interact online (Maher, 2022). The digital landscape includes the internet, social media, mobile applications, online platforms as well as other digital tools and technologies (Maher, 2022). Webster, Svalastog and Allgaier, (2020:1101) define the digital landscape as the complex and overlapping ways in which information flows, exchanges and meanings occur both online and offline.

The term the digital landscape is often used synonymously with terms such as the digital environment (Boczkowski and Mitchelstein, 2021:6) and the digital ecosystem (Barykin, Kapustina, Kirillova, Yadykin and Konnikov, 2020:8). For the purposes of this study, these terms are referred to as the digital landscape.

The digital landscape is constantly evolving and changing as new technologies and platforms are introduced while old ones are updated or phased out (Bakri, 2019:232). For example, new social media platforms are constantly emerging, while older ones are becoming less popular. Alternatively, new technologies such as artificial intelligence and blockchain are being integrated into various industries (Feroz, Zo, and Chiravuri, 2021:2).

Moreover, the digital landscape also supports educational opportunities for all types of learners and provides digitally enhanced instruction (Johnason, Adams, Cummins, Estrada, Freeman and Hall, 2016). Educational researchers from diverse disciplines have been trying to identify the success factors of learning with digital media

in higher education for about two decades (Schneider and Preckel, 2017). One central aim of higher education is to foster student potential for high-quality accomplishments (Ellis, Pardo & Han, 2016) and support them in applying their knowledge to future challenges in their professional lives (O'Connor and Allen, 2010). Therefore, research on the use of digital learning environments in higher education should pay particular attention to learning outcomes as a prerequisite for evaluating learning success.

In this context, online assessments offer a broad range of pedagogical functions (Heil and Ifenthaler, 2023). Online assessments can be administered formatively throughout the learning process, offering continuing feedback and support, or summatively at the conclusion to assess overall accomplishment (Gikandi, Morrow and Davis, 2011). By incorporating online assessments into digital learning environments, educators may improve instructional efficacy and meet the needs of a wide range of learners.

4.4 Overview of the Digital Landscape in South African HEIs

The digital landscape in South African higher education institutions is complex, with both challenges and opportunities (Kayembe and Nel, 2019:87). On the one hand, many institutions face limited funding and inadequate infrastructure, limiting their ability to fully utilise digital technologies (Yende, 2021:56). Furthermore, there is a significant digital divide between urban and rural institutions, with many rural institutions lacking access to high-speed internet and other digital resources (Moonasamy and Naidoo, 2022:76).

On the other hand, several initiatives and programmes exist to encourage the use of digital technologies in higher education (Manda and Backhouse, 2017:5). For example, the South African government has launched several programmes to improve access to digital resources and support the development of digital skills among students and staff at higher education institutions. Furthermore, many institutions are exploring the use of online and distance learning to increase educational access, and a variety of e-learning platforms and resources are available to support these efforts (Mhlanga, 2021:28).

The COVID-19 pandemic, which started in the 2020 academic year and reached its peak during the 2021 academic year, had a substantial impact on the digital landscape in South African HEIs (Mhlanga, 2021:15). The sudden shift to remote learning in response to the pandemic has highlighted the need for greater investment in digital infrastructure and resources (Mhlanga, 2021:16). With many students and academics unable to access physical classrooms, institutions have had to quickly adapt and find ways to deliver education online (Mhlanga, 2021:16).

Mhlanga, Denhere and Moloi (2022:12) indicated that one of the major challenges faced by HEIs in the current digital landscape is the digital divide, which has been exacerbated by the pandemic. Mhlanga et al (2022) highlight that many students and HEIs, particularly those in rural or remote areas, have limited access to high-speed internet and other digital resources, making it difficult for them to participate in online learning and assessments. Additionally, Mhlanga et al (2022) found that institutions in these rural and remote areas would likely continue to be marginalised while the higher education industry undergoes a digital revolution.

5. Research Methodology and Design

The methodology employed in research concerns a set of rules and procedures that guide the researcher (Brewer and Miller, 2003). According to Fink (2005), to review literature one must have a methodology with a systematic approach that explains the complete mechanism of its operations and includes all material relevant to the area of the study. This section gives an overview of the primary and secondary research that was conducted in this study.

