CHAPTER THREE

Redefining Postgraduate Supervision in the Age of AI: Balancing Technology and Human Mentorship

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Abstract: The advent of technology, particularly the rapid advancement of Artificial Intelligence (AI), is posing significant challenges to traditional models of postgraduate student supervision, ranging from affective mentorship relationships to automated interactions. AI-powered tools such as ChatGPT, Grammarly, DeepSeek, and automated data analysis software provide unprecedented data support to students, thereby enhancing and automating routine tasks. Consequently, the role of supervisors in upholding the fundamental principles of mentoring, such as fostering critical thinking, creativity, and ethical inquiry, is being scrutinised in light of this technological shift. This chapter examines the challenges associated with the incorporation of AI into postgraduate supervision, investigating its impact on intellectual independence, academic integrity, and mentor-mentee dynamics. Through a comprehensive Systematic Literature Review, this conceptual paper identifies strategies for balancing AI-driven efficiencies with human-centred mentoring practices. Additionally, we address ethical considerations, power dynamics, and equity issues that arise within AI-mediated supervision. Our contributions suggest that while AI offers transformative potential, it is essential to preserve the human elements of supervision, empathy, intuition, and the capacity to inspire original thought. This chapter contributes to the ongoing conversation on redefining postgraduate supervision in the digital age, providing actionable insights for supervisors navigating the challenges and opportunities presented by AI.

Keywords: Academic integrity, Artificial Intelligence, critical thinking, ethical inquiry, intellectual independence, mentorship, postgraduate supervision.

1. Introduction

In the contemporary academic landscape, universities worldwide are considering policies regarding the ethical and responsible use of Artificial Intelligence (AI), particularly in balancing its use with human effort during learning (Omodan, 2025). Generally defined, artificial intelligence refers to a machine's capacity to reason, communicate, and function autonomously in both known and unfamiliar situations, similarly to a human (Du-Harpur et al., 2020). This means that tasks performed by a human being can also be executed by AI. In the context of this chapter, all the supervisory tasks that a supervisor undertakes during the student supervision process can likewise be performed by AI. These tasks include student supervision and mentorship. The adoption and integration of AI in student supervision, particularly at the

postgraduate level, have ushered in new paradigms and reshaped traditional mentorship models. The advent of AI has led to greater confusion about acceptable conduct or codes of behaviour between mentors and mentees during the research process. Consequently, institutions of higher education have mandated that new supervisors undergo training before supervising students, while even qualified supervisors are required to participate in continuing professional development (Mpofu & Madlela, 2024). The current initiative by most higher education institutions to provide courses for student mentors is critical, as supervision involves not merely checking the student's writing but also guiding them through intricate research projects that foster critical thinking and encourage academic growth (Eley & Jennings, 2005), which can be challenging if a mentor lacks exposure.

Before the introduction of AI, it was the mentor's responsibility to shape the academic and professional trajectories of their mentees, providing tailored feedback, emotional support, and career advice (Whitcomb, 2025). In a study by Bouzar et al. (2025) examining how postgraduate students perceive ChatGPT-generated feedback compared to traditional supervisory feedback, the authors found that supervisory input is appreciated for its contextual relevance and level of engagement, while AI-generated feedback is gaining popularity due to its ability to provide quick and consistent evaluations. The literature reviewed indicates that supervisors and mentors may not be readily accessible to their students, and their feedback may not always be clearly noticeable. Paradoxically, engaging with supervisors is a crucial element of learning (Li et al., 2025). In contrast to supervisory feedback, AI-generated feedback is regarded as understandable and readily available whenever needed (Nazaretsky et al., 2024). A balancing act is urgently needed to bridge the human touch with technology. Over the years, postgraduate student supervision has consistently been characterised by a deeply personal and rigorous practice (Ringo, 2025). In this chapter, we examine the intricate nuances of integrating AI into postgraduate supervision while preserving the essential human elements of supervision and mentorship.

