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Multi-, Inter- and Transdisciplinary Perspectives

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About this journal

The *International Journal of African Reflections (IJAR)*, which is housed at iYunivesithi Walter Sisulu, publishes multi-, inter- and transdisciplinary peer-reviewed articles that encourage and support researchers in all fields and disciplines, especially female, black and young researchers, by providing a platform to publish their work with the aim of eventually obtaining an NRF rating. The journal also intends to act as a facilitator in building a cohort of scholars from among the master's, doctoral and postdoctoral graduate students through the articles that are published in the journal. It is hoped that new epistemological ideas will emerge, and that this will contribute to improving the quality of teaching, research and learning.

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Preface

It is my privilege to present Volume 3 (2026) of the *International Journal of African Reflections* (*IJAR*), a scholarly platform that embodies iYunivesithi Walter Sisulu's commitment to disseminating knowledge that is intellectually rigorous, socially responsive and firmly rooted in African realities. This issue brings together researchers from the humanities, social sciences, law, health sciences and economics to examine some of the defining questions of our time: gender justice, historical memory, land governance, Indigenous knowledge, technological change, institutional accountability, public health and sustainable development. Its interdisciplinary reach reflects a fundamental truth: the challenges confronting Africa do not respect disciplinary boundaries and our responses cannot remain confined within them.

At iYunivesithi Walter Sisulu we understand that a university is not simply a place where existing knowledge is transmitted but a public institution with a duty to imagine, test and build better futures. Our Vision 2040+ is anchored in the aspiration to become a technology-infused African university that is locally responsive, continentally consequential and globally engaged. This vision calls upon us to draw intellectual strength from our location while refusing intellectual isolation; to use technology without surrendering human judgement, and to pursue academic excellence in ways that improve the lives of the communities we serve. The *IJAR* contributes directly to this purpose by creating a credible space in which African experiences generate concepts, evidence and solutions of wider significance.

Vision 2040+ is given practical direction through the university's three signature themes: Food Futures; One Health, and Leadership, Justice and Governance. These themes are not separate institutional compartments: together, they recognise that human flourishing depends on the relationship between sustainable livelihoods, healthy communities, ecological resilience, ethical institutions and responsible leadership. The contributions to this volume illuminate these relationships precisely. Research on external debt and agricultural development reveals the fiscal conditions that can advance or impede food security and rural transformation. Scientific enquiry into the bioactivity of medicinal plants brings indigenous and community-based knowledge into productive conversation with experimental research while opening up opportunities for health innovation. Studies of land boards, apartheid regulation, gendered violence and institutional power demonstrate that development cannot be separated from justice, legitimacy and accountable governance.

The volume also engages directly with the technological future of higher education. Artificial intelligence is already altering the way universities teach, learn, conduct research and administer their responsibilities. Yet technology is never transformative merely because it is new: its value depends on whether it advances equitable access, strengthens human capability and serves clearly defined educational purposes. The analysis of AI adoption in South African higher education, together with the dialogue on literary criticism, pedagogy and the digital humanities, underscores the importance of infrastructure, digital literacy, ethical governance and critical judgement. This is central to our Vision 2040+ ambition. A technology-infused African university must be technologically capable, but it must also remain intellectually independent, ethically grounded and attentive to any inequalities that may be reproduced through innovation.

Equally important is the volume's insistence that language and interpretation are forms of social action. The analysis of feminist speech acts in Chimamanda Ngozi Adichie's *Dear Ijeawele …* shows how language can challenge inherited assumptions and direct new practices. Historical research into the criminalisation of interracial relationships under apartheid reveals the opposite possibility: law and official language can classify, stigmatise and control human beings. These contributions remind us that knowledge is never detached from power. The terms through which society describes gender, race, authority, land, health and development influence what institutions permit, prohibit or neglect. Universities therefore carry a special responsibility to cultivate critical literacy: the capacity to identify the assumptions embedded in dominant categories and to formulate more just ways of understanding the world.

This responsibility is particularly urgent for an institution bearing the name of Walter Max Ulyate Sisulu. His legacy represents principled leadership, disciplined service, social justice and an enduring belief in people's capacity to transform their circumstances through collective action. To honour that name, the university must ensure that its scholarship is measured not only by quantity or visibility, but also by its integrity, relevance and impact. Research must confront the lived realities of rural and historically marginalised communities; strengthen democratic institutions; protect human dignity, and contribute to a more equitable distribution of knowledge and opportunity. *IJAR* serves this mandate by enabling scholars to respond to Africa's problems without reducing the continent to a catalogue of deficiencies. It foregrounds African agency, intellectual creativity and the capacity to produce solutions.

The geographical position of iYunivesithi Walter Sisulu gives this mission particular force. Our campuses are located within communities

that experience the opportunities and contradictions of contemporary development up close. Questions of rural livelihoods, public health, land, educational access, language, technology and governance are not distant research themes; they shape the everyday lives of our students, staff and surrounding communities. Vision 2040+ requires us to transform this proximity into a scholarly advantage. Community engagement must inform research questions; research must strengthen teaching; teaching must prepare graduates to act with competence and social responsibility, and innovation must yield benefits beyond the boundaries of the university.

The *IJAR* is therefore more than a publication outlet. It is part of the knowledge infrastructure through which our university advances research excellence, supports emerging and established scholars, strengthens interdisciplinary exchange and extends African scholarship into international conversations. A strong university journal safeguards rigorous peer review, promotes intellectual independence and preserves a public record of enquiry. It also enlarges the range of voices and contexts represented in global knowledge. For African universities, this work is essential to epistemic justice: not the rejection of global scholarship, but fuller and more equitable participation in its production, evaluation and circulation.

I commend the authors in this issue for having researched and placed on record difficult questions with methodological seriousness and a commitment to evidence-based knowledge dissemination. I thank the reviewers for the careful and often unseen intellectual labour through which the quality of scholarly publication is secured. I also acknowledge the Managing Editor, the Editorial Board, and the production team for sustaining *IJAR* and bringing this volume to completion. Their collective work demonstrates the institutional commitment required to convert research into an enduring scholarly resource.

As readers engage with this third volume of *IJAR*, I invite them to consider not only the individual findings in its articles but also the shared challenge they present. What kinds of universities, technologies, laws, economies and knowledge systems are needed for Africa's people to flourish? Vision 2040+ calls on iYunivesithi Walter Sisulu to help answer that question through courageous scholarship and purposeful action. The future we seek will not be produced by aspiration alone; it will be built on evidence, ethical leadership, interdisciplinary collaboration and sustained accountability to society.

