

Supervision Skills of Supervisors in AI-enhanced Environments: Perspectives on Postgraduate Supervision

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Abstract: The use of AI by postgraduate students quickly changes supervisory relationships and requires new supervisory skills. This study examines the fundamental supervisory abilities needed to manage postgraduate students who integrate AI tools into their research work. It employs a qualitative research method based on exploratory phenomenology within an interpretive research paradigm to investigate supervisors' subjective experiences and perspectives in AI-integrated supervision environments. Ten purposively selected supervisors with experience in AI-enhanced settings provided data through semi-structured interviews. An analysis of the interview transcripts using thematic methods revealed consistent patterns and themes regarding supervisory competencies. Supervisors need to cultivate critical evaluation skills to identify students' overdependence on AI systems and learn how to detect AI-generated material that lacks originality by interpreting underlying meanings. Students require guidance from supervisors in learning essential research techniques, such as

literature searching and correct source attribution, to uphold academic integrity. The study emphasises the importance of supervisors mandating students to record their research steps and participate in evaluative discussions to test their understanding and ethical use of AI. Supervisory responsibilities must incorporate AI tools while simultaneously promoting independent critical thought and ethical principles. The study proposes specialised training programmes for supervisors to enhance their AI literacy and evaluation skills while also creating clear ethical guidelines for AI use in postgraduate research. Future research should investigate how AI integration affects supervisory relationships over time and develop scalable supervisor training frameworks suitable for various academic fields and institutional settings.

Keywords: Artificial intelligence, digital literacy, higher education, human-AI collaboration, postgraduate supervision, supervisory skills.

1. Introduction

AI integration in professional settings has significantly changed supervisory functions, especially within postgraduate supervision frameworks. The development of advanced AI systems that handle complex tasks has altered supervisors' traditional responsibilities. This chapter investigates the necessary supervisory skills for supervisors working in AI-powered environments. Effective supervision throughout history has depended on supervisors who possess deep knowledge and expertise in their tasks to guide and mentor students appropriately (Corey et al., 2020; Davys & Beddoe, 2020; Lee, 2019). Supervisory roles have transformed due to advancements in AI tools, resulting in new supervisors who often lack firsthand experience in task performance. The emergence of AI-driven operations raises essential inquiries about the

preparation needed for supervisors who lack direct manual task execution experience (Bainey, 2024; Bhadoriya, 2024; Le, 2024). The current body of research identifies multiple challenges faced when preparing supervisors to work in AI-enhanced settings. A learning gap emerges when supervisors have no prior experience with tasks before AI integration (Rajabi, 2023). The existence of this gap limits supervisors' capacity to solve problems and drive innovation within AI systems. Organisations should fund extensive training initiatives that develop supervisory skills for AI technology management while promoting a continuous learning atmosphere (George & Wooden, 2023; Jarrahi et al., 2023; Morandini et al., 2023). The Four Pillars of Oversight and Four Steps of Supervisory Flow frameworks illustrate how supervisors can integrate AI tools effectively while preserving necessary human oversight (Kyriakou & Otterbacher, 2023; Mack, 2023). Supervisory frameworks focus on oversight, improvement, empowerment, and harmonisation to ensure the ethical and productive use of AI tools. Postgraduate supervision requires a clear understanding and development of supervisory skills due to its growing intersection with AI technologies. Through targeted professional development and addressing educational deficiencies, educational institutions can equip supervisors to succeed in the changing academic landscape and enhance the quality of postgraduate education through AI integration.

AI adoption in professional work environments has altered supervisory practices across various settings, including postgraduate supervision. The development of AI systems for the automated performance of complex tasks has shifted the original functions of supervisors. This chapter examines the specific supervisory abilities that supervisors need to possess when working in AI-enhanced environments. Effective supervisory practices of the past required supervisors to have task-specific knowledge and competency to guide students through similar tasks (Corey et al., 2020; Davys & Beddoe, 2020).

Due to advancements in AI toolkits, supervisors have evolved, and new supervisors are often hired without prior experience in the tasks performed by the organisation. AI-enabled operations raise urgent questions about how to prepare supervisors who lack a background in the manual execution of tasks (Bainey, 2024). The existing literature on the topic has identified several limitations in preparing supervisors for work in AI environments. Supervisors in AI-based systems may experience a learning gap, a situation in which they have never performed the task before the adoption of AI (Dohotaru et al., 2025). This gap constrains supervisors' ability to troubleshoot problems and innovate within AI systems.