Previous studies that have explored the use of AI in student supervision have shown a convergence of views on its usefulness as a tool for mentorship in education. The studies seem to agree with Kulhavy and Wager's (1993) triadic feedback model, as cited by Bouzar et al. (2025), which posits that feedback serves a multilateral function: to keep mentees motivated through response reinforcement, to inform mentees by providing corrective avenues, and to enhance feedback by associating correct responses with prior stimuli. Kulhavy and Wager (1993) suggest that supervision at the postgraduate level extends beyond mere academic guidance to involve the development of mutual trust, understanding the mentee's goals, and providing holistic support. This holistic support entails in-depth intellectual engagement, where ideas are exchanged, challenged, and refined. As previously indicated, this engagement is crucial for developing critical thinking and creativity (Bouzar et al., 2025; Matobobo et al., 2025). Therefore, we posit that the foundation of mentorship is rooted in human connection. Supervisors possess

a wealth of experience, wisdom, and empathy that AI cannot replicate. A study by Thong et al. (2025) aimed to investigate how GenAI facilitates the doctoral supervision process, concluding that AI is an effective collaborative tool between the learner and the supervisor. Collaboration in supervision can take various forms, ranging from automated feedback and task management to research mentorship, literature discovery, and collaborative writing and editing (Maor et al., 2016; Lee, 2019). Mentees will spend less time addressing grammatical, structural, and other aesthetic issues in their work. As suggested by Choudhary et al. (2024), when feedback is automated, mentees are freed from the onerous, tedious, and repetitive tasks that are synonymous with traditional mentorship in student research.

Another study by Dai, Lai, Lim, and Liu (2023) examined the impact of ChatGPT, one of the most popular AI tools, on functional enculturation, critical thinking, emancipation, and relationship development during the mentorship process. Their findings reveal that the relationships and roles of mentees and mentors are being transformed by AI, with the mentee transitioning from a mere research apprentice to an independent researcher, while the mentor is tasked with providing strategic direction for the collaboration and research. In the traditional model of student supervision, the mentor typically dominates the relationship, with the mentee following the mentor's instructions. Mentors who have been supervising mentees for a long time may find it difficult to accept the autonomy of their mentees. This is a natural instinct; any change that threatens the sovereignty of mentor power is likely to be resisted. While this is true, some mentors will find the use of AI to be innovative and effective (Choudhary et al., 2024).

AI is proving to be a disruptive tool in student supervision, bringing efficiencies and effectiveness (Halagatti et al., 2023). AI feedback is popular for its speed, consistency, and data-driven insights. It can quickly identify errors in the mentee's work, suggest workable improvements, and provide detailed analyses based on predefined criteria (Thong, Atallah, Islam, Lim, & Cherukuri, 2025). This can be particularly useful for the technical aspects of research, such as statistical analysis or coding. It is evident that the benefits of AI are two-pronged; firstly, it can help the mentee attain independence by utilising AI tools in both the research process and self-management. Secondly, it can assist the mentor in organising the mentoring process effectively and managing their diary properly. However, the impact of physical interaction between a mentee and mentor cannot be underestimated. Face-to-face meetings are essential for detecting non-verbal communication, building mentor-mentee relationships, and facilitating spontaneous, unplanned discussions. If the mentor can detect non-verbal cues during physical meetings, it is easier to manage the mentee's emotions and offer reassurance where appropriate. Finding a balance that integrates AI mentorship with traditional supervision is critical to addressing paradigm shifts in student mentorship.

In other arguments, Bouzar et al. (2025) suggest that the traditional mentee-mentor relationship, which is neither influenced nor enhanced by AI, is effective in promoting engagement. The mentee is able to interact with the mentor in real time. The premise is that apprenticeships are

the best way to learn; in this context, the mentee acts as an apprentice to the mentor, who oversees the entire research process. In the traditional model of the mentee-mentor relationship, it often took a long time for the mentor to provide feedback to the mentee. Planning was also difficult, as the mentee had to physically travel to meet the mentor on campus. Mentors hold more power, and as a result, the relationship between mentor and mentee can sometimes be toxic (Dai et al., 2023; Paulsen & Schmidt-Crawford, 2017). Aymen and Zakarya (2024) argue that AI-generated solutions lack originality. AI tools have gained fame for their speed and accuracy in problem-solving. However, concerns about relying too heavily on AI are likely to impact the development of cognitive skills required in the current job market, including critical thinking and problem-solving (Chang et al., 2024; Wright, 2024). The growing use and overdependence on AI may produce cohorts of graduates who could face challenges in utilising their mental faculties to solve problems or engage in meaningful academic debate.

