

Effective AI Integration in Postgraduate Supervision Practices: Policy Implications for South Africa

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Abstract: Artificial Intelligence (AI) is revolutionising postgraduate supervision on a global scale by enhancing research efficiency, automating administrative tasks, and improving student engagement. Nevertheless, the adoption of AI within South African higher education, particularly in historically disadvantaged institutions, remains constrained, primarily due to a paucity of literature regarding AI adoption in postgraduate supervision. This chapter utilises the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) to investigate how AI tools are presently employed in postgraduate supervision across various contexts. It examines the constructs influencing the behavioural intentions of supervisors and students to adopt AI and identifies key facilitating conditions that enable its effective integration. A sectoral review was conducted employing document and thematic analysis to synthesise findings. Relevant peer-reviewed literature was sourced from traditional academic databases and AI-powered discovery tools such as SciSpace Deep Review, Elicit.com, NotebookLM, ChatGPT Deep Research, and Gemini Deep

Research. Findings indicated that students predominantly utilised ChatGPT to enhance academic writing, assist with literature reviews, and receive immediate feedback, particularly when supervisors were unavailable. Conversely, supervisors employed AI to refine methodologies, data coding, and provide administrative support. Performance expectancy emerged as the most significant predictor of behavioural intention to adopt AI. However, actual adoption was contingent upon facilitating conditions such as AI literacy, peer support, institutional policies, access to infrastructure, and training opportunities. This chapter advocates for the development of comprehensive institutional frameworks to guide the ethical, pedagogical, and equitable integration of AI into postgraduate supervision.

Keywords: Artificial intelligence, higher education, postgraduate supervision, South Africa.

1. Introduction

Artificial intelligence (AI) is rapidly transforming all spheres of education, with higher education experiencing particularly significant shifts in postgraduate supervision practices. Thong et al. (2025) noted that the integration of AI has enabled students and supervisors to engage more flexibly through virtual teaching and learning platforms, effectively reshaping traditional supervision models. In response to these developments, several studies have explored the role of AI in postgraduate education. For example, Asongo et al. (2024) and Oubibi et al. (2025)

examined how students utilise AI tools to enhance writing, conceptual understanding, and research productivity. Others, such as Chauke et al. (2024), investigated student perceptions of AI, while Caillaud and Skec (2024) focused on its ethical and methodological implications within doctoral supervision. A noteworthy contribution by Segooa et al. (2025) evaluated the use of generative AI tools to enhance the teaching of scientific research methods. Furthermore, Caillaud and Skec (2024) raised concerns about AI's potential to disrupt supervisory relationships and argued that it may act as either a valuable support mechanism or an intrusive influence. More recently, Thong et al. (2025) conducted a systematic review examining how generative AI facilitated doctoral co-supervision and found that, although AI supports personalised learning, empirical studies on AI adoption in postgraduate supervision are limited.

Other researchers have also focused on AI acceptance in postgraduate supervision, employing technology acceptance models. For instance, Sergeeva et al. (2025) conducted a quantitative study in Russia using the Unified Theory of Acceptance and Use of Technology (UTAUT) to assess generative AI adoption among university students. They identified habit and performance expectancy as key drivers of technology use. Similarly, Strzelecki (2024) employed a survey-based approach with university students in Poland to explore ChatGPT usage in higher education. This study extended the UTAUT model and found that performance expectancy, hedonic motivation, and habit significantly influenced behavioural intention. The findings highlighted generational and cultural factors that influence AI acceptance across student populations.

Despite the expanding literature on AI adoption in postgraduate supervision, several limitations remain. Much of the literature focuses narrowly on academic writing, ethics, or pedagogy and offers limited insight into how AI is integrated into supervision across disciplines and institutional contexts. While student-led adoption is well-documented (Asongo et al., 2024; Chauke et al., 2024), there is little evidence on how supervisors utilise AI or how it influences their pedagogical practices (Nikolic et al., 2024). Although some studies have applied technology acceptance models such as UTAUT (Sergeeva et al., 2025; Strzelecki, 2024), they typically focus on students and overlook supervisory dynamics. This gap is especially evident in low- and middle-income contexts such as South Africa, where infrastructural constraints, limited supervisor training, and the absence of formal policies hinder meaningful adoption (Mbangeleli & Funda, 2024).

1.1 Background literature review

Generative AI presents compelling arguments for its integration into postgraduate supervision, primarily due to its capacity to process vast amounts of data and provide valuable insights that would otherwise be time-consuming to attain. Nonetheless, this integration has been characterised by fragmentation, with divergent ethical perspectives and limited institutional support within the academic community (Nikolic et al., 2024). Attitudes towards AI adoption appear to be divided between the fields of science, technology, engineering, and mathematics

(STEM) and those of the humanities, with STEM practitioners embracing AI for its efficiencies in tasks such as coding and statistical analysis.

Conversely, scholars in the humanities exhibit greater scepticism, contending that although these tools possess fluent writing capabilities, they lack adequate contextual sensitivity and are susceptible to various forms of bias (Cowling et al., 2023). Hicham et al. (2025) indicate that a notable divergence exists between AI adoption in the Global North compared to the Global South, whereby developing nations such as Morocco view the social influences of AI as a more significant predictor of AI integration. This trend is particularly evident in African countries that prioritise efficiency gains due to limited resources. In contrast, the Global North appears to focus on the ethical implications and policy frameworks surrounding AI rather than its performance.

