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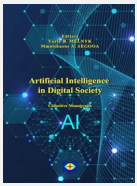

Chapter 12. Generative Artificial Intelligence in South Africa's Higher Education: Assessing Readiness and Responsible Adoption

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Abstract

The use of Generative Artificial Intelligence (AI) presents both opportunities and challenges in the South African higher education sector, particularly when guidelines for its use are lacking. The absence of comprehensive policies and frameworks is problematic, as it enables the unethical deployment of these tools and fosters inappropriate institutional responses to their use. This chapter aims to explore the readiness and levels of Generative AI adoption in South African universities. The study used a systematic literature review to research the phenomenon. Data were sourced from databases such as ScienceDirect and Scopus, as well as institutional reports and policies, to ensure comprehensive coverage of the topic under investigation, and analysed using content analysis guided by the Generative AI maturity framework. The results highlight varying levels of adoption, from exploration to implementation. Therefore, this study presents a framework for institutions to assess their Generative AI readiness and to identify gaps, thereby informing the formulation of policies and guidelines for the use of these tools. The study contributes to the limited literature on universities' readiness to foster a supportive environment for Generative AI tools in higher education. Additionally, it offers practical guidelines for policymakers to address potential readiness and adoption gaps.

Keywords: generative artificial intelligence, responsible artificial intelligence, higher education, readiness, South Africa.

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Introduction

Generative Artificial Intelligence (AI) has transformed the world of work and learning, offering tools that can help users to be more efficient. They are used in industry and higher education institutions (HEIs), and the latter are expected to be partners in developing Generative tools that will respond effectively to various business and academic contexts (Crumbly et al., 2025). The use of these tools can enhance students' digital skills and prepare them for the future of work. Research has shown that students are interested in learning to use Generative AI tools so they can apply these skills in their future employment (Rispler et al, 2025). Cardon et al. (2023) have however indicated that the policy stance in the organisation is the one that encourages employees to use Generative AI, meaning that clear policies on the use of these tools will influence uptake in any environment. Similarly, the adoption and use of Generative AI depend on HEIs' policy frameworks.

In HEIs, the use of Generative AI is closely linked to its responsible use (Rasul et al., 2025), as students may still use the technology even when explicitly instructed not to. Therefore, policies are imperative because they guide users of these technologies in using them responsibly. According to Alba et al. (2025), HEI policies aim to address academic integrity and ethical considerations to prevent plagiarism and unauthorised assistance, particularly in universities that permit the use of Generative AI. Policy and guideline formulation are important for producing graduates skilled in Generative AI who also understand that ethical aptitude in using these tools is the cornerstone of responsible use. Nevertheless, at some universities, students are unaware of their institution's guidelines on Generative AI (Al Zaidy, 2024). It also argued that these policy documents must be continually adapted as tools advance rapidly; therefore, regular review is necessary (Alba et al., 2025).

Recent studies have explored Generative AI's potential to, improve student learning experiences (Megbowon, 2025), and enhance the research process for postgraduate research (Segooa et al., 2025). The new technologies of generative artificial intelligence have been the factors that have revolutionised the industry of higher education (Melnyk & Pypenko, 2024). Despite increasing interest in the topic and rising expectations for institutions to develop policy guidelines to leverage Generative AI, there is a notable gap in studies documenting the presence of institution-wide policy guidelines in South African Higher Education (Chaka et al., 2024; Sadiq et al., 2021). Therefore, the current study builds on studies on Generative AI policy and academic frameworks that could guide institutional adoption of these tools. This study simplified the South African National AI Policy Framework (SANAIF) by assigning categories, thereby enabling the expansion of pillars aligned with institutional policy objectives (Department of Communications and Digital Technologies, DCDT, 2024). This contribution helps align the principles required for AI policy and guideline formulation across various

institutions of higher learning. To achieve the purpose of this study, the following research questions are set to guide this study:

- What institutional readiness measures are required to support the use of Generative AI in South African universities?
- What are the levels of readiness in South African HEIs in the adoption of Generative AI?
- What are the factors that influence the adoption of Generative AI in South African institutions of higher learning?

