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A Comparative Study of Generative AI Writing Tools and Their Impact on Academic Writing among PhD Researchers

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ABSTRACT:

The increasing integration of Generative Artificial Intelligence (AI) tools in academic contexts has significantly transformed doctoral writing practices. This study examines how various AI tools such as ChatGPT, Grammarly, Gemini, Claude, and Microsoft Copilot can be used in the context of doctoral academic writing. The qualitative research design was adopted, and data were gathered using semi-structured interviews with 14 PhD researchers, 13 of which were from the University of Vaasa, and the remaining one from the University of Oulu. Data was analysed through thematic analysis to detect the pattern and main themes from the collected data. The analysis demonstrates that the doctoral researchers are not using all tools of AI they have available; rather, they are using multiple, but selective, tools of AI in a task-oriented way. ChatGPT was primarily used for brainstorming and clarifying ideas, while Grammarly supported language enhancements and editing. Some creative uses included using Gemini and Claude for less comprehensive outputs and alternative perspectives, while Copilot was valued for its integration into writing environments. The results reveal benefits of AI tools for efficiency, writing quality, and user confidence, but also raise concerns related to issues of inaccuracy, originality, ethics, and dependency. Importantly, the study shows that the effectiveness of AI tools relies on their comparative and strategic application, with the researcher's critical thinking and academic responsibility. AI isn't meant to replace human thought, but rather to be a tool used in conjunction with it. This study contributes to the current knowledge on the use of AI tools in higher education by providing understanding of the use of multiple tools and its implications for doctoral writing practices.

KEYWORDS: generative artificial intelligence, academic writing, doctoral education, thematic analysis, interview study, higher education, writing, ideas (thoughts)

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INTRODUCTION

1.1 Background

Generative Artificial Intelligence (AI) technologies have revolutionized the world of higher education and academic writing. Artificial intelligence tools, including ChatGPT, Grammarly, Gemini, Claude, and Microsoft Copilot, are being integrated into the research and writing process, as they help generate ideas, draft content, edit language, and organize content. These tools have sparked much debate in the academic community about their ability to make improvements in the efficiency of writing, as well as concern over ethics, originality, and critical thinking. Recent research by Zhao et al. (2024) indicates that Generative AI is not just a technological trend but also a dynamic element of the process of academic knowledge creation and scholarly communication. The increasing accessibility and usability of these tools are accessible and usable has led doctoral researchers and students to try them out in their different academic settings to experiment with writing with these tools. With the ongoing evolution of technology in academic settings, the impact of AI-powered writing is an important topic in higher education (McDonald et al., 2025; Wang et al., 2024).

Doctoral level academic writing is considered as a cognitively challenging process that demands originality, analytical thinking, literature synthesis, and discipline precision. Doctoral researchers are expected to produce academically rigorous work while simultaneously managing time pressure, publication demands, and complex research activities. Doctoral students struggle with problems of argument structuring, as well as with the production of coherent academic discourse and critical engagement with academic texts. As described by Rafi and Amjad (2025), to meet these challenges, research into Generative AI tools as supportive mechanisms has grown in popularity, and these tools could potentially help researchers throughout the writing process. Previous research by Ros & Samuel (2025) suggests that AI-supported writing systems can offer scaffolds for idea development and text organization and language improvement, especially for multilingual and non-native English researchers. Meanwhile, researchers have highlighted concerns about the role of researcher agency and independent intellectual contributions

in the integration of AI in doctoral writing (Zhang et al., 2026). This makes the link between AI support and human cognitive control an important topic in the current debates on doctoral academic writing.

The release of ChatGPT in late 2022 was a major shift in the use of Generative AI technologies in the educational and research environments. Since then, AI-assisted writing tools have rapidly gained popularity among students and researchers because of their ability to generate human-like text and provide real-time writing assistance. Many researchers have found ChatGPT to be a helpful resource for brainstorming and summarizing information, for boosting writing fluency, and for improving productivity (Hosseini et al., 2024). The researchers also observed AI tools could help reduce cognitive strain while composing by proposing ideas to help users get started or enhance their content (Kim et al., 2025). Relying too much on AI-generated content can also impact originality, critical thinking and independent reasoning abilities if not used wisely.

There is a growing trend in the existing literature (Xu & Shen, 2026) suggesting that doctoral researchers are not only using AI tools on a particular platform but also selectively and as needed. Tools seem to have different functions for academic writing depending on users' purposes and academic writing needs. For example, ChatGPT is often used for brainstorming and clarifying concepts (Lendvai, 2025), while Grammarly is used for grammar checks and proofreading (Calma et al., 2022). Similarly, Gemini and Claude have been praised for providing concise explanations and alternative viewpoints (AlSagari et al., 2025) while Microsoft Copilot has been highlighted for its seamless integration with document writing platforms. Researchers often assess AI tools by their efficiency, reliability, contextual understanding, and their applicability to specific academic tasks when conducting comparative studies (Ateriya et al., 2025). This comparative engagement is indicative of a larger trend in multi-tool writing in which researchers carefully select technologies to support various aspects of writing. From these results, it is clear that AI-powered academic writing is not a uniform approach but a dynamic interaction between researchers and various AI tools.

As more universities and researchers encourage the integration of Generative AI tools into higher education, they are increasingly seeking supportive methods to academic

writing. Recent research has shown that AI tools can improve the productivity of writing, help develop ideas and offer ongoing academic support when conducting complex research. For example, Van Niekerk et al., (2025) stated that the benefits of AI-powered learning environments are becoming more apparent, especially in the field of information management and the streamlined dissemination of research findings. Previous studies also indicate (Rafi & Amjad, 2025) that the use of AI tools has created opportunities for self-directed learning, enabling doctoral researchers to receive immediate feedback and support with their writing throughout various stages of their research. In addition, AI-powered writing tools can help researchers work more flexibly and adaptively in their academic endeavors, as they can better organize and clarify their thoughts. Generative AI is emerging as a valuable, supplementary tool in today's research and learning landscape. The increasing interest of institutions in integrating AI into their doctoral education and academic writing further highlights the growing relevance of AI in academia (Khalifa & Albadawy, 2024).

More recent studies also highlighted the use of Generative AI tools to enhance critical engagement and facilitate deeper academic exploration during writing. Researchers suggest that AI systems can also promote reflective thinking by providing alternative viewpoints, creating conceptual explanations, and helping researchers look into new possibilities for research (Liu et al., 2023). Larson et al., (2024) indicates that AI tools are not intended to take the place of human intelligence, but rather to be used as a collaborative tool to help researchers explore ideas and information more actively. Research also shows that AI technologies can be used as brainstorming partners for doctoral candidates to help them clarify their arguments, organize concepts, and enhance analytical clarity (English et al., 2026). This dynamic interaction between researchers and AI systems contributes to a more flexible and iterative writing process, with technology serving to facilitate creativity and research progress (Luther et al., 2024).

The use of the Generative AI tools has also been widely considered as a help to academic communication for researchers from across the multilingual and international community. The previous literature has shown that AI writing tools can enhance the clarity and coherence of sentences, improve vocabulary usage and overall readability, which can

help researchers in effectively conveying their ideas in academic English (Wang et al., 2025). This support can be of great benefit to doctoral researchers in multilingual settings where language barriers can affect writing self-confidence and fluency. Research has shown that AI tools can offer instant and accessible support, allowing researchers to concentrate on conceptual development, and enhance the linguistic quality of the research. Consequently, the use of Generative AI has become a tool for communication and enabling greater participation in global academic conversation.

Generative AI technologies are contributing to the evolution of scholarly writing practices and research productivity. AI-driven strategies are now being adopting increasingly by universities and research communities to facilitate knowledge generation, knowledge management and academic communication. AI tools can enhance a number of writing tasks by helping researchers to draft out outlines, structure arguments, and edit written content more effectively. Researchers highlight that AI writing tools promote creativity and flexibility in academic writing, allowing researchers to try out various styles and techniques. This use of AI in doctoral writing, however, represents a wider shift in researcher attitudes to digital tools during the research process (Aljuaid, H. (2024). The implementation of these AI tools signifies the growing integration of AI as a supportive and collaborative resource in today's educational and research landscape.

1.2 Research Motivation (Gap)

However, despite Generative AI is gaining attention in higher education, there is still a significant lack of research specifically on its effects on doctoral academic writing in a comparative and critical analytical framework. The majority of studies concentrate on the functional capabilities of AI tools, such as their ability to improve writing productivity and assist in generating content (Samala et al., 2025; Rajabi et al., 2024).

Similarly, emerging research (Krumsvik,2025; Hoomanfard & Shamsi, 2025) has highlighted potential drawbacks regarding critical thinking, creativity and the development of independent scholarly thinking. Moreover, recent discussions by Khalifa and Albadawy (2024) indicate that while AI tools may help organize and edit academic texts, their effects on more complex writing dimensions, such as argumentation and intellectual contribution, are unclear. However, little research has focused on the comparative

impacts of Generative AI writing tools on aspects of doctoral academic writing such as clarity, coherence, argumentation and originality. There is limited research on PhD students whose writing needs demand more critical analysis and originality. Therefore, there is a need for a more focused and comparative investigation into how various Generative AI writing tools shape different dimensions of doctoral academic writing, particularly in relation to clarity, coherence, argumentation, and originality.

1.3 Problem Statement

This research aims to fill this gap by exploring the usage and evaluation of Generative AI writing tools in doctoral academic writing.

The main research problem of this paper is:

How do PhD researchers use and compare various Generative AI writing tools in academic writing, and how do they perceive them to affect writing practices?

To provide an answer to this question, the research adopts a qualitative research approach, where semi-structured interviews with PhD researchers who have used AI tools in their studies will be used. The strategy will enable a thorough investigation into the experience and perspectives of participants, which will give a detailed understanding of the impact of AI tools on academic writing on the doctoral level.

1.4 Contribution

This study contributes to the existing research by providing a comprehensive and empirically based understanding into the ways in which the Generative AI tools are integrated into the doctoral academic writing practices. Unlike earlier research that mainly concentrates on the technical capabilities or the overall impressions of AI, this study is based on qualitative evidence based on interviews with PhD researchers, thus constructing real world experiences and practices. Such empirical design allows exploring the way in which researchers use AI tools when it comes to writing. The study introduces the concept of AI as a mediating and bounded instrument and how researchers use AI to facilitate the development of clarity, coherence, and ideas whilst retaining control over originality and critical thinking. Moreover, it contributes by determining the advantages as well as the limitations of AI in a single analytical context with a focus on the equilibrium

between efficiency and ethical responsibility. The empirically informed and refined theoretical framework also adds value as it conceptualizes the interaction between Generative AI and academic writing as a dynamic, human-centered process influenced by critical judgment, thus providing a foundation to future research and policy development in higher education.

1.5 Structure of the Thesis

This thesis is organized into five chapters. Chapter 1 introduces the research topic, the research gap and research question. Chapter 2 summarizes the literature available on Generative AI in higher education and doctoral writing and constructs the theoretical framework of the study. Chapter 3 presents the research methodology such as research approach, data collection strategies, and research analysis strategies. The results of the interviews are described and discussed in Chapter 4. Finally, Chapter 5 contains the discussion of the results concerning the available literature, as well as the conclusion of the study with important insights and recommendations.

2 Literature Review

This chapter will critically evaluate the literature on Generative Artificial Intelligence and its application in academic writing and higher education. Specifically, it will explore previous discussion on the usage of AI-based systems and their contribution to doctoral writing processes and importance in the field of academic research. At the same time, it is essential to consider the comparative usage of various AI tools for different types of academic writing tasks. As a result, this chapter will provide an initial theoretical perspective on AI-assisted academic writing that is relevant for the current study.

2.1 Generative AI and Academic Writing

Generative Artificial Intelligence's (AI) presence in higher education has attracted growing academic interests over the last few years, as it has been expanding in the academic and research field. Existing literature indicates that AI tools are being used to assist with different aspects of academic writing, such as brainstorming, drafting, editing, and language polishing. These technologies have been studied in a number of ways, including

their increasing use, relative usefulness, and their impact on writing productivity. The following section summarizes previous research on the development of Generative AI tools and how they have been incorporated into doctoral academic writing.