1.1 Problem statement

The advent of AI is rapidly disrupting postgraduate supervision in the higher education sector. As a result, many institutions are facilitating its adoption and use to prepare for the fast-approaching market changes (Hutson et al., 2022). While some universities are accelerating the use of AI, others are conflicted by the complexities of its responsible and ethical application (Slimi & Carballido, 2023). Although the adoption of AI may seem plausible at face value, the reality tells a different story. Traditional models, which emphasised close, personalised mentorship between mentees and mentors, are being challenged by the integration of AI tools that can outline research designs, author articles, analyse data, and manage projects. While AI offers efficiency and easy access to knowledge, its adoption poses a threat to the human factors essential for critical thinking and ethical reasoning. The current discourse on the use of AI in higher education lacks substantive frameworks for balancing its use with human mentorship. There is a risk of eroding the gains, depth, and quality of postgraduate research that has been achieved over the years through traditional human mentorship. Furthermore, these conflicting paradigms present challenges to policymakers and higher education institutions regarding the direction to take on AI adoption and its use.

1.1.1 Research question

The study is guided by the following research question:
How can postgraduate supervision models be restructured to balance AI tools with human mentorship?

1.1.2 Theoretical underpinnings: Connectivism approach

This study is grounded in Connectivist Learning Theory, which was introduced by George Siemens in 2004 and published in 2005. Connectivism offers a theoretical framework for understanding learning in technology-mediated environments, characterised by interconnected nodes, dynamic networks, complexity, and openness (Siemens, 2005; Goldie, 2016). The authors argue that learning occurs when learners connect, share, interact, and collaborate with members

of a network community. AI has the capacity to stimulate self-learning and collaboration with others, which determines and redefines the extent of the supervisor's involvement in the student's work. Siemens (2004) posits that, under connectivism, the knowledge repository continues to grow due to the extensive use of technology, which serves as a source of up-to-date information. The arguments presented by both Siemens (2005) and Goldie (2016) are predicated on the importance of networks and distributed knowledge. Knowledge is no longer confined to the minds of individuals but is distributed across technological networks and databases. However, the authors also contend that connectivism may not be an appropriate standalone approach, as it focuses on how learners utilise digital technologies and interact with peers to acquire and build knowledge. In the context of the current study, AI can be viewed as a node in the student's learning network, while emphasising the supervisor's role in curating and validating learning paths. The implementation of AI in supervision can be seen as chaotic.

Connectivism has been criticised by Verhagen (2006) for its philosophical deficiencies. Although the advent of technology is shaping how humans can acquire knowledge through databases or connections, proponents of connectivism do not adequately explain how people 'come to know' (Clara & Barbera, 2013). Kop and Hill (2008) present a similar argument, suggesting that knowledge-making and transfer have not been sufficiently explained within the connectivist perspective. The availability of knowledge repositories, which are largely accessible across various networks, may diminish the importance of knowledge-making as long as learners know where to find the information when needed. When learners are aware of when to seek knowledge, interaction with tutors or supervisors is limited if they can navigate through knowledge repositories or learning networks to find what they are looking for. The assumption that where there is a network, there is learning is unsustainable; there are instances of learning where the supervisor's role is indispensable. The empathetic nature of human supervisors in addressing student queries makes AI a more complementary tool than a definitive one for learning.

2. Methodology

This study employed a qualitative approach and a systematic literature review (SLR) to explore how AI is influencing mentor-mentee relationships and supervision practices in postgraduate education. A qualitative approach was chosen because it is best suited to capturing the depth and complexity required to redefine supervision models in an AI-infused academic environment. The systematic literature review rigorously analyses existing research on AI's role in postgraduate supervision, ensuring a comprehensive and unbiased synthesis of diverse perspectives. The SLR methodology enables the identification of key trends, gaps, and best practices, providing a strong evidence base for redefining mentorship in the AI era. According to Okoli and Schabram (2010), the evaluation of scholarly works ensures transparency, reproducibility, and actionable insights for academia and policymakers.

2.1 Search strategy

A systematic search was conducted across three electronic databases: Scopus, Web of Science, and Google Scholar. These databases were selected for their comprehensive coverage of peer-reviewed literature in education, technology, and interdisciplinary research relevant to postgraduate supervision. To ensure consistency across the databases, the search strategy combined key concepts related to postgraduate education, supervision, mentorship, and artificial intelligence. Boolean operators were used to refine and broaden the search where appropriate.