Related Studies

While theoretical framing, such as technology organisation environment, the technology acceptance model, and diffusion of innovation theory, are usually used for technology-related studies (Depietro et al, 1990; Davis, 1989; Rogers, 2003). This study uses the Generative AI maturity framework to guide its analysis.

Generative AI frameworks are more relevant because they are better aligned with specific AI innovations than generic technological ones (Chukhlomin, 2024; Sadiq et al., 2021). The five phases that informed the assessment of the maturity level for the South African public university are demonstrated in Table 12.1.

Table 12.1

Adapted Readiness Levels for Assessment of the South African Public Institution

Phases	Description
Awareness	No Generative AI policy or guideline has been published.
Experimentation	Generative AI policy or guidelines exist.
Implementation	Students and academics are encouraged to use Generative AI tools at the individual level.
Integration	Generative AI tools are integrated with some of the university's workflow systems.
Transformation	The university integrates Generative AI tools into most of its workflows and processes.

Note. From "Gen AI maturity framework report: A comprehensive roadmap for organisations to evaluate and elevate their Generative AI capabilities" by AIM Research, 2024 (https://aimresearch.co/generative-ai-maturity-framework). Copyright 2024 AIM Media House LLC.

From "Generative AI capability maturity model for online and adult learning: Introducing the EMERALD-GenAI-CMM-OAL framework" by Chukhlomin V., 2024 (https://doi.org/10.2139/ssrn.4769557). Copyright 2024 Elsevier Inc.

From "Artificial intelligence maturity model: A systematic literature review" by Sadiq et al., 2021, *PeerJ Computer Science, 7,* Article e661 (https://doi.org/10.7717/peerj-cs.661). Copyright 2021 PeerJ.

The adoption of Generative AI in some areas is determined by institutional factors, which, in this study, are linked to the levels of readiness shown in Table 1. For example, Aldreabi et al. (2025) found that institutional support, ease of use, and access to digital technology were significant determinants of students' adoption of Generative AI.

Moreover, students' perceptions of these learning tools influence their adoption; for example, viewing Generative AI as an assistant has been associated with greater acceptance of the technology (Kanont et al., 2024).

However, several concerns may hinder the adoption of Generative AI, including rapid technological change, risks to academic integrity from student overreliance, and inadequate regulation, which can lead to bias and inaccuracy (Hughes et al., 2025). Educators' lack of confidence is a significant barrier, highlighting the need for targeted support (Kohnke et al., 2023).

Other adoption issues, as noted by Malacaria et al. (2023), include operational challenges related to infrastructure, maintenance and monitoring that affect tool use, as well as workforce competencies that limit optimal use of the tools. Complex interfaces and resource constraints are also cited as contributing factors (Weinberg, 2025).

Cordero et al. (2024) suggest the need for clear ethical guidelines, the development of effective prompts, ongoing development, and staff training to ensure that Generative AI is ethically incorporated into teaching practices. This process should be accompanied by constant monitoring and evaluation. Moreso, when policies are formulated, issues of copyright, data protection and ethical implications of Generative AI use within the institution should be considered.

Methods and Materials

The study employed a qualitative review using a three-phase approach to identify grey literature and academic sources, as depicted in the PRISMA flow diagram in Figure 12.1.

The first phase involved using Google Search and higher education institutions to identify policies and guidelines on Generative AI.

The second phase involved searching for peer-reviewed journal articles in databases such as Scopus and ScienceDirect published between 2021 and 2025.