2.1.1 Emergence and Growing Adoption of Generative AI in Higher Education

With the rapid progress of Generative Artificial Intelligence, the education and learning environment has undergone a dramatic shift in the way it is conducted in classrooms, schools, universities, and online learning platforms globally. The rapid advancement of AI-driven technologies has made them valuable tools for assisting in academic work and enhancing access to information, which has led to their integration into teaching, learning, and research-related tasks at universities and research institutions. Literature has demonstrated that AI writing tools are especially appealing to students and researchers, given their ability to produce human-like answers, brainstorm ideas, and offer instant writing guidance (Cantú-Ortiz et al., 2020). Tools like ChatGPT, Gemini, Claude, Grammarly, and Microsoft Copilot have been increasingly adopted across higher education, driving the rapid transformation of academic practices with AI. Academic practices are rapidly changing with the rise of AI tools like ChatGPT, Gemini, Claude, Grammarly, and Microsoft Copilot. The researchers also highlight that the greater accessibility of these technologies has led scholars to begin to explore alternative writing strategies that rely on AI in various academic settings (Alkamel & Alwagieh, 2024). With the transformation of education, Generative AI is becoming a key element of modern education settings and research ecosystems.

The use of Generative AI in higher education has grown significantly in recent years, driven by its potential to streamline academic processes and assist in high-level research and learning tasks. AI technologies are found to be very attractive in research-driven environment as they help in immediate content creation, editing, organization, and refinement of academic material. According to previous research by Ou et al., (2024) universities are currently exploring AI-powered systems to enhance digital learning and make it more flexible. The incorporation of AI technologies has further increased the accessibility of academic support, enabling researchers to get feedback immediately without being constrained by geographies or institutions. Discussions around these

advancements suggest a larger trend towards technologically enhanced academic environments in which AI tools are used as facilitating learning resources. Hence, Generative AI is now an integral part of the higher education and research environment (Popenici & Kerr, 2017).

With the rise of conversational AI systems, the adoption of AI technologies has been further propelled in academic writing practices. Conversational AI tools have become valuable support for researchers and students in generating ideas, clarifying concepts, and enhancing writing fluency since the release of ChatGPT. Existing research shows that these systems offer interactive and adaptive support, allowing users to interact with information in more dynamic manner. The researchers suggest that conversational AI helps in making the writing process more flexible, by assisting researchers in structuring their thoughts, improving their arguments, and considering alternative viewpoints in academic writing (Li et al., 2024). Also, the ease of use of these technologies has encouraged the broader uptake by doctoral researchers and graduate students. The advancements highlight the transformative impact of conversational AI on the relationship between scholars and digital tools in the context of higher education.

Generative AI technologies are contributing to the modernization of academic communication and knowledge-sharing practices. The use of AI-driven platforms allows researchers to handle more massive data quicker and helps them structure and present research concepts. The literature reviewed indicates that AI tools are being adopted by existing literature in the academic environment due to their potential in streamlining content creation and enhancing collaborative writing processes (Imran & Almusharraf, 2024). According to Qijia and Shikui (2025), the use of AI technologies in higher education shows a wider trend towards digitalization and technological innovation in research environments. The developments have led to a rethinking of academic traditions and more flexible models of scholarly communication by universities. Consequently, the role of Generative AI in contemporary educational and research frameworks remains crucial (Kim et al., 2026). The potential of Generative AI to facilitate independent and self-directed learning practices is another critical aspect that has facilitated the integration of technology in higher education. The potential of Generative AI to facilitate independent

and self-directed learning practices has also been a major factor that has been shaping the integration of technology into higher education. Previous research by Akbar (2025) shows that AI tools can motivate students and scholars to be more active participants in their studies, as they get instant explanations, ideas, and feedback while writing. The researchers propose that these technologies facilitate more interactive and personalized learning experiences, allowing users to try out various writing approaches and develop academic skills on their own (Yamazaki et al., 2026). AI-powered systems are now considered as supplementary academic tools that help researchers at various stages of their academic work, especially in doctoral education. The adoption of AI technologies in higher education therefore emphasizes that it is not merely a matter of innovation but also a shift in pedagogical attitudes and philosophies regarding learning, the research process, and academic growth.

2.1.2 Generative AI as Support for Doctoral Academic Writing

Doctoral level academic writing is widely acknowledged as a challenging and task-intensive writing process, which demands critical thinking, analytical thinking and effective scholarly communication. While doctoral researchers are expected to produce well-structured and academically sound research, they will also have to deal with the challenges of research activities, publications and time limitations. Studies indicate that due to their usefulness in supporting researchers at various stages of the research process, Generative AI tools have increasingly been used as supportive resources in education (Morris et al., 2026). According to Abbas et al., (2024) AI systems can help in the generation of ideas, clarity of language, and structuring complex academic content. These tools also offer immediate support to the students, help them work more efficiently with writing-related tasks, and are highlighted by researchers. This has led to increasing use of Generative AI technologies in doctoral writing processes and research workflow.

Students' use of AI writing tools is also associated with their capacity to brainstorm and explore ideas within doctoral programs. Previous research suggests that Generative AI systems are frequently used to generate research ideas, to explain theoretical ideas, and to improve arguments in academic writing (Zhang & Ge, 2025). These tools are believed to foster more interactive writing experiences, allowing users to interact with

information in a dynamic way and to explore alternative viewpoints on a given topic. Furthermore, AI-powered writing tools can encourage scientists to explore various ways of structuring and communicating their research. Existing studies also highlight the fact that AI-generated recommendations can serve as cognitive help, fostering creativity and the development of academic material. Consequently, Generative AI tools are becoming more important tools in doctoral research settings (Alam et al., 2026).

Another significant impact of Generative AI technologies on doctoral academic writing is language improvement and writing refinement. The literature has highlighted that AI tools can help researchers enhance their grammar, sentence structure, readability, and overall coherence in academic writing (Jiang, 2025). The support is especially useful for doctoral researchers who conduct research in more than one language and international doctoral researchers who might struggle to convey complex scholarly ideas in academic English. Researchers also highlight the ability of AI writing tools to offer suggestions for languages and feedback for your writing, allowing you to fix and enhance your content effectively (Krumsvik, 2025). Such tools have also been found to enhance confidence in writing as they assist in the creation of clear and decent academic writing. As a result, Generative AI technologies are increasingly being seen as facilitating resources for doctoral education for academic communication and scholarly expression.

The use of Generative AI tools in doctoral writing has also led to more flexible and adaptive ways of working, such as using AI to generate ideas and draft sections of texts. The use of Generative AI tools in doctoral writing also encourages more flexible and adaptive working styles, such as using AI to draft parts of texts and generate ideas. Previous research shows that AI technologies are being widely used at various phases of the writing process in planning, drafting, revising and editing academic writing (Rafi & Amjad, 2025). Although AI tools possess the potential to assist researchers in completing writing assignments, their effectiveness in doing so remains a subject of debate. The use of AI-supported systems as writing tools has been a topic of discussion, and there are varying views on their effectiveness in supporting research writing. These technologies enable researchers to pay more attention to conceptual understanding and analytical interpretation of the content and to enhance the efficiency of writing. AI writing tools can also

help create creative expressions in writing styles and organizational approaches when conducting academic research. The developments illustrate the growing integration of Generative AI into modern academic writing in doctoral education.

Interaction of doctoral researchers with AI systems may be viewed as a supportive writing partner, helping to develop ideas, clarify content, and enhance the structure of academic arguments (Garcia, 2025). In addition, scholars have also highlighted a range of possibilities for more iterative writing processes, in which users continuously modify and refine their texts based on the feedback and suggestions provided by the AI (Liu et al., 2024). With the interactive approach of writing that AI tools bring, students have been increasingly drawn into academic texts and given more dynamic ways of engaging in scholarly communication, which has also led to the generation of more interesting writing. The growing adoption of digital technologies by universities in research settings has led to a greater appreciation of Generative AI as a key element of the collaborative and technology-enhanced academic writing practices.

2.1.3 Comparative Use of Different Generative AI Tools

Doctoral researchers use multiple AI tools in a selective and task-oriented manner rather than depending on a single platform for all writing activities. Various Generative AI tools have unique capabilities and strengths, thus being appropriate for certain academic writing activities Previous research highlights the importance of researchers making strategic comparisons between these tools for efficiency, reliability, context and usability (Subaveerapandiyan et al., 2025). Consequently, comparative engagement to using various AI tools has become a growing trend in the context of academic writing in doctoral studies. From the existing literature, it has been mentioned that many researchers utilize more than one AI system to gain the best characteristics and capabilities of each system (Downs & Morrison, 2011). For example, one AI tool might be employed for idea generation and structuring, while another could help with language editing and organizing academic arguments. This multi-tool approach allows researchers to be more flexible in writing tasks and to select technologies as needed, based on their academic requirements. Research also suggests that doctoral researchers assess AI tools by their output effectiveness, depth of response, ease of use, and relevance to the context. As a result,

the use of AI has become a significant trend in modern academic writing (Schmidt et al., 2025).

With the increasing variety of AI-based writing systems, researchers have begun to compare the capabilities of different tools for different academic tasks. By Oubibi et al., (2025) it is found that the major criteria used to evaluate AI tools are their capacity to generate coherent ideas, enhance writing fluency, offer contextual explanations, and facilitate academic productivity. It has also been observed that as technology such as AI becomes more prevalent, there are more opportunities to experiment with various digital writing methods. This allows comparative assessments to highlight the most effective AI models for particular academic tasks and writing styles. Furthermore, when multiple AI platforms are employed, they can support more flexible and adaptive writing processes in which researchers use digital tools strategically as part of their research. The developments illustrate the changing nature of academic writing in post-secondary education in the age of AI technologies.

As mentioned earlier, the comparative use of AI technologies also demonstrates the general shift in researcher-digital system interaction while conducting academic research. A review of the literature indicates that doctoral researchers have come to rely on using AI tools more than just for writing; they also use them to help them organize, articulate, and refine their academic ideas. Comparing the results of various AI tools fosters a deeper engagement with the content of the academic text, aids in making informed choices for writing tasks, and increases reflective learning and application. Previous research by Ou et al., (2024) also indicates that this comparative engagement helps in creating a higher level of understanding regarding the strengths and workings of different AI platforms. Thus, the use of AI in academic writing and conducting digital research is now seen as a crucial aspect of academic communication and research (Deep & Chen, 2025).

The current academic debates indicate that the reshaping of Generative AI is challenging established concept of academic writing and output. AI-supported writing practices are making their way into research environments increasingly, due to their potential to facilitate knowledge production, ideation and scholarly communication. Universities and

research communities are actively examining the possibilities of AI systems to support more innovative and efficient scholarly practices. AI writing tools also promote experimentation and flexibility in academic writing, allowing researchers to engage more dynamically with information and digital technologies. The influence of AI in higher education and research practices will grow and evolve further as AI technologies continue to progress. The developments thus show the increasing importance of Generative AI in contexts of doctoral writing, academic research, or other academic settings.

2.2 PhD Studies and Academic Writing

Doctoral studies are high levels of academic engagement that involves writing as not a medium of communication but a central process by which the knowledge is built and assessed. PhD level writing differs essentially with the other levels of studies since it requires the creation of original argument, critical positioning and addition to the body of existing knowledge (Kamler, 2008). Doctoral writing is a complex and iterative process rather than linear task. This highlights that writing is not just the product of the research but also an aspect of the research process (Krumsvik, 2025).

One of the most key features of PhD-level writing is that academic writing currently is focused on originality and contribution to knowledge. Unlike undergraduate or master's level work, doctoral writing requires the identification of research gaps and the development of new insights. writing is very important in defining research direction and development of ideas (Agee, 2009). Therefore, writing is not a separate phase of research, it is a continuous phase that has an impact on the way knowledge is created. This makes academic writing a key success factor of doctoral studies (Lonka et al., 2019).

Another characteristic of PhD academic writing is the development of a scholarly voice. Doctoral researchers should position themselves in the context of the existing literature while simultaneously presenting their own arguments. According to Potgieter and Smit (2009) academic writing is a socially constructive practice that is influenced by disciplinary norms. This suggests that PhD students must learn a way to navigate such conventions as they form an independent voice. So, it is stated that one of the most difficult parts of doctoral writing is to strike this balance (Robbins, 2016).

Doctoral level writing is highly dependent on critical thinking, which helps the researchers to assess the existing knowledge and come up with arguments that are well-grounded. PhD writing does not only involve summarizing literature, but also critical interaction with the literature. This involves the capacity to recognize the strengths, limitations and gaps in past studies. Therefore, academic writing on this level is necessarily analytical, and one needs to engage deeper as compared to descriptive writing (Beaumont, 2010).

A second significant feature of doctoral writing is the recursive and time-consuming nature. This level of writing is not done in single draft but is continually revised, given feedback and refined. PhD students tend to find writing a continuous process of negotiation among ideas, structure and feedback. This suggests that writing is directly associated with thinking and learning which supports the argument that writing is a central element of doctoral research rather than a final stage (Ciampa & Wolfe, 2019).

