2025, vol. 12, issue 1, 55 - 59

RESEARCH ARTICLE https://doi.org/10.5281/zenodo.15804512

Artificial Intelligence as a Tool for Promoting Quality Higher Education: Balancing Innovation and Pedagogical Challenges

Mandlenkosi Richard MPHATHENI [1]

Sphamandla Lindani NKOSI [2]

[1] School of Social Sciences Department of Criminology and Criminal Justice University of Limpopo, Polokwane, South Africa, doc.mandlenkosi@gmail.com
https://orcid.org/0000-0001-6792-5305
[2] School of Applied Human Sciences, Department of Criminology and Forensic Studies, University of KwaZulu-Natal, Durban, South Africa
nkosilindani1@gmail.com

Abstract

Artificial Intelligence (AI) increasingly transforms teaching and learning in South African higher education institutions (HEIs). Its integration into academic environments has introduced innovative teaching methodologies, improved access to educational resources, and personalised learning experiences. For historically disadvantaged students, AI-driven tools offer an opportunity to bridge academic gaps by providing real-time support, adaptive learning, and broader access to quality content. Nevertheless, concerns persist regarding its impact on pedagogical effectiveness, curriculum integrity, and student engagement. While AI enhances efficiency in content delivery and administrative tasks, its role in fostering deep learning and critical thinking remains contested. Over-reliance on AI may diminish students' ability to engage in problem-solving, independent reasoning, and knowledge construction.

Furthermore, disparities in access to AI tools due to digital infrastructure limitations in certain regions pose challenges to equitable learning opportunities. Academics also face difficulties adapting teaching strategies to incorporate AI while maintaining instructional quality. This study employs a qualitative content analysis approach, drawing from existing literature. The paper critically examines how AI influences assessment methods and student-teacher interactions, focusing on maintaining high educational standards. The findings will contribute to ongoing discussions on policy development in higher education, advocating for a balanced approach that leverages AI's benefits without compromising academic rigour and critical engagement by addressing both opportunities and challenges.

Keywords: Artificial intelligence, curriculum, education, higher education institutions, and teaching methods.

Introduction

Alagabri (2024) defines artificial intelligence (AI) as a computer system capable of engaging in human-like behaviours such as learning, adapting, synthesising, self-correction, and data utilisation to process difficult tasks. Higher Education Institutions (HEIs), with new AI inventions connected to computer capabilities, introduce a new dimension and challenges to the educational sector. George and Wooden (2023) add to the definition of AI as a machine that imitates human-like functioning, such as reasoning, learning, problem-solving, understanding natural language, and adapting to new information. Advances in artificial intelligence bring new opportunities and challenges for teaching and learning in higher education, with the potential to fundamentally change governance and the internal architecture of HEIs (Popenici & Kerr, 2017). In order to benefit not just students and instructors but also educational administration, Latin American universities have worked to expand their use of technology and digital learning resources (Salas-Pilco & Yang, 2022). In another paper, Wu, Lu, Zhu, Chen, Zhu, Yu, Li, Li, Chen,

Li, and Cao (2020) emphasise that China's AI growth plan lays forth a plan for education and science and technology, addressing several difficulties like retaining talent, developing basic research, and investigating ethical dilemmas. The findings from the study conducted by Guo, Zhong, Li, and Chu (2023) indicated that China, the United States, India, Spain, and Germany were at the lead of the research effort, and AI research in education prioritises higher education over K–12 education. In another study, Contact North, a significant non-profit online learning organisation in Canada, there is not much doubt that artificial intelligence [AI] technology is inextricably linked to the future of higher education (Zawacki-Richter, Marín, Bond & Gouverneur, 2019).

This literature review study, among other things, tackles how AI is transforming higher education in South Africa. How does AI impact educational efficacy, curricular integrity, and student engagement? While touching on AI's new teaching approaches, briefly commenting on personalised learning, and studying and using AI by historically disadvantaged children in South Africa. The research also looks at how AI improves efficiency in content distribution and administrative tasks and explores how AI promotes deep learning and critical thinking. Finally, the article discusses the consequences of over-reliance on AI in education and the challenges that AI brings to the educational sector, particularly HEIs.

Background of the study

Artificial intelligence (AI) refers to computer programs that use established algorithms to approximate human intelligence. AI rapidly transforms numerous fields, including education (Kumar, 2013). Ade-Ibijola and Okonkwo (2023) agree that implementing AI in education, healthcare, agriculture, commerce, and government significantly impacts their operations. AI's effect on education can be seen in several dimensions, from personalised learning to administrative tasks, innovative teaching methods, and student engagement (Chen, Chen, & Lin, 2020). According to multiple global studies, Artificial Intelligence in Education (AIEd) is one of the most promising areas of educational technology. While it has been accessible for almost 30 years, educators are still unclear about how to utilise it pedagogically on a broader scale or how it may substantially impact teaching and learning in higher education (Zawacki-Richter et al., 2029). This slow understanding of AI use and impact could be because of what Ragolane and Patel (2024) refer to as fear of change, while they also allude that some people embrace change, whilst others panic about change, taking it as a threat rather than an opportunity.