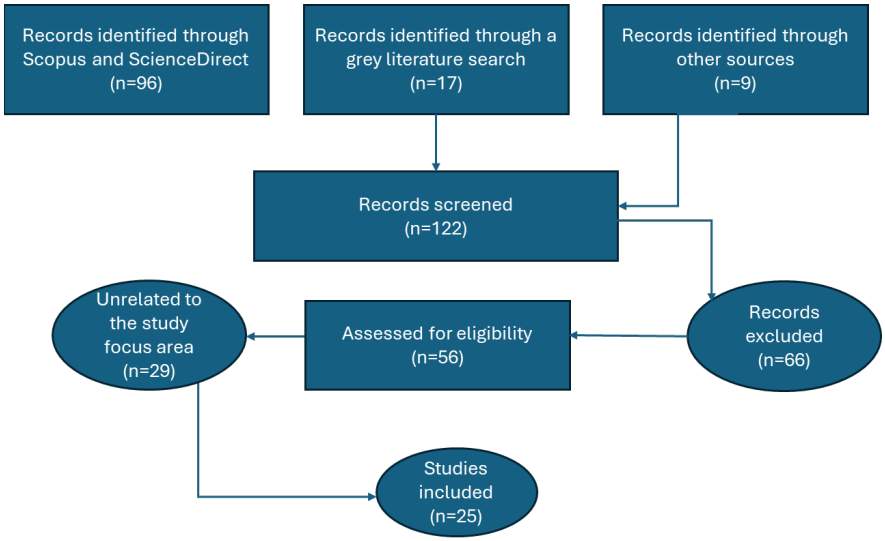
The last phase employed a snowball sampling approach to identify additional documents and empirical studies on Generative AI.

The policies were sourced using the search string: "Generative Artificial Intelligence" AND "institutions of higher learning" OR "Education" AND "South Africa" AND "AI Policy" OR "Generative AI guidelines".

Seventeen legal frameworks, in the form of policies and guidelines, were sourced from university websites and analysed for their readiness for Generative AI, including the Digital and Communication AI framework, to understand national Generative AI priorities.

Figure 12.1

Adapted PRISMA Flow Diagram Source



Note. Adapted from "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews" by Page et al., 2021, *BMJ, 372,* Article 71 (https://doi.org/10.1136/bmj.n71). Copyright 2021 BMJ Publishing Group Ltd.

A similar search string was applied to Scopus, in accordance with the inclusion and exclusion criteria in Table 12.2; the search returned 28 entries. When applying the country filter to South Africa, two records were returned. However, upon screening, the two records were excluded because they focused on Sub-Saharan Africa and Zimbabwe.

Table 12.2

Inclusion and Exclusion Criteria

Inclusion	Exclusion
Journal articles	Conference proceedings and journal preprints
Period between 2021 and 2024	Before 2021
Must focus on South African institutions of higher learning	Not focusing on South African Higher education
Must include Generative AI usage and policy frameworks	Not focusing on Generative AI

ScienceDirect yielded 68 records; after applying the period and article type filters, 57 were screened. After conducting the quality appraisal, 10 articles met the inclusion criteria, of which eight were accessible. Of the eight reviewed articles, only one met the inclusion criteria. All phases led to the inclusion of 25 sources for review. The generated data were analysed using content analysis guided by the Generative AI framework.

Results and Discussions

This section presents findings from grey literature and peer-reviewed sources (Table 12.3).

Table 12.3

Summary of Analysed Papers

Source	Focus	Methods	Theory	Summary of findings
Otto, 2024	Generative AI in pedagogy	Qualitative	Constructive theoretical approach	Prompts training for students. Polices clarifying AI usage. Clarification on AI plagiarism.
Mogoale et al. (2025)	Education 5.0	SLR	None	Collaborative AI policy formulation. Training needs for Generative AI skills. Ethical competencies for using these tools.
Chaka et al., (2024)	Institution-wide policies on AI	Literature review	None	Ethical concerns, academic Integrity, transparency, accountability and ownership, privacy, security, and safety.
Megbowon (2025)	Students' perceptions of Generative AI	Qualitative	Technology Acceptance Model	Concern about its ethical use. Lack of trust. A need for guidelines, awareness and training.
Mbangeleli and Funda (2024)	Generative AI in South African HEIs	SLR	None	Infrastructure and digital divide concerns. Instilling principles of integrity. Facilitating responsible use of AI.
Patel and Ragolane (2024)	Opportunities and challenges of Generative AI	Quantitative	None	Relevant infrastructure HEIs' and stakeholders' collaboration are essential for responsible usage.
Xulu et al. (2024).	ChatGPT adoption in a university	Quantitative	Technology organisation environment	Academic integrity Lack of policy frameworks. Improper adoption of these tools.
Mithi (2024)	The impact of Generative AI on formative assessments	Qualitative	None	Lack of training on responsible usage and ethical concerns. Educators' knowledge on Generative AI Guiding students on how to use these tools.

