Journal of Library and Information Science (JLIS), Vol. 51, No. 1 June 2026, pp. 16-31 (ISSN: 0970-714 X)

Impact of Artificial Intelligence for Doctoral Research in Tribhuvan University, Nepal

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ABSTRACT

This study explored the use of AI in doctoral research by identifying commonly used AI tools, examining scholars' perceptions of AI assistance, and assessing ethical concerns related to its use. A review of over fifty interdisciplinary studies revealed AI's increasing role in literature review, data analysis, academic publishing, and research integrity, while also highlighting gaps in ethical guidelines and training. Using a phenomenological research design, data were collected through in-depth interviews with 14 purposively selected PhD scholars with experience in AI use. Thematic analysis indicated that ChatGPT was the most commonly used AI tool, especially during the literature review stage. Participants viewed AI as a supportive assistant that saves time and enhances creativity, but not as a replacement for intellectual effort. Concerns were raised regarding plagiarism detection, contextual inaccuracies, and potential biases in AI-generated outputs. The study recommends structured AI training, ethical frameworks, and integration of AI literacy into doctoral curricula to guarantee the ethical research practices.

Keywords: Artificial intelligence, Research-Technology, AI-Ethical Aspects, Doctoral Students, Nepal

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1. INTRODUCTION

The Doctor of Philosophy (PhD) degree represents the highest level of academic achievement and expertise in a specialised area of research (Åkerlind & McAlpine, 2017). According to the International Standard Classification of Education (ISCED), doctoral education demands for original investigation and a significant contribution to knowledge through publishable-quality work (Sarrico, 2022). The doctoral journey is marked by rigorous inquiry, critical thinking, creativity, and intellectual perseverance. PhD scholars engage deeply with specific research problems, gradually developing expertise through continuous exploration, reflection, and scholarly commitment (Tustin, 2008).

PhD research plays a crucial role in developing competencies such as problem-solving, independent thinking, communication, and analytical skills, which are valuable both within and beyond academia (Săveanu et al., 2023). Universities serve as centers of innovation and knowledge production, and doctoral scholars contribute significantly to these goals through original research and fresh

Received: 10 February 2026; Revised: 18 May 2026
Accepted: 19 May 2026; Online published: 18 June 2026

perspectives. Their findings often become the foundation for future academic and scientific advancements.

The primary objective of doctoral research contribute on the innovative knowledge through systematic, in-depth investigations after figuring out research gaps (Baptista et al., 2015). PhD scholars expand the boundaries of current understanding through original contributions that support intellectual and societal progress (Wilkins et al., 2019). Many technological developments, including internet technologies, renewable energy systems, and Artificial Intelligence (AI), originated from research initiatives driven by scholarly inquiry (Alqhtani, 2025). Doctoral research also contributes to solving social, economic, and environmental challenges, thereby creating long-term positive impacts on society.

Despite its importance, the PhD journey is often demanding and stressful. Scholars frequently encounter intellectual pressure, emotional challenges, financial difficulties, publication demands, and time-management issues (Pyhältö et al., 2012). Conducting extensive literature reviews, analyzing large datasets, and producing original findings require substantial time and effort. Experimental failures, uncertainty in outcomes, and self-doubt may further increase stress and anxiety among researchers. These challenges have encouraged the integration of technological tools to support academic research processes.

After 2023, artificial Intelligence (AI) has been developed in speedy rate. AI refers to computer systems enables to imitate humanly effort and decision-making, hence, saving time and effort for human (Russell & Norvig, 2021). AI systems programmed in such a way that they could enrich learning capability through data inputs on it. This system assists users to complete tasks more efficiently and accurately.

In academic research, AI has significantly transformed how doctoral scholars conduct research. AI-powered tools assist researchers in literature review, citation management, data analysis, content summarization, pattern recognition, and recommendation generation. These tools help scholars process large volumes of information quickly, providing opportunities of time and concern for more critical thinking and creative investigation rather than repetitive tasks. The efficiency and accuracy of complex research activities are possible to prove with more precision due to Natural Language Processing (NLP), machine learning, and data mining.

The growing application of AI in academia has raised an important question: has conducting PhD research become easier in the AI era? To explore this issue, the present study investigated the experiences of 14 PhD scholars of Tribhuvan University, Nepal across disciplines regarding their use of AI tools in research. It examined the impacts, challenges, and implications of AI integration in doctoral research. It specifically aimed to identify the most commonly used AI tools among PhD scholars and explore their perceptions of AI usage in academic work. Based on thematic analysis of interview responses, three major themes emerged: the use and usage of AI, the impact of AI, and the challenges of AI on doctoral research.

2. RESEARCH METHOD

Phenomenological research has explored the lived experiences and perspectives of PhD scholars about the use of Artificial Intelligence (AI) in doctoral research. The interview protocol was organized into three major sections: the introduction section, which included the study purpose, confidentiality assurance, and participants' background information; the body section, which focused on AI tools used, their impacts on research, ethical concerns, and issues related to critical thinking; and the closing section, which addressed limitations and challenges posed by AI against doctoral research process.

In addition, a case study approach was incorporated, focusing on PhD scholars from the Faculty of Humanities and Social Sciences (FOHSS) at Tribhuvan University, Nepal. This approach enabled an in-depth exploration of interconnected issues related to AI integration in doctoral research. The study included 14 PhD scholars from nine different Central Departments under FOHSS, belonging to the 2021 and 2022 student batches. The

sample size was determined based on data saturation, as no substantially new information emerged from additional interviews.