Doctoral writing is commonly shaped by a set of institutional and disciplinary expectations which affect the presentation and assessment of research. PhD students must conform to the accepted academic guidelines in their writing and at the same time demonstrating originality. such expectations are not always explicitly stated, making the task of writing is more complicated among doctoral researchers. This suggests that PhD level academic writing entails not just intellectual work but also the capability to read and respond to implicit academic requirements.

The issues of doctoral writing are also well-reported in the literature, especially in the context of dealing with complexity and coherence (Rafi & Moghees, 2023). PhD students usually have to deal with vast amounts of literature and combine various points of view into one argument. It is not easy to ensure coherence in large-scale texts (Schneijderberg, 2021). Therefore, academic writing on this level needs high level of organizational and analytical skills, which develop gradually over time (Schneijderberg, 2021).

Emotional and cognitive burden of the process is another issue in doctoral writing. Ph.D. thesis writing is often said to be an isolated and challenging process and needs to be

motivated and self-disciplined. the difficulties of writing are emotional and not technical (Aitchison & Mowbray, 2013) . This means that scholarly writing in the doctoral level is tightly linked with the confidence of the researcher, his/her identity and the feeling of progress. It is therefore stated that writing issues cannot be solved using technical assistance alone but with the expanded perception of the doctoral experience (Aitchison et al., 2012).

Supervision and feedback are also important in influencing the practice of doctoral writing (Carter & Kumar, 2017). PhD students are also used to having their supervisors help them to learn to write and perfect their arguments. Feedback may be effective in enhancing writing, but it can also be said that the effect of feedback is also on how it is construed and used by the student. This indicates that doctoral writing is a cooperative process, which suggests the interaction between student and the academic community (Can & Walker, 2011).

Another important consideration in doctoral writing is time management since it involves a sustained process that needs to be maintained over a long time. PhD students have to struggle between writing and other academic activities such as research, teaching, and administration. time management issues have the potential to have considerable impacts on writing developments. It is thus stated that effective doctoral writing does not just require intellectual prowess, but also the time management skills and the willingness to engage in regular time-written writing (Boud & Tennant, 2006).

One of the dimensions of doctoral writing that have gained a growing literature focus is the development of independent scholarly identity. At the PhD level, students are not only supposed to interact with the existing knowledge but also to establish themselves as the new experts in their respective areas (Guerin & Aitchison, 2021). The process is closely linked to writing, because only through writing a researcher can form his/her point of view and establish their name in academic circles. writing is a key component that determines the self-perception of doctoral researchers and their perception by others. However, academic writing is not just a cognitive process but also a social and

identity-construction process, making it a very important part of doctoral development (L. Xu & Grant, 2020).

The literature also highlights the value of argumentation as a fundamental aspect of doctoral writing, in addition to identity formation (Walton, 2016). Unlike writing on lower academic levels where the focus can be on summarizing information, writing on the PhD level demands the development of continuous and convincing arguments. Good argumentation is clear, coherent, and logical. However, doctoral students do not always have the opportunity to develop such skills, especially at the beginning of their research. This suggests that argumentation is not a talent, but a skill that can be developed with time and practice and feedback and that makes doctoral writing even more complicated (Hyslop-Margison, 2011).

Recent studies have begun to shift beyond the perspective of Generative AI as a single, uniform writing aid to explore how doctoral researchers use these tools in a variety of context-dependent manners. H. Xu and Shen (2026) stated that they recognize various modes of interactions, including simple textual support or more profound cognitive cooperation. This perspective is further supported by Al-Zahrani (2024) that AI tools can assist with writing mechanics, as well as in organizing ideas and developing concepts. During the process of writing, planning, and editing the work, doctoral learners are turning to AI more and more. Advantages of these tools are very dependent on their utilization. Overall, there is an implication that AI interaction is not a one-dimensional practice but a stratified process that affects various levels of doctoral writing, both at the level of superficial editing and in depth intellectual growth (Garcia, 2025).

The literature has consistently suggested that the effect of Generative AI on doctoral writing is strongly dependent on the extent to which it is incorporated into research practices. Xu and Shen (2026) show that using AI superficially only makes writing more efficient, but more profound use will lead to better research quality and dissertation results. According to Al-Zahrani (2024) large language models can be used to assist in complex reasoning when critically used. Foley et al. (2025) emphasize the dangers of unrefined use of AI-generated material, especially regarding its accuracy and originality.

Technological tools have the ability to transform cognitive interaction but cannot replace human critical thinking. All these findings contribute to the statement that AI is not necessarily more effective in academic writing; but instead, it is up to the user to critically and strategically engage with it. This is especially important in the context of doctoral work, where originality, depth of analysis, and long-term argument development are the key aspects, but not the volume of written output.

One more important feature of doctoral writing is the need to engage into the world of existing literature by synthesizing it critically rather than simple description. PhD students are supposed to combine various sources, find connections between studies, and build a logical story that will facilitate their research interest. This is done through high level of analytical skills and intellectual involvement. It is therefore stated that the level of literature engagement in the doctoral level is fundamentally distinct with the previous levels since at this level, the creation of new meaning is involved instead of reporting on the available knowledge (Rafi & Moghees, 2023).

The role of writing in knowledge building is also a theme of key discussion on doctoral education. Writing does not just involve reporting on the finished research but involves the creation and polishing of ideas. Writing makes it easier to understand as it promotes reflection and critical thinking. This suggests that doctoral writing is closely connected with the thinking; therefore, it is a fundamental tool of producing knowledge. Anything that affects writing practices can impact on the quality of the results of research (Dowling & Wilson, 2017). Overall, the literature sources on PhD studies and academic writing emphasize that doctoral writing is a multidimensional, multi-faceted process that implies both mental, interpersonal, and emotional aspects. It involves learning critical thinking, arguing, academic identity, and competent interaction with literature, which are all involved in producing original research.

Although the current literature does offer some useful information on these dimensions, it also indicates that the process of writing a doctoral dissertation is a complicated and dynamic one to most researchers. This is especially critical in light of new technology and evolving academic habits, which can further shape new approaches to doctoral writing.

Thus, it is quite important to understand the character of academic writing on the PhD level in order to analyze the way in which external factors, i.e. the introduction of new writing tools, can influence this process in the modern research environment.

2.3 Theoretical Framework

To incorporate Generative AI in academic writing, there must be a theoretical approach that describes the interaction between writing, thinking, and external technologies in the research settings. Academic writing, especially at the doctorate level, is not an isolated process but rather a complex process of cognition, social and technological processes. It is possible to say that this interaction is vital in the analysis of this role of AI tools in writing practices. The theoretical framework of this research is thus based on the concept that writing is a cognitive process and a socially mediated practice, which is affected by the tools and environments, where it occurs.

The idea of writing as knowledge construction, instead of knowledge representation, is one of the most applicable to academic writing. Writing helps people to edit ideas by thinking and rethinking. According to Imran and Almusharraf (2023), the role of writing is active in thinking. Regarding this perspective, it can be stated that, if AI tools influence how writing is performed, they may also affect how knowledge is constructed. This highlights out the significance of studying AI as a writing assist but as a variable that can affect the cognitive functions.

Besides the cognitive views, academic writing may also be understood as a socially situated practice. Learning and cognitive development is a process that is achieved by exposure to tools and social contexts. This suggests that external mediating tools affect writing and determine the way people think and convey their ideas. Applying this approach to AI tools, it can say that Generative AI can be viewed as a mediating tool that facilitates and possibly transforms writing practices. This will give a theoretical framework to explore the interaction of AI tools with doctoral writing processes.

Mediated learning is another concept that enhances the applicability of socio-cultural theory in this scenario. The use of tools, both in the traditional and digital forms, is at

the center of the expansion of human cognitive abilities. tools not only affect performance in the task, but also the organization of thinking (Q. Wang, 2018).

The other critical theoretical approach is the academic literacies approaches which considers writing as a practice that is mediated by institutional practices and disciplinary expectations. Writing is embedded in certain academic conditions and structures of power. This perspective emphasizes that doctoral writing is not merely a matter of individual ability but also negotiating the disciplinary conventions. In this research, it is stated that the application of AI tools can change the process of adherence to these conventions, which can impact the process of creation and assessment of academic writing (Lea & Street, 1998).

These theoretical approaches can be integrated, but with the help of them, one can get a more comprehensive view of the interaction of AI with academic writing. Cognitive theory describes the value of writing in the construction of knowledge whereas the socio-cultural theory emphasizes the use of tools and interaction. Meanwhile, academic literacies approach stresses the role of context and disciplinary norms. Berber Sardinha (2024) suggested that the Generative AI tools exist in the overlap of these dimensions and affect not only the way that writing is done but also comprehended by academic circles. This multi-dimensional perspective has a strong basis to examine the role of AI tools in doctoral writing.

In this theoretical perspective, the use of Generative AI in academic writing can be regarded as both potential and a challenge. On the one hand, AI tools can make the writing process more efficient and help to organize and polish the text. On the other hand, they can affect the intellectual activities and emergence of independent academic thinking. This dual role suggests that the effect of AI cannot be perceived either in positive or negative terms (Dalalah & Dalalah, 2023). Rather, it needs a moderate approach where its supportive and potentially restrictive influence on academic practices in writing are taken into consideration.

Overall, the theoretical framework of the current research places academic writing as an active process, which is influenced by cognitive, social and technological factors. Through the synthesis of the findings of cognitive theory, socio-cultural theory, and academic literacies, the framework offers a systematic model to analyze the relationship between Generative AI tools and doctoral writing. It upholds the thesis that AI tools are not neutral and have an active effect on writing practices, making it essential to carefully assess their impact in the academic setting. The framework thus informs the study of the applications and the effects of various AI tools on the writing processes of doctoral researchers.

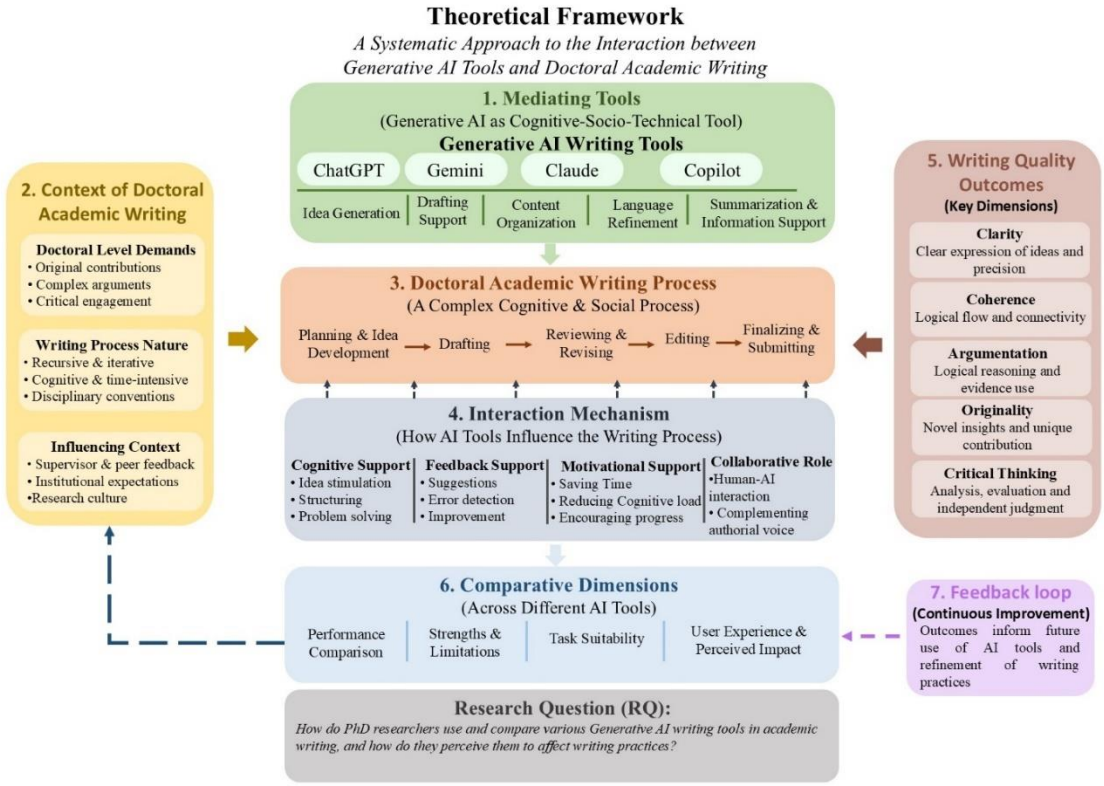


Figure 1: Theoretical Framework

3 METHODOLOGY

3.1 Research Approach

A qualitative research approach is the most appropriate choice for this study because the main focus is to explore how PhD researchers use, assess, and experience various Generative Artificial Intelligence (GenAI) writing tools in academic writing. Since the study focuses on understanding participants' perceptions, decision making processes, and personal experiences rather than measure fixed variables, quantitative methods would provide only limited understanding. Moreover, the use of AI tools into doctoral writing is a relatively new and rapidly evolving phenomenon, requiring an approach that can observe complexity, context, and changing practices. Therefore, qualitative inquiry provides the depth and versatility necessary to generate a complete understanding of how these technologies are being introduced and evaluated within academic writing practices (Aspers & Corte, 2019; Pearson et al., 2015).