For Scopus, ERIC, and Web of Science, the following search string was applied: (postgraduate) AND (supervision OR mentorship) AND (AI OR "artificial intelligence"). This search yielded 15 articles in Scopus and 48 articles in Web of Science, all published between 2020 and 2025. For Google Scholar, a more specific phrase-search approach was employed to manage the higher volume of indexed material: ("postgraduate supervision") AND ("artificial intelligence"). This search produced 415 results. All retrieved articles were exported for screening, and duplicates were removed prior to the eligibility assessment stage.

2.1.1 Inclusion criteria

The study was guided by the following inclusion criteria:

- Articles focusing on postgraduate supervision or mentorship
- Articles focusing on the use of AI technologies in postgraduate supervision
- Articles focusing on the integration, benefits, challenges, or risks of AI technologies in postgraduate supervision
- Articles are peer-reviewed
- Articles are written in the English language.
- Full articles are available online

The study generated a total of 478 articles across the three databases, as shown in Figure 1. After removing 32 duplicate articles, 446 articles remained. An initial screening of these 446 articles was conducted using their abstracts and titles. From this screening, 429 articles were excluded for not meeting the inclusion criteria, leaving only 17 articles that met the criteria. A detailed analysis of these 17 articles was performed. Five articles were excluded because they did not focus on AI technologies, and two were excluded as they did not pertain to postgraduate supervision. Consequently, only 10 articles met the inclusion criteria. As the studies were insufficient for the research, additional studies were sought from other Google search engines using the search string (postgraduate) AND (supervision OR mentorship) AND (AI OR "artificial intelligence"). Five studies met the inclusion criteria and were added to the research. Ultimately, 15 studies were included in the final analysis.

