



PhD Students' Engagement with Generative AI in Doctoral Academic Writing : Supportive Functions, Risks of Over-Reliance, and Implications for Scholarly Development

L'utilisation de l'IA générative par les doctorants dans la rédaction de leurs travaux universitaires : fonctions d'aide, risques de dépendance excessive et implications pour le développement académique

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Abstract: Doctoral studies usually require extensive reading, empirical experimentation, extended academic writing and careful considerations of ethical guidelines, all of which impose considerable pressure on PhD students, particularly in AI-enabled environments. This study, therefore, examines how PhD students engage with generative AI as a cognitive and pedagogical resource in doctoral academic writing without compromising academic integrity. Grounded in socio-cognitive theory, cognitive load theory, and self-regulated learning (SRL), the study adopts a cross-sectional survey design. Data were collected from multiple Algerian universities, including 109 survey responses from different PhD programs. Findings revealed that PhD students had widely adopted AI tools in their academic trajectories, such as plagiarism detection software, large language models, paraphrasing tools, and AI-enabled research databases. Thematic analysis indicated that students perceived tangible benefits from AI. However, the most recurring concern was the different perceptions towards the disclosing of AI text usage in their written papers. In response, the study proposes a principled framework for the responsible integration of AI in doctoral education, emphasizing guided use that promotes self-regulation, critical evaluation, and academic integrity.

Keywords: PhD Students, Generative AI, Academic Writing, Self-Regulation Learning Theory, Ethical Guidelines

Résumé: Les études doctorales exigent généralement de nombreuses lectures, des expériences empiriques, la rédaction de travaux universitaires volumineux et une prise en compte rigoureuse des directives éthiques, autant d'éléments qui exercent une pression considérable sur les doctorants, en particulier dans les environnements utilisant l'IA. Cette étude examine donc comment les doctorants utilisent l'IA générative comme ressource cognitive et pédagogique dans la rédaction de leurs travaux universitaires, sans compromettre l'intégrité académique. S'appuyant sur la théorie socio-cognitive, la théorie de la charge cognitive et l'apprentissage autorégulé, l'étude adopte un plan d'enquête transversal. Les données ont été recueillies auprès de plusieurs universités algériennes, dont 109 réponses à l'enquête provenant de différents programmes de doctorat. Les résultats ont révélé que les doctorants avaient largement adopté des outils d'IA dans leur parcours universitaire, tels que des logiciels de détection de plagiat, des modèles linguistiques de grande envergure, des outils de paraphrase et des bases de données de recherche basées sur l'IA. L'analyse thématique a indiqué que les étudiants percevaient des avantages concrets liés à l'IA. Cependant, la préoccupation la plus récurrente concernait les perceptions divergentes quant à la divulgation de l'utilisation de textes générés par l'IA dans leurs travaux écrits. En réponse, l'étude propose un cadre fondé sur des principes pour l'intégration responsable de l'IA dans la formation doctorale, mettant l'accent sur une utilisation guidée qui favorise l'autorégulation, l'évaluation critique et l'intégrité académique.

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Mots-clés : Doctorants , IA Générative , Rédaction Académique , Théorie de l'Apprentissage par l'Autorégulation , Directives Ethiques

Academic writing has long occupied a central place in educational discourse because it is both an essential medium of learning and one of the most demanding forms of language use. It is also a matter of considerable concern that has engendered ongoing scholarly debate. In this vein, academic writing is often regarded as the most complex of the other four language skills reading, listening, and speaking; as it requires the combination of both critical thinking and disciplinary conventions. As Grami (2010) argues, effective writing demands careful thought, discipline, and concentration, particularly for students learning English as a foreign language. Emig (1977) defined writing as mode of learning that extends beyond linguistic accuracy and lexical development to encompass the enhancement of learners' cognitive abilities and intellectual capacities. Despite its role as a means of communication, writing also functions as powerful tool for learning through which higher-order cognitive processes, such as analysis and synthesis, can be developed only through deliberate and structured thinking, a feature solely attributed to writing development. Similarly, Hyland (2003) contends that writing can be better understood when referred to as a social practice rather than an individual cognitive activity. On the whole, writing is can be conceptualized as a dialogic and relational mode of communication, shaped by the choices that reflect social meanings and adhere to discourse conventions.

Even with its substantial significance, academic writing is often perceived by students as difficult, stressful, and cognitively challenging. EFL learners, in particular, are often faced with a plethora of hurdles, namely linguistic accuracy, lexical range ,coherence and rhetorical appropriateness. These difficulties may be further exacerbated by first-language interference, limited familiarity with academic discourse conventions, and inconsistent or insufficient feedback. AL fadda (2012), for instance, notes that many learners struggle with low confidence about their writing, mainly due to limitations in language proficiency, unawareness of academic writing fundamental processes, and inadequate pedagogical support. Similarly, Aldabbus and Almansouri (2022) contend that the main challenges learners face are lack of confidence, especially when feedback is inconsistent, limited resources and opportunities for practice, and poor understanding of academic writing processes. In response to these difficulties, students increasingly resort to AI tools for error correction, idea generation, paraphrasing, and improving the overall quality of their writing (Ananiet al., 2025).

At the highest academic degree, doctoral studies demands extra cognitive effort as well as pressure to contribute to university reputation and the overall state of art (Nerad, 2010). Once enrolled, PhD students find themselves forced into extra extensive reading, critical analysis, empirical research, and sustained academic writing (Flower & Hayes, 1981). This exerts a heavy cognitive load and places considerable strain on working memory, potentially leading learners to burnout cases of loss, and despair. Researchers have long sought to address the complexities of doctoral writing, such as difficulties in developing scholarly identity, adapting to discipline-specific academic writing conventions, responding to and evaluating writing feedback, and managing the intellectual and emotional pressures

associated with advanced scholarly work (Inouye & McAlpine, 2019). In the same vein, Shamsi and Osam (2022) state that most of the significant obstacles PhD students face are primarily related to limited publishing training or experience, weaknesses in article construction, adherence to strict journals requirements, and insufficient instructional support and guidance during the PhD journey. Undoubtedly, although many challenges are inherent in the academic journey, PhD students are required to master academic writing conventions while simultaneously adapting to contemporary technological developments within clear ethical boundaries (Hoomanfard & Shamsi, 2025).