All 26 public universities were assessed and categorised as traditional, comprehensive, or universities of technology. The results indicate that most public HEIs have policies and guidelines to govern the ethical use of Generative AI. Of the 26 reviewed universities, 17 had guidelines. However, guidelines could not be identified on public platforms for the remaining nine universities: two universities of technology (UoTs), three traditional universities (TUs), and four comprehensive universities (CUs). One of the institutions has regulations, but they are not publicly available to external users. However, those without published guidelines demonstrated awareness by hosting academic events on Generative AI (Monono, 2024). Additionally, research papers on the use of Generative AI in such institutions were identified (Xulu et al., 2024; Mithi et al., 2024). Moreover,

training in the use of Grammarly was offered in one of the comprehensive universities.

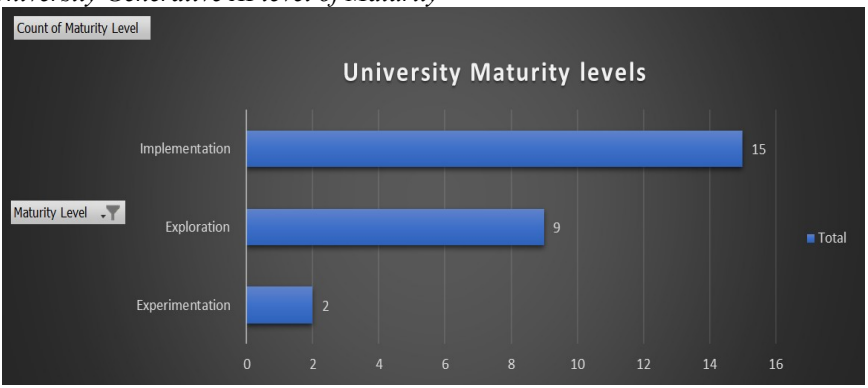
The available guidelines vary. Two traditional universities had extended guidelines to include educators and researchers, thereby providing a holistic policy. Other universities provide guidelines for students on the use of Generative AI in academic work, such as assignments and tests. Students are guided in using the tools and in what is unacceptable (three TUs; three CUs and one UoT), thereby promoting the ethical use of these technologies. Additionally, students are required to submit a declaration that the work submitted aligns with the Generative AI guidelines; this was observed in two TUs, one CU and one UoT.

Those at an advanced stage of exploring Generative AI were encouraging lecturers to include AI in the syllabus (three TUs, two CUs and one UoT). Others emphasised the importance of equipping students with AI skills and maintained dedicated Generative AI sites that outlined guidelines, available tools, and how they could support various tasks. Intellectual property (IP) guidelines on Generative AI in research, which help staff manage IP-related issues, were also noted (TU). Similarly, one TU encouraged academics to comply with data privacy legislation and leverage guidelines from Harvard and the University of Cape Town. One CU also had copyright guidelines.

The results also suggested a need to train staff and students in Generative AI skills, enabling them to understand the benefits and risks involved (Kohnke et al., 2023; Mbangeleli & Funda, 2024; Mithi et al., 2024; Mogoale et al., 2025). The need for students to be trained to use prompts was further emphasised (Otto, 2024), consistent with the findings of Cordero et al. (2024) and Kohnke et al. (2023). Such knowledge also helps users recognise the misuse of these tools and limit overdependence on them for academic and research purposes (Mithi, 2024), instead of using them as collaborators and co-creators of content.

Figure 12.2

University Generative AI level of Maturity



The findings in Figure 12.2 depict universities' readiness, as defined by the Generative AI maturity framework, comprising three phases. Level 1, Exploration with nine frequencies; they remain at the awareness stage, with no guidelines for generative AI. Nevertheless, there is evidence of academic events on Generative AI hosted by these universities. Level 2, Experimentation with two universities testing these tools. Level 3, Implementation with 15 universities engaging with Generative AI tools, enabling students and staff to use them.