The tension between efficiency and trust significantly shapes the experiences of both supervisors and students concerning AI adoption. When interpreting AI integration through the UTAUT framework, one can discern a complex interplay among factors such as effort expectancy, social influence, and facilitating conditions. In terms of effort expectancy, student adoption is frequently motivated by the perceived benefits of speed and language assistance. Supervisors recognise the advantages of AI in alleviating their workload, yet remain acutely aware of the potential for AI hallucinations and errors (Arbulú Ballesteros et al., 2024). This awareness has heightened the necessity for supervising AI usage, resulting in increased time commitments that exacerbate their burdens and contribute to negative perceptions of AI (Mohsin et al., 2024).

With respect to social influence, supervisors and students face differing pressures regarding AI adoption. Institutional norms, policies, and endorsements significantly shape supervisors' perspectives on AI integration, while the adoption trends among peers generate a sense of fear of missing out for students (Tao et al., 2024). Simultaneously, students' utilisation of AI is tempered by apprehensions concerning plagiarism and academic misconduct. Fear also plays a role in influencing supervisors' adoption decisions, particularly regarding concerns about AI potentially replacing human roles and threatening their epistemic authority (Khlaif et al., 2024).

Regarding the facilitating conditions for AI adoption within the South African context, digital inequality has been identified as a significant driver of AI adoption. Those with access to digital infrastructure and the financial means to afford the data required for the application of AI tools are better positioned to implement such technologies (Hicham et al., 2025). Furthermore, the policies that regulate AI adoption provide essential frameworks for institutions to navigate the associated tensions, ensuring that adoption is executed ethically and accompanied by appropriate training for both staff and students (Nikolic et al., 2024).

The UTAUT framework also promotes an analysis of AI adoption from both individual and organisational perspectives, while recognising the technical factors that influence adoption. Among supervisors, Fang et al. (2025) contend that personal attitudes towards AI can

significantly drive adoption. By fostering an environment of openness and demonstrating the benefits of innovation and self-efficacy, supervisors may come to see AI as an instrument for enhancement rather than a threat. Such demonstrations are feasible when student experimentation leads to innovations that stimulate curiosity, learning, and research (Tian et al., 2024). From an organisational perspective, as posited by Nikolic et al. (2024), AI policies serve as crucial frameworks that can cultivate a culture of innovation and facilitate successful adoption. Hicham et al. (2025) found that these policies were the most pivotal factor influencing adoption in Moroccan universities. Importantly, these policies must be complemented by funding and training to ensure that institutions are adequately equipped to operationalise AI tools effectively (Baharin et al., 2025).

AI adoption is also influenced by technical factors pertaining to its accessibility and reliability. Premium generative AI tools frequently necessitate subscriptions, contributing to unequal diffusion among supervisors and students. Therefore, policies are required to ensure that the benefits of these tools are distributed equitably (Mosae & Kaushal, 2025). Additionally, perceived security is a critical determinant of AI acceptance; thus, policies must clearly demonstrate how data can be protected, ensuring that neither user nor research participant information is compromised (Ratta et al., 2025). In this context, when these factors are aligned, Mohsin et al. (2024) assert that AI adoption has the potential to enhance supervisory efficiency and personalisation, consequently improving student outcomes and academic oversight.

1.2 Problem statement

This chapter seeks to fill the gaps in the literature by investigating how AI is currently being used in postgraduate supervision across disciplines and countries, guided by the UTAUT framework (Venkatesh et al., 2003). It explores the factors influencing the behavioural intentions of supervisors and students to adopt AI, identifies the individual, organisational, and technical conditions that facilitate actual use, and analyses the policy implications for integrating AI into supervision within the South African higher education system. This qualitative, document-based study draws on academic literature and employs document and thematic analysis to synthesise findings.

While the literature review, through a cursory examination of available studies, presents several factors influencing AI adoption among supervisors and students, these factors remain disparate and fragmented. A synthesis of these factors is needed to explain their interaction within a coherent theoretical framework. These views are sourced from across the Global South and North and have implications for the South African context, but they need to be reviewed in light of South African inequality and resource constraints. Thus, there is a need for a comprehensive, theoretically grounded examination of AI adoption in postgraduate supervision that consolidates existing evidence, identifies patterns across disciplines and geographies, and derives actionable policy recommendations. The research questions addressed are:

- How is AI being used in postgraduate supervision across different disciplines and countries?
- Which factors influence the behavioural intention of supervisors and students to use AI in supervision practices?
- Which individual, organisational, and technical factors mediate the adoption of AI in postgraduate supervision?
- What policy implications can be drawn to guide effective AI integration in South African higher education?

The next section introduces the theoretical framework used in the study, followed by the methods employed. Thereafter, the findings are presented and discussed in relation to the research questions. Lastly, this chapter concludes with practical recommendations for policy and practice.

2. Theoretical Framework

This study is grounded in the UTAUT, one of the most widely applied models for understanding technology adoption in educational settings (Venkatesh et al., 2003). The UTAUT model focuses on four key constructs, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy is defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447). In this chapter, it refers to the belief held by students and supervisors that AI enhances research and learning. Effort expectancy is described as “the degree of ease associated with using the system” (Venkatesh et al., 2003, p. 450), and we define it as AI tools that require little effort to use. Social influence is “the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451). We refer to this as the extent to which supervisors and students believe that significant individuals in their lives think they should use AI. These constructs influence users’ behavioural intention to use technology, which may ultimately determine their actual usage. Furthermore, this chapter focuses on facilitating conditions, defined as “the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system” (Venkatesh et al., 2003, p. 450). In this chapter, we describe facilitating conditions as individual, organisational, and technical factors that mediate the effective adoption of AI in postgraduate supervision practices.