For this study, primary data was collected through the analysis of the 2021 annual reports and official websites of the 26 public universities (HEIs) in South Africa. An environmental scan was conducted through content analysis of these documents to identify the current trends and key uncertainties faced by the 26 institutions for their core functions of teaching and learning related to the current digital landscape. These findings were then used to develop recommendations for educators to consider when developing assessments in the digital landscape. Secondary research was obtained through the use of reputable academic sources such as academic publications in accredited databases that can be found on university library websites. Websites and annual reports of South African private and governmental institutions were also used to guide the literature overview to provide a basis for the study. Table 1 provides a detailed overview of the data analysis steps followed by the study.

Table 1: Data analysis steps for the study

Phase	Activity	Application to the study
Step One	Data are collected and organised	Annual reports for the 2021 academic year as well as the official websites of the 26 public HEIs were analysed by the researcher. Notable extracts related to teaching and learning in the digital landscape were extracted from the annual reports, policy documents and websites and placed in the content analysis schedule.
Step Two	Researchers carefully study the data	The researcher carefully studied the data and removed extracts that were not relevant to teaching and learning in the digital landscape.
Step Three	Categories and themes are provided	The researcher manually categorised each extract as either a Current Trend (CT) or a Key Uncertainty (KU). Each driver was then allocated a code.
Step Four	Data are coded	Each extract was manually coded based on the codes developed in Step Three. A description of each code was developed based on notable extracts extracted from annual reports and official websites.
Step Five	Data are interpreted	Findings were interpreted, and interpretations were verified by a research expert, comments and suggestions were incorporated after mutual consensus was reached.
Step Six	Alternative understandings of the data are sought	Findings were then used as inputs for the development of assessment recommendations.
Step Seven	Data are reduced to meaningful chunks	Findings were then used to develop recommendations for educators to consider when setting up assessments in the digital landscape.

Source: Adapted from Marshall and Rossman (2016)

The steps presented in Table 1 were meticulously followed by the researchers to ensure that a comprehensive examination of the annual reports for the 2021 academic year and the official websites of all 26 public HEIs in South Africa were conducted to ensure the credibility of the findings.

6. Results and Findings

6.1 Current Trends

Current trends, in the context of any field or industry, represent the prevailing patterns, shifts and developments that are shaping the present landscape (Schoemaker, 1995). For Venter (2022), current trends are based on environmental scanning and represent issues that formed a pattern of developments over some time. Current trends can be derived from extensive research, analysis and observation of the field, including scholarly publications, annual reports, expert insights and empirical data.

To gain insights into the current trends within the core function of Teaching and Learning, a meticulous qualitative data analysis was conducted for this study (see Table 1). The analysis involved a comprehensive examination of the annual reports for the 2021 academic year and the official websites of all 26 public HEIs in South Africa, thereby encompassing the broad scope of this research. Table 2 tabulates current trends identified from the analysis accompanied by a description of the current trend and a unique code.

Table 2: Description of current trends in teaching and learning at South African HEIs