Figure 12.3

Generative AI Maturity Classification by Type

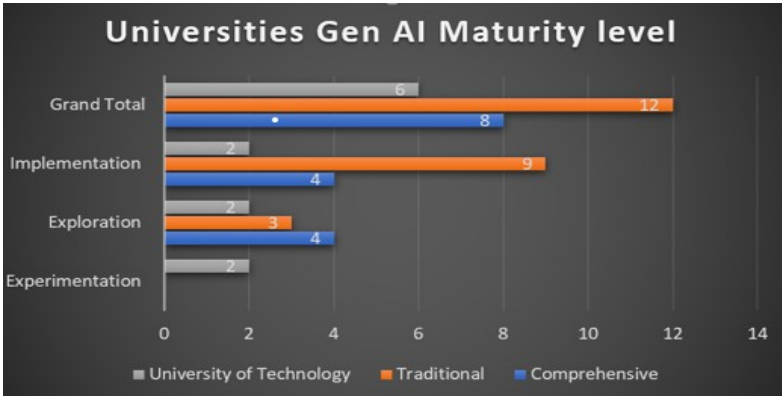


Figure 12.3 highlights institutions at the implementation level (TUs with eight frequencies), whereas UoTs appear to cross-cut Exploration, Experimentation, and Implementation, with two frequencies each. Comprehensive universities also display a frequency of four institutions on Exploration and Implementation, respectively.

Issues of the digital divide and inadequate infrastructure highlighted gaps in physical capital affecting some universities (Mbangeleli & Funda, 2024; Patel & Ragolane, 2024). This finding suggests a need for infrastructure support for universities to prevent the digital divide from becoming entrenched at the university level and to help address the country's structural challenges. It also confirms the findings of Malacaria et al. (2023). Some HEIs adopt AI haphazardly, resulting in fragmented and inconsistent use of AI tools (Patel & Ragolane, 2024).

Ethical principles were addressed in all reviewed studies, with a focus on the ethical use of tools, academic integrity, data privacy, transparency, and accountability as factors affecting adoption (Chaka et al., 2024; Otto, 2024; Mogoale et al., 2025). Additionally, privacy, security and safety can be compromised when users are not educated about tools. Moreover, accountability, transparency, and ownership can be compromised when users are poorly informed. Thus, showing the interconnectedness between ethical principles and human

capital. Similarly, Cordero et al. (2024) and Mithi et al. (2024) suggest that clear guidelines are necessary to avoid irresponsible adoption or use of Generative AI (Xulu et al., 2024; Megbowon, 2025).

The human approach to AI was framed as requiring training to address ethical concerns. Additionally, the argument that educators must implement countermeasures to address the lack of academic integrity (Mithi, 2024) reflects a soft approach to addressing AI-dependent students. Advocating and facilitating adherence to the principles of integrity and the ethical use of these tools could help address challenges related to cheating and academic integrity (Mbangeleli & Funda, 2024), aligning with Chaka et al. (2024) and Hughes et al. (2025).

Proposed Framework

Some universities in South Africa are interested in Generative AI and are already engaging with these tools. Some have developed guidelines to help staff and students understand the tools, particularly their benefits and risks, and to educate them on how to use them ethically and responsibly. However, some universities lacked published guidelines, particularly those classified as UoTs, despite being actively engaged in technology and planning to strengthen their Generative AI activities. The guidelines of the two CUs could also not be found. However, according to Alba et al. (2025), instances like this do not reflect a lack of Generative AI use, as educators may have course-level guidelines. This finding is also evident at CU and UoT, where empirical evidence suggests the use of tools (Mithi et al., 2024; Xulu et al., 2024). Some traditional universities also lacked guidelines, showing that even such institutions can lag. It was also noted that institutions such as Thensa have been instrumental in helping UoTs and CUs close gaps in Generative AI.

Based on these results, a South African Generative AI Readiness Framework (SA-GAIRF) is proposed in Figure 12.4.