3. Methodology

We employed a sectoral literature review to investigate the utilisation of AI in postgraduate supervision, the constructs influencing users' behavioural intent to employ AI, and the factors facilitating its use across various disciplines and countries. We conducted an extensive document analysis guided by a structured deep-search strategy (Bowen, 2009). This involved utilising

traditional academic databases, such as Google Scholar, in conjunction with AI-powered semantic search tools, including SciSpace Deep Review, Elicit.com, NotebookLM, ChatGPT Deep Research, and Gemini Deep Research. These tools enabled us to identify and retrieve academic literature pertinent to the scope of the study. Following the document analysis, we employed thematic analysis to systematically categorise the findings (Braun & Clarke, 2006).

Initially, we searched for literature using key phrases derived from the research questions. The traditional literature search was supplemented by a selection of studies sourced from the aforementioned AI-powered semantic search tools. Specifically, we sought case studies and empirical accounts of AI adoption in higher education settings, with particular attention to studies that capture the experiences, perceptions, and practices of postgraduate supervisors. We continued the iterative search process until we reached theoretical saturation, the point at which no new themes or substantive insights emerged from additional sources. However, while saturation was achieved for broader themes related to AI in higher education, the evidence base for supervision practices remains limited.

The findings were first organised according to the research questions. We grouped the findings from research question one based on emerging themes. Subsequently, we categorised research question two, focusing on the UTAUT constructs according to predetermined themes (performance expectancy, effort expectancy, social influence). Research question three, which centred on facilitating conditions, was organised into predetermined themes (individual, organisational, and technical levels).

To ensure the trustworthiness of the study, we applied strategies aligned with qualitative research principles, specifically focusing on credibility and confirmability (O'Leary, 2017). Credibility was maintained through the systematic use of multiple high-quality data sources from peer-reviewed journals, academic databases, and AI-assisted platforms. We carefully assessed each source obtained from SciSpace Deep Review, Elicit.com, NotebookLM, ChatGPT Deep Research, and Gemini Deep Research to ensure its relevance and accuracy. Confirmability was strengthened through collaborative review and cross-validation of findings among the research team, ensuring that interpretations were grounded in evidence rather than personal bias.

4. Findings

In the subsequent sections, we address the first three research questions. We discuss the last research question in the discussion section, focusing on policy implications for South Africa to avoid repetition.

4.1 AI Uses in postgraduate supervision across disciplines and countries

In this section, we present the actual applications of AI in postgraduate supervision practices across various national and disciplinary contexts (see Tables 1a-e). Although an increasing number of publications underscore the potential of AI in higher education, we identified

relatively few empirical studies that concentrate specifically on its implementation within postgraduate supervision. This limited evidence base may be attributed to the recent emergence of generative AI tools in academic environments.

Table 1a: *Applications of AI by postgraduate students in research and writing*

Country	Discipline/field	AI Tool(s)	AI Use	Citation
Jordan	English First Language (discipline unspecified)	ChatGPT	Thesis writing	Amer et al. (2025)
Nigeria	Discipline not specified	ChatGPT, Quilbot, ChatPDF, Consensus, Scite, Bit AI, Litmap, Jenni, Paperpal, Research Rabbit, Wordvice AI, Typeset.io	Enhance research	Asongo et al. (2024)
China	Education	ChatGPT, Grammarly; QuillBot	Academic writing	Oubibi et al. (2025)
South Africa	Human, Social Science and Education	ChatGPT	Refine research topics before submission to supervisors; assist with paraphrasing enhance academic writing, especially for non-native English speakers; formulate research ideas and problem statements; search for relevant literature and write literature reviews.	Chauke et al. (2024)
China	Medical education/ Health	ChatGPT and other tools	As conversational tools for studying — used by students to quickly obtain medical information and knowledge.	Tao et al. (2024).
Peru	All fields	ChatGPT	AI as a learning support tool.	Arbulú Ballesteros et al. (2024).

Table 1b: *Applications of AI in postgraduate supervision and mentorship*

Country	Discipline/field	AI Tool(s)	AI Use	Citation
Australia	Education/Research Supervision	ChatGPT	AI is used to support psychological need fulfilment, autonomy, competence, and relatedness among research students through preliminary formative feedback, literature review assistance, idea generation, proofreading, and editing.	Cowling et al. (2023)
France; Sweden; Italy; Slovenia; and Croatia	Engineering Design	ChatGPT, Scholar AI	PhD Supervisors: Finding relevant papers and supporting literature review; Summarising and synthesising; Analysing data and coding; Improving research methodology; Writing task such	Caillaud and Skec (2024)

Country	Discipline/field	AI Tool(s)	AI Use	Citation
United Kingdom	Not specified	ChatGPT (GPT4)	as administrative and routine tasks Fill the gaps left by the supervisor; Provide an interactive, private space; Test and refine complex research questions. Facilitate a deeper understanding of the research area. Conceptualise research focus; Generate new ideas; Literature review. advance understanding of methodological designs; Reflect on ethical considerations. Grammatical and structural checks	Harding and Boyd (2024)
Uganda	Computer Sciences and Electronics, Natural Sciences, Social Sciences, Education, Arts and Humanities	All generative AI tools	Students use AI to generate research content, which supervisors struggle to detect due to their limited knowledge of AI tools.	Rajab et al. (2025)