Qualitative research is especially suitable for studies that seek to examine complex and context-specific phenomena. As stated by Savenye and Robinson (2005), qualitative methods allow researchers to analyses the ways how individuals interpret their experiences and create meaning in certain situations. The interactions of PhD researchers with AI tools, in the framework of this study, depend on the academic field, the practice of writing, and personal preferences, which is why it is imperative to have a methodology that will be able to reflect such contextual differences.

Moreover, this study is concerned with the comparative use of various AI tools, which require a comprehensive insight into how the participants perceive and differentiate the tools. The subtle differences in user experiences may not be well understood using quantitative methods, especially in assessing other aspects such as the quality of writing, critical thinking, and research integrity. According to Busetto et al. (2020) qualitative methods are particularly effective in discovering patterns and meanings that are not obviously obvious and thus are applicable in exploratory research in new areas.

Subjective interpretation of AI-generated content is another factor that contributes to the choice of a qualitative approach. The usefulness of AI tools in academic writing is

impossible to evaluate by only objective means, depending on the perception and evaluation of the outputs of AI tools by the users. This aligns with the interpretivist paradigm which focuses on the interpretation of social phenomena in the light of the participants. As explained by Savenye and Robinson (2005) interpretivist research aims at making inferences about human behavior and experiences, and this is highly applicable in research conducted in the use of technology in academics.

In addition, qualitative research is also flexible in the process of collecting and analyzing data and therefore the researcher is able to change the study design as new information is discovered (Angelides, 2001). This is important in the present study as the application of AI tools can differ dramatically across the participants. The possibility of investigating the unexpected themes and patterns contributes to the depth and richness of the findings. Qualitative research is inherently flexible and adaptive, making it well-suited for investigating dynamic and evolving phenomena.

Overall, the qualitative research methodology will offer a strong framework to investigate the connection between Generative AI tools and doctoral academic writing. It allows the study to draw in-depth observations of how PhD researchers employ, assess, and contrast various AI tools as well as consider the larger academic and cognitive settings within which these tools are utilized.

3.2 The Sample / Case Selection

The selection of an appropriate sample is a critical element of qualitative research because the richness, relevance, and credibility of the results largely depend on participants who offer meaningful information into the phenomenon being studied (Robinson, 2014). That’s why, PhD researchers are the most suitable sample for the present study, as they have direct experience with the use of Generative Artificial Intelligence (GenAI) writing tools in academic work. They have been included with purpose and in line with objectives of the research. Doctoral-level writing involves advanced cognitive and scholarly demands, including critical analysis, theoretical development, argument construction, and original knowledge production. Therefore, PhD researchers are more likely than other student groups to present detailed and reflective accounts of how AI tools influence academic writing practices, productivity, and decision-making processes.

Therefore, selecting this group enhances the potential of the study to generate rich, credible, and contextually relevant data.

The study uses purposive sampling approach that is commonly used in qualitative research in order to identify the participants with certain characteristics that are relevant to the research problem (Ahmad & Wilkins, 2025). Instead of trying to be statistically representative, purposive sampling is concerned with finding information-rich cases that can provide in-depth knowledge about the phenomenon being studied. As stated by (Marshall, 1996) , Purposive sampling allows the researcher to select the participants that have direct exposure to the topic of research, thus increases the quality and relevance of the gathered data. Only the PhD researchers who have actively used AI writing tools are included in the sample.

In this research, the sample size is 14 participants, which is considered to be suitable in conducting qualitative research using in-depth interviews. Qualitative research prioritizes depth rather than breadth-based unlike quantitative studies, which need large sample sizes to analyze statistically. Francis, J. J. et al., (2010) suggests that data saturation: when there is no new substantial, can often be achieved within a relatively small number of interviews. This makes a sample of 14 people adequate to gather diverse perspectives while maintaining analytical depth (Campbell et al., 2020).

The participants were chosen from different academic disciplines, where possible, to include a variety of experiences and perspectives on the use of AI tools in academic writing. This difference in discipline background is important since the practices and demands of writing varied greatly among disciplines. For example, AI applications in technical fields were not similar to their applications in social sciences or humanities. The study increased the depth of the data and facilitated a more detailed picture of the AI used in doctoral writing by involving people with different backgrounds.

Along with disciplinary diversity, the study considered the variation of the experience of the researchers in PhD, both early-stage and advanced-stage students. It is significant as the role of AI tools vary according to the doctoral stage. The researchers in the earlier stages used AI tools to generate ideas and organize them, whereas more advanced researchers used AI tools to refine the ideas and edit them. Introducing diversity to the

sample helped strengthening qualitative results because it included varying perspectives of the same population (Sauer & Seuring, 2023) .

The inclusion criteria for participants are clearly defined to ensure that the sample is relevant to the objective of the research.

Participants must:

- Be currently studying a PhD program.
- Have experience using at least one Generative AI writing tool (e.g., ChatGPT, Gemini, Copilot etc)
- Participate actively in academic writing (thesis writing, research paper, or literature review).

These conditions ensured all participants to have personal and applicable experience with the phenomenon being studied, which further enhanced validity of results.

3.3 Data Collection

The data used in this study were gathered using semi-structured interviews, which are widely considered a good tool in investigating the experiences, perceptions and practices of the participants in qualitative research (Gill et al., 2008).

Semi-structured interviews are also an especially appropriate type of interview in this research since they enable the researcher to obtain in-depth information on how PhD researchers use and assess Generative Artificial Intelligence (GenAI) writing tools in their research. Unlike structured interviews, which are based on pre-established questions, the semi-structured interviews allowed the participants to elaborate on their responses and also the researcher to probe deeper in areas of interest as they raised during the interview process (Luna-Reyes & Andersen, 2003) .

The interview protocol is designed based on the research objectives, so that all the important aspects of the study are covered, and the discussion can be open-ended (Kvale & Brinkmann, 2009). The interview questions are designed in such a way that they can investigate some of the main themes, including how AI tools are used by the participants, their perception of the quality of writing, their assessment of the various tools, and how they think AI influences critical thinking and academic integrity. As stated by Diefenbach (2009) semi-structured interviews are especially useful to investigating complex

phenomena since they allow the researcher to achieve balance across interviews and a degree of flexibility in the process of exploring individual attitudes.

Each interview was approximately 30-40 minutes long, which gave enough time to have a detailed discussion and keep the participants engaged. The interviews were online via Zoom and Microsoft Teams based on the availability and choice of participants (Vaivio, 2012). The benefits of using online platforms were also practical, such as flexibility in scheduling and the possibility to have participants in various places.

Before data collection, the participants received clear information on the purpose of the study, details regarding confidentiality and voluntary nature of participation. All participants were informed and gave their consent to the interviews. This ensured that the study was ethical, and the participants were well informed of their rights. Informed consent and participant confidentiality are essential concepts in qualitative research (Nusbaum et al., 2017).

The interviews were recorded on audio with their permission to enable the recording of the responses accurately. Recording interviews ensured that this data can be revisited and assessed thoroughly, eliminating the chances of misunderstanding or data loss. The recorded interviews then transcribed, creating a textual dataset which can be systematically analyzed. Transcription is an important qualitative research process because it helps the researcher to immerse himself or herself into the data and discover patterns and themes (Halcomb & Davidson, 2006; Davidson, 2009).

Semi-structured nature of the interviews also enabled the use of probing and follow-up questions, which are essential in gaining deeper understanding of the participants' experiences. For example, when a participant mentions a particular tool in AI or writing strategy, the researcher can raise further questions to cover this in further detail. This flexibility enhances the richness of the data and can be used to explore unanticipated themes that may come up during the interviews.

One of the techniques used in qualitative interviews to help a researcher to uncover deeper meanings and insights is probing (Olson, 2010). Besides personal responses, the context in which participants utilize the AI tools was also taken into consideration during the data collection process, such as academic field, phase of research work, and writing

demands. This background information was essential in interpreting the data and the ways that AI tools are incorporated in various academic environments. The study gives a comprehensive understanding of the research problem by recording the content of the responses given by the participants as well as the context within which they are given. Finally, the data collection procedure was designed in a way that makes the process consistent and reliable in terms of inter-interview. Despite the flexibility of the interviews, it is structured by using an interview guide to make sure that all the essential topics was addressed throughout the sessions. This combination of structure and flexibility is vital to ensuring comparability among participants but permitting individual variation in responses. Semi-structured interviews are a powerful and efficient way to gather rich and detailed data to answer the research objectives of the study.

3.4 Data Analysis

The data obtained in semi-structured interviews was examined with the help of the reflexive thematic analysis, which is a popular qualitative analysis method that helps to find, analyze, and interpret patterns in the textual data (Kushnir, 2025). This approach is especially useful for conducting the present study, as it provides an opportunity to consider the perception and utilization of Generative Artificial Intelligence (GenAI) tools in academic writing by PhD researchers in detail. Thematic analysis offers flexibility in processing qualitative data and at the same time, has a systematic nature, which is suitable to the exploratory research in a developing field (Vaismoradi et al., 2013).

Reflexive thematic analysis is a method, which was developed by Braun and Clarke (2006) involves a series of structured steps that guide the researcher from initial data familiarization to the development of meaningful themes (Braun & Clarke, 2006) . This technique enables the researcher to find the repetitive patterns in the responses of the participants as well as taking into consideration the context in which the responses are given. This methodology allowed identifying the main themes associated with the use of AI tools, writing quality, critical thinking, and comparing the tools in the current study (Braun & Clarke, 2019).

The first step of the analysis process was data familiarization, which enabled the researcher reading and re-reading the transcripts of the interviews, so that he/she can have a thorough understanding of the data. At this phase, preliminary observations and thoughts are recorded, which serve as the foundation for subsequent analysis. The most important step was familiarization: it enabled the researcher to immerse themselves in the data and start detecting possible patterns.

The next step after familiarization was initial coding (Basit, 2003) where parts of the data were manually labeled to identify relevant features. Coding consists of the identification of meaningful units of text that are related to the questions of the research, for example how participants experience using AI tools or how they perceive the quality of written texts. According to Basit (2003) coding is a fundamental process in qualitative analysis that helps organize data and facilitates the identification of patterns.

After the initial codes have been created, the analysis was followed by the stage of theme development during which the similar codes are combined to create larger categories (Naeem et al., 2023). These themes are patterns that reflect important elements of the data on the goals of the research. For example, the codes related to efficiency, timesaving, and productivity can be grouped into one theme, e.g., perceived benefits of AI tools. While codes associated with the concerns about originality and critical thinking may comprise another theme. Themes are not just summaries of information but interpretative constructs that give understanding of the research problem (Engle, 2015).

The next step was to review and refine themes, ensuring that they accurately represent the data and are well defined. In the process, themes can be edited, amalgamated or separated to enhance the unity and suitability of the theme (Srivastava & Hopwood, 2009). The researcher constantly compared themes with the original information so that they were always based on the responses of participants. Such a process of iteration increased the validity of the analysis and guarantees the accuracy and the significance of the findings.

Once the themes have been refined, the researcher proceeded to the interpretation and analysis phase wherein the identified themes were analyzed with respect to the research questions and extant literature (Thorne et al., 2004). This step involves going beyond

description to provide explanations and insights into how and why certain patterns occur. For example, the study explored the impacts of using various AI tools on writing habits or how participants can combine effectiveness and critical thinking.

An important aspect of qualitative research is interpretation, which allowed the researcher to relate empirical results with theoretical concepts (Peshkin, 2000). The central characteristic of reflexive thematic analysis is that it puts considerable focus on the role of the researcher in the analysis process. Reflexive thematic analysis, in comparison to more analytical approaches, recognized that the researcher is an active interpreter of the data that he or she introduces his or her perspectives and insights into the analysis. This reflexivity contributes to the depth of the analysis at the same time, obliging the researcher to be aware of the possibility of biases.

To facilitate the process of analysis, it is necessary to use qualitative data analysis software (NVivo or Atlas.ti) to systematize and handle the data. These tools make the analysis more efficient and systematic as they facilitate the coding, development of the theme, and retrieval of data. It is important to note that data interpretation is the responsibility of the researcher, and software is just a supporting tool.