Prior to the main data collection, a pilot study with four participants was conducted to refine the interview questions. Participants were selected across different stages of their doctoral journey, including both early- and advanced-stage scholars, to understand how AI use evolves throughout the research process. The study initially identified scholars with prior experience using AI tools in their research. Subsequently, snowball sampling was employed to recruit additional participants.

Participants were contacted via phone, email, and university networks. The inclusion criteria ensured that only scholars with practical experience using AI tools in research were selected for the study. Some responses were collected through email communication and later verified through follow-up calls and meetings at mutually convenient times. All interviews were recorded, transcribed, and translated into a common language for analysis. To maintain confidentiality, participants' identities were protected through unique coding systems, and all digital data were securely stored in password-protected files.

The collected data were analyzed using thematic analysis in ATLAS.ti software to generate thematic figures and narrative reports. The analysis process was conducted in three stages: prior-analysis, material search, and explanation (Soratto et al., 2020). The prior-analysis stage involved creating the research project, preparing memos, organizing responses, and grouping documents. During the material exploration, the data were thoroughly reviewed, relevant segments were identified, initial codes were developed, and analytical notes were recorded. In the interpretation stage, themes were refined, participant quotations were linked to thematic categories, and network diagrams and reports were generated. A total of 15 initial codes were developed and later categorized into three major themes representing the collective perspectives of the participants. To ensure the trustworthiness and reliability of the findings, member checking and peer debriefing were used throughout the analysis.

3. ANALYSIS, DISCUSSION AND FINDINGS

The study aimed to evaluate how researchers are adopting Artificial Intelligence (AI) technologies in their academic research and to examine their perceptions and ethical concerns regarding AI usage. The collected data were systematically organized into specific categories to facilitate analysis. Each participant's response was carefully coded to identify patterns, practices, and insights regarding the use of AI tools in academic research. Through thematic analysis, the themes were grouped into three major categories: the key dimensions of AI usage, its impact on research practices, and the ethical challenges associated with its application. These thematic categories are presented in Figure 1.

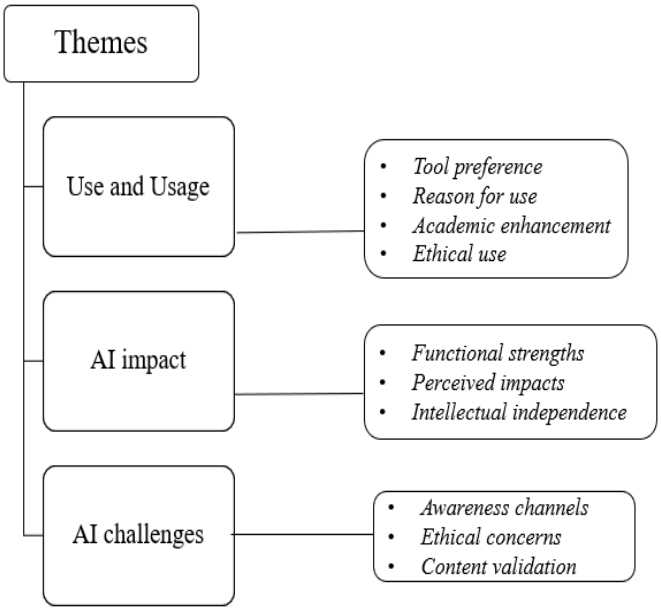

Figure 1: Theme categorization from interviews

Source: Author's own work.

The first objective of the study focused on the adoption and use patterns of Artificial Intelligence (AI) tools among PhD scholars. In contrast, the second objective examined the impact, challenges, and limitations of AI use in academic research. Based on the thematic analysis, the findings were organized into two major categories, as described below.

3.1 Adoption of AI: Use and Usage

The findings revealed that PhD scholars actively use a range of AI tools, including ChatGPT, Grammarly, DeepSeek, Paperpal, Gemini, QuillBot,

Jenni.ai, and Trinka, in their academic work. These tools support researchers in summarizing lengthy texts, generating ideas, analyzing data, improving writing quality, paraphrasing content, and managing citations within a limited time frame. Such applications demonstrate AI's growing role in reducing information overload, simplifying academic tasks, and enhancing research efficiency and workflow in higher education.

Among all the tools mentioned by participants, ChatGPT emerged as the most frequently used and widely appreciated AI application due to its versatility across multiple stages of research. Several participants highlighted their dependence on ChatGPT for academic assistance. For instance, one participant stated, "I use ChatGPT the most, but not regularly" (R11, Personal Interview, April 10, 2025). Similarly, another participant explained, "I mostly use ChatGPT" (R12, Personal Interview, April 2025). These responses indicate ChatGPT's dominant presence in doctoral research practices.

In addition to ChatGPT, participants reported using other AI platforms to meet their specific research requirements. One respondent shared, "ChatGPT, DeepSeek, and Gemini are mostly used in my academic activities" (R9, Personal Communication, March 19, 2025). While ChatGPT was primarily used as a general-purpose AI tool for brainstorming, literature review, drafting, and academic writing, other specialized tools such as Grammarly, Paperpal, QuillBot, Trinka, and Jenni.ai were employed for grammar checking, paraphrasing, summarization, citation support, and language refinement.

The findings further revealed that scholars rarely relied on a single AI platform. Instead, most participants combined multiple AI tools to meet different academic needs throughout their research process. This indicates that AI adoption among PhD scholars is becoming increasingly strategic and task-oriented, with researchers selectively utilizing tools based on their functionality and effectiveness. Some of the commonly used AI tools identified during the study are presented in Figure 2.