Since its wide spread in 2023, artificial intelligence has introduced a profound shift, filled with novel prospects and unprecedented opportunities; however, it has also marked a turning point fraught with apprehensions and skepticism (Pastarmadzheva & Angelova, 2025). Since the advent of such technological tools, the field of education has been restructured and revolutionized with the expansion of large language models and other AI-assisted writing technologies. Apparently, this digital transformation is rapidly advancing and cannot easily be reversed; rather, it will continue to shape higher education discourse and learning practices, being added to the didactic triangle as active dimension rather than peripheral technologies. In this sense, generative artificial intelligence tools (GenAI) are developed to assist students in their academic writing and to strengthen the skills of ESL learners, for instance, in generating texts, refining and proofreading, clarifying and summarizing ideas, and engaging in dialogic support (Yusuf et al., 2024). Other tools encompass advanced algorithms capable of engaging users in virtual language interaction to produce original content, refine outputs according to user needs, and even mimic aspects of human intelligence, such as ChatGPT, Trinka AI, Gemini, Writesonic (Ananiet al., 2025).

However, AI is referred to as a double-edged tool in higher education writing as it offers valuable assistance but requires careful regulation to avoid undermining learning outcomes and ethical standards (Aljuaid, 2024). Despite the significant benefits, concerns persist around the tool's accuracy, particularly in terms of hallucinations, plagiarism, over-reliance, bias, incorrect guidance, and the diminished development of autonomous writing skills, thereby raising calls for AI literacy to use these tools effectively. Thus, for an effective use of GenAI tools, students need to develop key competencies, for instance, the ability to formulate purposeful prompts, critically evaluate outputs, and apply critical thinking and reasoning when adopting AI-generated texts while prioritizing their scholarly voice (Choudhuri et al., 2023). This frames Gen-AI as more than a correction tool but to be positioned as a tutor and research assistant that can scaffold EFL learners' writing development while also raising ethical and pedagogical questions (Kim et al., 2024). In academic terms, this implies that students are not only in need for technical familiarity with AI tools, but also the metacognitive and ethical abilities required to use AI-generated texts appropriately in academic contexts.

Although recent studies have discussed the impact of gen AI writing tools on the development of academic writing of higher education, university and the growing body of research has been mainly concerned with the effective integration of AI tools within educational settings. Research on its effect on doctoral studies remains under-explored with dearth literature on how to guide students academically in this era in order to develop responsible scholars. This leaves a significant gap in understanding how PhD students use AI tools cognitively and ethically in the context of their doctoral writing, and

how supervisors can guide them effectively. For this reason, the present study seeks to examine PhD students' perceptions and experiences of gen-AI use in academic writing in Algerian higher education. Moreover, It aims to establish a definite line between productive, ethical use and detrimental dependence. such an understanding is crucial for the design of principled pedagogical interventions that address doctoral students' needs while still protecting their cognitive capacities and scholarly integrity. To achieve such objectives, the current study aims to answer the following research questions:

- 1.What advantages do PhD students perceive in the use of Gen-AI for academic writing ?
- 2.What challenges and risks do PhD students associate with Gen AI-assisted writing tools?
- 3.What are the implications of these perceptions and experiences for doctoral pedagogy and scholarly development?

Informed by socio-cognitive theory, cognitive load theory, and self-regulated learning (SRL), this study conceptualizes AI as an assistive tool rather than as a substitute for intellectual engagement (Vygotsky, 1978; Zimmerman, 2000). From this perspective, and through a holistic understanding of how AI tools support doctoral studies, this study aims to maximize the benefits of these tools while minimizing the barriers perceived by students, whether consciously or unconsciously, through principled recommendations for integrating AI into doctoral writing practices. This includes a model focused on enhancing both efficiency and autonomy while preserving the integrity and depth of scholarly development, particularly in an era where growing numbers of doctoral students are actively engaged with Gen-AI to support their academic writing (Kim et al., 2024).

1. Literature review

Academic writing once regarded merely as a form of communication, is now understood as a catalyst for the construction and development of knowledge. Likewise, doctoral studies is viewed as a demanding intellectual and social practice that necessitates the firm adherence to complex academic expectations. However, the rapid development and integration of AI-assisted systems raise several challenges and concerns, including students' over-reliance on such tools, intellectual property issues and threats to writer identity, especially for PhD students as budding academic writers. In this respect, considering doctoral studies as both an intellectual and social endeavor is crucial for investigating whether the effect of GenAI tools is beneficial or debilitating.

1.1.Doctoral academic writing as a cognitively and socially challenging endeavour

Academic writing is widely considered a challenging endeavor for doctoral students, as dissertations and academic papers must amount to high disciplinary conventions and institutional standards. It can be conceptualized as both an individual cognitive process and a socially mediated practice through which knowledge claims are formulated, tested, and then refined. Emig (1977) argue that writing plays a vial role in facilitating learning as a mode of language acquisition. Flowers & Hayes (1981) define writing as a recursive process that involving planning, translating, and reviewing. This task, therefore, encompasses far more than the mechanical production of grammatically sound sentences; it also includes managing projects adequately, synthesizing literature, designing robust methodology, and respecting academic standards within tight timelines (Hayland ,2003). All these demands may lead to cognitive overload and increased levels of burnout, which

can effect students' emotional state and influence whether they persevere or lift the burden by quitting (Hoomanfar & Shamsi, 2025). This is more complex for students of English as a foreign language, who face linguistic complexities and cultural barriers; therefore, constructive feedback is a must to guide and help them accomplish the goals of such a journey. This situation is further compounded for Arab and African PhD students by their limited linguistic competence, including restricted set of vocabulary, sentence repetition, and unawareness of cohesive devices; these challenges negatively affect clarity and logical sequencing (Al-Zubaidi & Richards, 2010).

In addition, balancing dissertation writing and research with personal and academic responsibilities has led to heightened levels of stress, fear, and anxiety which ultimately may end up with procrastinating their academic duties (Hopwood et al., 2011). Another difficulty for PhD students is the development of their academic identity, their hopes to become independent researchers (Inouye & McAlpine, 2019). According to Dardour and Bouyahya (2025), accomplishing the needed requirements for completing a doctoral dissertation marks a pivotal milestone in a researcher's academic trajectory, through which a doctoral student is supposed to demonstrate his ability to think independently, conduct extensive inquiry, and contribute meaningfully to a chosen field. However, this process requires a complex balance of intellectual rigor, technical competence, and emotional resilience. These difficulties span over multiple domains, including time management, psychological stress, language proficiency, quality of supervision, institutional support, and access to resources.