This volume is a meaningful contribution to that undertaking. It affirms our confidence that African universities can generate the highest-quality knowledge while remaining responsive to place, community and history. It also renews our conviction that scholarly

reflection must lead to transformation. May the ideas gathered here stimulate further research, deepen institutional debate and inspire partnerships that advance healthy communities, sustainable livelihoods, justice and human dignity across the Eastern Cape, South Africa, the African continent, and beyond.

Prof Thandi Mgwebi
Vice-Chancellor and Principal
iYunivesithi Walter Sisulu

Africa in transformation

Knowledge, power and institutional responsibility

Editorial for Volume 3 (2026)

This third volume of the *International Journal of African Reflections* (*IJAR*) brings together nine contributions that examine the ways in which knowledge, power and institutional responsibility shape African lives. Moving between history, gender studies, biomedical research, higher education, economics, land law, literary pragmatics, palliative care and the humanities, the volume asks what makes scholarship answerable to the societies it studies. Its coherence emerges from a shared concern with the conditions under which people acquire recognition, exercise agency, secure livelihoods and receive care. The contributions approach these concerns through different methods and at different scales, demonstrating why African scholarship needs both disciplinary precision and sustained conversation across fields.

The volume affirms Africa as a site of knowledge production, theoretical reflection and methodological enquiry. Its studies engage inherited inequalities together with contemporary pressures, attending to the institutions through which both are reproduced or challenged. Read in their published sequence, they move from the coercive regulation of intimate life and the vulnerabilities of university students to questions of scientific investigation, technological change, economic development and land governance. Feminist language, culturally responsive care and the renewal of literary criticism extend this enquiry into the meanings and practices through which social transformation becomes possible. Together, these contributions give substance to *IJAR*'s commitment to multi-, inter- and transdisciplinary scholarship grounded in African realities.

The opening article, AA Marwarwa and M Petse's '"The forbidden fruit": The consequences of interracial sexual relationships in apartheid South Africa', examines the 1952 case of Olaf Abraham Voster and Nomathemba Emily Nomatiti in Umtata. Through this case, the authors trace the operation of the Immorality Act 5 of 1927 and the consequences of racial regulation for those brought within its reach. Their historical analysis shows how racial domination entered intimate life through policing, prosecution and punishment. The case also directs attention to the unequal vulnerabilities of the people involved: racialised law operated within existing differences of status and power. By connecting a particular legal proceeding to a wider system of exclusion, the article demonstrates the value of archival

research to recovering the human consequences of institutionalised discrimination.

Questions of power and vulnerability continue in Keneilwe Wanthitha Mashishi, Mahlodi Monica Rebecca Makupula, Jabulani Gilford Kheswa and Mvuyisi Notole's study of sexual harassment and the mental well-being of female students at a South African tertiary institution. Drawing on semi-structured interviews with ten participants and guided by Power and Control Theory, the authors examine student experiences shaped by poverty, patriarchal norms, alcohol abuse and unequal relations of authority. The accounts reveal the consequences for psychological well-being and academic participation that institutional policy alone cannot adequately describe. The study recommends ongoing counselling, empowerment programmes and education on sexual harassment policies. Its place after the historical article establishes a consequential connection: the protection of dignity requires attention to be given the way power is exercised in everyday relationships, and also to the formal rules intended to govern them. For universities, student safety must surely be integral to the conditions that make learning possible.

The third contribution turns to the investigation of medicinal plants. Azola Zukisani Ntshobane, Elona Ngqayimbane, Suparna Chakraborty, Saif Khan and Talkmore Ngarivhume screen extracts of *Drimia altissima* and *Crinum macrophyllum* bulbs for anticancer, antioxidant and anti-inflammatory activity. Their laboratory findings identify promising responses in selected extracts, including activity against cervical cancer cell lines and strong inhibition in an anti-inflammatory assay. These are results obtained from laboratory screenings; they establish grounds for further investigation rather than clinical effectiveness. The authors accordingly call for the isolation and characterisation of active compounds. Their article contributes to this volume by showing how medicinal plant use can inform research questions that are then examined through controlled experimentation. Its significance rests in the disciplined movement from biological resources and medicinal knowledge towards evidence that can support further scientific enquiry.

ST Pika's exploration of the adoption of artificial intelligence in South African higher education shifts our attention to the infra-structures through which knowledge is taught, assessed and administered. Using Rogers' Diffusion of Innovations Theory, the article considers relative advantage, compatibility, complexity, trialability and observability in interpreting the emerging trends and barriers. Personalised learning, student engagement and administrative efficiency feature among the potential benefits of adopting artificial intelligence, while infrastructure constraints,

digital literacy gaps, inequality and ethical concerns complicate its adoption. The analysis places institutional readiness central to the discussion: technologies acquire educational value through the conditions of their use. Investment, staff development and appropriate policies therefore belong in the same conversation as innovation. Following the biomedical study, Pika's contribution extends the volume's attention to responsible investigation and adoption, asking how promising developments can serve public purposes in unequal institutional settings.

Nnane Eric Sumelong's study of external debt sustainability and agricultural development in Cameroon broadens this institutional enquiry to national economic policy. Using data for the period 1996–2023, an Engle–Granger co-integration framework and an error-correction model, the article examines the relationships between external debt and agricultural value added. It reports a negative long-run association between long-term external debt and agricultural value added, together with a strong positive association with gross fixed capital formation. The analysis interprets debt pressures in relation to constrained fiscal space and the resources available for agricultural development. Its recommendations emphasise transparent debt governance, the protection of agricultural investment and the productive use of borrowing. By bringing rural livelihoods and agricultural capacity into the debates on debt, the article asks readers to assess macroeconomic choices balanced against their developmental consequences. The practical question is what public finance enables communities to produce, sustain and improve.

The next article, by Akame Winslow Melle and Akwe Ngole Ray Junior, examines four land management boards in Cameroon through the lens of legal pluralism. The Land Consultative Board, Site Board Commission, Inter-Village Boundary Settlement Commission and Farmer–Grazer Commission operate where statutory rules, customary authority and administrative practice intersect. Drawing on legal materials, interviews and comparative African experiences, the authors identify procedural ambiguity, bureaucratic delay and institutional constraints that limit dispute resolution. They argue for reforms that combine customary legitimacy with clearer safeguards, digitisation, gender inclusion and more effective administration. Its position after the agricultural development study renders the relationship between productive investment and land governance particularly visible. Land sustains livelihoods, but it also carries histories of belonging, authority and communal obligation; the institutions responsible for land management must respond appropriately to these overlapping claims if their decisions are to command confidence.