Organisations should invest in extensive training programmes that enhance supervisory skills for managing AI technologies and foster an environment that values continuous learning (Billiot, 2023). The supervisory frameworks underscore the skills needed for oversight, improvement, empowerment, and harmonisation to promote the responsible and effective use of AI systems. Postgraduate supervision requires clarity in knowledge and the development of supervisory skills as AI takes centre stage in research. Targeted professional development and efforts to bridge

learning gaps by educational institutions can better prepare supervisors for work in a changing academic setting, ultimately improving the quality of postgraduate education with AI.

1.1 Problem statement

The growing integration of AI technologies into research processes requires urgent analysis of their effects on supervisory relationships, supervisor skills requirements, and the quality of postgraduate education. According to current literature, multiple critical issues have been identified that emphasise this problem (Bolanos et al., 2024). The use of AI tools delivers substantial benefits through increased efficiency and support, but it also raises ethical issues that supervisors must handle carefully to guarantee responsible and effective use (Chauke et al., 2024; Cowling et al., 2023; Khalifa & Albadawy, 2024). Students risk losing critical thinking skills and originality because their dependence on AI-generated content prevents them from conducting thorough research (Kaitharath et al., 2024; Shah & Asad, 2024; Zhai et al., 2024). This reliance on AI prompts doubts about how supervisors can both encourage independent thinking and maintain academic honesty. The literature stresses that supervisors need to develop appropriate skills to effectively guide students in using AI responsibly (Sibiya & Mahosi, 2025). Supervisors must establish explicit guidelines for the use of AI tools so that these technologies support academic work rather than replace student effort (Chiu, 2024; Qutieshat, 2025; Ratnam et al., 2023; Walter, 2024). They need to reassess their conventional supervision skills to integrate AI literacy into their mentorship approaches. Postgraduate supervision requires that supervisors balance the use of AI technology while maintaining ethical standards. Supervisors serve as essential guides for students in evaluating AI-generated materials while helping them avoid common misuse (Alzubi et al., 2025; Li, 2024; Vetter et al., 2024; Wang et al., 2024).

The necessity for supervisors to handle new challenges effectively makes it essential to establish specialised training programmes that equip them with the requisite skills. Educational institutions can enhance supervisory preparation for postgraduate students by developing skills to manage the complexities introduced by AI within a supportive and ethical learning environment. AI is not only revolutionising how postgraduate research is conducted but also emerging as a potential issue that needs to be addressed in terms of supervision and integrity. If not properly guided, its application might have significant implications for the postgraduate research community. In the absence of intervention, AI could lead to an increased reliance on technology by researchers, compromising originality and critical thinking. This dependence, if not addressed, could result in a generation of scholars who prioritise convenience over intellectual rigor, potentially diminishing the overall quality of research. Furthermore, the integration of AI poses a challenge to the role of supervisors, as their traditional mentoring approaches may need to evolve to incorporate AI literacy and ethical considerations. Supervisors who fail to adapt to these changes may find themselves ill-equipped to guide students effectively. Ultimately, the unchecked use of AI might erode trust in postgraduate education, as institutions

that overlook the importance of addressing these challenges may risk producing graduates who lack both intellectual independence and a strong moral compass.

The study sought to answer the following question: *What pedagogical mentorship skills are essential for supervisors to guide postgraduate students in the ethical use of AI tools in academic research development?*

2. Methodology

A qualitative research method was used to explore supervisors' views on the necessary skills for postgraduate supervision within AI-enhanced settings. The researcher applied an interpretive paradigm to gain thorough contextual insight into supervisors' experiences with AI tool integration (Elbardan et al., 2017; Elliott & Timulak, 2005; Price & Smith, 2021). The study seeks to clarify the intricate supervisory skills and competencies required to supervise postgraduate students who use AI tools by examining participants' experiences. The qualitative research method emphasises understanding the creation of meaning alongside contextual interpretation (Hatch, 2023; Lim, 2024; Tisdell et al., 2025; Tracy, 2024). The researcher selected qualitative approaches because they generate comprehensive and in-depth understandings of participants' experiences and perspectives (Lim, 2024; Moser & Korstjens, 2018; Rosenthal, 2016). This method was utilised to identify subtle elements of supervision practices that quantitative research methods might miss. The study adopts the interpretive research paradigm, which aims to deliver a detailed understanding of supervisors' experiences and facilitates an in-depth examination of the contextual elements affecting supervision skills within AI-enhanced environments. It recognises that supervisors construct their experiences and meanings through social interaction and personal interpretation (Pervin & Mokhtar, 2022; Schwandt, 1994).

