RETHINKING THESIS SUPERVISION AMID THE RISE OF ARTIFICIAL INTELLIGENCE

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Abstract

The integration of artificial intelligence (AI) into academic research and writing has profoundly impacted the process of thesis conceptualization, writing, editing, and assessment. Although the existing body of literature on AI has explored its role as a technical tool for writing assistance, plagiarism detection, and citation management, there is a relative lack of consideration for its role in thesis supervision as an academic relationship. Historically, thesis supervision has been a form of academic apprenticeship that is predicated on a dialogue and intellectual struggle between the supervisor and the researcher. However, the increasing use of AI tools is disrupting this process by introducing algorithmic mediation into a process that was previously exclusively human-mediated. This paper aims to rethink thesis supervision in the context of the increasing use of artificial intelligence.

On the basis of theoretical observations from educational theory, post-humanism, and cognitive labor studies, this paper argues that the role of AI is becoming increasingly informal or "invisible" as a co-supervisor. While AI-assisted supervision has several benefits, such as efficiency, accessibility, and structural support, it also has the potential for intellectual dependency, homogenization of the voice of scholarship, and the dilution of supervisory mentorship. This paper finally recommends a hybrid approach to thesis supervision that attempts to find a balance between human supervision and ethical AI integration, and also emphasizes the need for critical thinking, originality, and academic integrity in the new research paradigm.

Keywords: Thesis supervision; artificial intelligence; academic mentorship; cognitive labor; research pedagogy; AI ethics.

1. Introduction

Supervision of thesis writing is a crucial area within higher education, especially at the postgraduate and doctoral levels, where research is not only a product but also a process of intellectual

development. Conventionally, the role of supervision has been conceptualized as a dialogical process that entails mentorship, feedback, and the development of scholarly independence over time. This process not only enables students to learn how to undertake research but also enables them to learn how to think critically, how to engage with sources in an ethical manner, and how to develop an academic voice.

The development of artificial intelligence applications, including generative writing software and paraphrasing software, automated citation management software, and literature mapping software, has started to transform this conventional supervisory environment. These AI applications are increasingly mediating the core aspects of thesis writing, such as literature reviews, methodological explanation, writing, editing, and referencing. This has started to transform the supervisory environment, which is no longer a purely dialogical process between the student and the supervisor but is increasingly impacted by algorithmic systems that provide feedback, correction, and structural inputs.

However, this new reality also prompts several questions about the future of thesis supervision in the age of AI. If AI is making a substantial contribution to research design, writing, and editing, what happens to the supervisor's role? How does the cognitive workload get redistributed between human and machine? Does AI improve learning in the academy, or does it potentially reduce supervision to a form of evaluation rather than mentorship? These questions are pressing as institutions seek to preserve academic integrity in the face of technological change.

The purpose of this paper is to critically investigate the impact of artificial intelligence on thesis supervision and the ways in which AI is reshaping supervision as a form of mentorship, authorship, and cognitive engagement.

2. Literature Review

2.1 AI in Higher Education and Academic Writing

The literature on artificial intelligence in higher education has grown significantly over the past decade, primarily fuelled by the increasing power of machine learning, natural language processing, and educational data analytics. Initial and influential studies on AI in higher education include conceptualizations of AI as a revolutionary tool that can improve efficiency, personalization, and scalability in teaching and learning settings (Holmes, Bialik, & Fadel, 2019). Other systematic reviews, such as Zawacki-Richter et al. (2019), classify the application of AI in higher education into subfields such as adaptive learning systems, automated assessment, intelligent tutoring systems, and academic analytics, primarily focusing on the administrative and organizational aspects of AI in higher education.

In academic writing, the application of AI has been considered for assistance. The literature indicates the application of AI tools for grammar correction, style enhancement, paraphrasing, and text generation, particularly for multilingual and beginner academic writers (Luckin et al., 2016). The

literature highlights the capability of AI to enhance linguistic accuracy, reduce writing anxiety, and increase productivity. In this regard, AI is often depicted as a neutral or positive technology that can help writers in meeting the formal requirements of academic writing.

However, a significant amount of this literature continues to be rooted in an instrumentalist approach, conceptualizing AI as an ancillary technology rather than an agent that has the potential to transform academic practices and relationships. The emphasis continues to be on what AI does and not on what AI changes. The question of how AI impacts intellectual engagement, academic formation, and the social dynamics of academic work continues to be relegated to the background. Consequently, the more profound epistemic implications of AI, especially its impact on knowledge production, mediation, and assessment, continue to be inadequately addressed.