As mentioned previously, doctoral writing places heavy demands on students' shoulders as it requires the balancing of different aspects, namely research, high quality papers writing, and personal duties. Nonetheless, these requirements should remain consistent and accurate while producing scholarly work. These overlapping pressures often lead to states of anxiety and cognitive load which, in return, may increase dropout rates. Even time consumed and longed in waiting for the article to be published represents a source of anxiety for the doctoral students, as it may prevent their graduation on time (Shami & Osam, 2022). He and Mu (2025) highlight that PhD students' mental health is a pressing urgent issue that requires both scholarly and policy intervention. They further call for the adjustments needed in the system of education and employment surrounding doctoral research. Recent studies declare further that PhD students' anxiety has intensified worldwide in this era due to pressures from research, finances, future prospects, and supervision. However, this classification only concerns mild cases, which can be managed through self-relaxation strategies like positive thinking or exercise. More alarming are severe cases, in which institutional or medical support is required (Ma et al., 2024; Phyo et al., 2025).

1.2. Generative AI tools for Strengthening Academic Writing

Generative artificial tools such as ChatGPT, which is a category of chat bots, are equipped with advanced natural language processing features. These systems are capable of replicating the styles and even mimicking the flow of human communications (McGrath et al., 2024). The advent of generative artificial intelligence has radically transformed academic writing practices and outcomes. In this case, despite the challenges and concerns regarding AI integration within higher education contexts, Hemachandran et al. (2022) claim that these advanced tools can increase tutoring by improving assessment accuracy and thus developing personalized education. As an example, Grammarly and

QuillBot have achieved up to 58% accuracy in student assessment data. In the same line of thought, Marzuki et al.(2023) note that AI tools have contributed positively to enhancing EFL learners' writing quality, especially by improving content development and assisting in the production of well-crafted essays. He further state that this improvement was received favorably by EFL teachers. Chu et al.(2022) advocate for the professional development of higher education practitioners in order to leverage these new emerging technologies. Moreover, they highlight the need for empirical research in authentic educational contexts so the integration of these tools is both meaningful and effective.

Generative AI has a deeper effect on students. They perceived it as an effective writing assistant that increases efficiency during the writing process through ameliorating expressions, and providing formal academic vocabulary whenever needed. In this context, Wang & Wang (2025) report that students use GenAI across multiple stages of writing in order to aid them with different aspects of writing, such as formal vocabulary, grammar accuracy, coherent sentences, and idea generation. In the same line of thoughts, Jin et al. (2025) examine AI-assisted functions across a range of levels, from technical support to substantive text development. Their research further emphasizes that the efficacy of such tools depends not only on the tool availability and efficiency, but also on learners' awareness of self-regulation strategies and their understanding of how and why these technologies should be used. Thus, learners differ in both their perceptions of AI tools and the strategies they deploy when using them. While some view these advanced tools as mere machines, others use them as assistants, and still others employ them as part of their process of creating meaning (Wang et,al.2025). Indeed, AI supports students in planning, performing, and reflecting on their works more effectively. However, for this to be truly beneficial, students must remain in control of how they use AI rather than granting technology dominance over their learning(Lan & Zhou, 2025). Overall, recent empirical evidence indicates that These technologies have constituted valuable learning resources because they provide immediate feedback and reliable support for improving the quality of writing.

1.3 The use of GenAI for scaffolding the writing process

PhD students often face limited training opportunities and insufficient supervisory guidance within their institutions. Therefore, many of them resort to AI tools as a form of assistance in academic writing (Rahman et al., 2023; Melouah, 2023). From a socio-constructivist perspective, these tools may function as a scaffolding agent by offering individualized feedback, assistance, explanations, and language refinement. However, doctoral writing extends far beyond surface-level language correctness; it requires the development of critical reasoning, methodological awareness, writing skills, and disciplinary expertise. In this respect, supervisory guidance remains essential for strengthening students' research competence and developing their academic identity. Recent studies therefore call for the careful integration of AI tools within structured supervision and ethical guidelines. This is particularly important because academic writing is inherently process-oriented, involving a recursive cycle of drafting, revising, editing, and proofreading through which ideas are progressively refined (Kumar et al., 2020). Accordingly, it is a cognitive practice that requires learners to analyse, evaluate, and synthesize knowledge in order to contribute to academic discourse (Nakrowi et al., 2025). What remains elusive in the existing literature is how it can be integrated in ways that

support writing development without weakening students' cognitive engagement or scholarly voice.

1.4 Risks of over-reliance on Generative AI Tools

It is acknowledged that AI tools offer PhD students numerous advantages that can significantly support their doctoral journey. However, over-reliance on these tools in academic writing may engender a profound set of pedagogical and ethical concerns. In this view, excessive use of AI tools may undermine learners' critical and creative thinking skills, as it encourages them to outsource the production of written texts rather than engage in the analytical and evaluative processes upon which academic competence is founded. Fan et.al.(2025) argue that excessive dependence on AI tools may result in metacognitive laziness, which hampers their ability to deeply immerse in their learning journey and be able to control their self regulation skills. They further warn against its negative effects as it may limit knowledge gain and transfer. Accordingly, learners should focus on developing a deeper understanding of knowledge and activate their metacognitive processes .For instance, instead of blindly following AI tools outputs or feedback, they should analyse evaluate then use the afforded information to complete their assignments efficiently.

The risk, therefore, lies not only in overt misuse, but in the diminishing of critical engagement, meta-cognitive monitoring, and authorship, in addition to the weakening reflective effort needed for authentic learning and scholarly development. In a similar context, Hoomanfard and Shamsi (2025) found that L2 doctoral students perceive GenAI as both a powerful mediator of dissertation writing and a source of ethical uncertainty. Their study reports that doctoral students use GenAI for multiple dissertation-related purposes, yet remain uncertain about the boundary between legitimate support and plagiarism, thereby expressing their strong need for structured training. More broadly, recent reviews indicate that AI can support aspects of self-regulated learning and personalized feedback; however, its pedagogical value depends on whether human agency remains central in the learning process (Niekerk et al., 2025; Lan & Zhou, 2025; Lee et al., 2025; Ou et al., 2024).