2.1 Research design

The study employed exploratory phenomenology, chosen for its aim to describe participants' lived experiences and the meanings they attribute to those experiences in naturalistic settings. This exploratory design provides a robust framework for uncovering detailed perspectives on the essential supervision skills required to manage AI-enhanced research environments while upholding academic integrity and student independence amid rapid technological evolution (Eppich et al., 2019; Naz et al., 2022; Ruslin et al., 2022). The phenomenological approach emphasises the essence of lived experience, highlighting the personal significance and subjective interpretation of one's experiences. This orientation facilitated in-depth and reflective inquiry into supervision, enabling the researcher to explore how supervisors interpret, negotiate, and enact integrity, autonomy, and ethical responsibility in their roles while supporting students in an era of swift technological advancement. The exploratory aspect is particularly suitable for contexts where existing theoretical models may be inadequate, allowing the researcher to contribute new insights and understanding related to AI-integrated supervision.

2.2 Sampling strategy

Purposive sampling was used to select ten supervisors with experience in supervising post-graduate students. These supervisors were chosen from three public universities in South Africa. Seven participants were drawn from two comprehensive universities, and three from one university of technology. In purposive sampling, researchers deliberately choose participants based on their relevance to the research goals (Campbell et al., 2020; Etikan et al., 2016). The selected participants contributed direct experience by sharing the skills that supervisors must possess when overseeing students in the realm of AI technologies in academic research. Including supervisors from different universities allowed the researcher to identify shared elements and distinct features in various AI integration scenarios within postgraduate research supervision. The variety of institutional backgrounds among participants demonstrates how organisational culture shapes supervision techniques during technological advancement. Analysing supervisors at different points in their careers provided insights into how their perspectives evolve over time amid rapid technological development. The researcher selected participants who met defined experience criteria in AI-enhanced environments to gather data that reveals detailed insights into real-world supervisory challenges. Purposive sampling facilitates a nuanced understanding by examining contextual elements such as disciplinary standards and institutional practices (Campbell et al., 2020; Robinson, 2024) that influence supervisors' methods in implementing new technologies, including generative models.

2.3 Data collection

Individual semi-structured interviews were conducted to collect data. These interviews offer a flexible research structure that allows participants to express their thoughts and experiences without being constrained by predefined limits (Iyamu, 2018; Karunarathna et al., 2024; Knott et al., 2022). Qualitative research produces detailed descriptions that reveal subtle aspects (Corbin & Strauss, 2014; Strauss & Corbin, 1998). Narrative-driven themes contribute to the development of theories regarding supervision skills in evolving tech environments, enabling the researcher to explore complex issues in modern postgraduate supervision.

2.4 Data analysis

The research applied thematic analysis to explore themes related to supervision skills by analysing semi-structured interview data. Transcripts underwent multiple examinations to detect initial patterns and impressions (Clarke & Braun, 2017; Lochmiller, 2021). The researcher utilised open coding to assign initial labels to sections of data, which were then organised based on their conceptual meanings before being compared to the full dataset (Clarke & Braun, 2017; Kiger & Varpio, 2020; Skjott et al., 2019). Thematic analysis operates within an interpretivist framework to explore the subjective experiences of participants in postgraduate supervision through AI tools (Braun & Clarke, 2023; Ozuem et al., 2022). By following this structured method, researchers can uncover recurring patterns across various experiences while

maintaining the ability to develop data through iterative processes (Braun & Clarke, 2022; Peel, 2020). This research investigates the crucial supervision skills needed in technologically advanced academic environments.