Gabriel Ndamzi Amadi's 'Doing feminism with words: a Searlean speech act analysis of Chimamanda Adichie's *Dear Ijeawele …*' then turns to the capacity of language to challenge inherited authority. Analysing 239 coded units from Adichie's manifesto, Amadi shows how assertives contest naturalised gender assumptions and directives translate feminist argument into practices of parenting and socialisation. Commissives and expressives establish ethical and affective positioning, while quasi-declaratives attempt to rename or reclassify familiar gendered categories. The recognition of hybrid forms also allows the article to test the usefulness and limits of its theoretical framework. This contribution returns the volume to gendered power at the level of ordinary speech and conduct. It demonstrates how feminist writing can intervene in the vocabularies through which inequality becomes familiar and in the practices through which it is passed from one generation to another.

The eighth contribution, K Zweni, A Mavembela and G Mkukuli's 'Decolonising South African palliative care psychosocial services for mental health benefit: eclectic context', brings the relationship between recognition and institutional responsibility into end-of-life care. Guided by an ecological perspective and an eclectic narrative review, the authors examine the ways patients' social, cultural and spiritual environments shape their experiences of care. They argue that the exclusion of African beliefs and knowledge systems can undermine culturally responsive psychosocial support, and they advocate their inclusion alongside allopathic approaches in healthcare training, policy and practice. The article offers a framework for reform rather than a clinical evaluation of a new intervention. Read alongside the earlier biomedical contribution, it widens the volume's understanding of health: research into biological activity and attention to the meanings through which patients experience suffering respond to different complementary dimensions of care. Respect for patient preferences and cultural diversity is central to that relationship.

The volume concludes with 'Beyond the Ibadan School', Mark Ighile's dialogue with Emeritus Professor Dan Izevbaye on literary criticism, pedagogy and digital humanities. Reflecting on six decades of scholarship, the conversation revisits the relationships between text, context, authorship, audience and interpretation. Its discussion of a declining tutorial culture and campus collegiality underscores the social conditions through which critical judgement develops. Its treatment of canon formation asks how intellectual inheritance can remain responsive to changing publics and media. Returning to the questions raised by Pika, the dialogue considers digital tools and artificial intelligence as supports for enquiry whose usefulness depends

on humanistic judgement and ethical interpretation. This is a fitting conclusion to the sequence: an issue concerned with institutional transformation ends by examining the ways in which scholars learn to interpret, evaluate and transmit knowledge responsibly.

Through these contributions, institutional legitimacy emerges as a demanding practical achievement. Courts, universities, land boards, healthcare services and fiscal systems exercise authority in ways that affect people's opportunities and vulnerabilities. Their legitimacy depends on how that authority is justified, scrutinised and experienced. The articles illuminate this problem through distinct forms of evidence, from a historical prosecution and students' accounts to legal analysis and economic modelling. Together, they encourage a conception of reform that is attentive to everyday consequences: access to education, security of livelihood, recognition of claims and dignity in care.

The volume also clarifies why the recognition of African knowledge must be accompanied by methodological care. Archival interpretation, laboratory screening, qualitative interviews, narrative synthesis, speech-act analysis and econometrics support different kinds of claim. Bringing them into conversation requires respect being shown for those differences. Medicinal knowledge can generate research questions; cultural understanding can inform care; literary criticism can examine the terms through which values are communicated. None of these contributions needs to assume the methods of another to acquire intellectual worth. Their collective strength lies in making evidence, interpretation and the limits of inference visible while responding to problems that exceed any single discipline.

We thank the authors for their contributions, the reviewers for their critical engagement, and the editorial and production teams for the sustained work that makes scholarly publication possible. Their efforts support a journal that is committed to widening participation in research while maintaining the rigour on which scholarly trust depends. For emerging and established researchers alike, that commitment entails the opportunity to contribute and the responsibility to formulate arguments that others can examine, question and develop.

Volume Three of *IJAR* invites readers to consider African scholarship through the quality of the understanding it produces and the opportunities it opens up. Its contributions recover histories of exclusion, scrutinise present institutions and propose directions for change without resolving their differences into a single account of Africa. Their shared achievement is to render the relationship between knowledge and responsibility concrete. *IJAR* advances that relationship

by providing a space in which African experiences inform enquiry, African intellectual resources shape interpretation and scholarship remains answerable to the people whose lives give its questions urgency.

Prof Enongene Mirabeau Sone
and
Dr Thoahlane Thoahlane
Editors, *International Journal of African Reflections*

Exploring trends in artificial intelligence adoption in South African higher education through the diffusion of an innovation lens

ST Pika

Abstract

Since the inception of ChatGPT in 2022, artificial intelligence (AI) has undergone significant development in higher education worldwide, including in South Africa. This study analyses the key trends and barriers to the adoption of AI in South African higher education, using Rogers' (2003) Diffusion of Innovations Theory as the guiding framework. The research analysed the emerging patterns and challenges associated with AI integration in educational settings by focusing on the key constructs of Rogers' (2003) theory: relative advantage, compatibility, complexity, trialability and observability. The study integrated the findings from multiple sources, which revealed promising trends such as enhanced student engagement, personalised learning experiences and improved administrative efficiency. However, it also revealed barriers, including infrastructural limitations, digital literacy gaps and issues of digital inequality, that constrain AI's widespread adoption. Ethical concerns complicate the adoption process. It is therefore recommended that strategic investments in technology and faculty training be made, including the development of institutional policies that foster a supportive environment for AI innovation. The findings contribute to a deeper understanding of the transformative potential of AI in higher education while highlighting the key areas that require targeted interventions to ensure its effective and sustainable adoption in the South African context.

Keywords: artificial intelligence, AI, diffusion of innovation, higher education, inclusive education, South African universities

1. Introduction

Artificial intelligence (AI) is transforming higher education and administrative operations worldwide. However, its adoption at South African universities is still in its initial stages, even though it can possibly respond to many aspects of academic life (Funda & Mbangeleli, 2024; Patel & Ragolane, 2024). AI-powered tools that include automated assessments, intelligent tutoring systems and adaptive

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learning platforms increase student engagement, enable positive learning experiences and improve academic performance (Funda & Mbangeleli, 2024). However, limited infrastructure, socio-economic differences, ethical and data-privacy concerns hinder the efficacy of AI integration (Funda & Mbangeleli, 2024; Patel & Ragolane, 2024). To overcome these barriers, politicians, educators and technology providers should collaborate, invest in technological infrastructure and plan AI integration strategically (Borah & Borah, 2024; Patel & Ragolane, 2024). Despite these challenges, AI is able to improve access to higher education and offer the adaptability and efficiency needed to meet students' learning outcomes (Borah & Borah, 2024).

