CHAPTER TEN

Sustainable Mentorship Practices: Designing Frameworks That Blend AI Efficiencies with Human Intuition

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Abstract: The integration of Artificial Intelligence (AI) into academic mentoring has the potential to transform conventional approaches by increasing efficiency, availability, and accuracy. However, the challenge lies in ensuring that such advances do not supplant the essential human factors of empathy, intuition, and contextual understanding. This chapter aims to design a sustainable framework that combines AI-driven effectiveness with human-centred mentorship practices, thereby achieving an optimal equilibrium between technological advancement and personalised guidance. To this end, a qualitative methodological approach was employed, with data collected through semi-structured interviews with ten academic mentors and fifteen postgraduate mentees from a range of multidisciplinary fields of study. Thematic data analysis was utilised to examine the data. The findings reveal that while AI significantly enhances routine tasks such as feedback, scheduling, and resource allocation, mentees consistently value human interaction for emotional support, nuanced advice, and contextual adaptability. The proposed framework underscores the integration of AI tools and human guidance, highlighting areas where AI excels and domains where human insight remains irreplaceable. This chapter emphasises the importance of promoting synergy between AI and human mentors, which ultimately aims to improve the quality, accessibility, and inclusiveness of mentorship in academia. Furthermore, the chapter serves as a foundation for further research on sustainable, AI-enhanced mentorship paradigms.

Keywords: Artificial intelligence, higher education, mentorship in higher education, postgraduate supervision, university sustainability.

1. Introduction

The landscape of academic mentoring is changing, and higher education institutions aim to boost productivity while embracing the diverse backgrounds of postgraduate mentees and providing support (Khumalo & Ndlova, 2024). Akinwalere and Ivanov (2022) noted that as institutions strive to enhance productivity and create fairer, more inclusive educational environments, new technologies, such as Artificial Intelligence (AI), are making significant impacts. However, these technologies also introduce serious ethical questions and complexities. Traditionally, mentorship has been grounded in knowledge transfer, engagement, and empathy; yet, it now finds itself caught between tradition and innovation (Kuznetsova-Bogdanovitsh & Jyrämä, 2022). AI technologies promise to enhance efficiency in various ways, from automating everyday communications and feedback to providing personalised learning suggestions and

predictive analytics (Holmes et al., 2021). Nevertheless, there is a risk that AI may overlook the critical emotional and intuitive components essential for fostering academic and professional development (Mohamed Badawy et al., 2023). Therefore, it is crucial to explore how a sustainable mentorship framework can seamlessly integrate AI capabilities with human intuition to improve the mentoring experience while maintaining its core integrity.

According to Sarany et al. (2023), mentoring is a cornerstone of success in the ever-evolving academic environment, particularly at the postgraduate level, where mentees navigate complex research requirements and personal development goals. Zellers et al. (2008) highlighted that traditional mentorship models often involve face-to-face interactions, informal knowledge exchange, and adaptive coaching based on shared academic and cultural backgrounds. Despite their demonstrated effectiveness, these models are frequently constrained by mentor availability, scalability, and varying levels of participation and quality. Consequently, AI-powered systems have emerged to help bridge these gaps by analysing mentee performance, providing scalable solutions for rapid feedback, and predicting academic risks (Luckin et al., 2016). Nevertheless, their use raises significant concerns regarding the validity of the mentor-mentee relationship, particularly regarding emotional intelligence, cultural sensitivity, and ethical responsibility. This creates a major question: "How can higher education institutions utilise AI while preserving the relational depth of effective mentorship?" Existing mentorship models often operate in isolation, either being overly reliant on human connection or prematurely adopting technology without appropriate ethical and pedagogical considerations. As a result, mentees may encounter diminished personal relationships, fragmented support, and unequal outcomes. Additionally, an overreliance on AI risks depersonalisation, cultural insensitivity, and algorithmic bias, particularly in diverse academic settings.

Kaye (2024) stated that human intuition and empathy are important in mentoring situations involving underrepresented first-generation or international mentees. These mentees often rely extensively on mentors for socio-economic support, contextual navigation, and specialised academic help. Although AI can mimic specific patterns through natural language processing (NLP), it lacks the potential for profound human connection and moral judgement (Marcus & Davis, 2019). Furthermore, reliance on AI tools might reduce mentorship to transactional exchanges devoid of relational richness. Consequently, a hybrid strategy that preserves the qualities of human mentorship while harnessing AI capabilities is essential for establishing sustainable and equitable mentorship practices in academia.

In higher education, the urgency for sustainable mentorship models has been intensified by global trends such as resource constraints, academic burnout, and remote learning (Essop, 2021). Hence, Bao (2020) noted that the COVID-19 pandemic exposed the vulnerability of traditional mentoring systems and catalysed interest in digital tools for resilience and continuity. In this context, AI-enabled mentoring platforms may provide adaptive learning environments, resources, and real-time progress tracking across institutional and geographical boundaries

(Imamguluyev et al., 2024). Nevertheless, mentorship sustainability must encompass operational efficiency, continuity, adaptability, and relational and long-term impact (Stozhko et al., 2021). Thus, developing a framework that systematically integrates AI's precision with the human mentor's intuition and ethical judgment is both timely and important.

2. Literature Review

2.1 The changing landscape of academic mentorship in higher education

Academic mentorship has long been an important part of student development, particularly at the postgraduate level (Stravakou & Lozgka, 2022). Traditionally, mentorship relied on in-person interactions and informal relationships in which senior academics assisted junior scholars with research, professional development, and career paths (Nuis et al., 2023). According to Jyoti and Sharma (2015), these relationships were often based on physical proximity, shared institutional culture, and a mutual interest in academic achievement. While traditional mentorship models fostered strong interpersonal bonds, they were heavily reliant on the availability and willingness of individual mentors, resulting in inconsistencies in quality and accessibility (Nuis et al., 2023). Furthermore, the historical foundations of academic mentorship were established in the apprenticeship model, in which the mentee gradually acquired tacit knowledge and professional skills through close, long-term interactions with a mentor (Peiser et al., 2018). This model prioritised academic guidance along with the development of personal and ethical values. However, as higher education systems have expanded and diversified, the demand for mentorship has increased, often outpacing institutional capacity. The modern academic landscape currently faces various significant challenges, particularly in postgraduate supervision, such as limited faculty time, mentor burnout, and high student-to-supervisor ratios, which have led to fragmented mentoring experiences (Sambunjak et al., 2010; Odularu & Akande, 2024).