3. Presentation of Results and Discussion of Findings

This section included the presentation of the data and the discussion of the study's findings. The data presentation was categorised into themes and sub-themes. Three major themes emerged from the data, each with two sub-themes. Data were collected through semi-structured interviews with six women supervisors and four men, who were selected from two comprehensive universities and a university of technology in South Africa. One supervisor is a professor, three hold PhDs, and six supervisors have Master's degrees.

3.1 Critical Evaluation Skills

3.1.1 Subtheme 1: Detecting AI overreliance and limitations

The findings indicate that supervisors should develop a keen ability to discern when students are overly reliant on AI tools in their work. This involves understanding the capabilities and limitations of AI, as well as having a deep insight into the skills and abilities of their students. By reading between the lines, supervisors can identify instances where AI may be doing more than just assisting, potentially undermining the learning process or academic integrity. Participant four from comprehensive university one stated: *“Supervisors should be able to read between the lines to identify when AI is using their students especially knowing the ability of their supervisees”*. Participant one from the university of technology stated that when students struggle to provide accurate sources or authors for the information they present, it often indicates that they have relied heavily on AI without properly understanding or attributing the original sources. *“I check through in-text referencing, usually students who use AI improperly struggle to provide sources/authors, they cannot acknowledge the sources where they got the knowledge [...]”*.

3.1.2 Subtheme 2: Guiding processes and validation methods

From the outset, supervisors should guide students through the process of searching for relevant literature, which is a foundational step in academic research. Participant seven from comprehensive university two stated: *“From the beginning when guiding the student is to searching the literature and so forth and I think I've when I reach my students work, I can see this one where is this student reading outdated literature”*. Supervisors must have a comprehensive approach to ensuring that students understand and critically evaluate their research, especially when using AI tools. By requiring students to document their research process and engage in in-depth discussions, the supervisor aims to assess not only the final product but also the thought process and methodology behind it. Participant five from comprehensive university one shared the approach they use to address several key aspects: *“I require students to document their research process, including the prompts they use and how they validate AI-generated information. I also engage in in-depth discussions to*

assess their comprehension of their work? Supervisors must have a method that they use to detect improper use of AI in student work, focusing on in-text referencing and source acknowledgment.

The research data reveals the essential skill that supervisors possess to detect and handle AI tool misuse within academic settings. These findings align with those of Meinokat and Wagner (2022), which state that supervisors' ability to monitor and understand student behaviour enables them to identify potential digital tool misuse in academic contexts. Furthermore, the findings indicate that supervisors must develop strong detection skills to recognise excessive student reliance on AI by learning about AI capabilities and limitations while gaining an in-depth understanding of their students' abilities. The capacity to read between the lines is a crucial skill that supervisors use to identify situations where AI applications interfere with educational outcomes or academic standards. The findings emphasise the importance of recognising when AI becomes the dominant force in student interactions rather than serving the students. Sibiya and Mahosi (2025) discovered that effective supervision plays a critical role in shaping student writing abilities, as it helps students develop the skills necessary to critically assess literature.

The findings indicate that supervisors should begin by teaching students basic research procedures, including how to find relevant literature. Through this guidance, supervisors can identify emerging problems, such as the use of outdated literature, which suggests insufficient critical analysis of the content. Guiding students through literature research enables supervisors to determine whether students are critically analysing their sources or relying on AI-generated content. Supervisors employ targeted techniques to identify improper AI use by examining in-text citations and source acknowledgements. The inability of students to provide precise source details or author names demonstrates their excessive dependence on AI tools without understanding or attributing original sources.

Students who fail to correctly use AI struggle with citing sources or acknowledging the origins of their information. This highlights the necessity of preserving academic integrity so that students can demonstrate their unique critical thinking and personal effort in their work. Supervisors implement a comprehensive approach to ensure that students conduct critical evaluations of their research work. Students must keep records of their research activities and engage in detailed discussions to evaluate both their final outputs and the reasoning and methods that led to their conclusions. The findings support this approach by requiring students to maintain detailed records of their research process, including the validation of AI-generated data and participation in discussions to assess their understanding. This method enables supervisors to determine whether students use AI to enhance their learning or to substitute their own work with AI assistance. Barkley and Major (2020) noted that student learning assessment methods, such as maintaining research journals and participating in reflective discussions, reveal important insights into students' thinking patterns and academic honesty, allowing tutors to assess authentic student engagement.