2.2 AI and Thesis Writing Practices

The more contemporary literature has progressed to the effects of AI on postgraduate and doctoral-level research writing, particularly in the context of thesis writing. The literature is mainly driven by the debate on plagiarism, originality, and ethics. Research such as Cotton, Cotton, and Shipway (2023) show the growing institutional concern about the use of generative AI tools such as ChatGPT, which are seen as a threat to academic integrity and have to be strictly regulated and monitored.

In this discourse, AI is either a risk that needs to be managed or a neutral technology that operates as a helper whose use must be declared. Although these are significant issues in ethics, they do not have the effect of reducing the issue of thesis writing to one of compliance rather than learning. Furthermore, the issue of the use of AI is often considered in a way that is independent of the academic context in which thesis writing takes place. The thesis is considered as a product rather than a process that is often long and involves issues of struggle and development.

However, the literature that specifically connects the issue of AI to the supervision of theses is relatively limited. The reports and guidelines are intended to establish what constitutes acceptable use of AI, the supervision aspect, and the standards of assessment. The aspect that is largely absent from this discussion is any form of pedagogical analysis of the use of AI in the supervision aspect itself.

The implication of the supervision aspect is thus assumed to be stable and human-centred, despite the use of AI in mediating central thesis writing tasks such as literature synthesis, composition, and editing. This assumption neglects the potential for AI to subtly influence the supervision and authority aspects of intellectual apprenticeship in thesis writing.

2.3 Identified Research Gap

A review of the existing literature indicates a significant gap in the conceptual and theoretical discussions of the ways in which artificial intelligence transforms thesis supervision as an academic discourse. Although there is a great deal of research on AI in education and AI-assisted writing, there is

remarkably little research that interrogates supervision as a transformed pedagogical relationship in the AI age.

In particular, there is a lack of engagement with cognitive labour questions, such as how the distribution of intellectual labour changes when AI systems undertake tasks conventionally associated with learning and intellectual maturation. The intellectual apprenticeship tradition, long fundamental to postgraduate research training, has not been adequately theorized in the context of AI research. Furthermore, the transformation of authority relationships between human supervisors and algorithmic systems, especially with regard to guidance, validation, and evaluation, has not been adequately explored.

This gap indicates the imperative need for a rethink of thesis supervision outside the regulatory and tool-based approaches. Instead of focusing on the question of how AI is to be regulated, it is necessary to investigate how AI transforms mentorship, learning, authorship, and academic responsibility. By situating AI as a new entrant within the supervisory system, this paper aims to make a contribution to a field of research that is currently underdeveloped but increasingly pressing. It proposes that thesis supervision be viewed as a hybrid process mediated by AI that requires a new set of ethical, pedagogical, and epistemic approaches.

3. Conceptual Framework

This research uses an interdisciplinary conceptual framework that combines post-humanist theory, cognitive labour studies, and research pedagogy to investigate the nature of thesis supervision in the context of artificial intelligence. Each of these approaches allows for a complex understanding of the role of AI in intervening in academic mentorship and transforming intellectual labour.

Post-humanist theory problematizes the traditional humanist assumptions that position agency and authorship exclusively in the human subject. Braidotti (2013) and Latour (2005) have argued that the production of knowledge is becoming more and more a distributed process involving human and non-human agents, such as technologies and systems of mediation. From this point of view, artificial intelligence cannot be conceived as a passive instrument used by researchers; instead, it becomes a co-agent that takes part in determining research paths, text formats, and epistemic norms. In the context of thesis writing, AI systems affect the choice of literature, argumentative organization, stylistic norms, and methodological formulation. Post-humanist theory, in this way, offers a critical approach to the analysis of how supervisory work needs to change when authority and guidance are no longer exclusively human-centred.

The cognitive labour theory is an extension of this discussion, as it emphasizes the organization, allocation, and valuation of intellectual labour in knowledge-creating settings. Conventionally, thesis writing has always involved cognitive labour in terms of critical reading, synthesis, writing, editing, and

reflective learning. However, with the advent of AI, this entire process is disrupted as cognitively demanding tasks such as summarizing, paraphrasing, and editing are outsourced to algorithmic systems. Although this outsourcing can be seen as an improvement in terms of efficiency and accessibility, it also gives rise to some important questions related to learning, intellectual property, and development in research training.

Research pedagogy is the third conceptual underpinning of this framework because it frames thesis supervision as a formative and relational process, rather than simply a technical or judgmental one. In the literature on research pedagogy, supervision is conceptualized as a kind of academic apprenticeship, in which students learn the norms, values, and methodologies of their discipline through engagement with experienced academics. This approach highlights the importance of mentorship, conversation, and reflective practice to academic development. The increasing role of AI in thesis writing disrupts this model by intervening in feedback loops and changing the character of supervisory engagement. Research pedagogy thus offers a critical framework through which the impact of AI on the educational aspects of supervision might be evaluated.