The acceleration of digital transformation in education, particularly after the COVID-19 pandemic, has fuelled a trend towards remote and technology-enhanced mentoring (Bao, 2020). For example, virtual mentorship provides flexibility and increased access, particularly for students in remote or underserved areas. However, it also raises concerns regarding relational depth and engagement quality (Owen, 2015). Iglesias-Pradas et al. (2021) noted that remote models decrease logistical barriers to regular engagement, but they often fail to replicate the complex, spontaneous exchanges that occur in person. Furthermore, remote mentorship may exacerbate inequities in areas where students lack a reliable internet connection, digital literacy, or safe study environments.

In addition to technological advancements, there is an increasing emphasis on the sustainability of mentorship practices. Thus, Stozhko et al. (2021) highlighted that mentorship must now be designed to meet the requirements of a diverse and changing student population without overburdening academic staff. Furthermore, sustainable mentorship systems provide continuity, inclusivity, and scalability. As a result, higher education institutions must reconsider how

mentorship is structured, evaluated, and supported across disciplines (Lechuga, 2011). According to Coetzee (2023), the old "one-size-fits-all" strategy is increasingly seen as inadequate for meeting the diverse demands of students from various socio-economic and cultural backgrounds, particularly in globalised academic institutions.

Equity concerns are prevalent in mentorship literature. Hagler (2023) indicated that marginalised and first-generation students frequently receive less consistent and culturally appropriate mentorship, and these inequities may be exacerbated by unconscious biases or institutional attitudes that exclude non-traditional student experiences. As mentorship models expand, it is critical that frameworks include the lived realities of different students and consciously incorporate equality into mentor training and institutional design (Ntshongwana, 2024).

Literature reveals a significant shift in academic mentorship, driven by structural constraints and digital innovation. The current changes require a purposeful and hybridised strategy that preserves the relational nature of mentorship while embracing the scale and flexibility technology provides. Furthermore, this shift opens the door for frameworks that integrate AI-enabled efficiencies with human-centred principles to promote a more sustainable and inclusive future for academic mentorship.

2.2 Artificial intelligence in mentorship: Tools, capabilities, and constraints

Integrating AI into higher education has transformed traditional academic practices, including mentorship (Akinwalere & Ivanov, 2022). AI is increasingly being used to improve the efficiency, scalability, and accessibility of mentoring systems, particularly at the postgraduate level. The authors state that AI technologies such as chatbots, predictive analytics, automated feedback tools, and scheduling algorithms have been developed to meet the growing demand for academic assistance (Holmes et al., 2021; Akinwalere & Ivanov, 2022). Automated feedback systems are among the most commonly used AI tools in education (Fitria, 2021). Saha and Mondal (2024) mention that these systems analyse student submissions and deliver immediate, personalised responses that help students identify errors and enhance their performance. Furthermore, AI-powered chatbots and virtual assistants are utilised to answer routine questions, assist students with academic procedures, and provide information about institutional services (Zawacki-Richter et al., 2019). AI technologies reduce administrative duties for academic staff, allowing them more time for one-on-one human interactions. Moreover, AI-enhanced scheduling solutions, such as intelligent calendar integrations, optimise meeting times between mentors and mentees based on availability, eliminating inefficiencies associated with back-and-forth coordination (Suman et al., 2024). Additionally, performance analytics enabled by machine learning provide valuable insights into student progress, engagement levels, and potential risk indicators. These insights allow mentors to proactively identify mentees who require intervention and tailor support techniques accordingly (Ncube & Ngulube, 2024; Alalawi et al., 2024). This means that AI helps provide more targeted and data-driven mentorship,

aligning with the increasing emphasis on evidence-based techniques in higher education. Despite the benefits of AI, there are limits to its efficacy in mentoring. One of the most pressing concerns is that AI systems lack emotional intelligence, intuition, and cultural sensitivity (Selwyn, 2019).

Effective mentoring involves an understanding of complex social settings, nuanced communication skills, and human emotions, all of which AI cannot yet replicate. This implies that AI cannot replace humans' ability to empathise and make ethical decisions. Additionally, overreliance on AI poses both ethical and technical challenges. Algorithmic bias is a well-documented issue where AI systems trained on non-representative data may unintentionally promote social inequities (Binns, 2018). For example, predictive algorithms used in student assessment and feedback systems may favour dominant cultural perspectives while disadvantaging students from marginalised backgrounds. Tsai et al. (2020) noted that in disciplines reliant on collaborative reflection and dialogue, the depersonalisation of mentorship exchanges through AI interfaces might weaken mentees' sense of belonging and trust. Williamson and Eynon (2020) highlighted another important concern: the transparency and accountability of AI systems. In mentorship, mentees may not be aware of how their data is collected, processed, or used to support AI-driven decisions. Moreover, a lack of transparency may lead to mistrust, especially if a mentee feels surveilled or judged by impersonal algorithms. This underscores that the ethical use of AI tools requires careful consideration of consent, data governance, and human monitoring. According to Ajani et al. (2024) and Imamguluyev et al. (2024), AI has developed promising tools to support and streamline various aspects of the mentorship process in higher education. While these tools improve operational efficiency and provide actionable information, they must be employed judiciously to ensure they complement human-centred approaches that uphold the relational and ethical foundations of mentorship. Therefore, AI should not replace human mentors but rather supplement their efforts with intelligent tools that enhance access and quality without compromising personalisation or trust.