Figure 2: Frequently used AI tools by PhD scholars

The word cloud on frequently used AI tools is about the presentation of the most used AI tool is ChatGPT, though it is limited merely on frequency. As participants had revealed that the primary purpose of AI tool use was literature review, as explicitly reported by 11 participants. The use of AI in literature review activities included summarizing scholarly articles, extracting key themes, organizing large volumes of academic texts, managing references, and identifying research gaps and emerging trends within existing literature. These applications demonstrate how AI tools are increasingly being integrated into one of the most time-consuming and foundational stages of doctoral research.

One participant explained the practical benefits of AI-assisted literature review by stating, "*I primarily use AI tools for literature review. ChatGPT helped me to extract key points from academic papers, summarize long texts, and even suggest related research articles. This allows me to identify trends and gaps in the existing literature on my research problem*" (R10, Personal Communication, March 14, 2025). Similarly, another participant highlighted the broader applicability of AI tools by noting, "*I use AI tools for literature review, sometimes for data analysis too*" (R14, Personal Communication, June 11, 2025). These responses indicate that AI tools are widely perceived as supportive technologies that help streamline extensive academic tasks and improve research efficiency.

Despite the growing reliance on AI tools, the findings also revealed that PhD scholars do not fully trust AI-generated outputs without verification. Participants had explained about the question of reliability, contextuality, and quality of responses provided by AI. One respondent clearly described this cautious approach:

"*I use AI-generated answers to draw the central theme of the relevant texts before going through the actual text and checking the gained concepts or knowledge. I grasp how AI tools interpret them. However, I do not use them directly in my research since I do not fully trust them. They roughly help me understand what the relevant texts are all about.*"(R5, Personal Communication, March 31, 2025)

This response suggests that scholars primarily use AI tools as preliminary support systems rather than as authoritative sources of academic knowledge. Most participants reported cross-checking AI-generated information multiple times before integrating it into their research work. Therefore, while AI tools may reduce the time required for information organization and preliminary understanding, scholars still invest considerable effort in validating the accuracy and authenticity of AI-assisted outputs.

However, participants demonstrated greater trust in AI tools for mechanical and language-related tasks, such as grammar checking, paraphrasing, and drafting support, as these functions are considered more technically predictable and less interpretatively sensitive. The findings indicate that AI tools are largely viewed as research facilitators that assist scholars in organizing, simplifying, and interpreting large volumes of academic information rather than independently conducting complex analysis or producing complete scholarly work. This usage pattern reflects a balanced and cautious integration of AI into doctoral research practices (Figure 3).

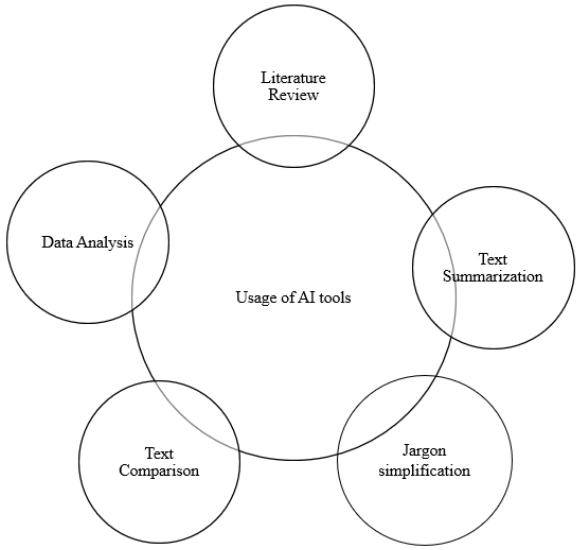

Figure 3: Usage of AI tools for research

Source: Author's own work.

Fig.3 revealed that PhD scholars use AI tools for a variety of academic purposes, including literature review, text summarization, comparison of scholarly content, simplification of complex jargon, data analysis, and academic writing support. Participants generally perceived AI tools as effective in improving research efficiency, particularly in managing extensive academic materials and reducing repetitive workloads.

One participant explained the effectiveness of AI tools in supporting literature review and information synthesis:

"*Yes, I find these tools very effective. ChatGPT has significantly enhanced my ability to quickly understand and synthesize large volumes of literature, which is essential for a comprehensive literature review. These tools save considerable time and effort, allowing me to focus more on analysis and writing*."(R10, Personal Communication, March 14, 2025)

The findings also suggest that AI tools play an important role in assisting scholars in selecting and organizing relevant literature. Although literature review fundamentally requires the researcher's own interpretation, arguments, and critical engagement

with existing studies, AI tools help scholars identify relevant sources, summarize content, and organize information efficiently. In this sense, AI primarily supports the preliminary and mechanical aspects of literature review rather than replacing the intellectual process of scholarly interpretation.

Participants also appreciated AI tools for automating repetitive tasks, improving workflow efficiency, and facilitating idea generation. However, many emphasized that AI should function as a supportive aid rather than a substitute for human creativity, originality, and critical thinking. While most participants viewed AI positively, some expressed mixed or critical views of its limitations. Certain respondents described AI responses as occasionally superficial, inaccurate, or lacking the depth required for advanced academic guidance. Participants also stressed the importance of verifying AI-generated information before using it in research work to ensure accuracy and reliability.