Code	Current Trend	Description
TLCT1	Blended/hybrid teaching and learning	In South African HEIs, there had been a shift towards blended/hybrid teaching, which combined traditional face-to-face teaching with online or digital learning. This had been driven by the need to improve access to education, reach a wider audience, and enhance the quality of teaching and learning. This shift had also been driven by the increasing availability of digital technologies and the need to provide flexible, accessible, and personalised learning experiences to students. South African HEIs were investing in digital infrastructure, training, and support to enable this transition. This approach had the potential to expand access to education, improve student outcomes, and enhance the overall quality of higher education in South Africa.
TLCT2	Student development and support	South African HEIs had implemented different student development and support initiatives to ensure student success. These initiatives included digital literacy training for students, mentorship programmes, psycho-social support services, and academic development services such as supplemental instruction (SI) and tutoring. Additionally, some HEIs had established crisis lines and apps for students with mental health issues, while others had designed programmes and plans for students with disabilities to ensure their success.
TLCT3	Curriculum transformation and policy renewal	South African HEIs had been transforming their curricula and renewing their policies in response to the current digital landscape. HEIs had been focusing on digital innovation and the integration of technology into teaching and learning practices. There was an emphasis on preparing students with digital skills and competencies that were essential to equip them with the skills needed for the workforce.
TLCT4	Development of fully online modules/programs	South African HEIs had been developing fully online modules/programmes. Some universities had been expanding their distance education capabilities even before the pandemic, while others had launched new initiatives and programmes to cater to different niche areas. Many universities had also implemented policies and procedures to guide remote learning, including the development of multimodal teaching and assessment methods.
TLCT5	Social learning and collaboration	The digital landscape had prompted South African HEIs to implement initiatives to promote social learning and collaboration among their students. South African HEIs were also implementing initiatives such as Collaborative Online International Learning (COIL) projects, virtual exchanges, and joint programmes with other universities to provide opportunities for students to work collaboratively with peers from different faculties and countries. HEIs were also adapting their modules to be more accommodating to student needs and encouraging group activities to foster peer interaction and experiential learning.
TLCT6	Use of emerging technology for teaching and learning	South African HEIs were using various emerging technologies to enhance student learning experiences, promote student success, and to keep pace with the Fourth Industrial Revolution. South African HEIs were using Learning Management Systems (LMS) such as Moodle and Blackboard, which provided real-time reports on learning progress to students and lecturers, and IdeaHubs, which offered interactive teaching and learning with multimedia features. Additionally, universities were implementing online proctoring systems such as Proctorio and the Invigilator app to maintain assessment integrity during online assessments. Furthermore, universities were using data analytics to identify at-risk students, which allowed them to intervene and provide support at an early stage.
TLCT7	Creation of new services in response to changes in the digital landscape	South African HEIs had implemented various initiatives and support systems to enhance online and blended learning opportunities for both students and academic staff in response to the current digital landscape. These included the establishment of learning technology hubs, e-learning units, centres for academic technologies, and online student support services. Many HEIs had also implemented data tracking systems to monitor student progress and provide support where necessary. Additionally, some HEIs had created online training programmes and courses to equip students with soft skills and employability skills.
TLCT8	Professional development for teaching staff	South African HEIs had been providing professional development and support to academic staff. HEIs had implemented various measures to ensure that academic staff were adequately equipped to teach in an online environment, such as offering training and resources on how to use online teaching platforms and technology. Additionally, HEIs had established support structures to assist academic staff with the challenges that arose from teaching in a digital environment. These structures included virtual help desks, online communities of practice, and mentoring programmes to provide guidance and support to staff. HEIs had also encouraged collaboration among academic staff through the formation of virtual teams and communities to facilitate knowledge sharing and support.

Source: Author's compilation

Evident from Table 2 is that in South African HEIs, there had been a significant shift towards blended and hybrid teaching and learning, which combined traditional face-to-face teaching with online or digital learning. This approach had been driven by the need to improve access to education and reach a wider audience, as well as the availability of digital technologies that could enhance the quality of teaching and learning. Additionally, HEIs were investing in digital infrastructure, training, and support to enable this transition, which had the potential to expand access to education, improve student outcomes, and enhance the overall quality of higher education in South Africa.

6.2 Key Uncertainties

Venter (2022:162) defines a key uncertainty as a situation or condition where outcomes or future events are not fully known or predictable. It denotes a lack of clarity or certainty regarding future circumstances. Table 3 tabulates key uncertainties identified from the analysis accompanied by a description of the key uncertainty and a unique code. Table 3 provides a concise yet comprehensive overview of the key findings that emerged from the qualitative data analysis.

Table 3: Description of key uncertainties in teaching and learning at South African HEIs

Code	Key Uncertainty	Description
TLKU1	Academic Quality and Integrity	South African HEIs had indicated that academic quality and integrity were being impacted in the digital landscape. As a result, HEIs had expressed concerns regarding the integrity of online assessments, including issues of cheating, collusion and plagiarism.
TLKU2	Cybersecurity	Cybersecurity was recognised as a significant challenge and risk, for South African HEIs, with the need for improved measures to protect valuable institutional information and student data.
TLKU3	Infrastructure and Systems	South African HEIs faced various challenges and concerns related to infrastructure and systems. These challenges included the need for improved academic and administrative systems to support student growth, customisation and consolidation of critical systems, inadequate IT provisioning and resources, upgrades to information technology infrastructure, insufficient ICT support, managing online systems and adjustments, legacy IT infrastructure limitations, control weaknesses in assessment management, energy supply disruptions impacting connectivity, inadequate infrastructure and equipment, outdated server infrastructure, difficulties in system ownership and technical support, the absence of an integrated help desk, and the need for adequate training and resources for staff and students. These challenges posed significant obstacles to creating an optimal learning environment and required attention and investment in infrastructure, systems, and support services.
TLKU4	Accessibility and Equity	South African HEIs had identified various challenges and disparities in access to technology, digital skills and resources among students and institutions. These challenges included the gap between basic and tertiary education standards, the digital divide affecting the adoption of blended learning approaches, difficulties faced by students with data and load shedding, disruptions in the academic calendar owing to external factors, limited participation and skills in online learning, the need to upskill students in ICT literacy, unequal access to devices and internet connectivity, disparities in digital skills and knowledge, inequities in access to resources and technology, and the impact of digital inequality on learning spaces.
TLKU5	Compliance and Policy	South African HEIs had raised concerns relating to compliance with DHET requirements and insufficient policies relating to teaching and learning in the digital landscape. Concerns had been raised about the potential loss of accreditation, which could harm an institution's reputation, reduce student employability, and impede its ability to attract new students. Additionally, there were limitations on offering fully online credit-bearing aspects, while non-accreditation of academic programmes was identified as a significant constraint.