2.3 Human-centred mentorship: Empathy, intuition and relational depth

Despite the growing integration of AI into academic processes, human-centred mentorship remains a critical and irreplaceable component of successful postgraduate education (Chan & Tsi, 2023). Mentorship is primarily a relationship that fosters professional development, emotional resilience, and intellectual identity. Lechuga (2011) noted that the most impactful mentors provide more than just technical assistance; they also offer empathy, encouragement, and contextualised support—qualities that existing AI systems cannot meaningfully replicate. Deane et al. (2022) indicated that empathy and emotional support are highly significant in mentorship because they help mentees feel understood and valued, especially during difficult periods of academic work. In agreement, NASEM (2019) stated that mentors who offer reassurance, validation, and emotional regulation are more likely to foster mentee confidence and persistence. Johnson and Ridley (2018) observed that trust built through consistency and

sincere human interaction enables mentees to share vulnerabilities, engage in reflective practice, and ask critical questions without fear of judgement. This trust forms the foundation for what is commonly referred to as "psychosocial support," a component of mentorship that is critical to mentee success and well-being.

Cultural responsiveness and context sensitivity are essential in a diverse and multicultural academic environment. This implies that good academic mentors understand and respect their mentees' backgrounds, values, and life experiences, modifying their support strategies accordingly (Straus et al., 2013). Sachpasidi et al. (2024) concurred that culturally sensitive mentoring helps to reduce marginalisation, especially among mentees from historically disadvantaged backgrounds. Unlike AI, which frequently uses biased data sets, human mentors can navigate complex social dynamics and tailor their approaches to match their mentees' cultural and institutional contexts (Farrelly & Baker, 2023). From the mentee's perspective, personalised and relational mentorship is not only preferable but often necessary. Curtin et al. (2016) and Stravakou and Lozgka (2022) found that mentees prefer mentors who understand their academic journeys, career goals, and personal challenges. These insights stem not only from verbal communication but also from mentors' ability to recognise subtle clues and respond intuitively, a skill AI cannot replicate. In a study conducted by Singe et al. (2021), doctoral students emphasised that the most important mentorship experiences were those in which the mentor interacted with them holistically, taking into account both academic and personal dimensions of growth.

Similarly, Lechuga (2011) found that mentors who shared their academic challenges helped normalise failure and reduce performance anxiety in mentees, which is another quality that would be difficult to reproduce with AI. These studies demonstrate that AI cannot replace the nature of human mentorship; mentees reported higher satisfaction and retention when mentors displayed empathy and discussed their own experiences (Nuis et al., 2023). While AI may be useful for administrative or analytical tasks, it lacks the emotional intelligence and relational depth needed for transformative mentorship (Dwivedi, 2025). Furthermore, human intuition allows mentors to recognise unspoken difficulties, respond sympathetically to discomfort, and empower students in complex socio-emotional situations. Rather than seeking to replace human mentorship, institutions should enhance these human-centric features while allowing AI to serve as a helpful operational tool.

2.4 Toward a hybrid framework: Merging AI efficiencies with human intuition for sustainable mentorship

The continuing digital transformation of higher education has paved the way for innovative mentorship models that combine AI and human-centred practices. According to Sajja et al. (2024), this hybrid approach takes advantage of AI systems' efficiency while maintaining the empathy, intuition, and contextual awareness that only human mentors can provide. Theoretical

foundations, such as socio-technical systems theory, which proposes the necessity for alignment between social actors and technological instruments, provide a guiding framework for this integration (Gumede & Tladi, 2023). Additionally, socio-technical perspectives encourage a balance between human agency and machine functionality, acknowledging that neither operates effectively in isolation. In the context of academic mentorship, this means using AI to manage repetitive administrative tasks, such as scheduling or feedback, while reserving emotionally nuanced interactions and decision-making for human mentors (Ciriello et al., 2024). The literature suggests that such a blended approach can increase the scalability and responsiveness of mentorship without sacrificing relational depth (Holmes et al., 2021).

Several frameworks and pilot programmes are currently testing this integration. For example, Georgia Tech uses Jill Watson, an AI teaching assistant built on IBM's Watson platform. This tool demonstrates how AI can help human educators by managing frequently asked student questions and freeing time for greater mentor-mentee connection (Goel & Polepeddi, 2016). Similarly, hybrid mentoring systems, such as those launched at Mohammed VI Polytechnic University, combine AI-driven predictive analytics with human oversight, allowing mentors to provide personalised guidance based on real-time student data (Baba et al., 2024; Goel et al., 2016). However, Williamson and Eynon (2020) noted that the effective implementation of hybrid mentorship models depends on inclusive design and ethical principles; as AI tools gain traction in education, concerns about data privacy, algorithmic bias, and transparency become critical. Furthermore, inclusive mentorship systems must be created with various mentee populations in mind, ensuring that AI does not exacerbate current inequalities but promotes fairer access to assistance and resources (Binns, 2018). Sustainability and scalability are critical parameters for assessing the efficacy of blended mentorship programmes. Zawacki-Richter et al. (2019) found that AI-supported mentorship can help higher education institutions with limited workforces to satisfy increasing student demand, particularly in postgraduate supervision. Slimi (2023) highlighted that AI improves mentoring delivery efficiency by automating mundane processes and making certain functions available around the clock. Nonetheless, experts caution against over-automation and stress that mentorship's long-term influence depends on developing relationships, trust, and social learning domains where human engagement is still required (Selwyn, 2019).