The analysis further demonstrated that AI contributes to doctoral research by simplifying tasks, reducing workload, and improving time management. Research efficiency and academic support emerged as dominant themes across participant responses. One scholar remarked:

"*AI tools save time and help students work faster. They are good supporting tools but should not replace deep thinking*."(R4, Personal Interview, April 19, 2025)

Participants highlighted that AI tools assist in managing literature, organizing references, supporting citation work, and enabling more efficient research practices. Although time-saving was repeatedly mentioned as a major benefit, some participants questioned whether the actual time saved is balanced by the need to verify and validate AI-generated outputs.

Another significant theme identified was the enhancement of skills and knowledge. Some participants believed that AI tools improved their research capabilities by increasing access to information, supporting language development, and bridging communication barriers. One participant stated:

"*Advances knowledge and skills, fills information gaps, language gaps, and many more*." (R3, Personal Communication, March 22, 2025)

Similarly, another respondent explained:

"*AI increases the level of PhD scholars' professional skills. It provides quick access to information resources and enables processing of large datasets*." (R12, Personal Communication, May 23, 2025)

Participants also viewed AI as useful for identifying emerging research trends and for locating research gaps within the existing literature. This reduced the burden of manually reviewing extensive academic materials and allowed scholars to focus more on analytical interpretation and theoretical development. One participant noted:

"*When AI helped identify emerging trends and research gaps from the literature, I could provide better analysis for my research*." (R14, Personal Interview, June 11, 2025)

Another scholar similarly observed:

"*AI tools support knowledge processing, organization, and presentation. They help reduce mechanical workload and enable scholars to focus more on interpretation and theory generation*." (R2, Personal Interview, April 9, 2025)

Writing improvement and coherence were also identified as major benefits of AI usage. Participants reported that AI tools helped improve language quality, argument structure, and clarity in academic writing. One participant expressed:

"*AI can check and improve my language, ideas, and arguments. It can also help find research gaps in my field*." (R13, Personal Interview, May 27, 2025)

Despite these advantages, participants also acknowledged AI's limitations in supporting deeper academic inquiry and critical analysis. One respondent argued that AI could assist with surface-level clarification but could not replace the intellectual depth required for doctoral research:

"*AI tools can only play the role of resolving instant ambiguities, but they cannot advance broad academic research among PhD scholars*." (R6, Personal Interview, April 22, 2025)

The experiences shared by participants indicate that AI tools significantly reduce the tedious, time-consuming aspects of doctoral research, particularly in literature review, information organization, and the identification of research gaps. However, scholars consistently emphasized that AI lacks the capacity for deep critical reasoning, complex interpretation, and original theoretical contribution, which remain fundamentally human aspects of academic research (Figure 4).

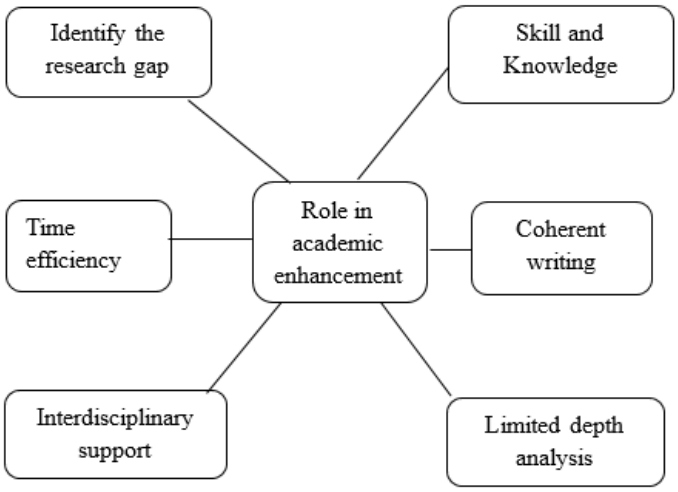

Figure 4: Impact of AI tools on academic enhancement

Source: Author's own work.

Participants complemented for the supportive features of AI in supporting various stages of doctoral research; however, they also demonstrated strong awareness regarding the importance of maintaining academic integrity and ethical responsibility. Most scholars emphasized that AI should serve only as a supportive tool and not as a replacement for original intellectual work. One participant clearly stated, "*I should not use AI-generated content directly in academic writing since it is considered plagiarism*" (R2, Personal Interview, April 9, 2025). This reflects a cautious, ethically conscious approach to AI integration in academic research.

Several participants highlighted the importance of limiting AI usage to supportive and temporary purposes. For example, one respondent explained, "By using as little as possible and for instant purposes only, I ensure that this is ethical usage" (R6, Personal Interview, April 22, 2025). Similarly, another participant noted, "*I use AI only for support and make sure the final work is my own*" (R4, Personal Interview, April 19, 2025). These responses indicate that scholars recognize the need to preserve originality, critical thinking, and personal scholarly contribution while benefiting from AI assistance.

Verification and cross-checking of AI-generated content emerged as one of the most commonly emphasized ethical practices among participants. The responses provided by AI are in need of cross-evaluation based on reliable sources, contextual accuracy, and potential biases of AI outputs. One participant stated, "*Information through AI tools should be verified with different sources and critically analyzed with relevant references*" (R3, Personal Interview, March 22, 2025). Another participant similarly explained, "*I always cross-check the drawn conclusions by myself*" (R5, Personal Interview, March 31, 2025). These findings suggest that researchers do not unthinkingly rely on AI-generated information but instead subject it to critical evaluation before incorporating it into their academic work.