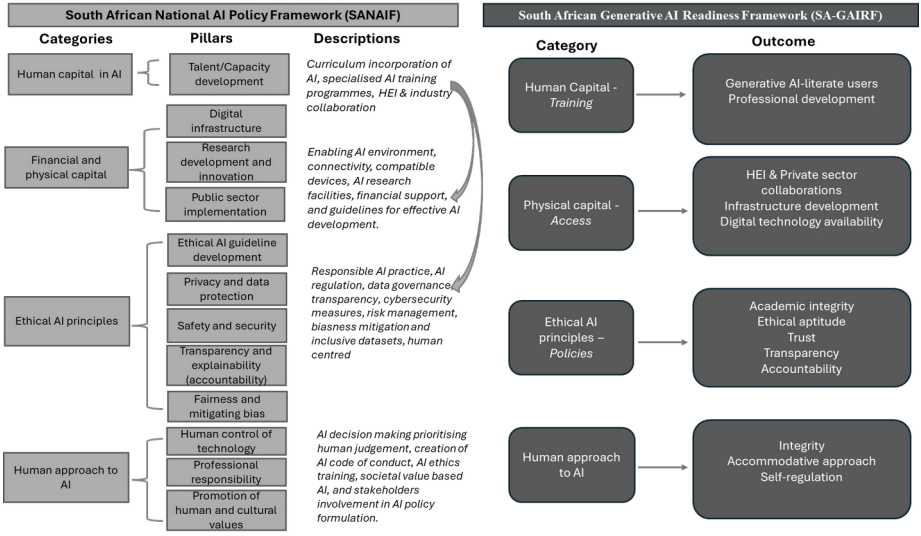
It illustrates alignment with the categories of human capital, physical capital, ethical principles, and the human approach to AI, as discussed in the introduction. This mapping to SANAIF showed the financial capital as the only element not emphasised as a factor in the results.

This study suggests that universities should formulate policies, guidelines, or statements on the ethical use of Generative AI to leverage the opportunities these tools offer. Challenges related to human capital can be addressed through capacity development for both staff and students, thereby strengthening integrity and self-regulation when the tools are used. The framework can be used to formulate a university-wide guideline on the ethical use of Generative AI.

Moreover, educators and students who adopt Generative AI in the absence of their university's guidelines may tailor their course-level user declarations, informed by the SA-GAIRF categories three and four, and aligned with the respective SANAIF pillars (DCDT, 2024).

Figure 12.4

Adapted Generative AI Framework for HEIs



Note. Adapted from "South Africa national AI policy framework" by DCDT, 2024 (https://www.dcdt.gov.za/sa-national-ai-policy-framework/file/338-sa-national-ai-policy-framework.html). Copyright 2024 Department of Communications & Digital Technologies.

Conclusion

The Generative AI policy landscape in SA shows positive progress. The key readiness factor for integrating and adopting Generative AI is the availability of guidelines in HEIs. Additionally, including a declaration or statement acknowledging the use of Generative AI tools contributes to academic integrity and the ethical use of these tools. When guidelines are unavailable, educators can develop course-specific guidelines to help students develop generative AI skills. The development of such guidelines can also assist educators in participating institutionally in the policymaking process. The involvement of educators at this level would ensure that classroom experiences are articulated and accommodated in the policy process. While human capital is important, financial and physical access are essential to ensure supportive infrastructure and AI-powered systems that promote inclusive access.

This study advances limited research on universities' readiness to ensure a supportive environment for Generative AI tools in higher education. It further provides policymakers with practical guidelines for addressing potential readiness and adoption gaps. Additionally, it offers higher education institutions in the global

South specific guidelines to support the adoption of Generative AI, taking into account infrastructural, human capacity, and ethical considerations that must be factored in for the inclusive and responsible use of these tools. However, its limitations include the use of only two databases; access to additional databases could have enabled more studies. Future studies could draw on additional databases and conduct empirical research to develop a deeper understanding of the readiness factors influencing guideline development and the effective use of Generative AI tools in South African Universities.

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