3. Problem Statement

Literature has shown that, with increased effectiveness, scalability, and data-driven support, the rapid adoption of AI in higher education has opened up new avenues for improving academic mentoring (Luckin et al., 2016; Donner & Hummel, 2025). However, these technological developments have also raised concerns about the potential decline of human traits such as empathy, intuition, contextual awareness, and cultural sensitivity, all of which are essential for successful mentoring (Rachmad, 2022; Shen et al., 2024; Singh & Singh, 2025). Despite being rich in relationships, Nkoala (2024) and Mbanjwa (2025) noted that traditional mentorship

models are becoming increasingly strained due to staffing shortages, a rise in postgraduate enrolment, and increased student diversity. Conversely, new AI-driven technologies often lack the contextual awareness, emotional nuance, and moral discernment necessary to foster comprehensive postgraduate growth (Marcus & Davis, 2019). Higher education institutions are now faced with an increasing dilemma: how to effectively incorporate AI tools into mentoring without sacrificing the ethical integrity and depth of human guidance. There is currently no comprehensive or long-lasting framework that intentionally combines AI efficiencies with human-centred mentorship methods, despite ongoing testing with AI-supported mentoring systems. In the absence of such a framework, mentoring encounters risk being disjointed, unfair, or overly automated, particularly for disadvantaged or underrepresented postgraduate groups (Judijanto, 2025). Therefore, the necessity of creating a sustainable, morally sound hybrid mentorship model that capitalises on AI's advantages while maintaining the indispensable human components required for significant academic support is the main issue this study seeks to address. Consequently, the following research questions need to be addressed in order to develop this framework:

- How can Artificial Intelligence tools be integrated into academic mentorship to enhance efficiency while preserving the essential human factors of empathy, intuition, and contextual relevance?
- What are the key challenges and benefits experienced by academic mentors and mentees when engaging with hybrid AI-human mentorship models?
- How can a sustainable framework for AI-supported mentorship be developed to ensure inclusivity, scalability, and ethical practices in diverse academic environments?

This study contributes to the emerging discourse on ethical AI integration in education by adopting a pragmatic and inclusive approach to mentorship. Furthermore, it offers actionable insights for lecturers, policymakers, and educational technologists interested in designing scalable, empathetic, and future-proof academic support systems. As higher education institutions grapple with the best ways to integrate AI into pedagogical settings, this chapter serves as both a theoretical foundation and a practical guide for designing a mentorship framework that is not only technologically advanced but also emotionally intelligent and culturally responsive.

4. Materials and Methods

This study employed a qualitative research approach, which was suitable for generating in-depth and contextually grounded insights into how AI can be integrated with human-centred mentorship practices in higher education. The aim of the study was not to test hypotheses or measure variables but rather to conceptualise and develop a sustainable hybrid mentorship framework. A qualitative orientation enabled the exploration of the lived experiences, perceptions, and expectations of mentors and mentees. This approach supported the identification of patterns, tensions, and opportunities within current mentorship practices and

AI-assisted tools, reflecting the socially constructed and interpretive nature of mentorship in higher education. It aligns with contemporary qualitative methodologies used in higher education studies, where evolving technologies intersect with complex interpersonal academic processes.

A descriptive study design was employed to inform the methodical development of a sustainable AI-enhanced mentorship framework. This approach was deemed acceptable as it allowed the researcher to collect and interpret participants' opinions in a manner that remained true to their actual words, while also facilitating the conceptual integration of insights from interviews and literature. Since the study does not aim to provide empirical generalisations, the design prioritises depth, contextual understanding, and interpretive synthesis.

The study targeted two broad populations within one university in the Eastern Cape such as all academics across faculties who are involved in postgraduate supervision and have exposure to traditional or AI-supported mentorship practices. Additionally, all registered Master's and PhD students across disciplines who have engaged in either in-person or AI-assisted academic mentorship were also targeted. From these populations, a purposive sample was selected to ensure participants had direct experience relevant to academic mentorship. The final sample consisted of 10 academic mentors drawn from 6 different faculties (Economics and Finance Science, Education, Engineering, Law, Humanities and Social Science, Management and Public Administration Sciences, and Medicine and Health Sciences) and were selected based on their postgraduate supervision experience and familiarity with mentorship tools (traditional and AI-supported). Furthermore, 15 postgraduate mentees (Master's and PhD) across the 6 faculties were chosen for their experience with either in-person or AI-assisted mentorship. Participants were selected to ensure diversity in discipline, gender, and institutional background to enhance the depth and transferability of findings.

The study employed semi-structured interviews because they allow participants to share rich and in-depth insights while still ensuring consistency across key topics. This flexibility made it possible to explore diverse experiences and perceptions of AI-supported mentorship in a structured yet adaptive manner. The interview protocol was developed based on themes from the literature review, focusing on the following: Firstly, Theme 1: Experiences with traditional mentorship. This theme corresponds to understanding the current context of academic mentorship, which informs the research question on how AI tools can be integrated without compromising human-centred elements such as empathy, intuition, and contextual relevance. Secondly, Theme 2: Exposure to or opinions on AI-assisted mentorship tools. This theme directly addresses participants' experiences with AI technologies, supporting the identification of key benefits and challenges associated with hybrid AI-human mentorship models. Furthermore, Theme 3: Perceptions of empathy, trust, and emotional support in academic supervision. This theme specifically investigates the human factors critical to mentorship, enabling exploration of how AI integration might preserve or affect these relational elements.

Lastly, Theme 4: Ideal features of a hybrid AI-human mentorship model. This theme aligns with the research question on developing a sustainable framework by gathering participants' perspectives on inclusive, scalable, and ethically grounded mentorship practices that integrate AI. Each interview lasted 30–45 minutes and was conducted virtually on MS Teams or face-to-face, depending on the participant's preference and location. Interviews were audio-recorded with consent and later transcribed verbatim for analysis.

Participants were recruited through university academic networks, supervisor lists, and postgraduate student mailing lists. An invitation letter was distributed, which included details about the study, such as its purpose, significance, and ethical considerations. As a result, interested individuals contacted the researchers directly and provided informed consent before participating. Participants were informed that their involvement was voluntary and that they could withdraw at any stage.