Transparency and clear distinction between AI-generated assistance and original scholarly contribution were also identified as important ethical principles. One participant shared, "*I ensure ethical usage by clearly distinguishing between AI-generated content and my own work*" (R7, Personal Interview, April 12, 2025). Another respondent added, "*I cite any AI-generated content clearly and maintain academic integrity*" (R11, Personal Interview, April 10, 2025). Such practices reflect an emerging awareness among scholars regarding responsible disclosure and ethical accountability in AI-assisted research.

Participants additionally acknowledged the usefulness of AI in improving understanding of complex concepts and terminologies. One scholar explained, "*AI can help you understand even complex terminologies, so that at least you have an understanding of the terminologies you use in your research*" (R13, Personal Interview, May 27, 2025). However, despite recognizing these benefits, some participants admitted uncertainty about the ethical boundaries of AI usage. One respondent remarked, "*It is challenging*" (R8, Personal Interview, April 21, 2025), while two participants openly stated that they lacked clear knowledge regarding ethical AI practices in academic research.

Many participants also warned against overdependence on AI tools. One scholar emphasized, "*We should not completely depend on AI output. We must review the output and check them*" (R14, Personal Interview, June 11, 2025). These concerns indicate that while AI tools are increasingly integrated into research practices, scholars still value human judgment, interpretation, and critical reasoning as essential components of doctoral research.

The findings reveal a growing sense of ethical responsibility among PhD scholars regarding the use of AI in academia. Participants highlighted practices consistent with academic integrity, including limiting AI use to supportive tasks such as brainstorming, language assistance, summarization, and quick referencing; cross-verifying outputs with credible academic sources; rewriting AI-generated content in their own words; and maintaining transparency about AI assistance. Participants further stressed the importance of following institutional guidelines, citation standards, and plagiarism policies to ensure responsible AI integration in research. Nevertheless, the responses also indicate a significant gap in AI literacy and institutional guidance, suggesting the need for formal training programs and ethical frameworks for AI usage in higher education.

The participants further emphasized that ethical AI integration requires clear, responsible, and informed practices. Many scholars recommended that AI should be treated strictly as a supplementary academic tool rather than a substitute for original thinking, creativity, and deep analysis. Participants advocated for AI literacy programs to educate researchers about AI's capabilities and limitations. Transparency was also repeatedly highlighted, particularly regarding the disclosure of AI use in writing, summarization, and data analysis.

Verification and critical evaluation of AI-generated outputs were identified as essential strategies to reduce misinformation, inaccuracies, and bias. Participants additionally called for institutional policies and guidelines to clarify acceptable AI practices in research and academic writing. Some respondents recommended using AI-detection tools to identify unoriginal or overly AI-generated content. One participant also emphasized the importance of integrating AI tools that support local languages, such as Nepali, thereby promoting more inclusive, context-sensitive technological development.

The findings of this study align with international research trends. For instance, a 2023 study conducted at the University of Sydney reported that approximately 55% of doctoral candidates used AI tools in thesis writing, particularly for literature reviews, data analysis, and document formatting. The study further suggested that AI utilization contributed to an estimated 20% improvement in the overall quality of academic work (Dorado, 2024). The responses in the present study demonstrate a strong consensus that ethical AI use in doctoral research requires responsible application, transparency, verification, academic integrity, and continuous education.

3.2 AI Impact

Regarding the impact of AI tools on doctoral research, participants identified speed, summarization, and analytical support as the most valuable and effective features. Scholars appreciated AI tools' ability to process large volumes of text quickly, summarize key ideas, synthesize information, and recommend related academic sources. These functions significantly improved productivity and efficiency during intensive research activities.

One participant explained, "*Its features of synthesizing, analyzing, and elaborating make them more useful in my research work*" (R6, Personal Communication, April 12, 2025). Similarly, another participant stated: "*Their ability to process large volumes of text quickly, provide instant feedback, offer paraphrasing suggestions, and summarize complex ideas is especially helpful. Some AI tools also suggest related academic papers based on prompts*." (R2, Personal Communication, April 9, 2025)

Analytical support emerged as another significant advantage of AI tools. Participants reported that AI helped them interpret statistical findings, simplify complex theories, and elaborate academic concepts more effectively. Several respondents also highlighted AI assistance in citation formatting, referencing, and academic organization. One participant remarked, "*their ability to pinpoint the exact arguments, stating exact text, saves time and unnecessary effort*" (R13, Personal Interview, May 27, 2025).

In addition, participants valued AI tools for grammar checking, paraphrasing, content generation, and flexible adaptation to different research tasks. One scholar appreciated AI systems' ability to generate multiple forms of content from a single source, reflecting the adaptability and multifunctionality of these technologies in academic work.

Despite these positive experiences, some participants also acknowledged the occasional unpredictability and superficiality of AI-generated responses. A few respondents suggested that AI outputs can sometimes appear overly generalized or lack the depth required for advanced scholarly interpretation. Nevertheless, the overall findings indicate that scholars largely appreciate AI tools for their speed, responsiveness, efficiency, and practical support, particularly during the early and organizational stages of doctoral research. These findings are summarized in Table 1.

Table 1. AI impacts on given tasks

Tasks	Explanation
Summarization & Citation Features	Quick summarizing, citation generation. It supports literature handling and academic referencing.
Analytical Support	Interpretation, elaboration, simplification. It helps with complex academic content.
Instant Feedbacks	Fast processing, related paper suggestions. It increases efficiency and responsiveness.
Writing Aid	Easy to use, grammar checking, and clarity help. It enhances academic writing and understanding.
Textual Accuracy & Time Saving	Extracts key arguments, saves effort. It minimizes redundant reading and work.
Others	Paraphrasing, tool-specific functions, and flexibility. It includes unique or personalized tool benefits.