Another set of concerns related to ethical conduct, authorship, and academic integrity have been widely examined in recent studies. In doctoral research and academic writing, PhD students are expected to uphold responsibility and integrity of their work; yet the use of AI-generated texts without critical evaluation or verification may undermine such expectations because of hallucinations in the form of fabricated or partial claims. This may obscure the boundaries of authorship, devalue intellectual ownership, and jeopardize academia through the use of inaccurate material. For this reason, academic and publication ethics emphasize the need for critical AI literacy, transparent discourse, and the maintenance of human supervision .To reach an advanced academic level, students must develop the critical skills necessary for employing AI tools ethically and effectively without violating the principles of academic integrity. Accordingly, AI raises concerns about academic integrity, particularly when students submit AI-assisted work without proper acknowledgment (Rafi& Amjad, 2025). Balalle and Pannilage (2025) warn against threats to academic integrity caused by AI integration in education, while emphasizing the importance of upholding ethical standards. However, when AI is used properly in educational contexts, it can enhance academic integrity and quality at all levels. For example, Grammarly, Wordtune, QuillBot, and similar software help students with

language -related difficulties while also offering support that may safeguard institutional academic integrity (Yeo, 2023). On the whole, this body of research suggests that AI tools can assist students in improving language, strengthening structure, and enhancing academic writing efficiency. Despite their potential advantages, scholars argue that these tools can not enhance every aspect of academic writing quality and that serious issues about academic honesty and ethical compliance still persist.

While the existing literature emphasizes the existence of both sides of GenAI, namely its potentials and limitations, they still have one unanswered question: How do PhD students can use gen AI throughout their doctoral journey effectively and ethically, with their supervisors support? the answer therefore may remain vague, requiring practical strategies to balance AI and human efforts while preserving academic rigour and originality. Against this background, this study seeks to contribute to a better understanding of PhD students' perceptions and attitudes toward AI use in the completion of their doctoral studies, and to propose effective supervisory recommendations to fulfill this requirement. The following section explains the methodological procedures used to explore this issue.

2. Methodology

This section outlines the methodological procedures adopted in the present study to investigate PhD students' perceptions and experiences of GenAI use in their academic journey. It describes the research design, participants, and data collection tools employed to obtain a comprehensive overview of the use and evaluation of these technologies. Through the combination of quantitative and qualitative data, the study seeks to offer a nuanced account of the subject under investigation.

2.1 Research design

This study draws on both quantitative and qualitative insights and aims to examine the effectiveness of artificial intelligence tools in enhancing academic writing among postgraduate students, including their perceptions and concurrent views concerning the effects of Gen-AI on their academic writing, cognitive development, related ethical issues, and the need supervisory guidelines. More specifically, it adopts a survey-based design, therefore the questionnaire used in this study allows the researcher to explore patterns, frequencies, and possible relationships.

2.2 Participant

The sample of this study consists of 109 students from majoring in English from different universities across Algeria. Participation was voluntary, and the sampling technique was based on the online distribution of questionnaire. The respondents come from different academic specialties, such as didactics, applied linguistics, language sciences, literature, civilization, Language and Communication, ensuring diversity in academic backgrounds. Their years of study ranges from one year to four years, reflecting different levels of academic experience. The participants' age ranges from 24 to 59 years, which provides a broad perspective and reveals diverse professional backgrounds. The sampling technique was particularly adopted in order to generate referrals and reach the participants at different stages of their writing development. It further sought to gather their rich, relevant, and varied insights into students' perceptions of GenAI, the challenges they encounter, and the possible ways forward for harnessing the benefits of AI-assisted dissertation writing in a creative and critical manner.

2.3 Data collection

The data were gathered through an online questionnaire consisting of 26 items and divided into three main categories: close-ended questions aimed at generating quantitative data, semi-closed questions allowing a limited but precise input, and open-ended questions developed to capture participants' opinions and experiences in greater detail. In lay terms, closed-ended questions are used to conduct statistical analysis in a systematic manner, while open-ended questions provide deeper insights into their personal explanations. This combination of both question types permits a more comprehensive understanding of the targeted phenomenon. It concentrates on several key aspects including the frequency of AI use in academic writing, the perceived applications of AI tools, the challenges faced during its use, and its impact on the writing quality, organization, and language.

The questionnaire was distributed online through emails, Messenger, WhatsApp, and Facebook applications in order to reach a larger number of participants. The respondents were informed about the purpose of this study and their participation was entirely voluntary. This was also followed with a reminder after 7 days to raise the responses rate. These responses were primarily stored through an online platform. This, in fact, facilitated the organization and exportation of data for structured analysis. For organizing purposes, participants were required to complete one item before moving to the next one so that they can submit the questionnaire. These items were designed purposefully to capture the participants' varied levels of understanding and decisions regarding the mechanisms of AI use in their doctoral academic writing. This set of items included the main practices of a PhD writing requirements such as generating ideas, drafting, editing, summarizing, organizing literature review, providing arguments, AI use disclosure, awareness of ethical standards, and supervisory guidance. This provided the researcher with sufficient material to form descriptive results and a thematic interpretation. The respondents completed the questionnaire based on their willingness to contribute to this research. On the whole, the responses to this questionnaire probes helped define the coding frame, inform the analysis procedure, and refine the final supervision recommendations.

2.4 Data analysis

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS), version 29, including percentages and graphs. The quantitative data were processed through descriptive statistical procedures, including frequencies, percentages, and graphs, in order to provide a clear overview of response patterns. Besides, responses to the open-ended questions were analyzed through thematic analysis to identify repeated themes and generate profound insights related to students' experiences. This enabled the researchers to develop a more comprehensive understanding of participants' perceptions of the standards governing AI use in their academic journey.

A thematic analysis approach was deployed to examine the interactions and perceptions of participants towards using AI tools in their dissertation writing and when publishing papers. The researchers commenced by reading the data multiple times to select representative excerpts. These excerpts were then analyzed to generate linguistic codes through processes of combination and elimination, which were subsequently organized into themes aligned with the questions of the research. These themes were further verified to ensure their validity and relevance to the study's aims.

3. Results

Participants' responses revealed that they used AI tools as an assisting tool for most of the time but not as a complete substitute for their own writing. Nonetheless, some concerns seemed consistent across their responses, namely plagiarism, hallucinations, privacy, and over dependence, all of which may weaken critical thinking and undermine authorial ownership. Another significant finding is that many respondents explicitly emphasized the need for AI literacy training, targeted workshops, and supervisory guidance on what can be ethically used and what should be avoided in academic writing.