4.1 Data analysis

The data were analysed using NVivo version 15, following Braun and Clarke's (2006) six-phase thematic analysis process. This process involved familiarising oneself with the data, generating initial codes, searching for potential themes, reviewing and refining those themes, defining and naming them, and finally producing the analytical report. The resulting themes were closely aligned with the study's objectives and existing literature, allowing for the identification of areas of convergence and divergence between AI capabilities and human mentorship practices. During the semi-structured interviews, saturation became evident when no new themes, perspectives, or insights emerged from additional participants, and the data began to repeat across both mentor and mentee groups. By the time the final interviews were conducted, the patterns were consistent, and further data collection was unlikely to add new conceptual information. Saturation, therefore, confirmed that the sample size was sufficient for addressing the study's aims and developing the proposed hybrid mentorship framework.

4.2 Ethical considerations

Ethical clearance was obtained from the Research Ethics Committee of Walter Sisulu University, protocol number 31/16/10/2025/DRI. Participants were informed of their rights, which included the right to anonymity, confidentiality, and voluntary participation. Data was securely stored on password-protected systems, and pseudonyms were used in reporting to protect identities. No personal information or identifiers were linked to the published data. Furthermore, this study adhered to South African academic ethical guidelines and the Protection of Personal Information Act (POPIA).

5. Presentation of Results

This section presents the study's findings, which aim to explore and design a sustainable mentorship framework that effectively integrates the efficiencies of AI with the relational depth

of human intuition. The findings from semi-structured interviews with academic mentors and postgraduate mentees, are as follows:

5.1 Theme 1: Integrating AI tools into academic mentorship

Across all faculties, both academic mentors and postgraduate students expressed strong appreciation for traditional face-to-face mentorship. Participants emphasised that the human connection remains central to meaningful academic support. When asked the guiding question, "How can AI tools be integrated into academic mentorship to enhance efficiency while preserving essential human factors?", responses consistently highlighted the depth and authenticity of human interaction.

A mentor from the Faculty of Law, Humanities and Social Science shared:

> *"With the mentorship style I use, it allows me to truly know the person behind the student or work. It's more than academic support; it's guiding them through personal, emotional, and career-related issues. That relationship is impossible to replace. Also, I can be able to see when a student is tired, stressed, or losing confidence. AI will never pick up on those subtle cues."*

Another mentor from the Faculty of Engineering added:

> *"Traditional mentorship allows you to intervene early. In face-to-face sessions, I can immediately sense when a student is confused even if they say they are fine."*

However, many mentors described the intensity and strain associated with traditional approaches. A supervisor from the Faculty of Medicine and Health Sciences explained:

> *"The workload is massive. I supervise undergraduates, Masters, and PhDs. I often wish I had support systems that could help with routine questions so I could focus on conceptual guidance. Mentorship becomes overwhelming because supervising multiple students while managing teaching and research is difficult. Sometimes students expect immediate feedback, and I simply cannot respond quickly to everyone."*

A Masters students expressed similar challenges. A postgraduate student from the Faculty of Management and Public Administration Sciences said:

> *"Face-to-face mentorship is powerful, but inconsistent. Sometimes weeks pass before I get proper feedback."*

Another PhD student from the Faculty of Education added:

> *"My supervisor is excellent, but getting time with them is difficult. When they finally respond, it's very helpful but waiting can be stressful.*

A Masters student from the Faculty of Law, Humanities and Social *Science* highlighted emotional dependence on traditional mentorship:

> *"When I am anxious about my progress, I prefer speaking to my mentor directly because they reassure me. AI cannot do that."*

A student from the Faculty of Medicine and Health Science in a Masters programme mentioned:

"Getting one-on-one sessions is difficult because my supervisor has so many students. Sometimes I feel like my questions are not seen as urgent."

Across faculties, participants generally converged on the importance of traditional, human-centred mentorship. Mentors from the Law, Humanities and Social Sciences, Engineering, and Medicine and Health Sciences faculties highlighted empathy, personal connection, and emotional awareness as essential components of supervision. Their reflections frequently emphasised the relational depth that arises from face-to-face engagement. However, divergences emerged based on discipline and supervision experience. For example, mentors from the Faculty of Engineering tended to emphasise efficiency and structured problem-solving, stating that traditional mentorship is effective but time-consuming. At the student level, master's students were more vocal about access challenges, noting that limited supervision time slows progress. PhD students, on the other hand, emphasised the need for sustained intellectual engagement and emotional support, highlighting that doctoral work demands a more personalised supervisory approach. This range of views illustrates that while traditional mentorship is valued across the board, the reasons for valuing it differ by department, academic level, and years of supervisory experience.

5.2 Theme 2: Challenges and benefits of hybrid AI–human mentorship models

When asked "What are the key challenges and benefits of engaging with hybrid AI–human mentorship models?", participants provided mixed but insightful responses. While mentors welcomed the efficiency that AI brings, they were cautious about its limitations in relational aspects.

A mentor from the Faculty of Economics and Finance Science noted the efficiency benefits:

"AI scheduling and quick feedback systems have reduced my administrative workload. I can now use my time for deeper intellectual engagement."

A mentor from the Faculty of Medicine and Health Sciences described a similar experience:

"I rely on AI to flag formatting issues or incomplete references. It saves hours. But I would never trust AI to give conceptual feedback on a research proposal."

Others were more cautious. A mentor from the Faculty of Law, Humanities and Social Science remarked:

"AI gives generic advice. It doesn't understand creative methodologies or practice-based research."

A mentor from the Faculty of Education noted:

"AI tools reduce admin tasks significantly. Automated scheduling and document feedback systems free my time for deeper conversations with students. But AI cannot build rapport or understand student emotions."

Students also expressed varied opinions. A master's student from the Faculty of Engineering said:

"AI tools help me fix grammar and structure, but when I ask for conceptual clarity, it sometimes gives misleading information."

A PhD student from the Faculty of Law, Humanities and Social *Science* added:

"AI helped me brainstorm ideas, but the suggestions sometimes contradict my supervisor's expectations. That causes confusion. I also use AI systems for quick feedback on structure and grammar, but the responses feel mechanical. It doesn't understand what my argument really means. "

Some postgraduate students highlighted the advantages of AI for productivity:

"AI summarised articles for me, which saved a lot of time, especially when I was reviewing many journal papers." PhD student, Faculty of Law, Humanities and Social Sciences stated.