Source: Author's own work.

Most participants perceived AI tools as highly effective in supporting their academic and research-related activities. Scholars particularly appreciated AI tools for their demand-driven assistance, rapid access to relevant information, ease of use, and ability to support complex academic tasks efficiently. Participants highlighted that AI tools streamline literature review processes, help retrieve relevant scholarly resources, and save considerable time, thereby enabling researchers to focus more on analysis, interpretation, and academic writing.

One participant explained the usefulness of AI tools in academic research by stating: "*Yes, I find these tools very effective. ChatGPT has significantly enhanced my ability to quickly understand and synthesize large volumes of literature, which is essential for a comprehensive literature review. These tools save considerable time and effort,*

allowing me to focus more on analysis and writing." (R10, Personal Interview, March 14, 2025)

Participants also valued AI tools' ability to automate repetitive academic tasks, generate efficient outputs, and facilitate the exploration of new ideas and concepts. However, most respondents emphasized that AI should function as a supportive academic assistant rather than a replacement for human creativity, originality, and critical thinking. While most scholars viewed AI positively, some participants expressed mixed or critical views about its limitations. A few respondents described AI-generated outputs as partially effective, occasionally unsatisfactory, or lacking the depth required for advanced scholarly guidance. Others stressed the importance of carefully verifying AI-generated information to ensure accuracy, reliability, and contextual appropriateness. Overall, although most participants appreciated the efficiency and practicality of AI tools, a minority expressed concerns about their limitations and potential academic risks.

A major concern raised by participants was the potential negative impact of excessive reliance on AI on critical thinking and the originality of research. Scholars generally agreed that AI tools should not be seen as barriers to originality but rather as supportive technologies that help researchers process information more efficiently. Participants believed that originality and scholarly contribution can still be maintained if researchers critically evaluate AI-generated outputs and integrate their own interpretations, insights, and reflections into the research process.

Several respondents warned that over-reliance on AI could weaken independent thinking and intellectual engagement. One participant stated: "*If we depend too much on AI, it can reduce our own thinking capabilities. That is why we should use AI as a helper, not a replacement*." (R4, Personal Interview, April 19, 2025)

Another participant expressed concern that AI-generated text may encourage researchers to adopt or lightly edit pre-formulated content, thereby reducing authentic scholarly contribution if not carefully managed. One respondent explained: "*AI generally offers a generic approach and arguments. I felt AI lacks the capacity to provide critical thinking that can only be generated from lived experience, field engagement, and deep reflection. However, AI is largely a supportive tool*." (R2, Personal Interview, April 9, 2025)

Participants further emphasized that originality and creativity are fundamentally human qualities rooted in deep cognitive, reflective, and experiential processes that technological systems cannot fully replicate. Some scholars believe that the uncritical use of AI tools may suppress individual ideas, reduce contextual depth, encourage overdependence, and limit originality in academic research. At the same time, participants acknowledged that AI tools can strengthen academic writing and organizational efficiency when their outputs are critically reviewed, cross-checked, and supplemented with the researcher's own analysis and interpretation.

One participant highlighted the risk of cognitive dependency and misinformation by stating:

"*Too much AI can reduce cognitive effort. It will create bias and misinformation*." (R12, Personal Communication, May 23, 2025)

Similarly, another participant observed:

"*AI tools limit originality or critical thinking in research because excessive use forms the habit of shortcut solutions, which is harmful for new knowledge creation*." (R6, Personal Interview, April 22, 2025)

The findings suggest strong consensus among PhD scholars that AI can be a powerful academic aid when used responsibly and critically. However, participants consistently warned that excessive or uncritical dependence on AI may undermine essential scholarly competencies such as originality, critical thinking, contextual interpretation, and independent analysis, which remain central to high-quality doctoral research (Figure 5).

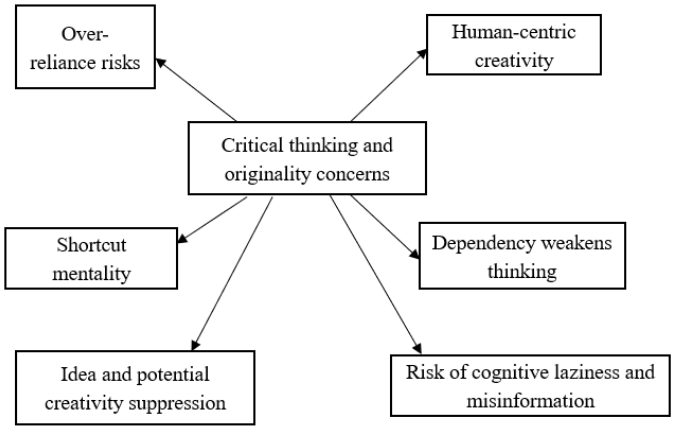

Figure 5. AI impacts on critical thinking and originality concerns

Source: Author's own work.

3.3 AI Challenges

The findings revealed several challenges associated with the use of AI tools in doctoral research. Among the various concerns raised by participants, issues related to accuracy and reliability emerged as the most frequently mentioned challenge. Several participants reported that AI-generated outputs were sometimes outdated, incorrect, overly general, or lacking contextual precision, requiring careful verification against original academic sources.