Overall, the application of reflexive thematic analysis offers a framework for analyzing qualitative data used in this study. It allows the researcher to thoroughly examine the experiences of participants and identify important themes related to the use of Generative AI tools in doctoral writing. This methodology serves to provide rigorous and insightful results because it combines systematic processes with interpretative depth.

3.5 The Assessment of the Quality of the Data

Quality and rigor of qualitative research is essential in ensuring that the results are credible and trustworthy (Tobin & Begley, 2004). Unlike quantitative research where validity and reliability are measured using statistical values, in qualitative research, alternative criteria are used: which are concerned with the depth, consistency, and transparency of the research process. In this study, the data quality is evaluated through framework of trustworthiness, which includes the standards of credibility, transferability, dependability and confirmability. These are the criteria that came up with to help in assessment of the rigor of qualitative research (Elo et al., 2014).

The first criterion, credibility, refers to the extent to which the results reflect the experiences and opinions of participants. The study utilizes a number of methods to increase credibility such as lengthy interaction with the data, transcription of interviews, and iterative analysis. The researcher reduces the chances of misrepresentation by comprehensively examining the data and making sure that the interpretations are based on the responses of the participants. Credibility is achieved when the findings are realistic and represent the facts of the people who were the participants of the study (MacLean et al., 2004).

The second critical element of credibility is use of rich, detailed data, which provides a more comprehensive detail into the research problem. Semi-structured interviews in this study allow the participants to give detailed and elaborate answers, hence improving on the quality of the data gathered (McIntosh & Morse, 2015). The researcher can also engage in member reflection whereby the participants will have the chance to revise and elaborate their answers so that their views can be properly recorded.

The second element is transferability that is associated with the extent to which the results can be transferred to other settings. Although in qualitative research, it is not aimed to be generalized in the statistical sense, it is supposed to give findings that can be applicable in the same environment. The study gives a detailed description of the research context, participants and data collection process to aid transferability. According to providing contextual rich information allows readers to know whether the findings can be applied to their own contexts (Grossoehme, 2014).

The third criterion is dependability which is concerned with the consistency and reliability of the research process. Qualitative research attains dependability through maintaining a clear and transparent record of all research processes such as data collection, coding and analysis. This study ensures dependability by documenting each stage of the research process, allowing for the possibility of external review.

The fourth criterion is confirmability that describes the extent to which the findings are shaped by the data rather than by the personal prejudices and presumptions of the researcher. To ensure confirmability, the researcher adopts a reflexive approach,

continuously reflecting on their role in the research process and acknowledging potential biases. Reflexivity is one of the important elements of qualitative research that encourages transparency and increases the validity of the results.

Besides these criteria, the study also takes into consideration the role of data triangulation in improving the research quality. Even though the main source of data is interviews, the existing literature and theoretical frameworks are used to analyze the data, which gives several approaches to the research problem.

Ethical considerations are also important in ensuring the quality of the data. The confidentiality and anonymity of the participants in the study are maintained during the study and the data stored is safely handled to avoid access by unauthorized people (Shaw, 2003). The study will keep the participants comfortable sharing their experiences because of ethical guidelines, which will help with the reliability and authenticity of the data (Orb et al., 2001).

Overall, the application of these quality standards ensures that research is carried out in a high-rigor and transparent manner. Through credibility, transferability, dependability and confirmability, the research provides a strong foundation of generating meaningful and reliable results. Such steps not only make the study more credible but also help increase the overall academic value.

4 Results

The findings presented in this chapter are based on a qualitative research design using semi-structured interviews conducted with 14 PhD researchers in Finland. Among these participants, 13 were affiliated with the University of Vaasa, while 1 participant was from the University of Oulu. This chapter is aimed at examining how Generative AI tools are currently being used in doctoral academic writing, as well as to analyze the experiences of participants in a systematic way. Data collected were analyzed using thematic analysis where responses were thoroughly coded, categorized and organized into major themes that reflected recurrent patterns. These themes are the ways in which researchers can engage with AI tools without violating their academic obligations. There are four broad themes in the chapter and further broken down into sub-themes to give a detailed and systematic interpretation of the results.

4.1 AI as Writing Support

The first significant theme emerging from the analysis is the use of Generative AI tools as writing support in doctoral academic writing. Data shows that the most common usage of AI tools by participants is to improve the quality of their writing rather than original information. This theme is indicative of a long-running trend of controlled use, where researchers use AI to make technical enhancements without relinquishing ownership of ideas and arguments. The results indicate that AI assists writing on several levels, such as language, structure, and refinement, but its contribution is secondary and peripheral.

4.1.1 Language and Grammar Enhancement

One of the most prominent uses of Generative AI tools identified in the data is for improving grammar and linguistic accuracy. The respondents consistently indicated that they use AI tools to fix grammatical mistakes and refine sentencing structures especially at the revision stage of writing. This suggests that AI is mostly utilized once the first drafting process has been completed where researchers are worried about enhancing the quality of the already written material. For example, one participant said that "*he/she typically writes all his work and then uses AI to clean up on grammar and sentence structure*". This shows a definite pattern wherein AI is utilized as a polishing tool rather than a content generator.

Besides eliminating mistakes, participants also highlighted that AI could assist them in obtaining a more formal and academically proper tone. Written work should be precise and professional, which sometimes may prove to be a challenge to maintain at all times. AI, in this regard, seems to be a kind of a tool which contributes to the overall quality of expression. According to one of the respondents, "*AI makes my writing look more professional and appropriate to academic writing*". Similarly, another respondent said that "*it assists him to convert simple sentences into more professional ones*". These reactions suggest that AI is not only effective in grammatical correctness but also in enhancing style.

Moreover, the results indicate that AI can be of great help assisting researchers in making their complex ideas understood better. A significant number of interviewees emphasized the fact that they sometimes fail to express themselves effectively, although they may have a good, conceptualized understanding. In these situations, AI helps to increase clarity without changing the intended meaning. One of the interviewees said that "*he/she knows what he/she wants to say but AI helps them translate it better*". However, participants also noted the necessity of examining AI-generated suggestions, ensuring that the final content appropriately reflects their own thoughts.

4.1.2 Structuring and Coherence Development

The other significant role of AI tools that have been identified in the analysis is that AI tools can be used to enhance the structure and coherence of academic writing. One of the reasons why AI is used by participants was to organize their ideas in a more effective way, especially when working with complex arguments or with long sections. This indicates that AI does not only contribute at the sentence level, but also that it can serve at the level of overall text organization, as well. One of them stated that" *AI tools assists me in organizing my paragraphs in a logical order*". This kind of responses highlight how AI can be used to help maintain the coherence of academic text.

The skill of maintaining a rational flow is one of the essentials of doctoral writing as it has a direct impact on the clarity and strength of the arguments. Respondents reported that AI assists them in determining the areas in which their writing does not make sense and offers them suggestions on how this can be corrected in the future. For example, one respondent stated that" *AI tools assist him to better transition between paragraphs making the writing process smoother*". It shows that AI can help to make a more connected and cohesive narrative, which is imperative in presenting research findings.

Despite these advantages, the participants made it clear that AI does not determine the organization of their work. Rather, it is applied to enhance an existing framework that was created by the researcher. One of the interviewees has mentioned that the key structure is formed out of my knowledge, but AI assists me to refine it. This will be an indicator of a balanced course of action, where AI helps to organize ideas without taking away the role of the researcher to analyze the findings.

4.1.3 Paraphrasing and Content Refinement

It was also found that the art of paraphrasing and content refinement are the main areas where AI tools are extensively used. The respondents said that they used AI to paraphrase sentences, prevent repetitions, and make their writing easier to read. This is especially important in the world of academia, where precision and difference in wording are key to it. One of the participants gave the reason that "*I use AI to paraphrase my sentences to sound better"*. One more respondent observed that "*it helps me not repeat the same words again and again*". These responses indicate that AI contributes to enhancing the overall quality of writing.

Besides the enhancement of style, participants emphasized that AI can be used to simplify complex sentences without losing their original meaning. Academic writing is usually filled with overly dense and technical language, which can be difficult to interpret. AI helps to make such content more accessible without the loss of academic value. One of the interviewees stated that "*AI makes my sentences shorter but does not change the meaning*". This indicates that AI helps in clarity and readability of academic texts.

However, the respondents were also wary of utilizing AI to paraphrase. It was emphasized that AI-generated content should be carefully reviewed to be accurate and relevant. According to one respondent, "*sometimes AI distorts the meaning, and that is why he always looks it up*". This emphasizes that critical evaluation is necessary, in which researchers are more involved with AI outputs than blindly depending on them.

4.1.4 Controlled Use and Human Oversight

One of the most common findings in all interviews is the focus on the targeted use and human control in integrating AI tools. The participants mentioned in several instances that AI is applied as a supporting tool rather than a primary source of information. This is indicative of a good sense of the dangers of overdependence on AI, especially regarding originality and academic honesty. One of the respondents said that "*AI is nothing more than a support tool, the concepts are always personal*". This proves the need to ensure intellectual property in academic writing.

Respondents also explained how they develop a clear boundary as to how AI is used in their work. These boundaries involve limiting the use of AI to editing, paraphrasing and structuring of work, but not to the creation of core arguments or research content. One of the respondents wrote that "*he/she only edits with AI but never writes his/her ideas with AI*". This shows that there has been a constant attempt to strike a balance between the advantages of AI and the necessity to maintain originality.

Further, the need to focus on human control can be explained by the realization that AI cannot completely understand the depth and context of doctoral research. The participants admitted that AI could help with technical side but could not substitute critical thinking and expertise specific to the subject. This supports the notion that AI is an aiding device in the human-driven process of writing.

4.1.5 Synthesis of Theme

The results within this theme clearly indicate that Generative AI tools are mostly applied as writing support tools that can help improve the technical quality of academic writing. With features like grammar check, structure, and paraphrasing, AI helps enhance clarity, coherence and readability. Yet, this support is always subject to a moderation of proactive participation of the researcher and their critical judgment. The focus of the participants on controlled use and human control emphasizes that the use of AI does not substitute intellectual work, it complements it. This makes AI a facilitative aid which facilitates, but does not dominate, the academic writing process.

4.2 AI for Idea Generation

The second significant theme of the analysis is associated with the idea of applying Generative AI tools to the idea generation in the academic writing of doctoral students. Although the participants repeatedly pointed out that they do not use AI when creating core arguments, the data shows that AI assists during the first and exploratory phases of writing. It involves the cases when a researcher has some problems with starting a task, organizing his/her thoughts, or determining in which directions a discussion can go. The results show that AI is utilized as an intellectual aid that enables the writing process

without substituting the intellectual role of the researcher. This is the theme that shows that AI assists in ideation and yet is controlled by the user.

4.2.1 Brainstorming and Initial Idea Development

Brainstorming and development of first thought ideas, especially when a participant is starting a writing project, is one of the major ways in which participants utilize AI. The information obtained during the interview indicates that researchers turn to AI when they experience a lack of ideas on how to start a section or when they are unsure about the way to approach a topic. In this case, AI offers a sort of initial step that can help to reduce the initial cognitive load of writing. For example, one of the participants said that "*when the person does not know how to begin, he/she asks AI to provide him/her with some ideas just to get the direction*". It means that AI is a type of tool providing suggestions that the researcher can further elaborate on.

Also noted among the tools were Google Gemini and Claude to explore an idea, in particular, when they are seeking alternative perspectives or simplified explanations of complex concepts. Although ChatGPT was more popular, Gemini and Claude were sometimes favored to provide succinct responses and clarify original ideas. Also, Microsoft Copilot was observed to be of use in giving quick prompts within writing systems, although it was less commonly used in developing more in-depth ideas.

Besides offering starting points, AI assists researchers to follow various perspectives concerning a certain subject. Participants emphasized that AI-generated answers may incorporate various angles or approaches and that may be helpful in expanding their knowledge about the topic. One of the respondents stated that "*with AI, I offer different perspectives, and it helps me to think differently*". This suggests that AI can help broaden the range of thought, allowing researchers to consider those ideas that they may not have recognized initially. It should be noted, however, that these ideas are not applied directly but are critically reviewed and refined.

Although these advantages are evident, the participants made it clear that AI-generated ideas are only used as a starting point rather than the final product. Researchers also emphasize that they do not, through the use of AI, construct their own arguments but rather use AI to stimulate their own thinking. One of the interviewees explained that "*AI*

just gives a starting point, but the actual idea development is mine.". Other respondents mentioned tools like Microsoft Copilot, especially when working in integrated applications like Word, where it facilitated quick idea generation and drafting. In comparison to standard AI tools, Copilot was seen as more contextually integrated in the writing process, but less often utilized to explore concepts more deeply. This brings out one of the major aspects of AI use in that it assists brainstorming without compromising originality and independent thinking.