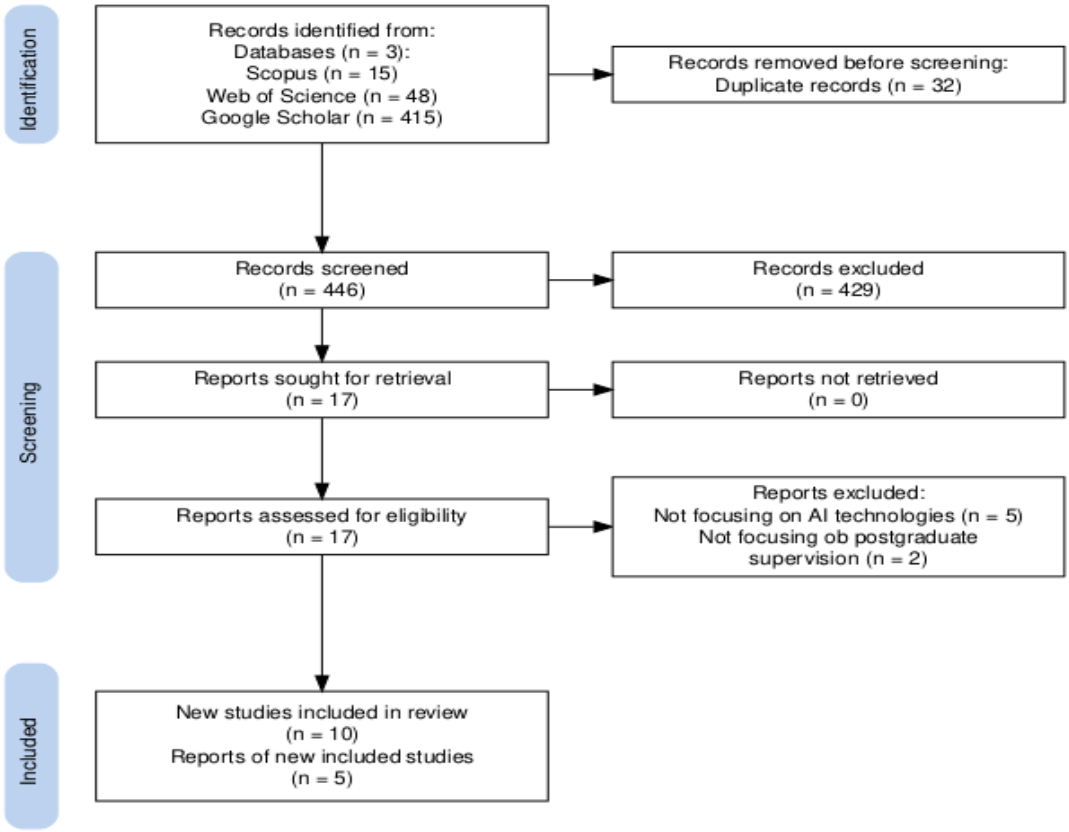

Figure 1: *PRISMA flow diagram*

The 15 articles included in the study were analysed using ATLAS.ti. Thematic analysis was conducted following the six steps recommended by Braun & Clarke (2006). The first step involved the authors familiarising themselves with the data. The second step entailed developing initial codes relevant to the study. The third step consisted of identifying themes by merging the generated codes. The fourth step focused on refining the themes. The fifth step required describing and naming the themes by generating distinct meanings for each one. The sixth step involved reporting on the gathered themes, which are presented in the subsequent section.

3. Presentation of Results

The results are presented in the form of themes. The chapter generated five themes and 23 codes, as shown in Table 1.

Table 1: *Themes and codes*

Theme	**Codes**
Power dynamics and trust in AI-mediated Supervision	AI as disruptor Fear of academic dishonesty Shifting power balances Need for transparency Ethical vigilance
Role of transformation in the AI era	AI handles routine tasks

	Supervisors focus on strategy Students gain autonomy AI as "third wheel" vs collaborator Virtual mentoring
Implementation challenges and systemic barriers	Lack of institutional policies Need for training Ethical concerns Cultural adaptation needs
Optimal integration models	AI for efficiency Humans for quality Task-technology fit Critical engagement
Complementing Human Support and AI in Mentoring	Emotional support Contextual understanding Critical thinking Bias mitigation Ethical oversight

3.1 Power dynamics and trust in AI-mediated supervision

This theme captures the fundamental tensions that arise as AI becomes embedded in postgraduate supervision, reshaping long-standing power relations, trust expectations, and supervisory roles. The integration of AI tools, particularly conversational systems such as ChatGPT, has disrupted traditional postgraduate supervision by altering the power dynamics and trust between students and supervisors. Studies show that students fear being penalised for using AI tools, while supervisors are concerned about reputational risks, compromised academic integrity, and the possibility of students submitting work without attribution (Harding & Boyd, 2024; Wright, 2024). As a result, AI frequently becomes a concealed "third wheel" in the supervision process rather than a transparently negotiated support tool (Wright, 2024).

Evidence across the reviewed studies demonstrates that covert AI use significantly alters power dynamics. Boyd and Harding (2025) reveal that doctoral students increasingly use AI as an "invisible tutor" or "safety net" to avoid criticism, effectively shifting epistemic authority away from supervisors and creating, in their view, a "sinister power behind the scenes." This hidden reliance complicates trust and undermines the relational foundation of supervision, particularly because supervisors are often unaware of the extent to which AI is used. Mbodila (2025) similarly notes a shift in the supervisor's role from primary knowledge provider to facilitator of critical AI use, which diffuses traditional authority and raises new integrity concerns.

Transparency emerges as a central mitigating principle. Iatrellis et al. (2025) argue that AI involvement in supervision must be "visible and accountable," warning that non-disclosure threatens ethical authorship practices and relational trust. This aligns with broader ethical concerns highlighted by Köbis and Mehner (2021), who emphasise that AI systems introduce opacity and algorithmic influence into mentoring relationships, contexts that require exceptionally high levels of trust. Jensen et al. (2025) add further nuance by showing how AI redistributes agency in feedback processes. Students gain more control during chatbot

interactions, as chatbots follow the user's agenda, whereas supervisors exercise traditional authority by redirecting attention and shaping scholarly engagement.

Overall, these dynamics highlight an emerging landscape of ethical vigilance (Dai et al., 2023), where supervisors must monitor issues such as fabricated references, biased outputs, or inappropriate reliance on AI (Segooa et al., 2025), all while operating without clear institutional policies or shared norms. Collectively, the studies indicate that the introduction of AI into postgraduate supervision reconfigures trust, destabilises established hierarchies, and requires deliberate strategies of transparency, guidance, and ethical oversight to maintain a healthy supervisory relationship.