The launch of ChatGPT in late 2022 created a turning point in AI's impact on higher education. This language-learning model expanded the potential for academic writing, tutoring and research support, prompting universities to explore AI's educational and ethical consequences (Dwivedi et al, 2023). However, the deployment of AI-powered tools such as ChatGPT raises concerns about accessibility, relevance and institutional readiness (Fowler, 2023). Similar concerns include assessment integrity (Batista et al, 2024), teacher preparedness, digital literacy and the digital divide (Pika, 2024). Subsequently, research into the adoption of AI in education has gained momentum. However, studies that discuss trends in AI applications in higher education are limited (Akhmadieva et al, 2024), particularly in the South African higher education context. Therefore, this study aimed to contribute to closing this contextual gap. The central question guiding the study was this: What are the key trends in and barriers to AI adoption in South African higher education? The study examined the emerging patterns of AI integration and the challenges universities face in using AI for teaching, learning, research and administration.

2. Literature review

Recent studies show that AI enhances educational outcomes, administrative efficiency and personalised learning experiences (Funda & Mbangeleli, 2024; Patel & Ragolane, 2024). However, as with any other technological innovation, AI implementation faces challenges such as inadequate infrastructure, socio-economic disparities and ethical concerns (Maina & Kuria, 2024; Patel & Ragolane, 2024). The integration of generative AI tools such as ChatGPT raises concerns about assessment integrity (Batista et al, 2024) and institutional readiness (Tarisayi, 2024) to embrace the tools in an ethical manner effectively. Effective AI adoption in higher education requires investment in technological infrastructure and also the development of ethical policies and the adoption of strategic frameworks (Maina & Kuria, 2024; Patel & Ragolane, 2024). Similarly, collaboration among

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policymakers, educators and technology providers is key to successful AI integration (Funda & Mbangeleli, 2024; Patel & Ragolane, 2024).

Akhmadieva et al (2024) report on major trends in AI integration in higher education using a bibliometric study from 2004 to 2023. One of the most striking trends in their findings is the growing number of AI-related studies, particularly after 2019, which are showing a greater interest in AI-powered educational systems, assessment strategies and personalised learning. Over time, the research focus on AI has shifted. Between 2015 and 2017, AI applications were mostly investigated in medical education, particularly for problem-based learning. From 2017 to 2020, there was a stronger emphasis on AI-driven engineering education and adaptive learning; and a wider investigation of AI in teaching, assessment and educator decision-making support grew from 2020 to 2023.

Geographically, developed nations, particularly Australia and the United States, have been leading the AI research in higher education, with top universities and research organisations encouraging its adoption through financed initiatives and interdisciplinary studies (Akhmadieva et al, 2024). Despite the increased interest in AI research, though, collaboration is still limited, with inadequate international partnerships among experts still being the reality. This shows that the prospect of cross-border AI research partnerships has not been adequately formulated. In practice, AI is being integrated into higher education to improve teaching and learning practices through applications such as intelligent tutoring systems, automated grading and AI-assisted course design (Akhmadieva et al, 2024).

An article by Phokoye et al (2024) focuses on integrating robotics into higher education. It covers three major areas:

- the factors influencing robotics applications in higher education;
- strategies for integrating robotics in improving teaching and learning; and
- the perceived benefits of adopting robotics in educational settings.

Bibliometric analysis and a comprehensive review method were used to investigate the evolution, importance and implications of adopting robotics in higher education. The findings reveal that robotics is becoming popular in higher education. However, challenges related to technological concerns and instructional improvements remain. The study advises stakeholders on integrating robotics into higher education to improve student engagement and academic accomplishment. The article also analyses regional disparities in robotics adoption, noting that while countries such as the United States and China dominate research publications, African countries lag behind in adopting

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robotics in education. The authors emphasise the significance of targeted efforts to bridge this gap, proposing a comprehensive and ethical strategy for maximising the benefits of robotics in teaching and learning worldwide. Finally, the study acknowledges the game-changing potential of robotics in higher education and strategic insights to enable a creative and inclusive academic environment (Phokoye et al, 2024).

3. Theoretical framework: Diffusion of Innovations Theory

In the present study, Rogers' (2003) Diffusion of Innovations Theory was adopted as a comprehensive framework for understanding the ways in which modern technologies are accepted in organisations. This theory is built around five essential tenets:

- *relative advantage*: refers to the degree to which innovations are preferred over conventional ways, with observable benefits that stimulate their use (Raman et al, 2024).
- *compatibility*: assesses how well innovations align with institutions' values, needs and practices, emphasising the need to integrate innovative technologies into current frameworks (Raman et al, 2024).
- *complexity*: refers to the ease or difficulty of understanding and applying innovation. If technology is perceived as being excessively complex, its adoption is delayed (Rogers, 2003).
- *trialability*: refers to the ability to experiment with an innovation on a small scale before full-scale deployment, reducing uncertainty and increasing confidence among potential users (Rogers, 2003).
- *observability*: refers to how visible the benefits of the invention are to others, which can help to accelerate adoption by providing actual positive results (Rogers, 2003).

These constructs provide insights into the drivers and constraints to infusing technologies in higher education. They emphasise the need for methods that maximise benefits while minimising challenges in order to promote more effective diffusion.

Rogers' (2003) Diffusion of Innovations Theory posits that the innovation process begins with *innovators*, who are the first to embrace innovative ideas, taking risks and experimenting without fear. Following them are the *early adopters*, the respected opinion leaders who adopt innovative ideas early on but with a cautious approach. Next, the *early majority* carefully consider innovations and adopt them just before the average person, ensuring a balanced and thoughtful

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uptake. The *late majority* then step in, typically characterised by a sceptical nature and a tendency to wait until the innovation has become well established. Finally, *laggards* are the last to adopt, often due to strong resistance to change or constraints that prevent them from keeping pace with new developments (Rogers, 2003).

Globally, universities are adopting a proactive and careful approach to integrating AI, emphasising academic integrity (Batista et al, 2024) and classroom enhancement while acknowledging the importance of comprehensive policy frameworks (Jin et al, 2024). Similarly, South African higher education institutions (HEIs) must intentionally create enabling environments to encourage the widespread adoption of emerging technologies in ways that promote fair education (Pika, 2024).

4. Methodology

The primary research method used in this study was a scoping literature review (Håkansson et al, 2024). A scoping literature review is a form of systematic literature review (SLR) that involves a structured and replicable process for finding, analysing and synthesising the relevant academic literature. Systematically reviewing existing studies provides a comprehensive understanding (Al Faruq et al, 2023; Batista et al, 2024; Khoalenyane & Ajani, 2024) of the ways HEIs in South Africa integrate AI into their practices, particularly tools such as ChatGPT.