3.2 Supervisors' pedagogical mentorship skills

3.2.1 Subtheme 1: Essential skills and proactive training

The supervisors must possess a combination of pedagogical skills to effectively guide students in a digital and technologically advanced academic environment. Participant six from the comprehensive university one outlined these skills: “*Supervisors need digital literacy, critical thinking, ethical awareness, and adaptability*”. The supervisors must train students in the responsible use of AI tools. By acknowledging that AI is an integral part of modern academic work, the supervisor emphasises the importance of teaching students how to use AI effectively and ethically. Participant two from the comprehensive university one stated: “*As such, I have to train them how to use it so that when using it they can use it appropriately [...]*”. The supervisors must guide students on how they can maximise the benefits of AI tools in their academic work. Participant seven from the Comprehensive University Two indicated that by providing guidance on effective AI use, supervisors can help students leverage technology to enhance their research, writing, and critical thinking skills. “*Where possible, supervisors should guide their students on how to use AI to make the best out of it*”.

3.2.2 Subtheme 2: Guidance strategies and integrity measures

Supervisors take a proactive approach to guiding students in their use of AI tools, emphasising the importance of critical thinking and scepticism when relying on AI-generated content. By discouraging full dependence on AI and highlighting the potential inaccuracies or lack of authenticity in AI-generated content, the supervisor aims to foster a balanced and responsible use of technology in academic work. Participant three from Comprehensive University Two stated: “*I totally discourage them from being fully dependent on AI. I even tell them that not all content generated by AI is true or authentic.*” The supervisor guides research students in developing their research focus, emphasising the importance of personal reflection and literature review. By initially focusing on a personal reflection of leadership challenges, the supervisor aims to help students identify a specific research gap related to their leadership experiences. This process is designed to ensure that students engage deeply with their topic and are less likely to rely on AI tools to bypass the reflective process. Participant eight from Comprehensive University Two shared how they help students to keep their research work original: “*So as a first step, I request my [...] students to write a reflection of their leadership challenge or gap; we work on that reflection until it reflects one specific challenge that relates to their leadership, after which I tell the student that they must now go and look for literature [...]*.” The supervisor manages plagiarism and ensures academic integrity in student work. A participant outlined that they allow students to write freely and then require them to generate a similarity index report; by doing so, the supervisor aims to educate students about the importance of original work while also providing them with tools to assess their own writing for potential plagiarism. Participant one from the University of Technology shared: “*Hence, I allow them to write freely; thereafter, they proceed to generate a similarity index report. Meanwhile, before this time, they*

are made to know that plagiarism is a grievous offence." Supervisors must be able to detect improper use of AI in student work, combining both qualitative analysis and technological tools. Participant ten from Comprehensive University Two shared that they examine writing patterns, check for inconsistencies in argumentation, and utilise AI detection software; the supervisor aims to ensure academic integrity and identify potential misuse of AI tools: *"To detect improper use of AI, I analyse writing patterns, check for inconsistencies in argumentation, and use AI detection software where necessary."*

The findings show that mentorship in teaching methods is essential for student use of AI tools and academic honesty. Navigating AI implementation in educational settings requires supervisors to demonstrate digital skills, critical thinking abilities, ethical understanding, and flexibility. According to the findings, these essential skills highlight the necessity for supervisors to guide students effectively in the responsible use of AI tools. Supervisors must possess technological pedagogical content knowledge to successfully integrate AI and other technologies into teaching, as this knowledge encompasses technical skills, pedagogical understanding, content expertise, and awareness of ethical technology use, as stated by Yue et al. (2024). Bansal (2023) argues that today's supervisors must teach students to use technology, such as AI, effectively to enhance their learning and academic performance, while also preparing them to thrive in technology-rich environments. The findings reveal that supervisors have the responsibility to teach students to use AI tools properly and effectively, as AI has become essential to contemporary academic work. AI will remain a permanent fixture, so students need to learn to utilise it appropriately. Students learn to apply theoretical principles in practical situations through clear expectation setting and practical training opportunities. Supervisors enable students to unlock AI's full capabilities, which enhances their research skills, writing abilities, and critical thinking.