Cumulatively, the post-humanist theory, cognitive labour studies, and research pedagogy provide a comprehensive conceptual framework to analyse the phenomenon of artificial intelligence in thesis supervision. The comprehensive conceptual framework provided by the post-humanist theory, cognitive labour studies, and research pedagogy helps the analysis to move beyond the limitations of tool discourse and focus on the pedagogical undertones of thesis supervision in the context of artificial intelligence. By focusing on the importance of mentorship, intellectual development, and academic responsibility, the conceptual framework helps to critically re-evaluate thesis supervision as a hybrid process that involves human expertise and algorithmic mediation.

4. AI in Thesis Writing: Current Practices

Artificial intelligence has been increasingly used in the current thesis writing process, affecting almost all dimensions of research development and writing. AI-powered literature review software assists researchers in searching relevant literature, identifying thematic clusters, and summarizing a huge amount of academic literature in a remarkably short period of time. The software relies on relevance ranking, citation analysis, and keyword optimization, not only affecting what literature is searched but also affecting how research fields are identified and conceptualized by new researchers.

The generative writing software extends the use of AI by assisting in the writing and paraphrasing of thesis chapter drafts. Students use these tools to write draft versions, paraphrase their ideas, and enhance their academic writing, particularly in literature reviews and methodology explanations. Citation management software assists in the automation of citation and referencing, as well as in-text citations, to

ensure that all processes are done within the specified styles, while AI-assisted editing software assists in stylistic consistency, grammatical mistakes, and tone improvement.

These developing trends have important implications for the relationship between supervisors and students. Increasingly, drafts submitted for supervision will be linguistically complex and well-organized, even at quite early stages of research. This means that classic signs of intellectual struggle, such as argumentative fragmentation, prose difficulties, or conceptual confusion, may be less apparent to supervisors. Cycles of feedback may become shorter and more judgmental, as supervisors increasingly concentrate on conceptual alignment, methodological validity, and argumentative coherence rather than foundational writing and research skills. While this may improve efficiency and enable supervisors to contribute at a more conceptual level, it also raises questions about the degree to which the submitted work represents the student's autonomous cognitive engagement.

The role of AI in thesis writing could further obscure the distinction between support and authorship. As AI tools increasingly contribute to argumentative organization and methodological justification, supervisors may find it increasingly difficult to distinguish between clarity that is a result of understanding versus optimization. This conundrum requires a more interrogative form of supervision, in which students must be able to explain and justify their conceptual choices.

Hypothetical examples can help to clarify this process. A chapter on methodology written with heavy AI support might contain sound methodological terminology and proven research design paradigms but fail to integrate meaningfully with the particular research questions or data at issue. In such instances, the supervisor is forced to move from a teaching to a critical assessment mode, questioning the student's understanding and reasoning rather than merely improving the prose on the page. This process highlights how AI-mediated activities are reconfiguring the supervisory process from a developmental to a validation and interrogation process.

In conclusion, the current state of AI use in thesis writing is both efficient and complex. While it provides important support in academic conventions and workload, it also reconfigures learning visibility, feedback, and authority in the supervisory relationship. It is crucial to understand these dynamics in order to reimagine thesis supervision in the AI-mediated academic environment.

5. Rethinking Thesis Supervision

The growing role of artificial intelligence in thesis writing requires a paradigm shift in the concept of thesis supervision as a teaching process. With AI intervening in the heart of research production, thesis supervision becomes less of a teaching process and more of a reflective, ethical, and evaluative form of academic supervision.

5.1 Redefining the Role of the Supervisor

In an AI-mediated research context, the supervisor's role changes from being the central guiding figure who is primarily engaged in the textual correction process to a pivotal moderator of AI-supported research work. Instead of being engaged in the surface-level language correction process or in making structural changes, the supervisor is increasingly involved in evaluating the intellectual consistency, validity, ethical soundness, and originality of research outputs that are mediated by AI.

However, this new definition of supervision requires the establishment of new supervisory skills. Digital literacy emerges as a new skill for supervisors, allowing them to appreciate the strengths, weaknesses, and biases of AI software that is widely used in thesis writing. Ethical awareness is also important, as supervisors need to help students navigate the complexities of authorship, accountability, and responsible AI use. Furthermore, supervisors need to develop new pedagogical skills that encourage students to clearly express their intellectual inputs, so that AI software becomes a helpful tool and not a hidden author.