Table 1c: *AI Integration in Postgraduate Teaching and Curriculum Design*

Country	Discipline/field	AI Tool(s)	AI Use	Citation
Malaysia	General	ChatGPT and other generative AI tools	AI is used to enhance postgraduate teaching by providing personalised learning experiences, fostering active engagement, and supporting educators in identifying suitable learning theories and strategies	Omar et al. (2024)
Not mentioned	Pathology and microbiology	Generative AI tools in general	AI is used to provide personalised learning experiences, simulate complex scenarios, automate assessments, and enhance teaching performance in postgraduate supervision	Roy et al. (2024)
Global	Medical education	Generative AI tools in general	AI is used in postgraduate medical education to provide personalised learning experiences, real-time feedback, AI mentorship, and assistance in medical research and evidence-based practices.	Pashkovskyy et al. (2023)
Saudi Arabia	Education	Generative AI tools in general	AI is used in scientific writing by postgraduate students to enhance academic integrity, detect plagiarism, facilitate automated reviews, improve writing skills, and aid in formatting scientific papers.	Hegazy et al. (2024)

Table 1d: Global perspectives and attitudes toward AI in higher education

Country	Discipline/field	AI Tool(s)	AI Use	Citation
Global	All fields	Generative AI tools in general	Studied in terms of teachers' attitudes, perceptions, intentions and behaviours toward using AI/GenAI	Nikolic et al. (2024)
Morocco	Social sciences, exact sciences and medical disciplines	Large language models	Examined as a technology whose adoption intention is influenced by factors like social influence and facilitating conditions.	Hicham et al. (2025)
Malaysia	All fields	Generative AI tools in general	Examine attitudes and behavioural intentions to adopt AI in their education based on UTAUT factors.	Mohsin et al. (2024).
Middle East	All fields	Generative AI tools in general	Staff integrating AI into assessment practices to design assignments and manage workloads.	Khlaif et al. (2024).
China	Library and Information Science	Generative AI tools in general	Examines librarians' intention to adopt AI in library routines and services	Fang et al. (2025)
Global	All fields	ChatGPT, Grammarly	As learning support and writing/editing aid tools that simplify complex content, improve writing and grammar, support personalised learning, and speed up research.	Mosae & Kaushal (2025)

Table 1e: General and cross-disciplinary applications of AI in postgraduate education and research

Country	Discipline/field	AI Tool(s)	AI Use	Citation
Australia	Postgraduate Research (General)	ChatGPT	Personalised tutoring; Language editing and proofreading; Brainstorming, Coding and interpretation; Literature synthesis; Mock interaction and rehearsal	Dai et al. (2023)
Global	All fields	Generative AI tools in general	AI is used to personalise teaching, provide formative feedback, identify at-risk students, accelerate research discovery, streamline administrative processes, and optimise resource utilisation.	Tarisayi (2024)
China	Language Education/Linguistics	EvaluMate	AI is used to support peer review through an AI-powered system called EvaluMate, which includes a chatbot named Eva that evaluates and provides feedback on student reviewers' comments to improve the quality of peer feedback.	Guo et al. (2025)
China	All fields	AI Chatbots	Used as conversational technology for study and research support.	Tian et al. (2024)
India	Medical sciences	AI-driven Clinical Decision Support Systems	As decision-support tools for clinicians	Ratta et al. (2025)

4.1.1 Academic writing and language support

A significant area of AI use involves support for academic writing and language development. According to Oubibi et al. (2025), the integration of AI in higher education institutions is recognised as a transformative tool that enhances academic writing for postgraduate students, effectively addressing their writing challenges. In Jordan, Amer et al. (2025) noted that students used ChatGPT to enhance thesis writing, particularly to expand vocabulary, clarify meaning, and generate coherent text. Similarly, in South Africa, students relied on ChatGPT to paraphrase, restructure sentences, and improve the grammatical quality of their work before submitting it to supervisors (Chauke et al., 2024). In Nigeria, Asongo et al. (2024) found that students used ChatGPT and Quillbot to improve sentence clarity and coherence, while in China, students reported using ChatGPT, Grammarly, and Quillbot to check grammar, refine sentence structure, and edit formal writing (Oubibi et al., 2025). Additionally, in a study focusing on pathology and microbiology, generative AI was noted for its potential to grade written assignments, reduce faculty workload, and provide students with formative feedback on their scientific writing (Roy et al., 2024).

4.1.2 Research development and conceptualisation

AI was also used to support the early stages of research development. Large Language Models (LLMs) like ChatGPT are uniquely suited to assist students in the beginning stages of their candidature by helping them articulate key concepts through generated text, allowing them to focus more on the concepts themselves than on the written expression of ideas (Cowling et al., 2023). In South Africa, students used ChatGPT to clarify research objectives, develop problem statements, and refine their study focus (Chauke et al., 2024). In Australia, Dai et al. (2023) reported that students used the tool for brainstorming, conceptual planning, and refining research topics.