The findings indicate that supervisors must guide students to use AI tools effectively for maximum benefit while preventing complete reliance on these technologies. According to Robert and Stanworth (2024), educators should instruct students in using digital technologies, including AI, in a way that promotes critical thinking, discernment, and agency, rather than merely relying on these tools, to foster informed and independent learning. The findings emphasise the need for critical evaluation and scepticism when using AI-generated content, as not all information produced by AI systems is factual or genuine. This balanced approach promotes ethical technology use while giving students authority over their research processes and analytical work. Educating students enables them to learn ethical standards and recognise the limitations of AI detection tools while emphasising the integrity of source acknowledgment. Supervisors guide research students in developing research focus through personal reflection and literature review, enabling them to engage deeply with their topics and preventing them from using AI to bypass the reflective process. Ogwueleka (2025) asserts that teaching students about academic integrity, proper citation methods, and the limitations of plagiarism detection

will help them understand ethical standards and responsible digital technology use, including AI-generated content. Supervisors uphold academic integrity by educating students about original work while managing plagiarism. They emphasise AI as a supplementary tool to human thought processes, enabling students to utilise AI effectively while preserving personal authorship and genuine work in their academic pursuits. Students should use academic sources to cross-check AI-generated insights to enhance their critical thinking abilities. Educational mentorship is essential for guiding students to responsibly apply AI tools and uphold academic integrity throughout their studies.

3.3 Adaptive communication skills

3.3.1 Subtheme 1: Proactive guidance and resource support

Supervisors must provide clear guidance to students on the appropriate use of AI tools in academic work. A supervisor advised that by actively addressing AI use rather than remaining silent, supervisors can ensure that students understand how to leverage AI responsibly and maintain academic integrity. Participant two from Comprehensive University One stated: *"I think also that supervisors must give proper guidance to students on the use of AI rather than keeping silent about the use of AI while students are using them."* Another supervisor supports postgraduate students in their use of AI tools by combining both personal guidance and institutional resources. By encouraging students to attend university-organised training sessions and sharing relevant materials with those who cannot attend, the supervisor ensures that students have access to a wide range of educational opportunities. Participant six from Comprehensive University One shared: *"I also encourage them to attend the AI training that is organised by the university and those who could not attend I make sure I share the slides and the information [...]."* Supervisors take a proactive approach to guide students on integrating technology into their academic work, particularly in tasks such as transcription, mind mapping, and writing enhancement. By encouraging students to use AI tools like transcription software and Grammarly, the supervisor aims to streamline their workflow, improve the quality of their work, and enhance their overall academic experience. Participant nine from the University of Technology echoed: *"I am encouraging my students to use AI tools when they transcribe their audio and video recordings from interviews or observations. [...]. I also encourage my students to use Grammarly to enhance their sentence construction and grammar [...]."*

3.3.2 Subtheme 2: Ethical use and authenticity emphasis

The supervisor emphasises the responsible use of AI as an aid to research rather than a replacement for critical thinking and originality. By providing guidance on ethical practices, proper citation, and validation of AI outputs, the supervisor ensures that students maintain academic integrity while leveraging the benefits of AI. Participant ten from comprehensive university two stated: *"I encourage students to use AI tools responsibly as research aids rather than substitutes for critical thinking. I provide guidance on ethical considerations, proper citation of AI-generated content, and distinguishing between AI-assisted work and original intellectual contributions. I also emphasise the need to*

validate AI-generated insights against peer-reviewed literature." Supervisors must commit themselves to ensuring that students engage authentically with their academic work, particularly in writing and research. Participant three from the University of Technology shared that they discourage the independent use of AI tools for writing research content; the supervisor emphasises the importance of maintaining academic integrity and sincerity in students' work. *"In terms of using AI tools to assist students with writing [...] their research, I do not allow them to use any tools independently. Like I said, I push them to engage with their work [...], because I feel that it is unethical; it takes away the sincerity of writing."* Participant four from Comprehensive University One encourages students to incorporate their own voice and understanding into their work; the supervisor aims to maintain the authenticity and originality of their research. *"I just tell my students that we need their voice to be in the project. [...]. I try to explain why we are doing the research, as it is not just AI that has to answer the research questions."*