3.1 Doctoral Students' Perceptions of the Need for AI Literacy Training

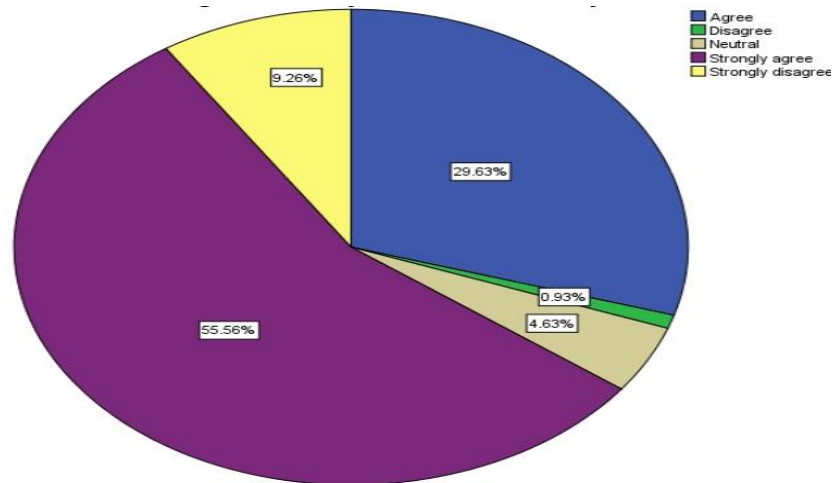


Figure 1: Training of AI use

The results presented in the pie chart above highlighted the necessity of AI literacy training for PhD students. The majority of the participants (55,56 %) strongly agreed that such training is highly necessary. Furthermore, 85,19% of the respondents expressed overall positive attitudes toward the integration of AI into doctoral programs. This fact reflected an increasing awareness of the importance of artificial intelligence in research contexts, while 9.26% strongly disagree. By contrast, a only small proportion of participants (4.63 %) expressed neutrality with, suggesting the lack of appreciation or familiarity with the use of AI tools. These findings implied that the rejection of the integration of AI remains low among PhD students. Overall, the results proposed that doctoral students were largely aware of the role of AI tools in boosting research productivity and academic writing. Consequently, universities should incorporate AI literacy training within PhD programs to ensure that students are adequately prepared to use advanced technologies effectively

3.2 Formal guidelines for Responsible AI Use in Doctoral Writing

The findings revealed agreement concerning the need for formal guidelines for the responsible AI integration into academic writing, particularly among postgraduate students. A considerable proportion of respondents (40.70%) strongly agreed, while 38.9% of them agreed that explicit and formal guidelines are beneficial to accomplish their academic requirements, resulting in an overall positive response rate of with a total of

79,59%. This pattern reflected a clear awareness of the need for structured guidance to support the effective and ethical deployment of these tools. Conversely, a small group of informants (7.41%) preferred to remain neutral, proposing uncertainty and unfamiliarity with the role of such guidelines. Only 0.93 % disagreed, whereas 12.04% believed that such guidelines were unnecessary.

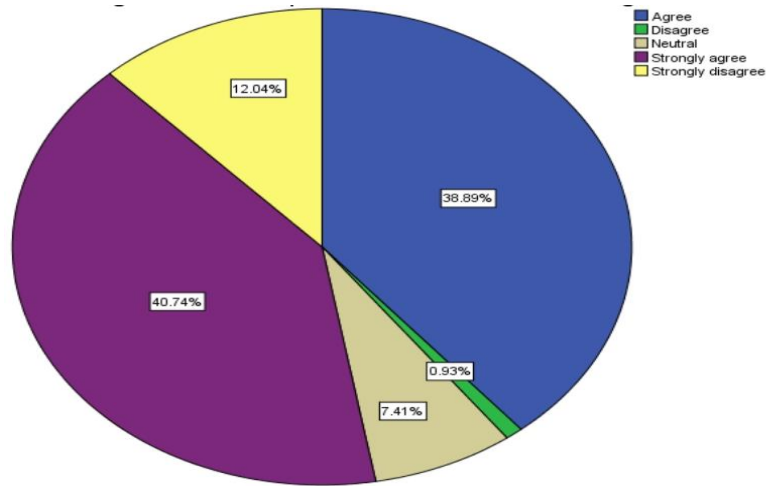


Figure 2: Formal guidelines for responsible use of AI

3.3 The Benefits of AI Use

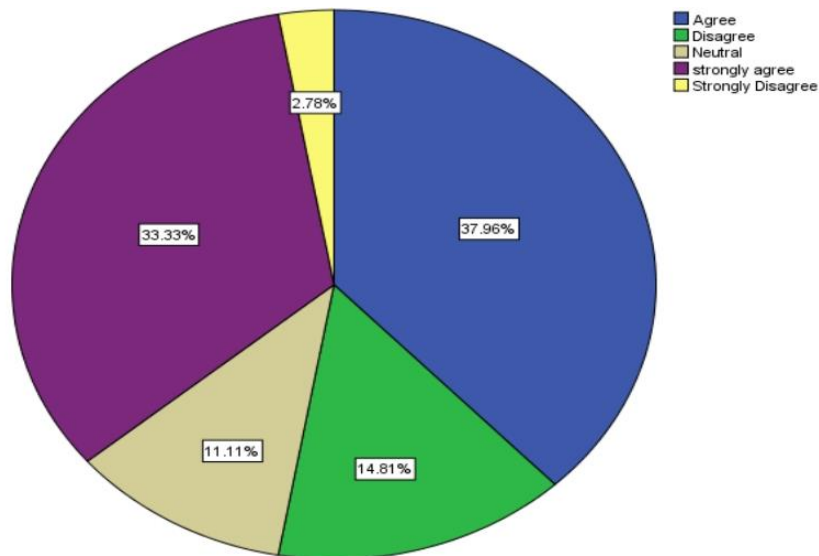


Figure 3: Frequent use of AI and its benefits

As shown in figure 3, the findings offered important insights into PhD students' beliefs regarding the use of AI and its effect on their ability to expand their ideas and analyze arguments. While 33.33% of participants strongly agreed and 37.96% agreed, the combined percentage of agreement reached 71.29%. This indicates that the majority of the students perceived AI tools as supportive of idea development and argument analysis. However, 12.04% of participants remained neutral, which may suggest limited awareness of AI advantages. Meanwhile, 14,81% agreed and 1.85 strongly disagreed, suggesting that the

minority of respondents were skeptical about the usefulness of AI for these higher-order writing processes. Generally, most students PhD are aware of both its benefits and drawbacks while recognizing the importance of extending and refining their own ideas independently.