"Chatbots helped me prepare for meetings by explaining concepts before I met my supervisor." PhD student, Faculty of Education noted.

Yet, several students emphasised the risk of over-reliance on AI. Master's student, Faculty of Management Sciences mentioned:

"AI made me feel like I was learning less. It gave too many answers, and I stopped thinking critically at some point."

Some students expressed concerns about over-reliance on AI. A Master's student from the Faculty of Medicine and Health Science warned:

"AI made me too dependent at some point. I thought I was improving academically, but I later realised I was just accepting suggestions without understanding them fully."

Participants across faculties demonstrated a consensus on the practical value of AI tools, particularly for administrative or routine academic tasks. Mentors in the Faculty of Economics and Finance were especially positive about the efficiency of AI in scheduling, formatting checks, automated reminders, and preliminary feedback tools. Mentees in Law, Humanities and Social Sciences, and Medicine and Health Sciences also appreciated AI's ability to provide quick responses and assist with research organisation. However, significant divergences emerged in perceptions of AI's academic reliability. Participants in Law, Humanities and Social Sciences expressed scepticism, arguing that AI-generated feedback lacked nuance and contextual understanding. In contrast, participants in Engineering and Medicine and Health Sciences were more open to using AI for initial technical explanations, grammar checks, and literature structuring. At the student level, PhD candidates were more critical of AI feedback on conceptual and methodological aspects, while Master's students viewed AI as beneficial for building foundational understanding at the early stages. This cross-sectional diversity enhances the understanding of hybrid mentorship models, illustrating that acceptance of AI is influenced by discipline, supervisory experience, and research level.

5.3 Theme 3: Developing a sustainable, inclusive, and ethical framework for AI-supported mentorship

5.3.1 Sub-theme 1: Perceptions of empathy, trust and emotional support

Across faculties, participants strongly emphasised that empathy, trust, and emotional support are core pillars of effective mentorship. When asked "How can a sustainable AI-supported mentorship framework ensure inclusivity, scalability, and ethical practice?.", many expressed concerns about the limitations of AI in handling the emotional dimension of supervision.

A mentor from the Faculty of Medicine and Health Sciences explained:

> *"When students lose family members, struggle financially, or feel overwhelmed, they need a human being. AI cannot provide that type of support."*

A mentor from the Faculty of Law, Humanities and Social Sciences added:

> *"Research can be isolating. Students need reassurance, especially when dealing with complex ethical or philosophical questions. No AI can replace that human reassurance."*

A mentor from the *Faculty of Management and Public Administration Sciences* explained:

> *"Supervision is not just academic. Students face personal struggles, mental health issues, financial stress, and cultural pressures. AI can never replace the warmth and presence of a human mentor."*

A mentor from the *Faculty of Engineering* summarised the shared sentiment:

> *"AI might offer resources and instant answers, but when a student breaks down or feels lost, only a human can understand and respond with empathy."*

Students echoed these views strongly. A PhD student from the Faculty of Education shared:

> *"During my proposal stage, I cried in my supervisor's office because I felt like quitting. No chatbot could have supported me the way she did. When I was discouraged about my research, my mentor reassured me and helped me regain confidence. That emotional support is something AI can never provide."*

Another Master's student from the Faculty of Economics and Finance Science noted:

> *"AI cannot pick up on my tone, frustration, or stress. A human mentor immediately notices when I am not coping."*

A Masters in medicine and health science student emphasised the ethical dimension:

> *"AI can answer questions, but it cannot 'feel' with you. It doesn't understand when I'm anxious, overwhelmed, or confused. So, if AI misinterprets my emotional state or dismisses my struggles, the consequences could be harmful. Only a human mentor should guide emotional welfare."*

5.3.2 Sub-theme 2: Ideal features of a hybrid AI–human mentorship model

Participants across all faculties expressed interest in an integrated hybrid mentorship model where AI and humans complement each other.

A mentor from the Faculty of Law, Humanities and Social Sciences described the optimal balance:

> *"AI should handle admin tasks, reminders, early feedback, and resource sharing. This frees me to focus on higher-order feedback, idea development, and emotional support. However, the human mentor should handle intellectual engagement and wellbeing."*

A mentor from the Faculty of Medicine and Health Sciences suggested:

> *"AI could generate reading lists, track student progress, and highlight patterns in draft submissions. But conceptual discussions must remain human-led."*

A mentor from the Faculty of Engineering also suggested:

> *"AI is a useful tool for enhancing scalability and supporting large supervision cohorts. However, a machine will not replace a human. Therefore, Using AI for scalability and administrative tasks then combining a human mentor will certainly produce good results quickly."*

Students also envisioned practical uses for AI. PhD student, Faculty of Law, Humanities and Social Sciences said:

> *"I want AI to help me track deadlines, suggest article databases, and check ethics compliance forms."*

A Masters student, Faculty of Management and Public Administration Sciences suggested:

> *"AI could monitor my progress and notify my supervisor when I'm falling behind."*

However, students were firm about maintaining human contact: Another PhD student in Faculty of Education stated:

> *"AI should never be allowed to replace meetings, emotional support, or conceptual supervision. Those must remain human."*

A Masters student from the Faculty of Engineering emphasised the boundaries:

> *"AI should support, not replace. It cannot understand my personal struggles or reassure me when I am uncertain."*

One Masters postgraduate student in the Faculty of Economics and Finance Science summarised the shared view across faculties:

> *"AI should assist, not replace. It must do the routine work so that my supervisor can do the real mentoring."*