3.2 Role of transformation in the AI era

The results indicate that AI integration is reshaping postgraduate supervision by altering the roles of both students and supervisors. AI tools, such as ChatGPT, enhance student autonomy by supporting self-directed learning and assisting with routine tasks, including grammar checks and idea generation (Sim et al., 2023; Dai et al., 2023). This shift allows supervisors to concentrate on higher-order academic guidance, such as refining research questions, ensuring methodological rigour, and fostering critical engagement, rather than spending time on technical editing (Dai et al., 2023; Mbodila, 2025). The transformation of supervisory roles is further emphasised by Mbodila (2025), who argues that supervisors now function as "AI literacy mentors," responsible for promoting ethical AI use, maintaining academic integrity, and preserving the human element in supervision. The supervisory relationship increasingly resembles a balanced triad, where the student, supervisor, and AI each contribute distinct expertise (Dai et al., 2023; Iatrellis et al., 2025). Iatrellis et al. (2025) formalise this shift through the tripartite mentoring model, in which AI provides scalable support, supervisors offer domain expertise and ethical oversight, and students engage critically with AI outputs. From the student perspective, AI is sometimes perceived as a surrogate mentor, offering emotional, exploratory, and pedagogic support, thereby reshaping expectations of the supervisor (Boyd & Harding, 2025). Jensen et al. (2025) further distinguish the complementary strengths of humans and AI, noting that chatbots excel at immediate, task-focused assistance, while supervisors remain essential for developmental, relational, and context-rich feedback. Collectively, these insights demonstrate that, although AI supports emerging hybrid and virtual supervision practices, it cannot replace the supervisory functions founded on pedagogical intention, identity development, and care (Dai et al., 2023; Jensen et al., 2025).

3.3 Implementation challenges and systemic barriers

AI in postgraduate supervision faces multifaceted implementation challenges and systemic barriers that span policy, ethics, training, and institutional culture. Studies reveal three institutional shortcomings. First, persistent policy gaps leave supervisors without clear standards for evaluating AI-assisted work (Wright, 2024). Second, inadequate training limits supervisors'

readiness to integrate AI meaningfully into their pedagogy (Cowling et al., 2023). Third, cultural adaptation challenges, especially in Global South contexts where students already face resource constraints, further magnify inequitable access to AI tools (Segooa et al., 2025). These barriers intersect with detection difficulties, as institutions often lack the tools to detect sophisticated AI use, resulting in enforcement dilemmas and highlighting a sector struggling with AI integration (Wright, 2024). Further evidence shows that the covert and unacknowledged use of AI, driven by unclear institutional guidelines and the stigma surrounding AI, creates fear, confusion, and a reluctance among academics to openly discuss best practices (Boyd & Harding, 2025). Ethical and practical risks, such as over-reliance on AI, academic integrity violations, limited AI literacy, and the absence of robust supervisory policies, all contribute to a substantial implementation gap between identifying problems and developing institutional responses (Mbodila, 2025). Ethical concerns extend to data privacy, algorithmic bias, and the wide variability in prompt-engineering competence, which restricts the effectiveness and reliability of AI-supported feedback (Iatrellis et al., 2025; Jensen et al., 2025). Broader systemic tensions further complicate adoption, including conflicting institutional priorities, financial constraints, and disciplinary divides, where educators may overlook technical risks while AI developers may underestimate pedagogical ethics (Köbis & Mehner, 2021). Collectively, these findings demonstrate that while AI holds potential value for postgraduate supervision, its integration is hindered by intertwined policy, ethical, technical, and cultural barriers that institutions have yet to adequately address.

3.4 Optimising hybrid supervision models

To utilise AI effectively, it is essential to tailor the technology to the specific task at hand. For example, the use of Elicit can streamline literature discovery while allowing students to focus on deeper conceptual development (Segooa et al., 2025). However, AI outputs must be approached critically, as studies show that students should not accept responses at face value due to the risk of inaccuracies (Sim et al., 2023) and fabricated citations, which require human oversight and correction (Bouzar et al., 2023). Ethical safeguards remain central, particularly in preventing bias and ensuring responsible use (Cowling et al., 2023). Existing evidence also suggests that AI can help balance the supervisory workload by providing timely support for routine tasks (Iwashokun & Ade-Ibijola, 2022; Serek & Zhaparov, 2024). However, scholars caution against overreliance, which may make the research process feel overly mechanistic and detached (Dai et al., 2023).