3.4 The Disadvantages of AI Tools

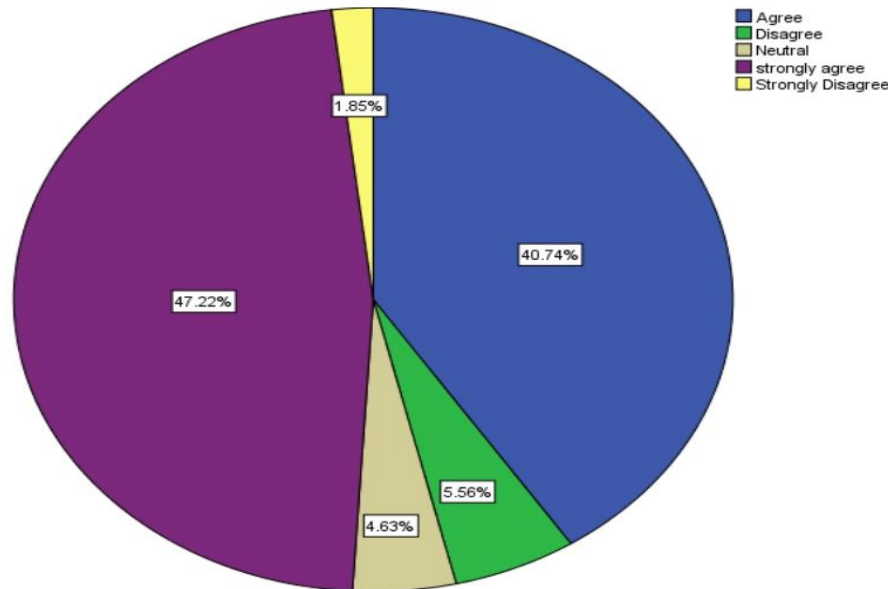


Figure 4: The Risks of Using GenAI tools

This pie Chart illustrates students' views on whether AI suggestions occasionally contain misleading or incorrect information. Over 47.22% proportion of respondents strongly agreed with this statement. Nearly half of the participants firmly believed that AI could provide incorrect information or misleading content. By contrast, 5.56 % of participants disagreed, while 4.63 % were neutral. Only 1.85% of them strongly disagreed and rejected the statement. Approximately, 88% of informants expressed agreement, indicating a strong perception that AI tools were not always fully reliable. Very few students trusted AI completely without reservation. Instead, most of the students appeared to recognize the limitations of these technological tools and highlighted the importance of critically verifying these tools' outputs rather than totally relying on them.

3.5 Thematic Analysis of Open-Ended Responses

The responses of the open-ended questions were to be classified into three major themes in accordance with this study research questions : (1) PhD students' use AI in doctoral writing and its perceived advantages, (2) PhD students' perceptions and ethical concerns, and (3) The forms of supervisory guidance they expect.

3.5.1 Perceived Advantages of GenAI in Doctoral Writing

The analysis of the participants answers revealed that doctoral students used GenAI as a supportive and assistive tool rather than a replacement of their own intellectual work. The most frequent use was language correction, including grammar, improving the academic style, and enhancing clarity and coherence. Besides, many students relied on AI tools for brainstorming and idea generation, particularly when developing research topics and overcoming writing blocks. Another frequently mentioned prominent use was its role in

organizing and structuring ideas, such as outlining sections, planing arguments, and improving the logical flow of a text. In addition, some respondents used AI for explaining and summarizing literature review materials and suggesting relevant updated resources. However, they stressed the need to critically scrutinize the information generated. While a minority reported limited use of AI, like generating ideas to boost the initial drafting process.

For further illustration, these doctoral scholars emphasized the potential of GenAI in improving their academic writing quality. The following excerpts from the data to reflect participants' views:

- 1- *"I mainly use AI to refine my academic language, organize ideas, check clarity and coherence, and get feedback on structure, while ensuring that all arguments, data, and analysis remain my own."*
- 2- *"It provides me with guidance and answers to questions that would take me too much reading and too much time to figure out on my own, especially in terms of conducting research and finding sources."*
- 3- *"In my doctoral writing, I typically use AI as a support tool rather than a substitute for my own thinking. I use it to brainstorm ideas, refine research questions, clarify complex concepts, and improve clarity and structure."*
- 4- *"I use it to clarify complex ideas, organize arguments, improve academic language, and refine structure and coherence."*

Informed by the open-ended responses, repeated themes showed that doctoral students mainly use AI as a supporting academic tool for language improvement, idea development, organization, literature review, and conceptual clarification. Despite the variety of themes, the findings consistently demonstrated that AI was widely integrated into doctoral writing practices and that PhD students regarded it as an assistive resource that enhanced writing efficiency and overall quality, rather than a substitute for scholarly thinking.

3.5.2 Perceived challenges and risks with using GenAI

The respondents' answers revealed that their increased awareness of AI use risks and issues was high. The most frequently recurrent concern included plagiarism, inaccurate references, and the fear that overuse of these tools might slow their cognitive abilities. Many respondents expressed concern about the unreliability of AI detection tools, while others reported unease regarding privacy and authorship issues. For instance, the following narratives confirmed that the integration of GenAI in dissertation writing might hinder the critical thinking skills typically required for doctoral research and writing.

- 1- *"Sometimes even if the whole chapter is written by my own, AI detectors consider it positive. This makes me wonder whether I should lower the level of my English just to seem more human."*
- 2- *"Sometimes AI provides more polished ideas than the ones I originally suggested. Working on the new idea makes me feel like it was not mine in the first place."*
- 3- *"The risk of over-reliance on AI could undermine original thinking or blur the boundaries of authorship, from actually assisting to doing the work."*

All in all, these responses stated that PhD students viewed AI as a facilitative tool, yet one that remains problematic when it is used with no critical evaluation, review, ethical guidelines, and clearly established boundaries .

3.5.3 Implications for Doctoral Pedagogy and Scholarly Development

The analysis of participants' answers further highlighted an urgent necessity for the structural institutions support, practical training, and AI use awareness to ensure an effective usage of AI in doctoral research. Guidelines and policies are also important. Many participants reported uncertainty regarding whether the use of AI tools is legitimate in academic writing. Respondents highlighted the importance of targeted training and AI literacy development. Many participants suggested organizing workshops, seminars, study days, and formal courses held by experts to provide guidance. These training sessions should not focus just on the effectiveness AI use but also on its drawbacks and limitations, including the risks of incorrect information and unreliable sources. Moreover, participants stressed the significance of maintaining a balance between the use of AI and the student's own work, since AI is regarded as a scaffolding tool rather than a replacement for the human cognition.

- 1- *"Clear ethical guidelines, practical training on AI tools, and institutional support, including workshops, policies, and supervision, are needed to ensure AI is used transparently and critically."*
- 2- *"Clear institutional guidelines, transparency about acceptable uses, training on ethical and critical AI use, and supervision that encourages AI as a support tool, not a replacement for scholarly thinking, would help."*
- 3- *"Training and guidance are still necessary not only in how to use AI effectively, but also in understanding its limits. As researchers, we need clearer awareness of when AI can be beneficial and when we should deliberately refrain from using it to preserve our capacities."*

These findings suggest that stakeholders and policy makers in higher education should favour and develop a balanced approach for the integration of AI tools into doctoral programs, yet preserve the adherence to ethical standards, transparency, and the preservation of scholarly integrity.