One participant explained:

"*One of the main challenges I have encountered is ensuring the accuracy of the information generated by ChatGPT. While ChatGPT can quickly process and summarize text, it is important to cross-check the results against primary sources to avoid inaccuracies. Additionally, ChatGPT requires some time to get accustomed to, especially in setting up proper citation styles and handling very large volumes of sources*." (R10, Personal Interview, March 14, 2025)

This response highlights that although AI tools improve efficiency in processing academic information, researchers still need to critically evaluate and authenticate AI-generated outputs before incorporating them into scholarly work.

Similarly, another participant identified inconsistency in AI responses as a major limitation. Participants observed that AI systems may provide varying interpretations or contradictory information depending on prompts and contextual inputs. Concerns regarding data quality and contextual relevance were also strongly emphasized. One participant stated:

"*Sometimes AI tools provide outdated or mechanized data, which is not useful for academic writing. Sometimes AI overreacts by providing unnecessary data*." (R2, Personal Interview, April 9, 2025)

These concerns suggest that AI-generated content may occasionally lack academic depth, precision, and contextual appropriateness, thereby limiting its usefulness in advanced scholarly research.

Financial and security-related concerns also emerged among participants. One respondent explained:

"*Payment is the challenge; sometimes fake AI will hack ID*." (R8, Personal Interview, April 21, 2025)

This response addresses concerns about subscription costs, the accessibility of premium AI services, and the risks associated with fraudulent or insecure AI platforms.

Another major limitation highlighted by participants was the restricted capability of free AI versions. One participant noted:

"*They do not provide deep and scholarly article-based research if you just use the free version. They mostly do superficial data gathering and produce results useful for beginner-level researchers*." (R13, Personal Interview, May 27, 2025)

This finding indicates that free AI platforms may not adequately support advanced doctoral-level research requiring in-depth academic analysis and high-quality scholarly resources.

Language accessibility also emerged as an important concern. One participant highlighted the limited compatibility of AI tools with the Nepali language and academic context:

"*Yes, there are challenges. Some of the content is not compatible with the Nepali language. It often favours English and does not support Nepali academic writing effectively*." (R11, Personal Interview, April 10, 2025)

This suggests that current AI systems remain largely English-centered and may inadequately support multilingual or localized academic environments, particularly in non-English research contexts.

In addition to these concerns, participants also mentioned challenges such as over-reliance on AI, dependency on prompt quality, superficial outputs, and occasional dissatisfaction with generated responses. Some scholars observed that AI tools require carefully structured prompts to generate meaningful and relevant outputs, suggesting that effective AI use demands a certain level of technical and analytical skill from researchers.

Despite these limitations, four participants reported no significant challenges when using AI tools in their research. However, the overall findings indicate that the most critical concerns among PhD scholars revolve around content accuracy, trustworthiness, contextual understanding, depth of analysis, and ethical dependency on AI systems. These findings demonstrate that while AI tools offer substantial support in doctoral research, their limitations require cautious, critical, and responsible usage by researchers (Figure 6).

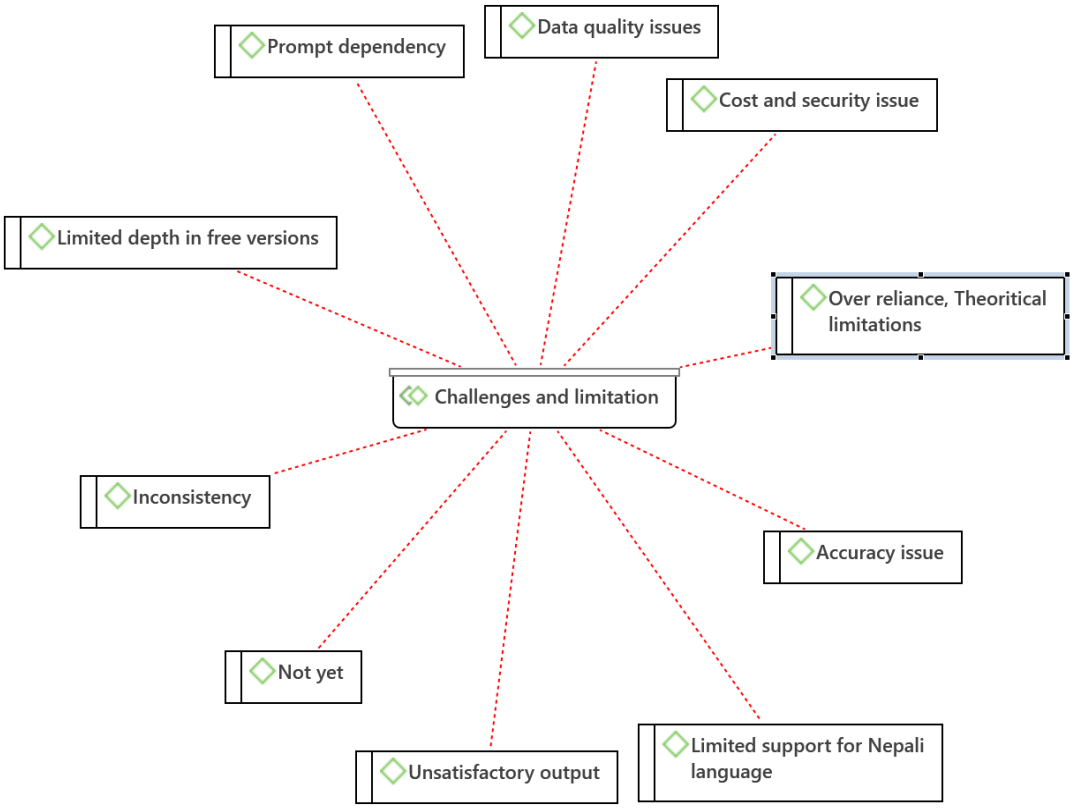

Figure 6: Challenges and limitations of AI tools

Source: Author's own work.