Code	Key Uncertainty	Description
TLKU6	Pedagogical Effectiveness	South African HEIs had highlighted concerns about pedagogical effectiveness in the digital space for teaching and learning. Ineffective pedagogic relationships, unpreparedness for blended learning, and challenges with self-directed online learning were identified as issues impacting student success, learning capability, and staff satisfaction. There were also concerns about the fairness and proficiency of online assessments and the need for contextually responsive teaching approaches. Additionally, the integration of technology into the curriculum and the training of academic staff in online pedagogies were emphasised as essential for enhancing pedagogical effectiveness. These concerns collectively underscored the importance of addressing pedagogical strategies and support mechanisms to ensure effective teaching and learning in the digital environment.
TLKU7	Student Engagement and Motivation	South African HEIs had highlighted concerns about student engagement and motivation in the digital landscape for teaching and learning. Strategies such as feedback and varied student experiences across campuses were mentioned to support student engagement. However, there were instances of low engagement, underestimation of effort, and limited interaction between academics and students, leading to disengagement and impact on learning quality. Factors such as lack of communication, feeling isolated, distractions, and domestic responsibilities contributed to decreased student engagement. Challenges with online teaching included dealing with passive students, different learning styles, and difficulties in encouraging collaboration and interaction. Adapting to remote learning environments, maintaining student engagement, and ensuring equitable access were identified as significant challenges in programme delivery in the current digital landscape.

Source: Authors' own compilation

As evident from Table 3, there were several key uncertainties South African HEIs faced in the current digital landscape. Academic quality and integrity were areas of concern as HEIs raised uncertainties about the credibility and fairness of online assessments, including issues of cheating, collusion and plagiarism. Cybersecurity was recognised as a significant uncertainty, with HEIs expressing the need for improved measures to protect institutional information and student data from cyber threats. Infrastructure and systems presented uncertainties related to inadequate resources and energy supply disruptions (for example, loadshedding) impacting connectivity. Access to technology, digital skills, and resources also raised uncertainties regarding the digital divide and unequal access among students. Compliance with regulations and policies, such as accreditation requirements, introduced uncertainties about potential reputational harm to institutions. Pedagogical effectiveness uncertainties included unpreparedness for blended learning, proficiency in online assessments, and the integration of technology into the curriculum. Student engagement and motivation uncertainties arose from limited interaction, feelings of isolation, and distractions in online learning environments. Addressing these uncertainties is crucial for HEIs to navigate the evolving digital landscape effectively. These key uncertainties are to be understood and considered when developing online assessments so that an inclusive assessment approach is developed.

6.3 Recommendations to Consider When Developing Assessments in the Digital Landscape

Based on the findings from the analysis presented in Table 2 and Table 3, recommendations were developed for educators to consider when developing assessments in the digital landscape, these recommendations are presented in Table 4.

Table 4: Recommendations to consider when developing assessments in the digital landscape

Recommendations	
Ensure Academic Quality and Integrity	Implement tools such as Proctorio or Respondus to monitor online exams and prevent cheating. Educate students on the importance of academic integrity and use plagiarism detection software like Turnitin. Design assessments that are authentic in that students are required to provide personalized responses which minimize the opportunity for dishonesty.
Promote Accessibility and Equity	Identify the technologies that students have available and ensure that the assessments are compatible with those technologies. Create assessments that are accessible to students with disabilities.

Recommendations	
Improve Own Pedagogical Effectiveness	Educators are advised to continuously improve their own pedagogical effectiveness by engaging in ongoing training on digital pedagogies and assessments strategies in order to equip them to develop the most appropriate assessments.
Increase Student Engagement and Motivation	Provide students with timely and constructive feedback on their assessments to keep them motivated and informed about their progress.
Embrace Continuous Improvement	Treat assessment design as an ongoing process, continuously iterating and improving based on data and feedback.