The United Kingdom presented similar findings, where students engaged with ChatGPT-4 to test and reformulate complex research questions and enhance the clarity of their theoretical framing (Harding & Boyd, 2024). Similarly, the study conducted by Dai et al. (2023) examined the use of ChatGPT and its impact on postgraduate research supervision. Insights gathered from Australian postgraduate research students indicated that ChatGPT not only enhanced research and academic performance but also fostered critical thinking skills. Students reported that the AI generative tool allowed them to work more independently and encouraged self-directed learning in their research endeavours.

4.1.3 Literature review and source discovery

In addition to writing and conceptualisation, both students and certain supervisors have utilised artificial intelligence (AI) to facilitate literature review tasks. AI algorithms can support postgraduate students in researching and analysing extensive volumes of academic literature by

employing Natural Language Processing (NLP) techniques to extract pertinent information, summarise research articles, and provide evidence-based recommendations (Pashkovskyy et al., 2023). In Nigeria, students have employed tools such as Litmaps, Scite, and Elicit to identify relevant literature, explore citation networks, and construct structured reviews (Asongo et al., 2024). In South Africa, students have utilised ChatGPT to define key search terms and summarise foundational texts (Chauke et al., 2024). Furthermore, supervisors in France, Sweden, Italy, Slovenia, and Croatia have also employed AI tools such as Scholar AI and ChatGPT to assist doctoral candidates in locating pertinent publications and synthesising academic arguments (Caillaud & Skec, 2024).

4.1.4 Methodological and ethical reflection

Beyond topic development and access to literature, AI has supported students in engaging with research methodology and ethical design. However, a core limitation is that AI language models, such as ChatGPT, lack a specific ethical framework and operate based on the data and algorithms on which they were trained. This can result in biased or flawed advice, making critical review by the student essential (Hegazy et al., 2024). In Australia, students have consulted ChatGPT for assistance with interpreting methodological texts, understanding research designs, and reflecting on ethical concerns related to data collection (Dai et al., 2023). In European contexts, particularly in France and Italy, supervisors have employed AI to assist students in refining methodological frameworks and comparing the strengths of various design approaches (Caillaud & Skec, 2024).

4.1.5 Personalised tutoring and independent learning

AI also provided a form of personalised academic support, particularly in environments where students had limited access to supervisors. Generative AI can significantly enhance learning experiences by offering interactive and personalised educational tools, such as generating realistic images or simulating complex processes, and by creating virtual tutors that provide personalised feedback and guidance. The integration of AI into postgraduate medical education facilitates a more personalised and adaptive learning experience by analysing individual learning patterns and recommending tailored study plans (Pashkovskyy et al., 2023). In Australia, Dai et al. (2023) found that students used ChatGPT as a private tutor to review language, provide feedback on drafts, help interpret data, and rehearse academic presentations. Similarly, in China, students utilised ChatGPT for idea generation, editing, and practising responses to critical questions (Oubibi et al., 2025).

4.1.6 Filling supervisory gaps and supporting reflection

In settings where supervision was inconsistent or limited, students used AI to bridge the gap. For research students, ChatGPT can provide preliminary formative feedback, checking for errors and critiquing early ideas. This enables students to have higher-impact conversations with

their human supervisors (Cowling et al., 2023; Hegazy et al., 2024). In the United Kingdom, Harding and Boyd (2024) found that ChatGPT-4 served as a reflective partner, helping students rehearse arguments, clarify complex ideas, and receive immediate feedback. Students described the tool as a non-judgmental space for intellectual experimentation, which allowed them to progress even in the absence of timely supervisor input. Similarly, in South Africa, students reported that AI supported their progress between supervision sessions, particularly when institutional resources were stretched (Chauke et al., 2024).

4.1.7 Supervisor use of AI for academic and administrative tasks

Although supervisors used AI less frequently than students, some applications were identified. AI is being used to streamline administrative processes in higher education through chatbots, and it has the potential to automate administrative teaching tasks, identify areas needing classroom reinforcement, and intelligently utilise data for student support (Rajab et al., 2025). Furthermore, AI can support educators' professional development by offering teaching evaluation models and suggestions to enhance their instructional practices (Omar et al., 2024). In France, Sweden, Italy, Slovenia, and Croatia, Caillaud and Skec (2024) found that supervisors employed AI tools to assist in identifying relevant articles, coding qualitative data, and refining research methodology sections. Additionally, supervisors reported using AI to support administrative tasks such as writing feedback summaries and managing supervision documents.

4.2 Factors influencing the behavioural intention to Use AI in postgraduate supervision

In this section, we discuss how performance expectancy, effort expectancy, and social influence, as stated in the UTUAT (Venkatesh et al., 2003), influenced the supervisors' and students' behavioural intention to use AI in postgraduate supervision practices.

4.2.1 Performance expectancy

This construct emerged as a strong predictor of the intention to adopt AI. For instance, Acosta-Enriquez et al. (2024) found in their systematic review of AI acceptance in universities that performance expectancy was a significant predictor of students' and faculty's intention to use AI. The potential for AI to enhance postgraduate teaching is realised by promoting active engagement and meaningful learning interactions, thereby improving learning outcomes, productivity, and student engagement through personalised education, feedback, and assistance (Omar et al., 2024). Performance expectancy was evident in how students perceived AI tools such as ChatGPT and Grammarly to enhance their academic output, particularly in supporting research writing, conceptual development, and methodological clarity. For instance, students in education and the humanities viewed these tools as useful for managing their academic workload and producing higher-quality work (Chauke et al., 2024; Dai et al., 2023). Supervisors also believed that ChatGPT could enhance thesis writing, vocabulary usage, and flow (Amer et al., 2025).