AI technologies continue to grow in various sectors worldwide (Ragolane & Patel, 2024). Incorporating AI into pedagogy can result in creative teaching, learning, and administration methods in education. The core assumption behind AI is that robots can easily imitate human intelligence and do tasks ranging from the simplest to the most complex. One of the primary goals of AI is to imitate human intelligence. Developers and academics are making incredible advances in replicating observable mental functions like learning, reasoning, and perception (Chang, 2023

Method

The qualitative literature evaluation serves as the study technique. By combining the findings and viewpoints of several investigations, a literature review may address research issues with the power that no one study can. Shava, Hleza, Tlou, Shonhiwa, and Mathonsi describe qualitative content analysis (QCA) as a method by which academics perceive social reality in a subjective yet scientific manner. The technique emphasises a thorough grasp of the texts and their contents. It extends beyond gathering textual content to analyse the meanings, themes, and patterns that may arise in the given text (Shava et al., 2021). QCA is mostly used inductively, with topics and themes being studied and conclusions drawn from them.

A brief literature review

The integration of artificial intelligence (AI) is becoming a contentious issue, attracting various scholars from South Africa and across the globe. Integrating AI technologies into the South African higher education system, particularly concocting AI and academia and sustainable development, is seemingly on the move (Opesemowo & Adekomaya, 2024). In their study, George and Wooden (2023) inferred that completing the integration of AI in institutions of higher learning in South Africa would play an optimal role in ensuring that students' learning and engagement are enhanced. A study by Hannan and Liu (2021) emphasised the importance of recognising AI in the higher education sector as a source of competitive advantage. In South Africa, the higher education system demonstrates a stagnant movement regarding the adoption of AI, and research finds that a clear understanding of AI technology remains an integral task to capitalise on the benefits of this system, particularly in the higher education sector (Patel & Ragolane, 2024).

Eagerness to adopt and implement AI tools in the pedagogical and learning systems demonstrates great interest from various higher education institutions (HEIs) in South Africa (Teyise, 2022). However, Africa’s

education sector is burdened by a lack of indispensable factors, including infrastructure deficits, economic conditions, and disparities in access to technology (Jaldi, 2023). In a similar vein, Ade-Ibijola and Okonkwo (2023) found that improper infrastructure continues to yield adverse effects that stagnate the implementation of AI projects in Africa. The slow movement of AI technology in Africa is proportional to various African sectors' failure to keep up with the world level in terms of economy and education.

Discussion of Findings from the Literature Review

AI brings along some opportunities to transform higher education (HE) whilst also significantly contributing to the attainment of Sustainable Development Goals (SDGs); this is claimed by Opesemowo & Adekomaya (2024). Creating a supportive environment for the development of AI in South Africa enables sustainable development. Opesemowo and Adekomaya (2024) argue that the government has a significant role in promoting AI while enhancing the SDGs. They argue that the government should invest in research and development initiatives.

Opesemowo and Adekomaya (2024) state that the South African government is devoted to exploring AI and discovering how it could address various social and economic challenges the country faces. Supporting the argument that the government is dedicated to exploring AI use, Opesemowo and Adekomaya (2024) state that President Ramaphosa, when assuming office in 2018, introduced the fourth industrial revolution in his economic strategy. However, nothing in this study by the government demonstrates dedication to promoting and embracing AI in the educational sector. The government's dedication to supporting innovations is seen through its collaboration with Higher Education (HEs), research institutions, and the private sector (Opesemowo & Adekomaya, 2024).

While acknowledging the gains 30 years after the attainment of democracy, South African HEIs are faced with funding challenges, students protest, curriculum transformation, and addressing historical injustices (Sivanath, 2020). With the history of inequality within South African education, quality education, equity, and lifelong learning remain critical issues. The emergence and promise of AI provide exciting answers. Ragolane and Patel (2024, p.27) refer to "Pedro Francesc, Director of the United Nations Educational, Scientific and Cultural Organization (UNESCO) International Institute for Higher Education in Latin America and the Caribbean (IESALC), (UNESCO, 2023), as he states that it is imperative for individuals in higher education to assess the opportunities and challenges presented by AI and to take appropriate action, despite any fears or uncertainties". However, Jaldi (2023) contends that the African continent has infrastructure constraints, digital gaps, and socioeconomic disparities that impede the equitable application of AI technology in education. Ade-Ibijola and Okonkwo (2023) concur that the issues of infrastructure in the African continent are a setback to the successful adoption and use of AI in the continent. South Africa, therefore, is not free from the issues that the continent faces.

In the South African context, the Council for Higher Education (CHE), a body entrusted with monitoring and ensuring quality in HEIs, should encourage the integration of AI in HEIs' curriculum. We urge universities and colleges to provide basic training occasionally and educate their staff members regarding AI. University and college staff members need to be at par with or even above learners regarding the use and application of AI in teaching and assessment administration.