Participants across all faculties strongly converged on one central point: AI cannot replace human mentorship when it comes to emotional support, empathy, trust-building, motivation, and the understanding of personal or contextual challenges. Mentors in Education, Law, Humanities and Social Sciences, and Medicine and Health Sciences particularly emphasised the non-negotiable human role in offering emotional reassurance and contextual guidance. PhD students across all faculties echoed this, noting that the emotional strain of research requires human connection. However, divergences emerged concerning the specific roles AI should play in a sustainable mentorship framework. Mentors in the Law, Humanities and Social Sciences faculties stressed ethical concerns, including bias, privacy, and the danger of students becoming overly dependent on AI. Meanwhile, mentors from the Faculty of Engineering viewed AI as a useful tool for enhancing scalability and supporting large supervision cohorts, particularly where technical or data-driven feedback is required. The level of study also shaped responses. Master's students preferred AI for organisational tasks such as reminders and literature classification, whereas PhD students preferred AI strictly as an administrative aid, not a conceptual advisor. Departments with high supervision loads, such as Education, expressed the strongest interest in

AI-supported frameworks that reduce supervisory bottlenecks. These differences highlight that while a hybrid model is generally accepted, its design must be discipline-sensitive, ethically grounded, and aligned with student needs at different levels.

6. Discussion of Findings

This study aimed to design a sustainable framework that combines AI-driven effectiveness with human-centred mentorship practices, thereby allowing an optimal equilibrium of technological advancement and customised guidance. To be able to achieve the aim, the following questions were asked:

- How can Artificial Intelligence tools be integrated into academic mentorship to enhance efficiency while preserving the essential human factors of empathy, intuition, and contextual relevance?
- What are the key challenges and benefits experienced by academic mentors and mentees when engaging with hybrid AI-human mentorship models?
- How can a sustainable framework for AI-supported mentorship be developed to ensure inclusivity, scalability, and ethical practices in diverse academic environments?

The findings emphasise the necessity of preserving the human aspects of mentorship, such as empathy, trust, and emotional support, while acknowledging that AI can potentially increase efficiency, particularly in administrative tasks for mentors. Both academic mentors and postgraduate students praised the idea of a hybrid model in which AI handles routine duties while human mentors focus on providing individualised, emotionally supportive counsel. The literature consistently emphasises the historical significance of human-centred mentorship founded on empathy, intuition, and relational depth (Deane et al., 2022). Consistent with earlier literature emphasising the relational depth of mentorship (Atchley et al., 2024), the interview data show that mentees thrive when trust, empathy, and emotional presence are prioritised, reinforcing long-standing evidence on the importance of supportive academic relationships.

This reinforces the findings indicating that mentees flourish in emotionally supportive contexts where mentors serve as intellectual and personal guides (Lechuga, 2011). Furthermore, participants were cautiously optimistic about AI technologies but were clear that these tools could never replace the delicate and profoundly relational aspects of academic mentorship. There was widespread agreement that AI might enhance mentorship as a supporting tool, particularly in scheduling, feedback, and resource allocation. From both the literature (Holmes et al., 2019) and the interviews, it is clear that AI tools improve efficiency and relieve administrative burdens, especially in scheduling, automated feedback, and performance tracking. These findings align with recent research showing that AI excels in automation and cognitive support tasks but lacks the contextual judgement and emotional capacity needed for relational mentoring roles (Woo & Cho, 2025). This supports socio-technical perspectives, where technology augments human effort rather than replaces it (Ciriello et al., 2024). However,

mentors and mentees caution against overreliance, which the literature warns can lead to depersonalisation and ethical issues such as bias and a lack of context-sensitivity (Binns, 2018). Furthermore, interviewees expressed concern regarding the limitations of AI, echoing literature on emotional intelligence and ethical judgement gaps in AI systems (Selwyn, 2019).

These concerns demand a cautious, ethical design that incorporates human oversight, cultural sensitivity, and feedback loops to prevent marginalisation or algorithmic harm (Mubashir et al., 2025). Additionally, the findings support the notion that a hybrid mentorship approach that combines AI efficiencies with human intuition has the potential to enhance mentorship in higher education. However, this approach must be carefully designed to ensure that AI does not overshadow the important human traits mentees value in their intellectual and emotional growth (Woo & Cho, 2025). The literature affirms the need for a hybrid mentorship model that blends AI efficiencies with human relational depth (Luckin et al., 2016; Walker et al., 2020). The interviews confirm that mentors want AI to support but not replace them, while students appreciate how AI can streamline tasks without compromising emotional connection.

7. Conclusions and Recommendations

The current chapter investigates the changing landscape of academic mentorship, emphasising the use of AI-driven systems alongside traditional human-centred mentoring approaches to develop a sustainable and inclusive mentorship framework suitable for higher education institutions. The study utilises a mixed-methods approach, which includes a systematic literature review and semi-structured interviews with academic mentors and postgraduate mentees. The findings reveal that AI technologies offer significant scalability, efficiency, and administrative relief benefits. However, the human element of mentorship comprises empathy, intuition, and contextual guidance, which are irreplaceable. Furthermore, the findings show that AI can effectively supplement mentorship by automating routine tasks, including feedback delivery, scheduling, and performance tracking. Conversely, mentors and mentees emphasise that effective academic connections are founded on trust, emotional support, and personalised guidance, which AI cannot fully replicate. These insights support the development of a hybrid AI-human mentorship framework based on socio-technical systems theory, ensuring that technological advancements complement rather than replace the fundamental human values of mentoring. Figure 1 below illustrates the proposed framework: sustainable AI-supported mentorship model.