4.2.2 Overcoming Writer's Block

The other important application of AI in the data is that AI can assist researchers to find a solution to writer block. Doctoral writing is commonly a complicated and hard task, and participants report that they have moments when they are unable to progress with their writing. In these situations, AI is a tool that can help come out of this stagnation by offering prompts, suggestions, or partially complete content that can be further developed. One of them described the process in the way that "*when I feel like I am stuck, I somehow use AI to create something and then I work on it*." This shows that AI is an activator, which restarts the writing process.

The capability of AI to deliver instant feedback is especially useful in breaking the barriers to writing. In contrast to other types of support, like peer feedback or supervisor guidance, AI is immediately available, and researchers can respond to issues instantly. Respondents emphasized that this immediacy assists them to sustain continuity in their work. One of the respondents observed that "*AI assists me to keep going when I do not have ideas on what to write next*". This suggests that AI minimizes disruptions in the writing process, allowing researchers to stay on track.

However, respondents also highlighted that the content created in such a situation is not applied without edits. Rather, it is a scaffold that is tentative and is refined and aligned with the ideas of the researcher. One of the interviewees stated that*" he never used what AI provides directly, he always modifies it according to his understanding*". This is indicative of a restrained and skeptical application of AI, where it is used to help in solving problems without any intellectual input of the researcher.

4.2.3 Idea Refinement and Direction Setting

In addition to the first generation of ideas, the results also suggest that AI can also be applied to the idea generation and the direction of academic writing. The participants said, "*they used AI to help them explain their ideas, rearrange their concepts, and find out how they might develop their ideas*". This suggests that AI does not just only helps produce ideas, but it also helps to develop and refine them. According to one of the participants, "*AI assists me in bringing my ideas to a higher level and making them more organized*". This highlights how AI can be used to promote the intelligibility and structure of conceptual thinking.

Moreover, AI can be frequently used to check the validity and usefulness of concepts. Participants explained their methods of comparison of their thoughts with suggestions generated by AI to assess whether they are moving in the right direction. One respondent said that" *sometimes he/she uses AI to determine whether his/her idea is good or not*". This suggests that AI can serve as a reflective instrument and can allow researchers to take a critical look at their work and identify the areas of improvement.

Although it helped in refining the ideas, participants maintained that the ultimate decisions on content and direction are always made by the researcher. The use of AI as a supportive tool that provides suggestions is evaluated carefully and only after that, are the suggestions incorporated into the writing. One of the interviewees remarked that "AI can give suggestions, but it is my choice to incorporate into my work". This reinforces the importance of human judgment in the writing process and highlights the bound nature of AI usage.

4.2.4 Controlled Ideation and Researcher Authority

One pattern that can be observed in all the responses is the stress on ensuring the control of idea generation and development. It was evident that the participants distinguished between using AI as a source of inspiration and using it to create original content. This difference is indicative of a high level of understanding of the significance of intellectual property in scholarly writing. Even one of the participants mentioned that" *AI can*

assist in ideas, but the overall thinking has to be the work of the researcher". This highlights the most important part of the researcher in the ideation process.

The participants also explained that they proactively filter and manipulate AI-generated ideas to make sure that they align with their research goals and theoretical models. It is a process that is done critically as the researchers evaluate the relevancy and accuracy of AI outputs and then decide whether to incorporate them into their work. One of the respondents said that "*it is due to AI that I take the ideas, and then I always modify it according to my research*". This means that AI is utilized with a sense of selectivity and strategic planning, as opposed to being blindly used.

Moreover, the focus on controlled ideation also signifies the realization that AI is not able to fully grasp the depth and context of doctoral research. When asked about the role of AI in offering useful suggestions, the participants admitted that AI alone cannot substitute the knowledge of the researcher and his or her critical thinking. This supports the idea that AI will be more of supporting tool in an otherwise human-centered process, with the researcher remaining the major source of knowledge generation.

4.2.5 Synthesis of Theme

Overall, the results reveal that Generative AI tools are supportive in the generation of ideas by enabling brainstorming, overcoming the writer block, and refining conceptual thinking. This role is, however, strictly bounded by the control and critical involvement of the researcher. It was repeatedly highlighted by the participants that AI-generated ideas are consumed as initial input or auxiliary input and not as a final output. The researcher has the duty to develop, evaluate and integrate ideas, and the process of originality and intellectual integrity is upheld. This makes AI a cognitive tool that promotes the writing process without reducing the power of the researcher.

4.3 Perceived Benefits of Generative AI Tools

The third overarching theme that is emerging from the analysis is the perceived advantages of Generative AI tools in doctoral academic writing. Although the participants did note a substantial variation in benefits, the results also present the fact that not all benefits are equally present in all AI tools. Rather, the researchers tend to selectively use

multiple tools depending on their particular requirements and writing assignments. This indicates that the advantages of AI are not just linked upon its overall functions but also upon the individual performance of various tools in specific situations. Consequently, the respondents showed a relative knowledge of AI tools, rating their usefulness from the perspective of functionality, reliability, and ease of use.

4.3.1 Efficiency and Time Management Across AI Tools

One of the most significant advantages that the participants have noted is the increase in efficiency and time management, however, the advantages will vary depending on the type of AI tool used. Respondents also said that conversational AI applications are most effective in generating prompt replies and helping to develop ideas, although editing applications are more effective in dealing with grammar correction and sentence refinement. For example, one of the participants stated that "*when it comes to quick ideas, he prefers using AI, such as ChatGPT, however, when it comes to editing, he relies more on grammar tools*". It proves that efficiency is not attained with the help of one tool but with the help of various AI systems.

Besides the efficiency that is specific to the task, the participants also compared the speed and responsiveness of various tools. Some of these tools were seen to be more effective in giving immediate and relevant outputs as compared to others, which need more input of the user in order to produce useful output. One of the respondents stated that" *certain tools provide quicker and more helpful suggestions whereas others require more effort so that the appropriate output could be achieved*". It suggests that the researchers are actively assessing the performance of AI tools and selecting those that best fit their workflow.

Although these differences exist, participants noted that the overall advantage of time-saving is maximized when tools are not used in an interchangeable manner. One of the interviewees said that "*taking the right tool to apply to the right task would save more time in comparison to using a single tool to do everything*". Here, the comparative and selective approach, where efficiency is attained through informed decision-making, and not through generalized reliance on AI.

4.3.2 Improvement in Writing Quality and Tool-Specific Strengths

Participants also listed the quality of writing as one of the advantages of the AI tools, but they also acknowledged that various tools are involved in improving writing skills in different ways. Certain tools were found to be more beneficial in improving grammar and sentence structure and others were more appropriate in improving coherence and overall clarity. One of the participants described that "*grammar tools are more useful in correcting the errors, but AI such as ChatGPT is more effective in enhancing clarity and expression*". This means that the writing quality is improved by the complementary advantages of various tools.

Moreover, participants emphasized that some tools are more effective to keep academic tone and consistency in longer texts. Some AI systems are able to give detailed and contextually relevant suggestions, whereas others tend to give more general responses. One of the respondents pointed out that "*certain tools are able to provide a more accurate academic recommendation, and others are more widespread*". This comparison is an attempt to critically assess the performance of the tools, with the researchers attempting to differentiate between superficial and context-aware outputs.

Simultaneously, participants also highlighted that the quality of improvement in writing also relies on the effectiveness of the tools that are used. Instead of using one tool, researchers usually integrate the results of two or more AI systems to get improved results. According to one of the interviewees, "he sometimes uses more than one tool to enhance his writing since each has its own merits". This is an indication of a strategic approach whereby comparative knowledge helps to improve the overall quality of academic writing.

4.3.3 Confidence and User Experience Across Tools

The other significant positive aspect that could be outlined in the findings is the fact that the confidence of the researchers has grown, which is influenced by the experience of the researchers working with the different AI tools. The respondents also indicated that certain tools present more reliable and user-friendly results, which can make them trust and have confidence in their use. One respondent stated that "*I am more assured when*

using tools that offer consistent and accurate recommendations". This suggests that confidence does not merely correlate with the availability of AI support but also with the perceived reliability of certain tools.

Besides reliability, user interface and ease of interaction were also mentioned as significant factors affecting user experience. The respondents compared various tools in terms of their ease of use and their capacity to seamlessly fit into the writing process. One respondent mentioned "*that certain tools are easier to use and fit better into my workflow "*. This indicates that usability is an important factor in identifying which tools are favored by researchers.

Furthermore, study participants stressed that they could become more confident in their use of particular tools with time. With the experience, researchers are able to gain a better understanding of the strengths and limitations of each tool, and therefore, they can use them more effectively. One interviewee said that" *after a period of experience they know what tool to use in a given task"*. This emphasizes that confidence is not merely a product of AI support but also the skill of the user to navigate and compare various tools.

4.3.4 Comparative Advantages of AI Tools in Academic Writing

One of the specific trends that the information provides is the comparative assessment of the AI tools, based on their specific benefits. Participants did not make AI tools interchangeable but rather found the sharp differences in the functionality and effectiveness of AI tools. As an example, conversational AI applications have been typically identified with the generation of ideas and conceptualization, whereas applications that were grammar-focused were most commonly used to perform editing and conceptualization activities. One respondent explained "*that various tools are applicable in diverse situations and as such he applies them as it fits*". This represents a subtle interpretation of AI capabilities.

The participants also made comparisons of tools based on depth and contextual relevance. Certain tools were viewed as more competent with creating detailed and meaningful content, and others were regarded as only able to make superficial corrections. One of the respondents said that "*some AI tools offer more in-depth insights, whereas*

others are primarily used to fix simple mistakes". It means that researchers are proactive in evaluating the usefulness of AI outputs and choose tools that best suit their requirements.

A comparative trend was also found across tools with ChatGPT being most commonly linked with the idea generation and detailed explanations, whereas Grammarly was predominantly associated with language refinement. On the contrary, Gemini and Claude were viewed as helpful in creation of more concise and alternative answers especially when researchers required different viewpoints.

Moreover, such tools as Microsoft Copilot were found to be useful in the process of real-time writing support within document-based environments. Compared to ChatGPT, which was mostly utilized to generate ideas, Copilot was seen more as a tool to support inline drafting and editing assistance, especially in document preparation stages.

Furthermore, the findings suggest that this comparative approach enables researchers to maximize the benefits of AI while minimizing its limitations. By understanding the strengths and weaknesses of different tools, participants are able to use them more effectively and avoid potential issues. One of the interviewees observed that "*knowing which tool is more suitable to use in what task makes my work easier*". This emphasizes the fact that the advantages of AI are directly connected to the possibility of the user to compare and evaluating various tools.

4.3.5 Synthesis of Theme

In general, the results indicate that the perceived value of the Generative AI tools is directly correlated with their relative applications in academic writing. Instead of adopting one tool, participants are selective and strategic in their approach of applying various AI systems to various tasks as per their strength. This comparative use is more efficient, improves the quality of writing, and builds confidence, not to mention that this comparative use also enables the researcher to be in control of the writing process. The findings suggest that AI tools can work best when applied together with the critical judgment and awareness of the researcher of what they are capable of. This supports the notion that the advantages of AI are not intrinsic to the tools but a result of their intelligent and comparative use within the practices of academic writing.

4.4 Concerns and Limitations of Generative AI Tools

Although the findings indicate that there are numerous benefits of using Generative AI tools, the analysis shows that there are also a variety of concerns and limitations related to the usage of Generative AI tools in doctoral academic writing. Importantly, these issues are not uniform all tools but differ with their design, functionality, and purpose. They were also very conscious of these differences and tended to compare tools along the lines of their reliability, depth and ethical implications. This theme is more of a critical and evaluative stance whereby researchers will be keen to define the limitations of various AI systems and modify the way they use it. This type of comparative knowledge is instrumental in building responsible and efficient integration of AI.

4.4.1 Reliability and Accuracy Across Different AI Tools

One of the most apparent issues raised by participants concerns the reliability and accuracy of AI-generated content, with much noticeable difference between the tools. Respondents said that conversational AI tools occasionally produce information that seems convincing but not always accurate, whereas tools with grammar focused tools tend to be relatively more reliable when it comes to technical corrections. One respondent said that" *sometimes the tools such as ChatGPT provided irrelevant information, but grammar tools are usually correct*". This emphasizes an apparent difference between tools that are aimed at creating content and those aimed at polishing language.