To maintain relevance and academic rigour, the study included the literature published between 2023 and 2025, reflecting AI's evolving role in higher education following the release of ChatGPT in 2022. ChatGPT and Grok AI were used as AI search tools to find relevant sources. The search was conducted on 15 April 2025.

The search included the following criteria:

- Peer-reviewed open-access journal articles with digital object identifiers (DOIs) that reported on AI adoption in higher education.
- Studies should focus on South African universities or broader African contexts, including South Africa.
- Studies should have discussed AI's impact on teaching, learning, research and academic administration.

Studies published before 2023 were excluded unless they discussed foundational adoption theories of AI. The exclusion criteria included studies that focused solely on AI in basic education and articles lacking empirical or theoretical grounding, such as opinion pieces. Articles from the internet and blog articles were excluded as they had not been peer-reviewed, being opinion pieces or preprints. General news articles were excluded because they lacked empirical grounding.

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5. Findings

The findings that follow were drawn from ten articles that met the stated criteria and are summarised in Table 5.1 below.

Table 1: Trends in and barriers to AI adoption in South African higher education

Theme	Authors	Key findings	Barriers	Recommendations
1. **Personalised learning through AI**	Crompton and Burke, 2023; Funda and Mbangeleli, 2024; Khoalenyane and Ajani, 2024	AI enables the tailoring of content and pace to students' needs and provides higher engagement in adaptive systems.	Lack of trained academic staff, curriculum rigidity and limited tools standardised for South African contexts.	Invest in academic training, promote localised AI tool development and revise curriculum frameworks.
2. **Intelligent tutoring systems**	Afolabi, 2024; Pramjeeth and Ramgovind, 2024	Intelligent Tutoring Systems (ITS) promise to improve learning outcomes.	Poor infrastructure, a lack of awareness and minimal integration in pedagogy.	Pilot ITS programmes; conduct awareness workshops; integrate ITS into teacher education.
3. **Automated administration**	Vargas-Murillo et al, 2023; Raman et al, 2024; Maphalala and Ajani, 2025	AI automates grading and course management, freeing up faculty members' time.	Concerns about bias, transparency and reliability of automated systems.	Develop ethical guidelines, combine AI with human control and promote open-source assessment tools.
4. **Academic integrity**	Al Faruq et al, 2023; Crompton and Burke, 2023	Tools such as Turnitin and ChatGPT detection enhance academic honesty but are underused.	Students take advantage of gaps in AI policies and poor detection tools in African universities.	Update integrity policies, provide access to effective detection tools and educate students about academic integrity and ethics.
5. **Data governance and ethics**	Bond et al, 2024; Funda and Mbangeleli, 2024; Jin et al, 2024	Concerns about student data privacy and misuse of predictive analytics.	Inadequate regulatory frameworks, and digital rights are poorly understood.	Establish national higher education data-protection frameworks; conduct ethics training.
6. **Inequality and access**	Batista et al, 2024; Khoalenyane and Ajani, 2024; Maphalala and Ajani, 2025	AI adoption highlights digital divides: rural–urban gaps, device access and connectivity disparities.	Infrastructure deficits, affordability of technology and language barriers.	Targeted investment in rural campuses, multilingual AI, subsidies for devices and internet access.

The findings of the study report six major trends (personalised learning, intelligent tutoring systems, automated administration,

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academic integrity, data governance and ethics, and inequality and access), accompanied by barriers that constrain AI's capabilities and the recommendations to mitigate them. A key emerging trend is the use of AI to support personalised learning. Research by Crompton and Burke (2023), Funda and Mbangeleli (2024) and Khoalenyane and Ajani (2024) highlights the way AI enables the tailoring of content and learning pace to meet individual student needs, in these ways enhancing engagement and promoting student-centred education. However, this possibility is undermined by a lack of trained academic staff, rigid curriculum structures and the limited availability of AI tools designed for the local context. To overcome these challenges, universities should invest in staff training, revise curriculum frameworks to accommodate adaptive learning and support the development of locally relevant AI tools.

Another important trend is the increasing interest in Intelligent Tutoring Systems (ITS) that improve learning outcomes, particularly in large and resource-constrained educational environments (Afolabi, 2024; Pramjeeth & Ramgovind, 2024). Despite their promise, the uptake of ITS remains minimal due to poor infrastructure, a low level of awareness and the lack of integration into mainstream pedagogy. Piloting ITS initiatives, raising awareness through workshops and embedding such systems into both pre-service and in-service teacher education programmes are required to overcome these constraints.

The automation of administrative tasks is also gaining traction. AI is gradually being used for grading, attendance tracking and course management, which is freeing up academic staff to focus on more meaningful pedagogical activities (Vargas-Murillo et al, 2023; Raman et al, 2024; Maphalala & Ajani, 2025). Nevertheless, this trend is accompanied by concerns regarding algorithmic bias, a lack of transparency in AI decision-making and questions about the reliability of these systems. To mitigate these risks, ethical guidelines should be developed, AI systems should be used in combination with human oversight and preference should be given to open-source explainable AI tools.

Academic integrity represents another area where AI is being applied, particularly using tools such as Turnitin and other AI-content detectors. These technologies are able to enhance academic honesty (Al Faruq et al, 2023; Crompton & Burke, 2023). However, they are underused in many African universities due to gaps in institutional policies and inadequate access to reliable detection tools. HEIs therefore need to update their integrity policies, provide equitable access to detection technologies and educate students about the responsible use of AI in academic work to deal with these challenges.

Data governance and ethics are a critical concern in the context of AI adoption. Studies by Bond et al (2024), Jin et al (2024) and Funda

and Mbangeleli (2024) reveal widespread anxieties about student data privacy and the misuse of predictive analytics. These concerns are exacerbated by inadequate regulatory frameworks and a limited understanding of digital rights among staff and students alike. In response, a national-level framework to govern data use in higher education should be established, along with training in ethics in this specific area.

Finally, the implementation of AI in South African higher education foregrounds existing inequalities in access to digital technologies. Scholars such as Khoalenyane et al (2024), Maphalala and Ajani (2025), and Batista et al (2024) argue that AI adoption risks amplifying the rural–urban divide and also disparities in device ownership, internet connectivity and language inclusivity. These structural challenges require strategic investment in infrastructure for rural campuses, the development of multilingual AI tools and the provision of subsidies for devices and data access to ensure inclusive participation in AI-enhanced education.