The research findings demonstrate that adaptive communication methods are essential for providing personalised guidance to students based on their specific abilities and research requirements during the use of AI in academic settings. Supervisors provide vital direction regarding appropriate AI tool usage, ensuring that students maintain academic integrity while using AI technologies. Supervisors should engage in discussions about AI use instead of remaining silent to ensure that students learn about responsible AI practices. Postgraduate students receive support from supervisors through both individual mentorship and institutional resources. The findings illustrate this method, where supervisors motivate students to participate in university training sessions and distribute necessary materials to those who cannot attend. Access to diverse educational opportunities allows students to master ethical and effective AI usage. The 2024 study by Ellikkal and Rajamohan shows that supervisors who provide personalised guidance and adaptive communication enhance students' academic achievements and responsible digital technology use, including AI, by customising support to match each student's unique needs and abilities. Supervisors assist students with their academic work by addressing challenges such as outdated literature and restricted internet access.

The findings emphasise that supervisors need to recognise these challenges and provide necessary support by downloading and sharing reading materials to help students access essential resources for success. Supervisors actively help students incorporate technological solutions into their work, promoting the use of AI tools for activities such as transcription and writing improvement. The findings reveal how transcription software and Grammarly contribute to more efficient workflows while enhancing work quality. Effective supervisors identify students' various struggles and deliver specific assistance to tackle these difficulties, leading to better academic performance and encouraging the use of AI tools to improve student work. Supervisors emphasise that AI should support research activities but must not substitute for the essential processes of critical thinking and original creation.

Supervisors instruct students on maintaining academic integrity through ethical practices and proper citation while validating AI outputs. They advise against students using AI tools alone for research content creation, as these tools may undermine genuine student work. The use of independent AI for writing is unethical because it diminishes the sincerity of the work. Supervisors guide students to integrate their personal insights and voice into their research projects, helping to preserve their work's authenticity and originality. Students need to embed their voices into their projects while using AI tools to enhance human insight. The research findings indicate that adaptive communication plays a crucial role in helping students use AI responsibly while preserving their academic integrity and originality. According to Devaki (2025), supervisors must focus on academic integrity in student work while teaching the responsible and critical use of AI tools to ensure that technology supports rather than supplants human insight and original thinking.

4. Conclusions and recommendations

The study concluded that supervisors have been positioned as crucial gatekeepers who must navigate the interplay between technology and human intuition, ensuring that AI support does not override student autonomy. This places them in a pivotal role as protectors of the student experience, with mentorship serving as a critical safeguard against over-reliance on AI. The presence of distinct university types (comprehensive, traditional, technology-driven) and the strategies they employ suggest that contextual factors significantly influence how AI tools are adopted and integrated. This implies that a one-size-fits-all policy might not adequately address the diverse realities and resource gaps across different institutions, particularly in the South African higher education context. The convergence of all skills around the principle of academic integrity suggests that effective supervision requires a proactive and comprehensive framing of AI issues, from detection to training. This indicates a need to transform potential vulnerabilities into strengths, effectively preparing scholars for ethical leadership in an increasingly AI-influenced academic environment. The overarching inference from the entire study suggests a shift in the landscape of postgraduate supervision, where AI not only changes the tools available but also potentially alters the epistemology of supervision. This necessitates an ongoing effort in supervisor upskilling to model the behaviours and skills necessary for critical digital citizenship, which in turn shapes graduates who are equipped to ethically navigate AI in educational leadership and broader contexts.

Some of the major recommendations are presented:

- Supervisors need to acquire advanced evaluation skills that will help them identify excessive AI dependency while ensuring students display independent thought and original ideas.
- Supervisors should actively guide students through core research methodologies, including exhaustive literature reviews and correct source citation, to maintain academic standards.

- Supervisors must evaluate students' understanding and promote ethical AI practices by requiring documentation of the research process along with thorough discussion involvement.
- The effective supervision of contemporary postgraduate education relies on finding a balance between using AI tools and fostering independent critical thinking and ethical standards.
- Specialised training programmes need to be developed by educational institutions to enhance supervisors' understanding of AI systems and their ability to assess critically.
- Supervisors require training programmes that equip them with the necessary tools and strategies to guide students on the ethical and responsible use of AI technologies.
- Strict rules must be established regarding how AI should be utilised within postgraduate research initiatives.
- Research should focus on creating scalable supervisor training frameworks that meet the unique demands of AI in postgraduate supervision across different academic disciplines and institutional environments.

5. Declarations

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