This new definition of supervision also reshapes the power of supervision. Although supervisors still have the final say in academic matters, their new definition is increasingly about facilitating the interface between human knowledge and algorithmic results. In this new definition, supervision is no longer about correction but about interrogation, reflection, and validation of scholarly agency.

5.2 Cognitive and Pedagogical Implications

The inclusion of AI in thesis writing has far-reaching cognitive and pedagogical implications. Historically, thesis writing has been marked by intense intellectual struggle, entailing a process of reading, writing, revising, and self-criticism. AI-assisted writing can greatly ease this process by providing instant feedback, organized writing, and language polishing. Although this ease can be a great relief from anxiety and make thesis writing more accessible, especially to beginners and non-native writers, it also poses a problem of reliance and shallow learning.

If AI is doing most of the heavy cognitive lifting, there is a danger that students will be less actively engaged with theoretical concepts, methodological reasoning, and argumentative development. This trend undermines the pedagogical role of the thesis as a space of intellectual formation and not just knowledge transmission. There is a need for supervisors to devise ways to ensure that AI is a facilitator, not a substitute, for critical thinking and intellectual development.

From a pedagogical perspective, this means that there is a need for a process-oriented approach to supervision. Reflective practices such as research journals, explanations, conceptual mapping, and questioning can help the supervisor understand the level of understanding of the students beyond the

written text. Through reasoning, interpretation, and ethics, supervision can retain its formative role despite the presence of AI.

In conclusion, the future of thesis supervision must strike a balance between the efficiencies that AI can provide and the need for deep learning and intellectual autonomy. Through the redefinition of the role of supervision and pedagogy, the academic community can ensure that AI-assisted thesis writing is more than a technical process.

6. Challenges and Risks

The use of artificial intelligence in thesis supervision is also accompanied by its own set of challenges that need to be taken into consideration. Although artificial intelligence is bringing efficiency and technical expertise to thesis supervision, there is also the challenge of unregulated use of artificial intelligence that could potentially threaten the very foundations of academic scholarship. The most important of these challenges is the challenge of overdependence on artificial intelligence that could potentially threaten the intellectual autonomy of students. If artificial intelligence is used for the purpose of undertaking cognitively complex tasks such as summarizing, writing, and organizing, students are likely to be less involved in the process of critical reading, synthesis, and argumentation. This could potentially threaten the formative nature of thesis writing, which has traditionally been a site of intellectual struggle and development.

Intimately connected with this concern is the issue of authorship and intellectual ownership. The application of AI-assisted writing software raises the issue of traditional academic authorship in a manner that obscures the distinction between human and algorithmic input. If the coherence and argumentative structure of the text are, to a degree, the result of AI algorithmic input, it becomes increasingly difficult to determine the intellectual ownership of the text. This has important implications for the supervisor's role in determining originality and the issue of accountability in the context of thesis defence and viva voce assessment.

A further, and critical, risk is that of algorithmic bias and epistemic homogenization. AI algorithms are trained on large corpora of data that tend to represent the dominant academic traditions, methodological preferences, and linguistic practices. Consequently, AI-assisted research tends to favour normalized forms of argumentation, methodology, and expression, thereby subordinating alternative epistemologies, interdisciplinary, or context-specific research practices. This homogenization of research practices may, over time, reduce the diversity of research voices and reproduce existing power relations in academic knowledge production.

Apart from these epistemological concerns, the growing significance of AI might also contribute to the deterioration of the quality of mentorship in thesis supervision. Quality thesis supervision is not

only about text correction but also about emotional support, professional socialization, and the development of an academic identity. With the growing significance of AI in refining texts in thesis supervision, the possibility of dialogical engagement and formative assessment might be jeopardized. This might also result in a transactional approach to thesis supervision, which would undermine the affective and relational dimensions of quality research training.

With these challenges in mind, it is not an easy feat for institutions to find a balance between innovation and the preservation of academic values. The role of AI in thesis supervision, therefore, must be done in a manner that is accompanied by considerations that are well-intentioned and focused on transparency and accountability. Otherwise, the gains of AI may be achieved at the cost of intellectual value and diversity.

7. Opportunities and Positive Transformations

While there are risks and challenges involved in the integration of artificial intelligence in thesis supervision, there are also tremendous opportunities for a positive transformation of supervisory practices through the use of AI. If AI is critically and ethically engaged, it has the potential to improve, rather than degrade, the quality of research supervision.