As the findings reveal, the trends in the adoption of AI in South African higher education suggest significant potential to improve both learning and administrative processes. However, this potential is constrained by deep-rooted structural barriers, including infrastructural deficits, insufficient human capacity, outdated regulatory frameworks and persistent digital inequalities. The successful integration of AI requires generative mechanisms such as ethical governance, curriculum reform and inclusive innovation to be the activated, while responding appropriately to the enabling and constraining structures that shape human agency. Only through a systemic context-sensitive approach can AI serve as a transformative force in achieving equitable and effective higher education in South Africa.

6. Discussion

The use of AI in higher education is crucial to transforming learning, teaching and administration. Rogers' (2003) Diffusion of Innovations Theory was used in the present study to understand AI's distribution across higher education. This section examines AI adoption in South African higher education through Rogers' (2003) five essential attributes: relative advantage, compatibility, complexity, trialability and observability, and sone critical ethical concerns and structural challenges.

Table 6.1 below summarises the ways in which AI adoption in South African higher education aligns with Rogers' (2003) Diffusion of Innovation attributes, highlighting key findings and their implications to provide a brief overview of the discussion that follows.

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Table 2: AI adoption in higher education aligned with Rogers' diffusion of innovation attributes

Rogers' attribute	Definition (from literature)	AI in higher education (key findings)	Implications for AI diffusion	Supporting authors/studies
Relative advantage	The innovation is perceived as better than existing technologies (Rogers, 2003)	Gains in personalised learning, intelligent tutoring, administrative automation and increased student engagement.	Requires clear communication of multidimensional benefits, a positive feedback loop and observability.	Crompton and Burke (2023), Funda and Mbangeleli (2024)
Compatibility	Consistent with existing values, experiences and needs (Hoang Yen et al, 2024; Rogers, 2003).	Infrastructure constraints, digital literacy gaps and the unavailability of ethical frameworks.	Demands contextual adaptation, ethical governance; critical to establishing equity and trust; a dynamic attribute influenced by external factors.	Afolabi (2024), Funda and Mbangeleli (2024)
Complexity	Perceived difficulty in understanding and using (Hoang Yen et al, 2024; Rogers, 2003).	Ethical constraints, data-privacy concerns, members' and faculty training requirements.	Requires comprehensive training (technological & ethical); high complexity; hinders innovation and broad adoption.	Crompton and Burke (2023), Maphalala and Ajani (2025)
Trialability	Extent of experimentation on a limited basis (Hoang Yen et al, 2024; Rogers, 2003)	Advocacy of institutional policies for experimental phases to manage bias and misinformation.	Crucial to trust-building and risk mitigation, institutional AI may have low trialability, requiring creative approaches.	Pramjeeth and Ramgovind (2024)
Observability	Visibility of innovation outcomes to others (Hoang Yen et al, 2024; Rogers, 2003)	Evidence of improved educational outcomes, operational efficiency and student assessments.	Catalyses interpersonal communication and social influence; challenges in measuring complex pedagogical outcomes.	Crompton and Burke (2023), Maphalala and Ajani (2025)

6.1 Relative advantage and enhanced educational outcomes

Relative advantage is a foundation of Rogers' (2003) Diffusion of Innovation Theory. It describes the extent to which an innovation is perceived as higher than the idea it improves (Rogers, 2003). This

perception involves factors such as social status, convenience and user satisfaction that contribute to adoption (Hoang Yen et al, 2024). The stronger the perceived advantage, the sooner the innovation is likely to diffuse in a social system (Rogers, 2003).

Crompton and Burke (2023) emphasise 'considerable gains in personalised learning, intelligent tutoring systems and administrative automation', noting that these improvements enhance both educational outcomes and operational competencies. Similarly, Funda and Mbangeleli (2024) observe increased student engagement and personalised instruction in South African higher education, directly attributing early adoption to these perceived advantages. Crompton and Burke (2023) also indicate AI's role in assessment and data-driven decision-making.

The findings show that AI's relative advantage in higher education is multidimensional, affecting both pedagogical and administrative activities. This perceived benefit is a significant motivator of adoption among inventors and early adopters, who are important to an innovation's achieving critical mass (Rogers, 2003). AI attracts different stakeholders at a university: from faculty members who focus on teaching and learning to administrators, including the institution's management. As a result, to achieve successful distribution, communication methods must express these diverse benefits, adapting messages to resonate with the distinct perceived needs and values of various groups within the higher education social system (Rogers, 2003).

When early adopters successfully integrate AI and share its tangible benefits, such as improved student grades or reduced administrative workload, potential late adopters observe a greater relative advantage. A positive feedback loop in which a perceived advantage encourages initial attempts is then created. Successful trials result in observable advantages that ultimately stimulate the perceived advantage for others, accelerating wider adoption. This suggests that pilot programmes and early successes are important to ensuring an innovation's success. Strategic communication of these early accomplishments is crucial to spreading the word beyond the innovator and early adopter groups and generating greater adoption throughout the institution (Rogers, 2003).

6.2 Compatibility and contextual adaptation

Compatibility refers to the way an innovation aligns with users' current values, past experiences and needs (Rogers, 2003). An innovation that aligns with the norms, values and beliefs of a social system is adopted quickly because it feels familiar and poses less perceived risk. In contrast, incompatible innovations may demand a previous shift in value systems, which is often a slower and more complicated process to adopt (Rogers, 2003).

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Whereas AI offers tangible benefits, its compatibility with existing higher education systems and local settings differs greatly. Funda and Mbangeleli (2024) affirm the existence of 'infrastructure constraints and digital literacy gaps' among South African instructors and students. This indicates a significant divergence between technological progress and current local capabilities that consequently hinders compatibility. The demand for investment in infrastructure and training (Funda & Mbangeleli, 2024) responds to these compatibility difficulties, bridging the gap between AI requirements and current practices. Afolabi (2024) emphasises the importance of creating ethical frameworks to ensuring AI's alignment with the institutional requirements of fair decision-making and data protection, implying a deeper values-based dimension of compatibility. These proposals emphasise the importance of tailoring AI systems to the ethical, cultural and operational aspects of their environments in order to promote smooth distribution. Achieving compatibility in diverse educational settings therefore requires a comprehensive approach. This approach should include not only technological upgrades and training, but also ethical governance and an understanding of the socio-cultural context so as to avoid unintended negative equity and trust problems. This also implies that a one-size-fits-all AI solution is unlikely to gain widespread adoption across the diverse contexts of higher education.

In addition, compatibility is a dynamic resource that changes over time. Whereas AI is incompatible with existing norms or infrastructure, initiative-taking measures such as focused training and infrastructure investment can drastically modify dominant norms, values and beliefs (Rogers, 2003). This change, in turn, improves an innovation's compatibility. This perspective contends that institutions are not passive beneficiaries of innovation but can actively nurture compatibility through intentional interventions. As a result, whereas initial compatibility is low, strategic interventions (such as thorough training programmes, infrastructure expansion and clear ethical principles) can actively improve it. Furthermore, unforeseen external circumstances, such as the Covid-19 pandemic, can influence perceived compatibility – either accelerating or delaying adoption, stressing the importance of responsiveness and foresight in higher education innovation strategy (Rogers, 2003).