College and university staff members need to ensure the quality and integrity of education in this era. This assertion is supported by Ragolane and Patel (2024), who posit that all higher education community members must learn the fundamentals of artificial intelligence to make well-informed judgments. Ade-Ibijola and Okonkwo (2023, p.105) add that a critical obstacle to the implementation of AI is the inadequacy of skills. In addition, the skills required for the implementation of AI are not easy to master; thus, "there is a demand-supply imbalance in the market".

South Africa's higher education system has issues providing access to quality education. Marginalised populations generally lack equitable access to quality education. AI provides a potential answer, but the challenge is applying AI to overcome these inequalities. Concurring with the definition of George and Wooden (2023), the application of AI in education by learners from previously disadvantaged environments helps them submit quality work that reads well, logically, and coherently. This assists learners from previously disadvantaged backgrounds to compete equally and obtain higher grades like those from advantaged backgrounds.

Therefore, adopting AI in South African HE should not exacerbate inequality and, thus, should ensure inclusivity and equitable educational opportunities (Opesemowo & Adekomaya, 2024). South African higher education institutions successfully use and integrate AI technologies to address the multifaceted challenges of providing equitable access to quality education, promoting lifelong learning, and aligning with the SDGs in the South African socioeconomic and educational context (Opesemowo & Adekomaya, 2024). The latter scholars posit that AI enables an educational context that is gender indiscriminate and accessible to learning that accommodates girls' and women's needs while ensuring inclusivity by creating an environment that accommodates different capable

learners and those facing socioeconomic barriers. However, Ade-Ibijola and Okonkwo (2023) suggest that, as a developing continent, Africa's awareness of AI is still in its early stages, and people are still unsure of the benefits. The fear of the unknown is a significant barrier to the adoption and application of AI in Africa.

AI in education aims to customise learning, simplify administrative duties, and deliver vital insights for educators and students (Gupta, Zeballos, del Río Castro, Tomičić, Morales, Mahfouz & Inyaregh, 2023). AI has grown in popularity globally in education, with various uses and benefits. AI's position in education is evolving as novel applications and research initiatives drive its incorporation into classrooms and online learning settings (Mbiza & Sinha, 2023). AI technology in education is projected to improve quality, accessibility, and inclusion globally. Ragolane and Patel (2024) support the assertion that AI has distinct advantages, drawbacks, and disadvantages.

One of the advantages of AI in education is that it bridges the geographical divide by allowing students to engage in education from anywhere (Chakroun, Miao, Mendes, Domiter, Fan, Kharkova, & Rodriguez, 2019). However, in the South African setting, difficulties of load shading, which impact internet connections, and with most locations being rural, pose a barrier that exacerbates the disadvantages of impoverished students. Similarly, Ade-Ibijola and Okonkwo (2023) argue that a large portion of the African population has no internet access, whilst AI use requires good, functional internet. The latter scholar adds that the African continent also battles with expensive broadband, which becomes a barrier to the successful adoption of AI. Another advantage of AI in education is its inclusive and adaptable nature. The information or content is given at a student-tailored speed, allowing learners to consume it at their own pace and according to their requirements (Okewu, Adewole, Misra, Maskeliunas & Damasevicius, 2021). AI may also assist instructors or educators, track struggling students, and give them solutions that will help them realise their full potential (Chakroun et al., 2019).

Another advantage of using AI in education is that AI-based assessments provide learners with immediate feedback, allowing them to track their progress and make necessary improvements (Ragolane & Patel, 2024). Furthermore, AI-based evaluation reduces the administrative burden on educators, giving them more time to focus on teaching and assisting individual learners (De Villiers, Kuruppu & Dissanayake, 2021; Ragolane & Patel, 2024). Contributing to the impact of AI in assessment administration and grading, Ragolane and Patel (2024) posit that AI has a profound implication, particularly for the future. In their study, the latter scholars found that AI-based grading of learners has different views. Some acknowledge its ability to provide quick, consistent, and impartial feedback. However, some students are critical of the AI-based assessment, arguing that it lacks humanity and compassion.

The use of AI for grading may pose challenges, as it does not account for learners' diverse backgrounds and understanding levels, nor does it consider how the content was delivered. On the other hand, human grading considers factors like the content delivery method and the various ways learners approach assessments based on their learning capabilities. However, while AI lacks empathy and personal bias, elements that can sometimes be beneficial, it is seen as limited in understanding the context and intent behind student responses (Ragolane & Patel, 2024). They also note that a major drawback of AI grading is its inability to interpret responses effectively, particularly when dealing with the ambiguous nature of open-ended questions.

Conclusion

Artificial intelligence in most African regions is still a new tool that its people are not fully familiar with; thus, their fear of the unknown impedes their ability to adapt and embrace the use of AI. Also, poor infrastructure within African countries poses a serious barrier to the comprehension and use of AI. The lack of skills and training afforded to the academic staff members is a backdrop to embracing AI. This lack of knowledge of AI compromises the quality of education. Students were more knowledgeable about AI. Thus, they could use AI to complete their tasks and obtain higher grades. The use of AI affects the lack of critical thinking and understanding of an individual learner's ability to do tasks on their own. However, AI has some benefits that should be embraced despite the challenges it comes with.

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