Source: Authors' own compilation

As shown in Table 4, there are several recommendations that educators can follow to ensure that assessments developed in the digital landscape are of high quality and uphold academic standards and integrity. Assessments must be designed in such a way that they promote accessibility and equity. Educators should develop their own pedagogical approaches to ensure that they adapt to their students' requirements and that evaluations ultimately help students meet the outcomes required by the various modules and qualifications. Educators should also look for ways to boost student involvement and motivation while creating online tests, as this will benefit the students. Educators are also encouraged to embrace continuous improvement in their own assessment practices, such as approaching assessment design as an ongoing process and iterating and improving depending on data and feedback.

These recommendations are not an exhaustive list of recommendations educators need to consider when setting up assessments in the digital landscape, however, they serve as a solid foundation for educators. By incorporating the various recommendations presented, educators can ensure that assessments are of good academic quality, ensure academic integrity and promote accessibility and equity, which ultimately leads to an increase in student engagement and motivation and allows for introspection, which then ultimately improves the effectiveness of an educator's own pedagogical approaches.

7. Conclusion

The primary objective of this study was to set the scene for re-imagining the future of the core function of teaching and learning at South African HEIs in the digital landscape and to develop recommendations for educators to consider when developing assessments in the digital landscape.

Based on the results from the environmental analysis it was clear that the digital landscape had radically impacted teaching and learning in South African HEIs. The findings showed that South African HEIs had experienced a shift towards blended and hybrid teaching, driven by the goal of expanding access to education and improving teaching quality through digital technologies. This transition was supported by investments in infrastructure, training, and support services. South African HEIs were also prioritising student success by offering digital literacy training, mentorship, and academic support. South African HEIs were also focusing on equipping students with digital skills for the workforce as well as ensuring equity and accessibility through supportive policies. On the other hand, the findings also showed that teaching and learning in South African HEIs faced multiple uncertainties in the digital landscape. Uncertainties related to upholding academic quality and integrity, addressing cybersecurity risks, improving infrastructure and systems, ensuring accessibility and equity, complying with regulations and policies, enhancing pedagogical effectiveness, and promoting student engagement and motivation were critical.

Based on these findings, recommendations were developed for educators to consider when developing assessments in the digital landscape; these recommendations are not an exhaustive list of recommendations educators need to consider when setting up assessments in the digital landscape, however, they serve as a solid foundation for educators.

References

Bakri, C. (2019) The Students' Perception on the Use of PowerPoint Application in Their Learning English Activities. Thesis. Faculty of Languages and Literature. Universitas Negeri Makassar.

Barykin, S.Y., Kapustina, I.V., Kirillova, T.V., Yadykin, V.K. and Konnikov, Y.A. (2020) "Economics of Digital Ecosystems", *Journal of Open Innovation Technology Market and Complexity,* Vol 6, No. 4, pp 1-16.

Boczkowski, P.J. and Mitchelstein, E. (2021) The Digital Environment: How We Live, Learn, Work, and Play Now. The MIT Press. DOI: https://doi.org/10.7551/mitpress/13602.001.0001.

Brewer, J. and Miller, R.L. (2003) *The A-Z of Social Research*. London: SAGE Publications.

Cloete, N., Maassen, P. and Bailey, T. (2015) "Knowledge Production and Contradictory Functions in African Higher Education. Cape Town: African Minds", *Journal of Student Affairs in Africa,* Vol 3, No. 1, pp 101-104.

Council on Higher Education (CHE). (2021) *Quality Assurance Guidelines for Emergency Remote Teaching and Learning: An Assessment during the Covid-19 Pandemic in 2020.* [online], https://google.com/search?q=che+assessment+guidelines+during+covid+period&rlz=1C1JZAP.

Creswell, J.W. and Plano Clark, V.L. (2007) *Designing and conducting mixed methods research*. Thousand Oaks, CA: SAGE Publications.

Ellis, R.A., Pardo, A. and Han, F. (2016). "Quality in Blended Learning Environments—Significant Differences in How Students Approach Learning Collaborations", *Computer Education*, Vol 102, No. 1, pp 90-102.

Feroz, A.K., Zo, H. and Chiravuri, A. (2021) Digital Transformation and Environmental Sustainability: A Review and Research Agenda. *Sustainability,* Vol 13, No. 3, pp 1530.