4.2.2 Effort expectancy

We found limited evidence regarding effort expectancy, which we refer to as AI not being difficult to use. Although many instructors are unaware of AI's full potential and underlying principles, the utilisation of AI in education has led to the complete integration of teaching and learning, suggesting it is readily accessible. However, its successful adoption is influenced by users' level of trust in the tools (Hegazy et al., 2024; Roy et al., 2024). We report on how students perceived the use of AI, given that limited supervisors employed AI tools in their practices. Acosta-Enriquez et al. (2024) found that perceived ease of use emerged as a relevant factor in students' AI adoption decisions. Furthermore, Patterson et al. (2024) reported that students showed high agreement that AI tools were easy to use. Amer et al. (2025) also recommended training and upskilling both supervisors and students in AI functionalities, indicating that some effort is needed to adopt AI in practice. In contrast, Aljarboa et al. (2025) found that effort efficiency does not influence students' behavioural intention to adopt AI across disciplines, including science, engineering, business, and the humanities, in Saudi Arabia.

4.2.3 Social influence

Cowling et al. (2023) highlighted the importance of leadership in fostering AI integration within supervision. Their study found that students appreciated the use of ChatGPT to support their research productivity and academic empowerment. At the departmental level, leadership practices created opportunities for formative feedback, making AI tools more accessible and useful to both undergraduate and postgraduate students. However, the study also noted that leadership influence was sometimes limited to reinforcing existing norms rather than cultivating forward-looking practices. Nonetheless, the presence of supportive academic leadership contributed meaningfully to the social dynamics that encouraged AI adoption in supervision contexts (Tarisayi, 2024). Informal peer learning networks in countries such as Nigeria and South Africa played a pivotal role in normalising the use of AI, while departmental cultures in parts of Europe fostered collective engagement with emerging technologies (Asongo et al., 2024; Caillaud & Skec, 2024; Chauke et al., 2024). Furthermore, Supianto et al. (2024) found, using structural equation modelling, a positive correlation between social influence and Indonesian students' behavioural intention to use ChatGPT. This indicates that when Indonesian students feel encouraged or supported by their peers and significant others to use ChatGPT, their intention to adopt this technology increases.

4.3 Enabling conditions for AI integration in postgraduate supervision

In the previous sections, we discussed the constructs that influenced behavioural intention. However, even when students and supervisors intend to use AI, they will only employ AI in postgraduate supervision practices if certain facilitating conditions are in place. Table 2 summarises the factors that support the use of AI across contexts at the individual, organisational, and technical levels.

Table 2. *Factors facilitating the adoption of AI across countries and disciplines*

Level	Facilitating condition	Citation
Individual	AI literacy Peer support	Asongo et al. (2024); Gandhi et al. (2024); Asongo et al. (2024); Chauke et al. (2024) Caillaud and Skec (2024)
Organisational	Policies and guidelines Training and workshops	Amer et al. (2025); Caillaud and Skec (2024); Chauke et al. (2024); Dai et al. (2023) Acosta-Enriquez et al. (2024); Amer et al. (2025)
Technical	Reliable access to AI tools and infrastructure	Asongo et al. (2024); Chauke et al. 2024; Oubibi et al. 2025; Habibi et al. 2023

4.3.1 Individual-level facilitating factors

A key facilitating condition at the individual level is the capability and readiness of supervisors and students to use AI. A supervisor or student might not use AI in practice if they lack the knowledge or skills to do so. For instance, Gandhi et al. (2024) conducted a mixed-methods study to compare AI knowledge among medical students and found that postgraduates with greater AI knowledge engaged in more AI-related practices, while those with lower AI knowledge used AI less. The authors emphasised the need for targeted AI education to prepare students. A study by Asongo et al. (2024) acknowledged the limited research on postgraduate students' awareness and utilisation of AI technologies for research purposes. Asongo et al. (2024) argue that integrating AI technologies into higher education can provide researchers with deeper insights into learning processes and effective teaching methods. Furthermore, supervisors interviewed by Caillaud and Skec (2024) expressed a need to learn how to use AI ethically. This concern may stem from the fear that students might soon outpace their supervisors in AI proficiency (Caillaud & Skec, 2024).

In Nigeria, Asongo et al. (2024) found that peer networks served as an informal support system for learning about AI tools. Students relied on each other to share strategies and recommend tools for academic writing and research. Similarly, Chauke et al. (2024) reported that students in South Africa benefited from informal peer knowledge, especially in the absence of institutional training. These findings align with Caillaud and Skec (2024), who observed that peer and departmental culture influenced the legitimacy of AI use in European doctoral programmes. As some peers embraced AI, others felt more comfortable doing the same.