Besides factual accuracy, participants also compared the contextual applicability of outputs generated by various tools. It is believed that some AI systems were more responsive to providing meaningful and context-focused responses, whereas others were more inclined to produce generic or surface-level responses. One of the respondents mentioned that "*there are tools that comprehend the context better, and those that provide very general answers".* This implies not every AI tool can be equally well used when it comes to dealing with complex academic writing tasks, especially those ones requiring depth and specificity.

Some differences were also found in the limitations of these tools. The participants reported that although ChatGPT tended to give more detailed responses, tools such as

Gemini and Claude sometimes produced shorter and less detailed answers. At the same time, Copilot was seen as being shallow when addressing complex academic arguments because its responses were usually limited by the immediate writing context as opposed to a broader conceptual understanding.

In addition, those participants also noted that it is important to verify the outputs regardless of the tool being used but the degree of scrutiny varied according to the perceived reliability. One interviewee has mentioned that" *he/ she relies on grammar types more, but he/she will always check the content produced by an AI, like ChatGPT*". This is in relation to a comparative hierarchy of trust where researchers place various levels of trust on different tools depending on their experiences.

4.4.2 Originality and Ethical Concerns Across Tools

Related issues associated with originality and academic integrity were also extensively discussed, with participants noting that different AI tools have varying effects on the issues. Conversational AI tools were more often linked with risks of content generation where overreliance might potentially undermine originality. One respondent said that "*when we use AI-based content-generating tools, it can impact originality more than editing tools*". This implies that the degree of ethical concern directly depends on the nature of the tool.

Conversely, tools that were mainly used to correct grammar and paraphrase were seen as less problematic as regards to academic integrity. The participants reported that such tools assist with writing without having such tools change the ownership of ideas significantly. One of the respondents gave the explanation that" *grammar tools are safer as they just enhance what I have already written*". This analogy reveals that not every AI tool is equally ethically risky and that its use has different impacts based on its application.

Irrespective of these variations, participants noted that they were not sure about institutional guidelines and what is acceptable. The nature of the research is that with the absence of clear policies it is not easy to ascertain the right level of AI used in various tools. One of the interviewees said that "there is no definite rule regarding which tools

are accessible and the extent to which we can use them". This suggests that ethical issues are not merely tool-related but also affected by greater academic ambiguity.

4.4.3 Risk of Overdependence and Tool Preference

The results also show fears of overreliance in AI tools, especially when some of the tools are given the center-stage in the writing process. Participants reported that they can think and write without relying on highly competent tools, in particular, tools that produce content. One of the participants said that "*when I rely on AI too much to come up with ideas, it can influence my personal thinking, as well*." This shows one of the main dangers that exist in sophisticated AI systems.

Interestingly, the respondents likened their degree of dependence on various tools, where certain tools encourage high degree of dependence compared to others. The use of conversational AI tools was more likely to be used repeatedly to generate ideas, whereas grammar tools were perceived as used occasionally. According to one of the respondents," *when needed, I use grammar tools, however, AI tools to generate ideas can become a habit*". This implies that the way a tool has been designed and how it functions determines the frequency at which a tool will be used and also the degree of dependency one has on a certain tool.

However, the awareness of this risk was also shown by the participants who explained their plans to cope with this risk. It was reported that many restricted their use of some tools so as not to be overly reliant. One of the interviewees said that" *he or she attempts not to use AI tools, which generate content, too often because he or she wants to preserve his/her own skills"*. This is an attempt to make AI equally advantageous and to address the necessity to retain independent thought.

4.4.4 Depth, Contextual Understanding, and Tool Limitations

The other critical limitation found in the analysis is a deficiency of depth and contextual knowledge in the AI-generated content, which differs among various tools. The participants noted that some of the tools can give detailed explanations, whereas other tools will provide generalized answers that are not academic. One respondent stated that*" some AI tools can provide answers that are extremely simplistic and cannot be used in a*

PhD-level writing". This implies that not every tool is equally useful in managing complex academic content.

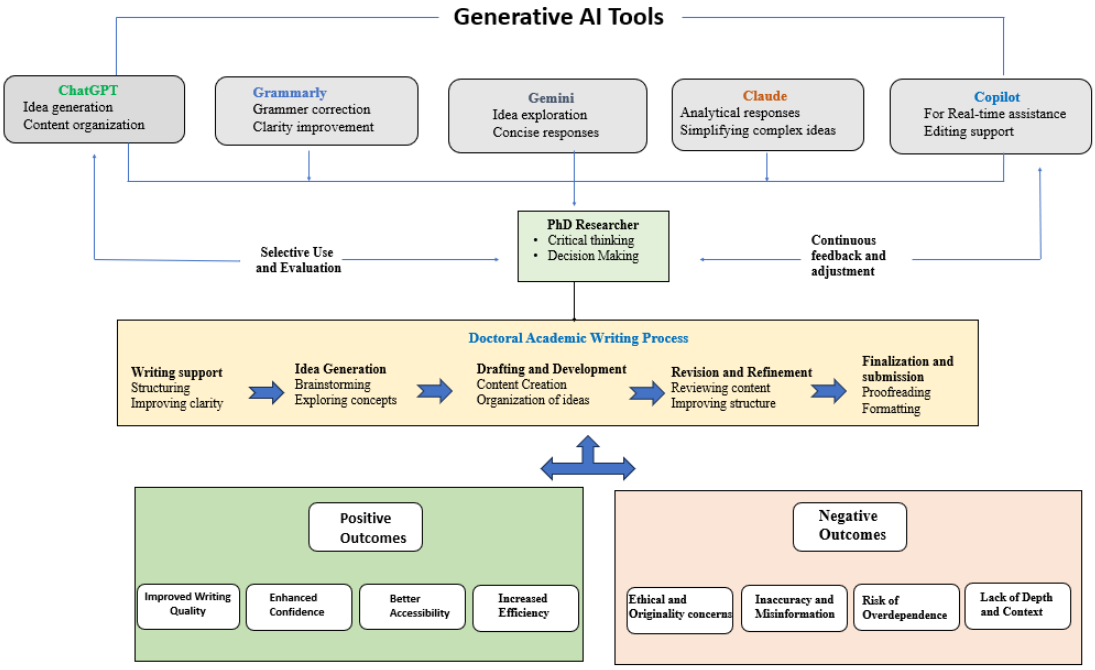
Besides depth, the participants also compared the capabilities of AI tools to comprehend the particular research situations. There were tools which were seen to be more adaptive to user input and generate contextually relevant responses, whereas others found specialized subjects challenging. The reason why some tools suit better my topic, and the reason why some tools fail with the too-specific topic explained one of the respondents. This points out the weaknesses of AI when it comes to handling knowledge that is domain specific.

However, it was sometimes felt that such tools as Copilot were somehow limited to generating in-depth academic responses, as their outputs were often constrained by the immediate context of the document, rather than by a larger conceptual understanding.

Consequently, participants explained that they needed to critically assess and adapt AI outputs and then integrate them into their work. Most of them referred to the use of AI-generated content as an initial source that should be refined. According to one interviewee*," AI can provide a general idea, but an interviewee has to develop it based on his/her research.*" This goes to affirm the role human intervention plays in the process of ensuring that academic writing undertakes the requisite standards.

4.4.5 Synthesis of Theme

The results of this theme are that the concerns and restrictions of the use of Generative AI tools are closely connected with their comparative application. There was an evident perception that various tools have varying degrees of risk, in terms of accuracy, originality, dependence, and depth. This comparative awareness helps researchers to make informed choices on the tools to be used and their proper use. Although AI provides good support, its shortcomings should be evaluated and interacted critically. Finally, the findings indicate that the possibilities of the tools and the skills of the researcher to evaluate and manage their differences are the keys to effective and ethical use of AI in academic writing.



Qualitative Insights into PhD Students' The Comparative Use of Generative AI Tools in Academic Writing

Figure 2

5 DISCUSSION

This chapter presents a critical discussion of the findings by linking the identified themes with existing literature and the study's conceptual focus. It interprets how the comparative use of different Generative AI tools shapes doctoral academic writing practices, moving beyond descriptive results to analytical understanding. In particular, it analyses how scholars choose to interact with different Generative AI tools in relation to task-specific necessities. The analysis also involves how the practices observed relate to the literature on the issue, especially with regards to writing assistance, idea generation, and benefits of specific Generative AI tools.

5.1 Theoretical Contribution

The findings of this study contribute significantly to the growing body of knowledge on the integration of Generative AI tools in doctoral academic writing. Although past studies have mainly focused on how AI can be useful in helping to write papers (Li et al., 2024; Nguyen et al., 2024) This study presents a subtle insight and discussion on how PhD researchers can use AI tools actively in a reflective and controlled fashion. The results illustrate that the connection between AI and academic writing is not merely technological but very cognitive and interpretive that is modified by the critical thinking and scholarly consciousness of the researcher.

One of the theoretical contributions of this study is the idea to view Generative AI as a mediating tool rather than a source of knowledge (Chan & Hu, 2023). The results of Chapter 4 clearly indicate that participants use AI to make linguistic clarity, generate initial ideas, and become more efficient; still, they remain in charge of intellectual content of their work. This supports the argument that AI is a part of the writing process as a supporting tool that promotes expression without using the mental authority of the researcher (Crompton & Burke, 2023). This perspective is in line with the new academic discussion, which prioritizes the facilitative, as opposed to the substitutionary role of AI in education (Garcia, 2025; Abbas et al., 2024).

Moreover, the current research can contribute to the theory, as it outlines the dual-dimensional nature of AI, which involves both technical and cognitive dimensions of

academic writing. On the one hand, AI improves technical aspects, including grammar, coherence, and structure. On the other hand, it promotes mental activities as it helps in generating ideas and getting past writer block (Kim et al., 2026). However, the results also show that this cognitive support is not as much as it needs to be evaluated by humans. This strengthens the idea that AI is not able to think on a higher-level independently, which is one of the key aspects of doctoral research (Kim et al., 2026).

The other theoretical knowledge that is valuable and results of this study is the idea of limited integration of AI. The results demonstrate that PhD researchers do not blindly embrace AI, rather, they set clear limits of its application, especially concerning originality, argumentation, and ethical aspects (Abdelhafiz et al., 2024). Such controlled use is evidence of an advanced awareness of the risks of AI, such as reliability concerns and academic dishonesty. This kind of finding contributes to the body of literature by showing that users do not passively receive AI outputs but are active participants who negotiate the place of AI in their academic activities.

Moreover, this research study will help advance the current discussion on the effects of AI on academic honesty and originality. Although the possibility of AI misuse has been mentioned in previous studies, the results of the current investigation indicate that doctoral researchers are very conscious of potential dangers and make conscious decisions to ensure the integrity of their work (Yeung et al., 2026). The participants emphasized that AI is applied to refinement, not to create content, thus maintaining the originality of their work. This challenges the assumption that AI is an inherent threat to academic integrity but provides a more reasonable perspective on its role.

A theoretical refinement of the study is also provided through the integration of the advantages and shortcomings of AI within a single analytical framework. Instead of considering them individually, the results show that they coexist and that they influence each other in their interactions, shaping the use of AI in academic writing. For example, AI has led to improved efficiency and transparency but also raises the issue of accuracy and dependence (Chatterjee & Bhattacharjee, 2020). This duality describes the necessity of a more detailed theoretical formulation that can reflect the complexity of AI integration (Chan & Hu, 2023).

Additionally, the results further extend on the existing part of work by highlighting the significance of critical engagement in the use of AI tools. Respondents always report that they review, revise and adjust AI-generated content instead of utilizing it directly. This critical interaction is necessary to make sure that AI outputs are aligned towards the intent of the researcher and scholarly norms. These findings help to develop theoretical discussion on the interaction between humans and AI because they allow emphasizing the active engagement of users in the development of technological consequences.

Finally, this study contributes to theory by proposing a refined understanding of academic writing in the age of AI, where writing is viewed as a collaborative process between human cognition and technological assistance. However, this collaboration is not asymmetrical; it is governed by the expertise of the researcher, his or her judgment, and moral principles. This perspective serves as a basis of future studies on the changing interaction between AI and academic practices.

5.2 Managerial Implications

The results of this study provide many practical implications to various stakeholders of the higher education ecosystem, especially PhD researchers, academic supervisors, and institutional policymakers (An et al., 2025). With the ever-growing popularity of Generative AI tools in academic settings, it becomes increasingly important to ensure that their integration into doctoral writing practices is both effective and responsible. The findings of this research indicate that although AI tools have substantial benefits, they can be used effectively only with the development of organized guidance, critical awareness, and ethical interaction among users.