Fink, A. (2005) *Conducting Research Literature Reviews: From Paper to the Internet*. Thousand Oaks, CA: SAGE Publications.

Gikandi, J. W., Morrow, D., and Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, Vol 57, No. 4, pp 2333–2351.

Gornitzka, Å. and P. Maassen (2007) "Hybrid steering approaches with respect to European higher education", *Higher Education Policy,* Vol 13, No. 1, pp 267-285.

Heil, J. and Ifenthaler, D. (2023). Online assessment in higher education: A systematic review. *Online Learning*, Vol 27, No. 1, pp 187-218.

Johnason, L., Adams B.S., Cummins, M., Estrada, V., Freeman, A. and Hall, C. (2016). *NMC Horizon Report: 2016* Higher Education Edition. Austin, Texas, USA: New Media Consortium.

Kayembe, C. and Nel, D. (2019) "Challenges and Opportunities for Education in the Fourth Industrial Revolution", *African Journal of Public Affairs,* Vol 11, No. 3, pp 79-94.

Kemp, S. (2019) Digital 2019: *Global Digital Overview.* [online]. Available at: https://datareportal.com/reports/digital-2019-global-digital-overview

Maher, A. (2022) *Understanding the Current and Ever-Changing Digital Landscape.* [online], Available at: https://www.aurecongroup.com/expertise/digital-engineering-and-advisory/digital-futures/digital-landscape.

Manda, M.I. and Backhouse, J. (2017) *Digital Transformation for Inclusive Growth in South Africa. Challenges and Opportunities in the 4th Industrial Revolution*. In 2nd African conference on Information Science and Technology. Cape Town, South Africa.

Marshall, C and Rossman, G. (2016) *Designing Qualitative Research*. 6th Ed. Thousand Oaks: SAGE.

Mhlanga, D. (2021) "The Fourth Industrial Revolution and COVID-19 Pandemic in South Africa: The Opportunities and Challenges of Introducing Blended Learning in Education"' *Journal of African Education (JAE),* Vol 2, No. 2, pp 15-42.

Mhlanga, D., Denhere, V. and Moloi, T. (2022) "COVID-19 and the Key Digital Transformation Lessons for Higher Education Institutions in South Africa", *Education Sciences,* Vol 12, pp 464.

Moonasamy, A.R. and Naidoo, G.M. (2022) "Digital Learning: Challenges Experienced by South African University Student's during the COVID-19 Pandemic", *The Independent Journal of Teaching and Learning,* Vol 17, No. 2, pp 76-90.

Neary, M., Harrison, A., Crellin, G., Parekh, N., Saunders, G., Duggan, F., Williams, S. and Austin, S. (2010) Learning Landscapes in Higher Education, Centre for Educational Research and Development, University of Lincoln.

O'Connor, K. and Allen, A. (2010). "Learning as the Organizing of Social Futures". *Natl. Soc. Stud. Educ*, Vol 1, No. 109, pp: 160-175.

Schoemaker, P.J. (1995) "Scenario Planning: A Tool for Strategic Thinking", *Sloan Management Review,* Vol 36, No. 2, pp 25-40.

Simpson, G. and Gevers, W (2016) '*Research', in CHE 2016 Eight Task Team Report. South African Higher Education Reviewed: Two Decades of Democracy*. CHE Pretoria. Section 5.

Singh, R.J. (2015) "Current Trends and Challenges in South African Higher Education"' *South African Journal of Higher Education,* Vol 29, No. 3, pp 1-7.

Tewari, D.D. and Ilesanmi, K. D. (2020) "Teaching and Learning Interaction in South Africa's Higher Education: Some Weak Links", *Cogent Social Sciences,* Vol 6, No. 1, pp 1-16.

Venter, T. (2022) Chapter Seven. In J.A.A. Lazenby (Ed.). *The Strategic Management Process: A South African Perspective.* 3rd Ed. Pretoria: Van Schaik.

Webster, A., Svalastog, A.L. and Allgaier, J. (2020) "Mapping New Digital Landscapes", *Information, Communication and Society,* Vol 23, No. 8, pp 1100-1105.

Yende, S.J. (2021) "A Transition towards the Fourth Industrial Revolution (4IR) in the South African Education Sector: A Perspective from Rural-based Higher Education", *African Journal of Development Studies (AJDS),* Vol 11, No. 2, pp 55-75.