One of the most promising domains of positive change is the application of AI as a collaborative partner in the supervisory process. By assuming the role of formatting, citation, language editing, and compilation of literature, AI can free supervisors and students from the drudgery of such tasks. This will allow supervisors to engage more with higher-order intellectual activities such as conceptual thinking, theoretical formulation, methodological integration, and critical interpretation. In this manner, AI can help supervisors get back to their fundamental pedagogical task: to guide students towards independent scholarly thinking.

AI can also help in the development of collaborative supervision models that can integrate human knowledge with the assistance of AI. Instead of being a substitute for the supervision, AI can act as an intermediary platform that can enable more informed and focused academic discussions. For instance, AI-assisted literature mapping can help in more productive discussions on research positioning, and feedback systems can assist students in preparing for more in-depth supervision discussions.

In the area of equity and accessibility, there is much that AI can offer. For students from linguistically diverse backgrounds or those who do not have access to supervisory interaction, AI can be a constant source of support in understanding academic conventions. This is particularly important in relation to academic confidence and participation, especially in resource-constrained settings. AI can thus be used to create a more inclusive research training environment without compromising academic standards.

Notably, the ethical incorporation of AI can also lead to pedagogical creativity. Supervisors are likely to stress process-based evaluation, oral defence, reflective writing, and dialogic evaluation to ensure that students show actual comprehension and intellectual possession. This trend urges a shift in supervision from critical thinking, creativity, and ethical thinking to textual excellence. To conclude , the presence of AI in thesis supervision does not have to be viewed as a challenge. Under the appropriate support and pedagogical purpose, AI presents a chance to reimagine thesis supervision as a collaborative, reflective, and intellectually stimulating process. The task is not to avoid the technological change but to train and prepare it to maintain the integrity, richness, and humanity of thesis supervision.

8. Future Directions

Future research must, therefore, progress from the current state of speculation or policy-oriented discourse and enter the realm of empirical research as artificial intelligence continues to develop and integrate itself into the practices of academic research. A significant area of research for the future would be to investigate student-supervisor-AI interactions. Research studies that investigate how students manage AI use, how supervisors respond to AI-mediated drafts, and the impact of such interactions on learning outcomes would be very informative about the realities of AI-supported supervision. It would also be interesting to find disciplinary differences, since the expectations regarding originality, methodology, and authorship are vastly different across disciplines.

Another important domain that would demand attention in the future would be policy formulation. The policies would have to move from a prohibitive or regulatory approach to ethical integration, transparency, and pedagogical clarity. The policies would have to define acceptable AI practices, disclosure, and supervisory duties while allowing for disciplinary and methodological diversity. It is also important that policy formulations view supervision as a pedagogical process and not an assessment process and that ethical standards are supportive of learning and not just compliance.

The use of hybrid frameworks for supervision is a bright future area for thesis supervision. The hybrid frameworks would integrate human supervision with reflective and accountable AI use, where AI would be considered a supplementary source rather than an authoritative source. The hybrid frameworks would use reflective practices like AI use statements, research logs, oral defences, and process evaluations to ensure intellectual ownership and accountability. These practices would ensure critical engagement with AI-generated outcomes and the use of reasoning, thus emphasizing scholarly agency.

Finally, future perspectives on AI in thesis supervision should also consider the implications of AI on academic identity and knowledge production. As AI becomes an increasingly common presence in research environments, supervision practices will be critical in shaping how new academics think about

authorship, responsibility, and intellectual integrity. Future practices in supervision can ensure that AI improves and does not diminish scholarly practice by promoting awareness and critical engagement.

9. Conclusion

The growing role of artificial intelligence in academic research calls for a paradigm shift in the concept of thesis supervision as a pedagogical and epistemological exercise. With the growing role of AI in research design, writing, and editing, it is high time that one recognized that thesis supervision is no longer a purely human endeavour, based solely on the traditional concept of supervision as a mentorship exercise.

This paper has argued that despite the massive impact of AI on cognitive labour, authorship, and supervisory roles, AI does not make thesis supervision redundant. Rather, the growing role of AI in research highlights the significance of the supervisor's role in cultivating critical thinking, ethical, and intellectual responsibility. While the role of AI in research highlights the significance of textual accuracy and procedural correctness, thesis supervision in the age of AI must focus on conceptual accuracy, methodological correctness, and reflective engagement with knowledge production.

By embracing hybrid models of supervision that incorporate AI in a thoughtful and well-designed manner, academic institutions can harness the power of AI in a way that improves efficiency without sacrificing the integrity of scholarship. These models conceptualize AI as a collaborative agent that works alongside human scholars, while also emphasizing the primacy of human judgment, guidance, and care. The real question that faces the world of higher education is not whether it will embrace or resist the challenge of artificial intelligence, but rather how it will be shaped in a way that honours the values of intellectual apprenticeship.

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