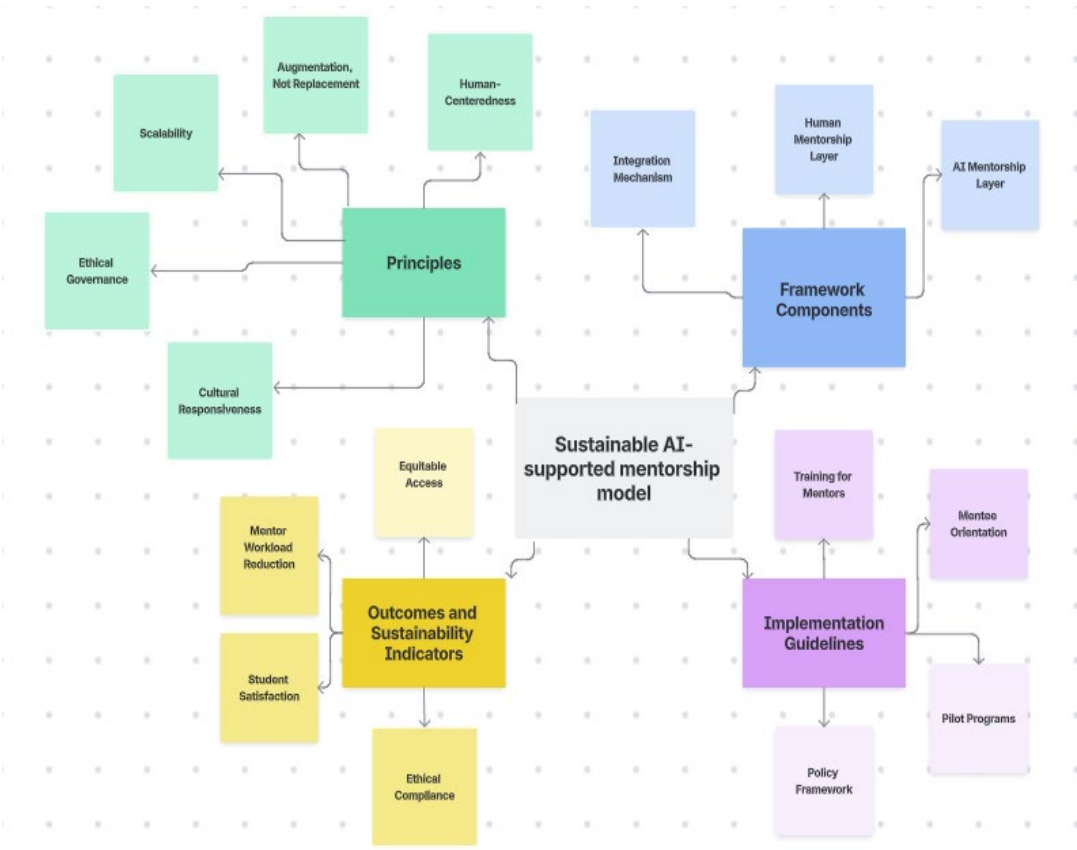

Figure 1: *Proposed framework: sustainable AI-supported mentorship model*

The proposed sustainable hybrid mentorship framework incorporates socio-technical systems theory and human-centred design to ensure inclusivity, scalability, and ethical grounding. The framework is structured around three key components. The human mentorship layer provides personalised academic guidance, emotional support, contextual advice, and guidance on ethical decision-making. In contrast, the AI mentorship layer offers administrative support, resource curation, automated feedback, and performance tracking. These layers are integrated through feedback loops that allow mentees to evaluate AI interactions, explainable AI tools that clarify recommendations, and an ethical review board that oversees fairness, inclusivity, and transparency. Implementation is supported through mentor training in digital literacy and AI ethics, mentee orientation on AI use and boundaries, pilot programmes to refine processes, and institutional policies that safeguard accessibility and equity.

Expected outcomes of the framework include improved equitable access, reduced administrative burdens for mentors without compromising the quality of relationships, enhanced student satisfaction through increased engagement and trust, and consistent ethical compliance, verified through periodic audits. By combining AI-driven efficiencies with human intuition and relational depth, this framework offers a sustainable approach to mentorship that is inclusive, scalable,

and ethically grounded, while preserving the personal and contextual integrity essential to effective academic supervision. Based on these, the following recommendations were made:

- The study recommends that higher education institutions develop a blended mentorship system in which AI handles the administrative and cognitive load tasks while mentors provide emotional, ethical, and contextual guidance.
- Higher education institutions should consider providing academic mentors with training on the ethical use of AI in mentorship programs, with a specific emphasis on data privacy, algorithmic bias, and the need for human presence in academic mentor-mentee partnerships.
- Educational institutions should initiate trial programs that use AI-powered mentorship tools and include robust feedback and monitoring systems to analyse impact, inclusivity, and satisfaction.
- Ongoing collaboration among mentors, mentees, and technologists is required to guarantee that mentorship innovations stay relevant, adaptable, and aligned with institutional ideals and mentees' requirements.
- Sustainable mentorship in the age of AI requires a purposeful, well-balanced, and ethical approach that takes into account both the promise of technology and the tremendous significance of human interaction. By accepting this dichotomy, institutions may improve the quality, reach, and effect of academic mentoring in an increasingly digital environment.

7.1 Social and Practical implications

This study carries important social implications for higher education by promoting more equitable, inclusive, and supportive mentorship experiences for postgraduate students. By integrating AI with human-centred mentorship, the framework helps reduce disparities in access to quality supervision, particularly for first-generation, rural, or historically marginalised students who often encounter inconsistent support. The model also foregrounds empathy, trust, and cultural responsiveness, ensuring that mentorship remains relational and contextually sensitive despite the introduction of technology. It strengthens students' sense of belonging, psychological safety, and overall academic confidence while advancing ethical awareness around issues such as bias, transparency, and data protection in AI-supported educational environments.

Practically, the study provides universities with a structured and scalable approach to improving mentorship systems. The framework offers clear guidance on how AI can reduce administrative burdens such as scheduling, resource curation, and early-stage feedback, allowing mentors to concentrate on higher-level academic and emotional support. At the institutional level, the model supports strategic planning by outlining training, policy development, and pilot implementation pathways that enable the safe and ethical adoption of AI tools. The framework

enhances the efficiency, consistency, and quality of postgraduate mentorship while preserving the human elements essential to successful academic supervision.

8. Declarations

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Use of Artificial Intelligence: The current work was created with the assistance of artificial intelligence technologies QuillBot Version 4.17.0 and Grammarly to assist with refining language for clarity.

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