6.3 Complexity and the demand for training

Complexity is the degree of difficulty by which an innovation is judged (Rogers, 2003). Innovations that are easier to grasp are adopted faster than those that require adopters to learn new skills and concepts (Rogers, 2003). Several studies have indicated the difficulty of implementing AI in higher education. Crompton and Burke (2023) posit 'ethical constraints and data privacy concerns, in addition to the

requirement for faculty training' as being significant impediments to AI deployment. Such considerations, which include compatibility and ethics, have an impact on the perceived complexity of AI. Maphalala and Ajani (2025) emphasise 'the importance of ongoing faculty training in properly harnessing AI as a learning improvement tool', citing a skills gap and a perceived difficulty in implementing AI effectively. The emphasis on training and professional development suggests that AI is regarded as challenging, particularly in educational settings where educators may have had limited previous exposure to or experience with such technology. Perceived high complexity restricts innovation acceptance, especially among Rogers' (2003) early and late majority groups, which are more hesitant and demand more evidence and support than innovators or early adopters (Rogers, 2003). Overcoming this hurdle requires a methodical approach to be adopted to capacity-building and training to ensure that all stakeholders acquire the necessary skills to harness AI tools successfully.

6.4 Trialability and incremental implementation

Trialability refers to the ability of an innovation to be evaluated on a small scale (Hoang Yen et al, 2024) with minimal effort to eliminate uncertainty and risk for potential users (Rogers, 2003). Pramjeeth and Ramgovind (2024) advocate using institutional policies to reduce erroneous information and bias in the application of generative AI technologies such as ChatGPT. Such policies could direct the experimentation process, require the effects of AI to be examined and be intended to resolve any undesirable consequences. This gradual or experimental strategy enables institutions to evaluate AI technology in controlled environments before scaling it up, in the process reducing uncertainty and increasing the chances of acceptance. HEIs should use trialability strategies to demonstrate benefits while minimising risks, which is in step with Rogers' (2003) notion that innovations which can be evaluated on a small scale spread more quickly (Hoang Yen et al, 2024). Moreover, the opportunity to learn through experience is a powerful motivator of adoption (Rogers 2003).

Through controlled experimentation, institutions are more likely to detect and resolve problems such as algorithmic bias and data-security breaches before they become prevalent. This transparency and reactivity during the testing phase increases stakeholder confidence and reduces the perceived vulnerability of AI, which is critical to achieving ethical compatibility and widespread adoption. For these reasons, institutional norms for AI trials should include processes for ethical assessment, data monitoring and user input, which would transform them into trust-building exercises rather than technological guides.

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However, the trialability of complicated institutional AI systems does present a difficulty. Whereas individuals can easily experiment with generative AI tools such as ChatGPT for free, universities face greater challenges when adopting complex AI systems such as AI-powered learning analytics platforms or adaptive learning engines, which require extensive data integration. These systems resemble deep technologies[1] in that they have low trialability, which renders them difficult to evaluate or implement on a small scale.

Despite the potential benefits of AI, its limited ability to be evaluated at an institutional level renders it difficult to adopt. As a result, universities must devise strategies to simulate trialability for the complex AI innovations. These strategies could include sandboxed environments,[2] vendor partnerships for pilot programmes or investments in specialised internal teams who are capable of managing initial deployments and demonstrating value before full institutional commitment.

6.5 Observability and the role of evidence

Observability is the extent to which the outcomes of an innovation are visible to others (Hoang Yen et al, 2024). Individuals are more likely to embrace an innovation if they can easily see its benefits, because visibility encourages peer conversation and information-seeking (Rogers, 2003; Hoang Yen et al, 2024). The positive outcomes of AI adoption, such as improved learning outcomes and a reduced administrative workload, encourage its adoption. According to Crompton and Burke (2023), AI enhances educational outcomes and operational efficiency, including assessment; these can serve as tangible indications for other institutions researching similar technology. These practical benefits contribute to a compelling case for its adoption in higher education. When these benefits are discussed publicly, uncertainty among potential adopters is reduced, resulting in a positive feedback loop that promotes adoption, as Rogers (2003) predicted.

Observability is more than observing results, though: it is about facilitating social confirmation and interpersonal conversations. When academics or administrators see actual gains, such as successful

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1 Deep technology, or deep tech, is an area of business or research that involves using significant scientific advances and technologies, such as artificial intelligence (AI), to provide innovative solutions to complex problems.

2 A sandbox environment is an isolated virtual machine in which possibly unsafe software code can be implemented without affecting networked resources or local applications. Think of a sandbox as a safe, controlled playground in which software applications, code and files can be tested to see how they behave without affecting anything outside of that contained environment.

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AI deployments by peers, this sparks informal discussions, the sharing of best practices and peer validation. Rogers (2003) emphasises that interpersonal communication is effective in changing attitudes and influencing adoption decisions, more so than messaging by mass media outlets. Moreover, visible success stories create compelling narratives that resonate within the social system of higher education, reducing scepticism and instilling a sense of confidence among late majority adopters (Rogers, 2003). Subsequently, universities provide opportunities for sharing AI success stories, forming communities of practice and selecting opinion leaders who can advocate AI adoption based on their own good experiences. This goes beyond reporting statistics: it actively fosters a culture of shared learning and practical demonstration.

However, whereas some AI outcomes, such as administrative efficiency or real-time feedback, are easy to observe and quantify, others, such as increased learning outcomes or the development of critical thinking skills, are extremely complex and difficult to attribute solely to AI. This means that measuring the impact of AI on learning, critical thinking or long-term student success requires advanced research methods and long-term studies, which may not yield immediate or easily measurable results.

The gap between visible outcomes and long-term impacts can tender the significant benefits of AI less observable, which may discourage adoption among those who want immediate evidence. As a result, institutions must invest in evaluation mechanisms that are capable of capturing both immediate benefits and complex long-term educational outcomes. Communicating these nuanced outcomes well is critical to persuading sceptical AI adopters.

6.6 Responding to ethical concerns and the role of institutional support

Many studies have identified ethical concerns as challenges to the use of AI. Afolabi (2024) and Pramjeeth and Ramgovind (2024) studied the ethical elements of AI, emphasising the need for legal frameworks to protect individuals and institutions against misunderstandings, bias and data breaches. According to Rogers' (2003) Diffusion of Innovation Theory, the perceived risks associated with these ethical dilemmas impede the adoption process: potential adopters are less likely to embrace technologies that may jeopardise their core values or subject them to legal or reputational risk.