Beyond tool-use guidance, several studies propose structured frameworks for integrating AI into supervision. Iatrellis et al. (2025) introduce the Tripartite Mentoring Model, grounded in principles such as complementary roles, collaborative dialogue, transparency, AI literacy, and ongoing evaluation, framing supervision as a coordinated interaction between student, supervisor, and AI. Similarly, Boyd and Harding (2025) argue for shifting from a covert "third wheel" model to openly giving AI a "seat at the table," emphasising the need to avoid hidden, unacknowledged AI use. Mbodila (2025) recommends a hybrid model in which AI functions as a supplementary research assistant while human supervisors retain responsibility for nurturing

creativity, critical thinking, and methodological rigour. From an ethical design perspective, Köbis and Mehner (2021) propose an interdisciplinary checklist that integrates AI ethics (e.g., transparency, robustness) with mentoring ethics (e.g., confidentiality, beneficence), encouraging the adoption of value-sensitive and stakeholder-inclusive AI. At the practical user level, Jensen et al. (2025) provide guidance such as using chatbots to prepare for meetings, ask questions, validate understanding, and translate complex material, while stressing that relational pedagogies must guide integration and that AI systems cannot assume supervisory responsibility.

3.5 Complementing human support and AI in mentoring

This theme affirms the irreplaceable role of human expertise in postgraduate supervision while highlighting the complementary value of AI. Studies consistently show that human supervisors provide emotional support, psychosocial guidance, relational depth, and contextualised scholarly judgment—qualities that AI cannot replicate (Bouzar et al., 2025; Cowling et al., 2023). Human supervisors also engage in critical thinking to mitigate algorithmic bias and ensure ethical decision-making, positioning them as guardians of academic integrity in an AI-mediated research environment (Harding & Boyd, 2024; Cowling et al., 2023). Several studies explicitly emphasise that AI should augment, not replace, human mentorship. Iatrellis et al. (2025) describe a tripartite model in which AI handles scalable, time-consuming tasks, such as generating initial recommendations, thereby freeing supervisors to focus on high-level intellectual guidance and ethical oversight, while students synthesise insights from both sources. Similarly, Mbodila (2025) stresses that AI remains a supplementary tool; the emotional support, trust-building, creativity nurturing, and personalised academic feedback provided by human supervisors are irreplaceable. Empirical evidence from Boyd and Harding (2025) suggests that although AI can temporarily fill certain support gaps, such as providing immediate clarification or reassurance, it does so only superficially. Instead, institutions should use this insight to reinforce areas where human engagement is most needed. Jensen et al. (2025) further reinforce this complementary relationship, demonstrating that chatbots are effective for instrumental, task-focused assistance, whereas supervisors provide developmental, identity-shaping, and relational feedback. Collectively, these studies underline that AI can enhance supervision efficiency, but the essence of mentorship—the human connection—remains central and indispensable.

4. Discussion of Findings

This study aimed to explore how postgraduate supervision models can be restructured to balance the use of AI tools with human mentorship. This scoping review identified five consistent themes across the literature:

- Power dynamics and trust in AI-mediated supervision
- Role of transformation in the AI era
- Implementation challenges and systemic barriers
- Optimising hybrid supervision models

- Complementarity of human support and AI in mentoring

These themes reflect a complex and evolving landscape where AI is reshaping traditional supervisory relationships, roles, and systems, prompting both opportunities and ethical considerations.

AI in supervisory roles raises concerns about power and trust. The reviewed literature has shown that trust in such systems largely depends on transparency, fairness, and ethical design (Kulhavy & Wager, 1993). Human oversight is thus essential to ensure that AI enhances rather than undermines the relationship between students and mentors at postgraduate levels (Jensen et al., 2025). Undoubtedly, students are more likely to trust AI, while supervisors, who may already be familiar with concerns about the algorithmic bias of models as reported in academic circles, may attempt to trust AI within limits. Without careful safeguards, the supervisory relationship risks becoming impersonal or coercive.