4.3.2 Organisational factors

Several studies emphasised the critical need for higher learning institutions to develop clear policies, guidelines, and regulations on the acceptable and ethical use of AI tools like ChatGPT in postgraduate research and thesis writing (Amer et al., 2025; Caillaud & Skec, 2024; Chauke et al., 2024; Dai et al., 2023). For example, in the study by Caillaud and Skec (2024), supervisors

and students from Europe (France, Sweden, Italy, Slovenia, and Croatia) highlighted the need for institutional regulations and explicit guidelines to ensure the proper and ethically acceptable use of generative AI. We also found that in South Africa, the University of Pretoria's Faculty of Health Sciences is guiding responsible AI use for postgraduate research (University of Pretoria, Faculty of Health Sciences, 2024). The institution has also provided a lecturer's guide, which offers practical strategies for the effective and ethical integration of generative AI into teaching (University of Pretoria, Faculty of Health Sciences, 2024). However, no provision is made for postgraduate supervision across disciplines. Researchers argue that contextualised policies and guidelines would set boundaries for AI use and address concerns related to academic integrity and responsible integration (Amer et al., 2025; Caillaud & Skec, 2024; Chauke et al., 2024).

Beyond individual self-learning, institutional training programmes can greatly support adoption. Universities that offer workshops on AI tools for research, provide documentation or helpdesks for AI software, or include AI modules in researcher development courses effectively equip their members to use AI. The literature frequently calls for such organisational initiatives. This construct also emerged as a strong predictor of the intention to adopt AI. For instance, Acosta-Enriquez et al. (2024), in their systematic review of AI acceptance in universities, suggest that training should be emphasised as an organisational strategy to leverage AI use. Additionally, Amer et al. (2025) highlighted that training is needed to use ChatGPT optimally.

4.3.3 Technical factors

Access to digital infrastructure, including personal devices, connectivity, and free online platforms, was a foundational enabling condition. In South Africa, Chauke et al. (2024) found that students used mobile phones and mobile data to access ChatGPT in the absence of institutional infrastructure. Similarly, in Nigeria, Asongo et al. (2024) reported that students utilised free AI tools, such as ChatGPT, Quillbot, and Elicit, without institutional licences. In China, Oubibi et al. (2025) observed a similar use of ChatGPT and Grammarly, both accessed externally from the university. The availability and affordability of these tools enabled students to integrate AI into their academic work, regardless of formal provision. In Indonesia, Habibi et al. (2023) identified facilitating conditions, including support for tools and infrastructure, as the most significant predictors of students' intention to adopt AI in learning.

8. Discussion of Findings

This study examined the factors that influence students' and supervisors' behavioural intentions to adopt AI, the facilitating conditions that enable actual use, and the policy implications for effective AI integration, particularly within South African higher education. The findings are discussed in relation to the four research questions that framed this study.

AI tools are increasingly being integrated to streamline various research activities. However, usage patterns differ between students and supervisors. Students leverage AI tools to initiate

their research, particularly for brainstorming topics and structuring initial drafts. In contrast, supervisors adopt a more cautious approach, using AI selectively to support tasks such as refining research methodologies, conducting literature searches, coding qualitative data, and managing administrative processes (Caillaud & Skec, 2024). Tools such as ChatGPT, Grammarly, and Quillbot are widely utilised to enhance grammatical accuracy, optimise clarity, and overcome linguistic barriers, particularly among students for whom English is a second or additional language (Chauke et al., 2024; Asongo et al., 2024). This observation aligns with the growing literature emphasising that AI tools are democratising academic writing by providing language support for English second-language learners (Wang & Wang, 2025).

The findings indicate that multiple factors shape the decision to adopt AI tools. The perceived usefulness of AI tools in expediting the research process emerges as a key driver of integration in academic settings. This supports the UTAUT model, which links performance benefits to technology uptake. Wang and Wang (2025) and Acosta-Enriquez et al. (2024) confirm that students value AI for speeding up research tasks and providing timely feedback, addressing gaps that traditional supervision cannot fill (Dai et al., 2023; Chauke et al., 2024). Performance expectancy emerges as the strongest predictor of AI use in higher education (Patterson et al., 2024).

Regarding the effort required to utilise AI tools, students generally find these tools user-friendly. Caillaud and Skec (2024) observe that while supervisors have some experience with AI tools, they often lack practical proficiency to apply them across various research activities. Effort expectancy plays a less significant role in academic writing contexts (Patterson et al., 2024). Despite widespread access, structured support remains essential to ensure the responsible and effective use of AI in academic writing (Ngoc et al., 2025).

Social influence emerges as another key driver of AI adoption in academic writing. In research environments where the responsible use of AI is endorsed by peers, students are more inclined to adopt AI tools (Funda & Piderit, 2024; Caillaud & Skec, 2024). Al-Bukhrani et al. (2025) argue that when influential figures, such as peers, supervisors, and the broader research setting, promote AI integration, perceived barriers are reduced, thereby encouraging student engagement. Supianto et al. (2024) also report a positive relationship between social influence and behavioural intention, reinforcing the crucial role of social factors in shaping students' willingness to use AI tools in their research. Cowling et al. (2023) emphasise that universities and research supervisors build students' competence in using AI tools by promoting digital literacy and guiding effective use in academic writing.

Individual-level facilitating factors can strongly predict AI integration in academic settings, particularly when supervisors and students are equipped with digital literacy and targeted AI training to use the tools effectively. However, any perceived difficulty in using these tools can negatively influence adoption decisions (Gandhi et al., 2024; Asongo et al., 2024; Caillaud &

Skec, 2024). In South Africa and Nigeria, informal networks have often compensated for the lack of institutional training, driving students' willingness to adopt AI tools (Asongo et al., 2024; Chauke et al., 2024). At the organisational level, institutions can promote AI adoption by implementing clear policies and guidelines on responsible use, alongside offering training and support to students (Acosta-Enriquez et al., 2024; Amer et al., 2025). Finally, technical factors, such as access to digital infrastructure and free online AI tools, are foundational. Even in the absence of institutional provision, students across Nigeria, South Africa, China, and Indonesia have used AI for research, highlighting the critical role of accessible technology and infrastructure in driving adoption (Asongo et al., 2024; Chauke et al., 2024; Oubibi et al., 2025; Habibi et al., 2023).