In addition, institutional support not only provides resources but also helps to shape decisions and policies in higher education. When management actively promotes AI adoption through clear policies, ethical principles and dedicated resources, the perceived risk

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to individuals and departments is considerably reduced. This formal endorsement indicates that the institution has reviewed the innovation and reduced possible risks and that it is committed to its effective implementation. This top-down effect reinforces bottom-up observability and interpersonal communication, resulting in a more robust environment for the diffusion of innovation.

6.7 Overcoming structural and infrastructural barriers

Funda and Mbangeleli (2024) and Khoalenyane and Ajani (2024) view infrastructural limitations and digital inequalities as the main drawbacks to the adoption of AI. These are not only surface issues but underlying structural barriers that have a direct impact on an institution's ability to integrate and exploit modern technologies. These hurdles are entrenched in the socio-economic and political structures that govern resource allocation, access to technology and digital literacy levels across a region or a country. For instance, the configuration of the South African higher education system influences the way in which overall national development levels can limit technological adoption (Pika & Reddy, 2022). Calls for governments to invest in infrastructure and provide targeted training programmes are critical to tackling these fundamental issues. Basic institutional prerequisites such as internet access, the availability of computing resources and digital literacy can influence the relative advantage and compatibility of AI developments, affecting their diffusion. Without dealing with these fundamental concerns, the apparent benefits of AI remain theoretical and its compatibility with current reality would be limited, regardless of any other characteristics.

Furthermore, organisations that encounter major structural and infrastructural impediments risk being permanently relegated to the laggard category of AI adoption, not owing to resistance but due to systemic restrictions. This is likely to perpetuate a growing digital divide in higher education, with well-resourced institutions being able to capitalise on AI's benefits while their under-resourced counterparts fall further behind, leading to increasing educational disparities (Pika & Reddy, 2022; Pika, 2024).

7. Conclusion

The widespread distribution of AI in higher education is a complex process that influenced by the interaction of several structural and contextual factors. The findings of this study indicate that AI has a clear multidimensional relative advantage, offering considerable advantages in tailored learning, student engagement and administrative efficiency. However, the realisation of this advantage is dependent on

its compatibility with current institutional principles, infrastructure and stakeholders' digital literacy. Infrastructure limitations, digital literacy gaps and the need for strong ethical frameworks highlight the importance of initiative-taking adaptation and investment in compatibility.

The complexity of AI, which encompasses both technical comprehension and ethical and data-privacy concerns, requires individuals to engage in ongoing training to foster technical skills and a deeper conceptual and moral understanding. This is crucial because it enables lecturers and administrators to reimagine AI solutions that align with their specific contexts, enhancing adaptability and adoption. Furthermore, trialability appears to be a crucial strategy for generating confidence and minimising risks, particularly considering the ethical complexities of AI. Whereas AI tools are trialled, AI at an institutional level frequently presents challenges such as deep technology, which requires the fostering of creative approaches to encourage experimentation and reduce perceived uncertainty.

The observability of AI's beneficial outcomes – ranging from expanded student assessment options to operational efficiencies – encourages peer conversation and influences adoption. However, quantifying the long-term pedagogical effects of AI remains difficult, requiring as it does sophisticated evaluation systems. Universal ethical difficulties underpin these qualities, acting as a complex barrier to compatibility, complexity, trialability and perceived advantage. Resolving these concerns by applying clear ethical standards and offering strong institutional support is more than simply a compliance issue; it is also crucial to fostering confidence and widespread adoption.

Finally, structural and infrastructural hurdles, such as insufficient digital infrastructure and digital disparities, are important constraints on all aspects of AI diffusion.

These concerns, which are frequently entrenched in larger socio-economic and political institutions, threaten to deepen the digital gap in higher education. Therefore, while AI offers transformative potential, its equitable and effective diffusion hinges on adopting a holistic approach that leverages its perceived advantages, deals with compatibility and complexity through targeted training and ethical governance, facilitates controlled experimentation, ensures the visibility of diverse outcomes and, critically, invests in the basic infrastructure necessary to supporting technological integration. Without such policies being in place, many institutions may struggle to realise the potential of AI in higher education.

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8. Recommendations

Based on the insights provided by the diffusion of innovations framework, a number of recommendations emerge for institutions attempting to integrate AI into higher education. First, they should prioritise investments in both technology infrastructure and faculty development. Confronting digital literacy gaps and ensuring that all stakeholders are appropriately prepared to manage AI technology is critical to lowering the perceived complexity of these tools. Institutions are encouraged to establish comprehensive professional development programmes that not only teach AI applications, but also resolve ethical issues such as data protection, bias and fair decision-making.

Several recommendations emerge from the diffusion of innovations framework for institutions attempting to integrate AI into higher education. Primarily, universities should prioritise investments in both technical infrastructure and the development of faculty members. Overcoming digital literacy gaps and ensuring that all stakeholders are properly educated in managing AI technology is critical to reducing the perceived complexity of these tools. Institutions are encouraged to implement complete professional development programmes that not only present AI technologies but also respond to ethical concerns such as data protection, bias and fair decision-making.

Finally, efforts should be made to increase the visibility of the benefits of AI. Institutions should document and share successful case studies that demonstrate increased student engagement, personalised learning and administrative efficiency. This transparency will be an effective strategy for encouraging greater adoption among potential users by emphasising tangible benefits and creating a positive feedback loop.

9. Future research

Future research should investigate the integration of AI in higher education using the Diffusion of Innovations Theory. Longitudinal evaluations could be used in studies to increase the understanding of how early pilot initiatives can mature into full-scale implementations; they could also serve to uncover the long-term effects on teaching, learning and administrative procedures. Research should also investigate the contextual aspects that influence the compatibility of AI with different educational environments. Comparative studies of a variety of similar locations or organisations may indicate the ways in which infrastructural limitations and cultural factors can influence the adoption process.

Furthermore, additional research on the ethical aspects of AI is required. Future research should investigate the way in which ethical

frameworks and institutional policies are developed and implemented, and also their effectiveness in minimising possible hazards such as data breaches, bias and misinformation. Researchers could also investigate the role of stakeholder beliefs in determining AI adoption, particularly the way in which relative advantage and complexity are communicated in an institution. Finally, more detailed research into the trialability construct is required, specifically the ways in which progressive approaches and pilot projects might be attuned to facilitate a smoother, more effective AI technology spread. These avenues of investigation will both enhance our theoretical understanding and provide practical guidance to those educational institutions that navigate the complexities of AI integration.

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