Our reviewed articles have demonstrated the potential of AI to transform the role, with most routine processes now achievable through the technology (Dai et al., 2023; Mbodila, 2025). Although this transformation has been noted, it has also created new demands for supervisors to acquire digital skills to critique AI output. This study anticipates potential tensions between management and supervisors, particularly regarding workload expectations, as management may assume that AI will enable significantly higher output. There is a growing sense of uncertainty surrounding AI integration, as institutions are hastily developing policies in response—an approach that risks premature implementation and insufficient stakeholder engagement (Wright, 2024; Matobobo et al., 2025). Notably, divergent perceptions of AI integration are emerging across academic platforms, including conferences and peer-reviewed journals, reflecting a lack of consensus within the scholarly community (Boyd & Harding, 2025).

While our findings suggest that AI is for efficiency and humans for quality, resulting in a balance, the quality teams in most universities may have different perceptions, adding another layer of complexity to the hybridisation process. The findings underscore the importance of striking a balance between human and AI support for emotional well-being, which is particularly crucial in supervisory contexts (Iatrellis et al., 2025). There are times when the mentee requires emotional support during the supervision process that AI cannot offer (Mbodila, 2025). An aspect that did not emerge in the findings is the position of contract writers. This study suggests that AI has the potential to alleviate the growing, yet often unspoken, challenge of contract writing in academic institutions, enabling students to complete tasks that were previously difficult to accomplish within limited timeframes (Sim et al., 2023; Dai et al., 2023). Given the rapid advancement of AI technology, current limitations may prove to be short-lived, as ongoing developments are likely to address many of the tool's perceived shortcomings in the near future. In summary, the lack of compassion in AI limits its ability to comprehend human emotions, often resulting in harmful or insensitive outcomes. This shortfall undermines trust and poses a barrier to the technology's broader acceptance and effectiveness.

5. Conclusions

This chapter examined the potential restructuring of postgraduate supervision models to achieve a balance between the integration of artificial intelligence (AI) tools and the enduring value of human mentorship. Guided by connectivist theory, the study conceptualised AI as an additional "node" within the supervisory relationship, rather than as a replacement for the supervisor. The findings from the systematic review reveal that postgraduate supervision is currently undergoing a transitional phase, characterised by shifting power dynamics, evolving roles of supervisors and students, and an increasing emphasis on trust and ethical responsibility within AI-mediated academic environments.

Across the reviewed literature, five themes emerged: power dynamics and trust in AI-mediated supervision, the role of transformation in the AI era, implementation challenges and systemic barriers, the optimisation of hybrid supervision models, and the complementarity of human support and AI in mentoring. Collectively, these themes underscore that while AI offers efficiency, scalability, and on-demand academic support, it cannot replicate the relational, developmental, and ethical dimensions of supervision. Human supervisors remain central to providing psychosocial support, exercising scholarly judgment, and safeguarding academic integrity. The study, therefore, contributes to both practice and theory by demonstrating that effective postgraduate supervision in the AI era relies on hybrid models that intentionally integrate AI capabilities with human-centred supervisory practices.

5.1 Recommendations

Based on the findings of this study, the following recommendations are proposed for higher education institutions, supervisors, and policymakers:

- Institutions could formally adopt hybrid supervision models that recognise AI as a complementary support tool while preserving the primacy of human mentorship. Such models should clearly define the respective roles of supervisors, students, and AI systems to prevent over-reliance on technology and to maintain accountability.
- Supervisors could be encouraged to participate in Continuous Professional Development (CPD) programmes focused on the pedagogically sound and ethical integration of AI in supervision. These programmes should address issues such as bias detection, ethical oversight, feedback practices, and managing power dynamics in AI-enhanced supervisory relationships.
- Higher education institutions must develop and enforce clear policies and guidelines governing the responsible use of AI in postgraduate research and supervision. These policies should clearly articulate the uses of AI, outline expectations for transparency, and establish mechanisms for maintaining academic integrity.
- Future research should expand beyond English-language studies to reduce geographic and linguistic bias and to capture perspectives from underrepresented regions. Empirical

studies examining the long-term effects of AI-assisted supervision on student agency, trust, and academic identity would further strengthen the evidence base for informed policy and practice.

6. Declarations

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Use of Artificial Intelligence: The current work was created with the assistance of artificial intelligence technologies (ChatGPT-4 and Grammarly) to assist with refining language for clarity, as confirmed by the authors.

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