In Northern Nigeria, particularly in Benue State, many postgraduate students struggle with academic writing, information sourcing, and producing original work (Asongo et al., 2024). Consequently, this study proposes several policy recommendations for effective AI integration in higher education. It is suggested that faculty and departmental heads prioritise organising seminars and workshops to educate postgraduate students on the effective use of various AI tools to enhance their research skills (Asongo et al., 2024). Effective AI integration in higher education can be further improved through the development of students' technical and digital literacy skills, such as training students to use AI tools effectively and ethically in their academic endeavours (Oubibi et al., 2025). Thus, developing these skills helps postgraduate students utilise digital tools effectively, promoting academic engagement and improved writing (Oubibi et al., 2025).

Similarly, in South Africa, AI integration into postgraduate supervision remains largely informal and student-driven. One key implication is the necessity of establishing clear institutional guidelines on the ethical and pedagogical use of AI in research, as informal approaches risk deepening inequalities in access and usage (Chauke et al., 2024). Therefore, universities should develop comprehensive AI integration frameworks that include training modules, codes of conduct, and assessment guidelines to support both students and academic staff. Additionally, the digital divide across South African higher education institutions, particularly between historically advantaged and disadvantaged universities, calls for differentiated policy responses. Targeted investment in digital infrastructure, subsidised access to AI tools, and the inclusion of AI literacy within postgraduate orientation and research methods curricula are essential. Faculty development should also be prioritised.

Furthermore, institutional support must be extended to create a culture that promotes responsible innovation. Policies should encourage interdisciplinary collaboration and the formation of AI learning communities within faculties. These communities can serve as peer support platforms that normalise and disseminate best practices in AI usage. Finally, given the benefits of AI in addressing language barriers and promoting autonomous learning (Chauke et al., 2024; Oubibi et al., 2025), it is essential that South African higher education policies integrate

AI tools into broader academic support systems. This is particularly important for students from multilingual and historically under-resourced institutions, where language and access challenges continue to affect research participation and success.

9. Conclusions and Recommendations

The purpose of this study was to investigate the adoption of AI in postgraduate supervision across various disciplines and countries, utilising the UTAUT (Venkatesh et al., 2003) as a guiding framework. Furthermore, we examined how the constructs of UTAUT, particularly performance expectancy, effort expectancy, and social influence, influenced the behavioural intentions of postgraduate students and supervisors regarding the adoption of AI tools. Additionally, we identified the key facilitating conditions necessary for transitioning from intention to actual use and assessed the policy implications for effective AI integration into postgraduate supervision practices within South African higher education.

The findings indicated that performance expectancy was a strong predictor of the intentions of both supervisors and students to adopt AI in postgraduate supervision practices. Moreover, facilitating conditions such as AI literacy, peer support, clear institutional policies, training, and reliable access to infrastructure were identified as critical factors for actual adoption. Notably, it was observed that students, rather than supervisors, were at the forefront of the integration of AI into postgraduate supervision practices. Furthermore, AI was increasingly employed to address supervision gaps by providing students with immediate feedback and intellectual companionship when formal supervisory support was limited.

This study carries several social and practical implications. Socially, the findings underscore the potential for AI to democratise access to academic support, particularly for students in resource-constrained environments or those for whom English is an additional language. By bridging supervisory gaps and offering immediate feedback, AI tools can foster greater equity in postgraduate education. Practically, the study highlights the urgent necessity for South African higher education institutions to progress beyond informal, student-driven AI adoption towards the establishment of structured institutional frameworks that ensure the ethical, equitable, and pedagogically sound integration of AI into supervision practices.

Based on this, the following recommendations were made:

- Future researchers could conduct a qualitative study to investigate the limited use of AI by supervisors.
- Research could also focus on supervisors' perspectives, exploring their training needs and barriers to AI adoption.
- We recommend the development of comprehensive institutional frameworks that govern the ethical, pedagogical, and practical use of AI in postgraduate education.
- Universities should also establish clear guidelines, training programmes, and resource support systems that promote responsible AI use.

9.1 Limitations of the study

While this chapter provides valuable insights into the global utilisation of AI in postgraduate supervision, the constructs influencing behavioural intent, and the factors facilitating its implementation in these practices, it also highlights several limitations. Firstly, the research relied exclusively on secondary data, which, although rigorously sourced and reviewed, restricted the inclusion of practice-based experiences from supervisors and students. Secondly, the algorithms employed in generative AI tools may have influenced source selection through inherent biases or content prioritisation. Lastly, the absence of empirical data collection hindered the study's ability to triangulate findings with an alternative stream of data, which could have enhanced the contextual understanding of AI integration in supervisory practices.

10 Declarations

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Use of Artificial Intelligence: The current work was created with the assistance of artificial intelligence technologies (NotebookLM, Elicit.com, Scispace Deep review, ChatGPT Deep Research and Gemini Deep Research) to assist with locating, organising the literature and identifying common themes; language and grammar clarifications; and aligning references according to APA 7th, as confirmed by the authors.

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