4. Discussion

It is acknowledged so far that AI tools have engendered a new perspective to how academic writing is to be perceived. Indeed these technologies are no longer presumed as mere tools, but as systems that are capable of generating full coherent variety of texts on different academic themes. However, the increasing proliferation and usage of such tools left many questions unanswered. These concerns are mainly related to ethical appropriateness and the need to establish clear ethical boundaries. At the front line of this uncertainty, PhD students are striving to thrive while fulfilling the demands of their programs and the requirements of academic writing within limited timeframes and unsupported conditions. Based on this, PhD students' personal experiences and perspectives on GenAI tools are analyzed and interpreted to propose a model of how this tools can be integrated appropriately and effectively in a hierarchical order, from higher authorities to end users.

4.1 Using GenAI as a an Assistant in Doctoral Academic writing

The findings of this study implied that a large proportion of PhD students were aware of AI tools' shortcomings and potential risks; therefore, they use it to refine their writing, but not to substitute their thinking and reasoning. This is evidenced by the quantitative

results, where the great majority of participants had expressed their appreciation with using AI as it aided them in developing ideas and analyzing arguments. This was further validated by their open-ended responses in which they explicitly revealed that they used AI as a scaffolding tool, typically for brainstorming and language accuracy. This was supported by a study conducted by Kim et al. (2024), which confirmed that GenAI could help students in different areas of the writing process. These tools are highly favored for their multitasking writing assistance. In the respect, the integration of GenAI into academic writing is greatly influenced by students' willingness to accept it, as well as their perceptions of its usefulness and ease.

What can be also inferred from this pattern is that PhD students viewed GenAI as a source of support and feedback. This interpretation parallels recent studies results, such as Gupta et al. (2022) and Hoomanfar and Shamsi (2025) in their investigation of the most prevalent academic writing challenges encountered by doctoral students. According to these scholars, academic writing in higher education studies necessitates an in-depth understanding of students' field of study, as it involves contextual reasoning and disciplinary knowledge, and critical engagement (Li & Lin, 2025). This is what was echoed by PhD students in the existing study. These findings are also consistent with previous studies. According to Dizon and Gold (2023), the fundamental role of GenAI tools lies in enhancing various aspects of writing and promoting linguistic competence.

4.2 Risk and Challenges of AI Usage in Doctoral Studies

Despite the explicitly stated usefulness and perceived ease of use of AI tools, doctoral students were quite aware of the drawbacks of these tools. The majority of PhD stated that outputs generated by AI tools may be misleading and may generate incorrect information. Hallucinations were identified as one of the main frequently recurrent risks reported by participants (Hoang & Nguyen, 2025). This is further reinforced by qualitative insights that repeatedly referred to plagiarism, false or fabricated citations, blurred ethical boundaries, and over dependence. This pattern suggests that doctoral students did not follow AI instructions blindly, but they used it prudently.

Recent studies revealed that students may struggle to distinguish between legitimate use and plagiarism; therefore, they remain hesitant about whether AI can be used safely (Hoomanfar & Shamsi, 2025). In the same fashion, PhD students expressed their worries about GenAI such as weakening their voice, compromising originality, violating privacy, and diminishing cognitive abilities. The voicing of such concerns reflects a strong level of awareness. Therefore, PhD students need basic training sessions in AI literacy, particularly to ensure that human judgment remains central to doctoral academic writing. These training workshops should involve critical evaluation of these tools generated outputs (Ou et al., 2024; Wang & Wang, 2025). Other studies such as Gabay et al. (2026) contend that GenAI issues such as academic authorship and integrity, over-reliance, unsettled policies, and unreliable AI detection tools remain unresolved so far. This clearly explains PhD students' attitudes in terms of the main problems that are related to academic responsibility rather than efficiency. In short, these deduced patterns may help resolve the assistive-substitution long term contentious debate.

4.3 Implications for Supervisory Guidance

What can be concluded from this study findings is the PhD students' strong desire to have clear instructions on how to harness the new technologies in a responsible and informed

manner. Based on the present data, most participants highlighted the exigency of training sessions and stronger academic supervision. For example, participants' narratives mainly emphasized the importance of workshops, practical guidelines, disclosure practices, and clear limits of AI use. This is clarified by a large-scale review of higher education AI case studies, which argues that AI effective integration is hinged upon pedagogical frameworks that connect technology to instructional practices (Blekina et al., 2025). Another study conducted by Parker et al. (2025) note that the lack comprehensive institutional guidance on AI underscores the need for doctoral students' training. Participant similarly emphasized the pressing need for digital literacy development and the critical evaluation of these tools. Likewise, the absence of an all-encompassing framework entails the development of institutional models for monitoring and governing AI tools according to their specific needs and values (Sanz-Tejeda et al., 2025).

Taken together, these studies suggest that more effective integration should be grounded in human judgement, where institutional policy, supervisory training, academic integrity, and scholarly genuine voice are structured within one coherent framework. A systematic review by Chanpradit (2025), synthesized 30 empirical studies from 2023 to 2024 and reported gains in proficiency after AI use; however, risks such as plagiarism, over-reliance, hallucinations, bias, and unequal access persist. The review also recommended institutional guidelines, transparent data practices, human oversight, and structured training which parallels the results of the current study. In the same context, Johnston et al. (2024) reported that the best use of AI tools in higher education merits the setting of clear institutional policies regulating its proper and ethical use. In a nutshell, these technologies are not supposed to be prohibited in universities ; rather, they should be leveraged to enhance academic practices.