In the case of PhD researchers, the study illustrates the need to be balanced, reflective, and critically informed regarding the use of AI in academic writing (Li et al., 2024). Although they acknowledged that AI positively affects the quality of the writing process, efficiency, and idea generation, participants also showed that they have a clear understanding of the limitations associated with AI. It indicates that researchers are not just required to apply AI tools but also learn to be critical of their outputs. Practically, this means that the content created by AI should be treated as a draft or a suggestion rather than a final product. Researchers have to work hard to refine, adapt and align this

content to their research aims and theoretical perspectives. Such an approach ensures that AI is used as a supportive tool, rather than a deterrent to originality and intellectual property, which are at the core of doctoral research.

In case of academic supervisor, the results highlight the increasing necessity to provide clear and organized instructions on the use of AI tools that can be acceptable. The data indicate that a significant portion of PhD researchers feel uncertain regarding the extent to which they should rely on AI, especially with regard to ethical and academic integrity (Kálmán et al., 2022). Such ambiguity may result in inconsistencies in practice and possible misuse. Supervisors, in turn, can play a critical role in enhancing how students perceive responsible AI integration through setting expectations, promoting transparency, and discussing the advantages and risks of using AI openly. By doing so, the supervisors may contribute to the ability to make sure that AI is being used as a learning tool instead of a shortcut, thus maintaining the academic rigor of doctoral research.

On an institutional level, the study provides a strong indication of the necessity of creating a complex of policies and regulatory frameworks on the use of Generative AI in academic writing. The absence of standardized instructions brings about confusion and researchers are unsure of the limits of acceptable AI application. Universities need to, therefore, be proactive in establishing such limits by focusing on important questions like authorship, plagiarism and ethical responsibility. Clear institutional policies may offer a stable guiding framework through which the students and the researchers can work with confidence. Therefore, these policies must not only curb misuse but ought to encourage the positive and moral use of AI as a valid academic resource.

Besides the development of the policy, the findings highlight the significance of integrating AI literacy and training programs into doctoral education. Although the participants showed some practical understanding of AI tools, the structured training programs can greatly improve their skills to utilize AI technologies in an effective and responsible way. Such programs would need to be oriented towards developing such critical skills as the ability to assess the content created by AI and understand the possibilities of bias and inaccuracy as well as how to preserve originality. Institutions can also guarantee the use

of AI to complement, and not to substitute, vital academic abilities like critical thinking and analytical reasoning by providing researchers with these competencies.

The other significant implication that emerged from the findings is a necessity to promote a culture of ethical awareness and academic responsibility. The respondents were also worried about the possible effects of AI on originality and integrity, which suggests that ethical concerns are the key component of using such tools. Institutions and supervisors should thus be more active in promoting discussions on ethics in AI and should push researchers to consider what their practices are about. Ethical training integrated into research programs may contribute to the establishment of a more responsible and aware academic community that will be in a better position to handle the challenges emerging due to the advent of new technologies.

Moreover, the results indicate that Generative AI applications can be beneficial to the idea of diversity and inclusivity in academic writing, especially among non-native English speakers. AI can be used to even the playing field by enhancing the clarity of language and minimizing obstacles to effective communication so that researchers with diverse language backgrounds can have equal chances to participate in the research process. This support, however, should be well coordinated so as to make sure that it is not a dependency building tool, but it is a skills building tool. Promoting active involvement in AI products can assist researchers to enhance their writing skills with time yet continue enjoying the support of technologies.

Finally, the study highlights the need to adopt a strategic and integrated approach to the use of AI in academics. Instead of seeing AI as an external or optional resource, institutions need to acknowledge it as a developing element of academic practice that needs to be woven into practice considerately. This includes integrating the use of AI into the current academic principles, such as originality, critical thinking, and intellectual independence. In this way, stakeholders will be able to make sure that the introduction of AI can improve the quality and efficiency of academic work without affecting its fundamental principles.

In general, the practical implications of the study emphasize that the successful application of Generative AI to doctoral academic writing needs a combination of critical

awareness, guidance, institutional support, and ethical responsibility. With these aspects covered, higher learning institutions can realize the advantages of AI, but also mitigating the risks, thus helping researchers navigate the complexities of academic writing in the digital environment that is becoming more and more complex.

5.3 Limitations

Although the current study offers some crucial information about the application of Generative AI tools in doctoral academic writing, it is essential to acknowledge that there are specific limitations, which can affect the scope and generality of results. The identification of such limitations does not only enhance the validity of the research but also gives an opportunity to future research to further build on the current work

The first limitation of this research is associated with the sample size and setting. The study relies on interviews with a certain group of PhD researchers, which, though sufficient to explore the problem qualitatively, might not be representative of the diverse range of experiences of doctoral students in various fields, universities, and geographic areas. The norms and institutional cultures of academic writing and attitudes to AI can differ considerably based on field-specific standards and institutional cultures Therefore, the findings of this study should be interpreted within the context in which the data were collected, rather than being generalized universally.

The other limitation relates to the qualitative type of research design. Although thematic analysis provides an opportunity to gain a in-depth insight into the experience of the participants, it is subjective in nature and relies on the analytical perspective of the researcher. Despite the attempts at achieving consistency and rigor in the coding process, there is still a possibility of subjective interpretation in the identification and categorization of themes. This limitation may be overcome in future studies by using mixed methods techniques that integrate qualitative knowledge with quantitative data to provide a stronger impact of results.

Additionally, the research is based on self-reported data, which can be affected by the perceptions of participants and their possible biases. For example, participants can under- or over-report the use of AI tools because of their academic integrity or social desirability reasons. The given limitation is typical of the interview-based research, where

the responses are not only influenced by the actual practices but also by the way the participants want to be viewed. Future research might also include the use of observational techniques or observation of real writing samples to get a more objective picture regarding the use of AI in academic writing.

The other major limitation is associated with the fast-developing nature of Generative AI technologies. The AI tools capabilities are constantly being enhanced, which suggests that the results of this study capture a moving and evolving picture. The role of the AI system in academic writing can also change with the advancement of this field, so the proportion between the aid and autonomy seen in this study can change. Therefore, further studies are required to monitor these changes and re-evaluate their consequences over time (Alfiras et al., 2026).

Moreover, the study does not extensively explore the specifics of differences in the application of AI tools across fields of study. The writing style, originality, and methodological rigor may be different across the academic disciplines, and this fact might have an effect on the perception and use of AI. Further studies may analyze these differences in more detail by comparing studies across fields in order to give a more detailed perspective on AI integration in academic writing.

5.4 Future Research

Based on these drawbacks, it can determine a few future research directions. Firstly, future research can be done to increase the sample size and incorporate participants with varied academic and cultural backgrounds to make research results more generalized. Secondly, researchers might consider using longitudinal designs to investigate the changes in AI usage in academic writing over time and especially with the progression of the doctoral degree of students through various phases (Chiu, 2024).

In addition, further studies can be conducted on the effect of AI on learning and acquisition of skills, especially in critical thinking and writing skills independently. Although this research indicates that scholars have control over their activity, more empirical research is required to evaluate whether a long-term dependency on AI affects the acquisition of the necessary academic skills.

The research of the ethical frameworks and policy formulation connected to AI use in academia is another promising direction of future research. Since institutions are still struggling to cope with the impact of AI, research to guide the development of effective and understandable guidelines is required. These studies might investigate the effectiveness of various policy measures and their influence on student behavior and academic integrity.

Finally, the future research might be on the relationship between human cognition and AI systems, how researchers can discuss the limits of assistance and authorship. This would help in a more theoretical comprehension of the role of AI in knowledge creation and academic activities.

Overall, although the current study gives a thorough discussion of the application of Generative AI tools in doctoral academic writing, it has limitations that highlight the importance of further research in this field of development. By overcoming these limitations and following up on the proposed research directions, future research could contribute to the better understanding of the intricate connection between AI and academic writing.

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Appendices

Appendix A: Research Questionnaire on Generative AI Tools and Academic Writing

Section 1: Background

1. Could you briefly describe your area of research and your current stage of PhD studies?
2. What are some of your current academic writing projects (e.g., thesis writing, research articles, literature reviews)?

Section 2: Use of Generative AI Tools

3. What are some of the Generative AI tools that you have used in your academic writing?
4. When did you start using these tools in your research work?
5. At what phase of your writing process do you make use of AI tools (e.g., idea generation, structuring, drafting, editing)?

Section 3: Role of AI in Supporting Writing

6. How do you use AI tools to assist in your academic writing?
7. What do these tools do to assist you in making your writing clearer, better structured, or expressed?
8. What is your process to incorporate AI-generated suggestions in your own writing?
9. How did the AI-generated output influence your next writing decision?

Section 4: Comparative Use of AI Tools

10. Have you used more than one AI tool? If yes, which ones?
11. In what ways can these tools be different in terms of their usefulness in academic writing?

12. What tool do you consider the most useful in:

- Generating ideas
- Improving writing quality
- Organizing arguments

13. What made you choose AI for a specific task instead of doing it manually?
14. How do you compare your expectations before using AI tools with your actual experience after using them?

Section 5: Impact on Academic Writing Practices

15. In what ways has the application of AI tools affected your work process of writing academic texts?
16. Are you influenced in your planning or organization of writing tasks using AI tools?
17. Do they help make the writing process more efficient in your experience?
18. Can you describe a situation where AI helped you overcome a writing block?
19. Before using AI tools, how did you handle structuring or editing your writing? What changed after adopting AI?

Section 6: Critical Engagement with AI Tools

20. How do you engage with the outputs generated by AI tools during your writing process?
21. How do you adapt or customize AI-generated suggestions to your research context?
22. How do AI tools influence your thinking or idea development during writing?
23. Can you recall a time when AI gave you a suggestion that you disagreed with? What did you do next?
24. How do you decide what to accept or reject from AI-generated suggestions?

Section 7: Reflections on Use

25. What challenges have you experienced while using AI tools for academic writing?
26. Which advantages have you found to be the most significant in using these tools?
27. Did you have ethical issues or hesitation using an AI tool?
28. Do you think these tools have evolved or improved your writing over time? How has AI affected your literature review process?

Section 8: Recommendations

30. What do you recommend other Ph.D. researchers to do when using AI tools for writing?
31. What are your thoughts on the impact of AI on academic writing?

Appendix B: Coding Framework

Initial Code	Category	Theme
Grammar correction	Language support	Writing Support (4.1)
Sentence refinement	Language improvement	Writing Support (4.1)
Paraphrasing assistance	Text modification	Writing Support (4.1)
Clarity enhancement	Readability	Writing Support (4.1)
Idea brainstorming	Idea development	Idea Generation (4.2)
Concept explanation	Understanding support	Idea Generation (4.2)
Overcoming writer's block	Cognitive assistance	Idea Generation (4.2)
Refining research direction	Conceptual support	Idea Generation (4.2)
Time saving	Efficiency	Perceived Benefits (4.3)

Faster writing process	Productivity	Perceived Benefits (4.3)
Improved writing quality	Quality enhancement	Perceived Benefits (4.3)
Increased confidence	User experience	Perceived Benefits (4.3)
Accessibility of support	Availability	Perceived Benefits (4.3)
Inaccurate information	Reliability issues	Concerns & Limitations (4.4)
Lack of depth	Content limitation	Concerns & Limitations (4.4)
Ethical concerns	Academic integrity	Concerns & Limitations (4.4)
Risk of overdependence	User reliance	Concerns & Limitations (4.4)
Tool comparison	Comparative evaluation	Cross-theme (Comparative Use)
Task-specific tool usage	Selective application	Cross-theme (Comparative Use)
Preference for specific tools	User choice	Cross-theme (Comparative Use)

Appendix C: Comparative Analysis of AI Tools Used in Academic Writing

AI Tool	Primary Use	Key Strengths	Limitations	Usage Pattern (Based on Participants)
ChatGPT	Idea generation, explanation, drafting	Detailed responses, strong conceptual	Often inaccurate needs to be verified, risk of over-reliance	Most common tool; preferred for idea development and

		support, useful for brainstorming		conceptual clarification
Grammarly	Grammar correction, editing, proofreading	High accuracy in language correction, improves clarity and readability	Limited to surface-level editing, cannot support deep content generation	Commonly used for final editing and refinement stages
Gemini	Idea exploration, alternative responses	Provides concise outputs, offers alternative perspectives	Less detailed responses compared to ChatGPT, limited depth in complex topics	Occasionally used for quick insights and simplified explanations
Claude	Concept clarification, alternative responses	Clear and structured outputs, helpful for understanding concepts	May produce shorter or less detailed content, limited academic depth	Used selectively for clarification and simplified understanding
Microsoft Copilot	Drafting assistance, in-text support	Integrated within writing tools (e.g., Word), supports real-time drafting	Limited depth, context-bound responses, less effective for complex reasoning	Less frequently used; preferred for inline writing assistance