5. Recommendations

The main rationale for this section lies in the participants' responses which revealed that the majority of the PhD students were in an urgent need for high-quality supervisory mentorship. In that , the researchers found that the most intriguing findings were that 85.20% of the students expressed their strong need for guidance and feedback. Henceforth, the role of supervisors in supporting doctoral scholars is fundamental. A synthesized model that was built based on recent studies and the findings of this study(Gupta et al., 2022; Phyo et al., 2025; Shami & Osam, 2022; Becker et al., 2025; Wu et al., 2025; Amjad & Rafi, 2025). This model explains the hierarchical sequence for integrating AI tools in higher education systems effectively, particularly to assist PhD students adequately, this is further exemplified in figure 5. This model illustrates how institutional, supervisory support, responsible Gen-AI, and publication literacy can be integrated into tailored doctoral writing interventions to improve scholarly development and publication readiness. Thereupon, the responsible and effective integration of AI tools in doctoral education demands clear and well-defined roles at each level, namely higher education stakeholders, universities, supervisors, and PhD students. Policy makers must develop balanced regulatory frameworks informed by ethical standards; universities should provide continuous, discipline-specific support and training; supervisors are expected to offer guidance and constructive feedback; and PhD students themselves must use AI critically in order to preserve their academic integrity and authorial voice. This recommendations may lessen the counterproductive effects of these advanced technologies (Cui & Yasseri, 2024).

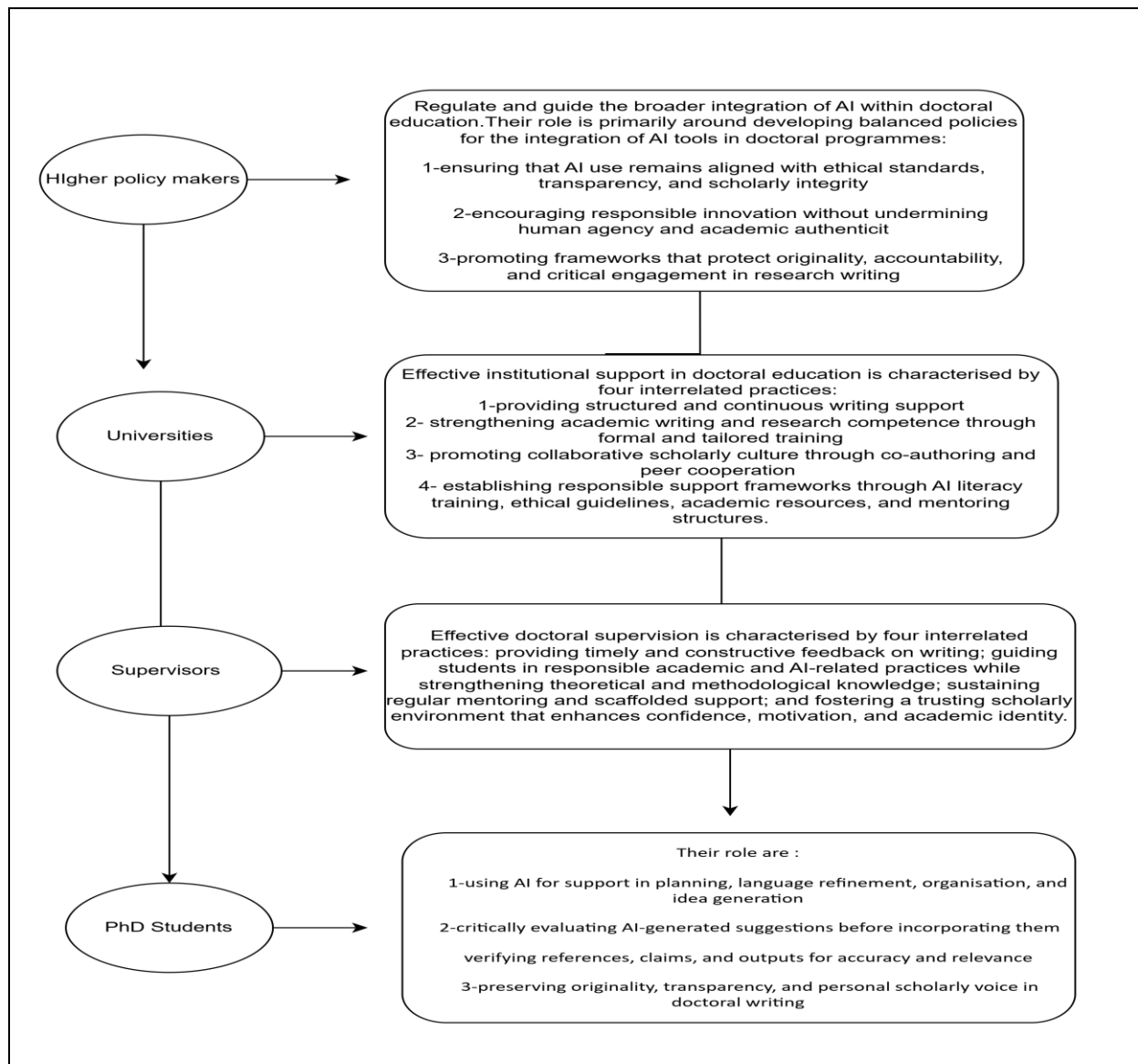


Figure 5 : A model of an Effective AI integration in higher education.

Conclusion

This study had shown that PhD students generally perceived generative AI as a useful tool for academic writing, particularly for idea generation, organization, language refinement, and writing efficiency. At the same time, they remained highly aware of its risks, especially plagiarism, inaccurate or fabricated information, over-reliance, and blurred authorship. The findings, therefore, suggested that the value of GenAI in doctoral writing lied not in replacing human thought but in supporting it through critical, ethical, and transparent use. The study had also highlighted the urgent need for clearer institutional guidance, supervisory feedback, and AI literacy training in doctoral education.

The study contributed to the growing discussion on AI in higher education by showing that responsible integration, rather than uncritical adoption or rejection, is essential if doctoral writing is to preserve scholarly integrity, originality, and human agency. The current paper has investigated the use of AI tools in doctoral studies from the students' perspective.

However, there remains a significant need to explore the same inquiry from the perspective of other stakeholders, such as supervisors, administrators, and even journal editors and reviewers. Investigating these discourse communities could provide valuable additional insights into the challenges of doctoral writing and article publication, while also informing more effective forms of support for doctoral students at this level. The findings were based on a small sample drawn from a single institution and national context, which restricts the transferability of the results. In addition, some of the data relied on retrospective accounts from doctoral graduates who successfully completed their programs, the findings might have been shaped by selective memory or response bias. Furthermore, the study had focused only on academic writing aspects. As such, this paper did not fully account for the broader complexities of the doctoral experience or the dynamics of student-supervisor relationships. Finally, although the identified practices may be relevant to both online and face-to-face doctoral contexts, further research is needed to confirm their applicability across different modalities. This research paper, therefore, calls for the significant institutional investment in the integration of AI tools into doctoral programs to improve research productivity and students' academic development. Such investment should operate across multiple levels, extending from policy makers to universities, supervisors, and PhD students, through which these cutting-edge technologies can be effectively and ethically integrated.

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