3.4. Ethical Concerns Encountered

The findings on the theme "Ethical Concerns Encountered" reveal mixed experiences among PhD scholars regarding the ethical implications of using AI tools in academic research. A majority of the participants, approximately eight respondents, reported that they had not personally encountered any major ethical problems while using AI tools in their research activities (reported by R1, R2, et al.). Nevertheless, many participants emphasized the importance of using AI technologies responsibly and cautiously to maintain academic integrity and originality in scholarly work.

One participant explained that although AI tools are helpful, careful moderation and verification are necessary to avoid excessive dependence on generated outputs (R10, Personal Interview, March 14, 2025). This reflects a broader understanding among scholars that AI tools should support research processes rather than replace human intellectual engagement.

At the same time, several participants identified specific ethical risks associated with AI use, particularly concerning plagiarism, misinformation, bias, and misuse of generated content. One participant stated:

"*One concern is that students or researchers might misuse AI to fabricate research or mask weak arguments. There is also the risk of unintentional plagiarism if AI-generated content is not properly integrated or cited within one's work*." (R7, Personal Interview, April 12, 2025)

Similarly, another participant highlighted multiple ethical concerns, including plagiarism, misinformation, and the validity of AI-generated ideas:

"*Definitely, I have encountered plagiarism, bias, and misinformation when using AI tools. It is crucial to understand why these risks exist and how to overcome them. I found concerns about the validity of ideas or text generated by AI tools. AI tools generate ideas that researchers may use without proper attribution, and there are risks of plagiarism, bias, and misinformation, too*." (R14, Personal Interview, June 11, 2025)

These responses indicate a growing awareness among doctoral scholars regarding the ethical challenges posed by AI integration in research. Participants acknowledged that AI-generated content may lack originality, depth of context, or factual accuracy when used uncritically. Consequently, scholars recognized the importance of maintaining transparency, originality, and responsible academic practices while using AI tools.

The findings further revealed that 11 out of 14 participants clearly recognized the potential risks of plagiarism, misinformation, and bias associated with AI-generated outputs. To minimize these risks, participants described several strategies they commonly apply in their research practices. These include manually verifying AI-generated content, cross-checking information against reliable academic sources, critically evaluating outputs, and using plagiarism-detection tools to ensure originality and accuracy.

Participants consistently emphasized that AI should serve as a supportive academic aid rather than a replacement for original scholarly thinking. One respondent clearly stated:

"*AI-generated content, if used in academic writing as it is, will amount to plagiarism. Hence, it is unethical to use AI-generated content without the originality of the writer. I would suggest limited use of AI, such as for brainstorming and generating ideas on certain issues*." (R2, Personal Communication, April 9, 2025)

This response reflects the broader perception among scholars that AI tools may assist with brainstorming, drafting, or organizing information, but that final academic outputs must remain grounded in the researcher's own interpretation, analysis, and intellectual contribution.

Participants also stressed the importance of adhering to academic and ethical standards, including

proper citation practices, transparent disclosure of AI use, and compliance with institutional guidelines. Some respondents warned that directly copying and pasting AI-generated content without critical engagement could compromise research integrity, particularly because AI outputs may contain inaccuracies, superficial interpretations, or biased perspectives.

Although a small number of participants believed that ethical risks could be avoided through careful, limited use of AI tools, the overall findings demonstrate a shared awareness of the ethical challenges posed by AI integration in academic research. The responses collectively suggest a growing need for clearer institutional policies, structured ethical guidelines, and enhanced AI literacy programs to support responsible and transparent AI use among researchers.

4. CONCLUSION

This study provides an in-depth qualitative exploration of how PhD scholars engage with Artificial Intelligence (AI) tools in academic research. The findings reveal that although there remains considerable uncertainty and a lack of formal guidance regarding the ethical and appropriate use of AI in research, AI tools have already become a common component of doctoral research practices. Scholars primarily use AI for supportive tasks such as literature review, drafting assistance, citation management, grammar checking, conceptual clarification, and information organization. Among the available AI tools, ChatGPT emerged as the most widely used due to its accessibility, flexibility, and ease of use.

The study further demonstrates that PhD scholars recognize the significant advantages of AI tools, including improved research efficiency, reduced repetitive workload, and time savings during intensive academic activities. However, participants also expressed serious concerns regarding plagiarism, misinformation, superficial analysis, reduced originality, and unclear ethical boundaries associated with AI-generated content. These concerns indicate that while AI offers substantial practical benefits, its integration into academic research requires careful regulation and critical awareness.

The findings suggest that successful integration of AI into doctoral research depends not only on technological advancement but also on the researcher's ability to use these tools critically, ethically, and responsibly. Most participants viewed AI not as an independent source of scholarly knowledge, but rather as a facilitator that supports understanding, organization, and information processing. In this sense, AI tools were perceived less as threats to academic scholarship and more as productivity-enhancing assistants, provided that researchers maintain critical judgment, originality, and ethical responsibility.

The study also highlights the urgent need for universities and academic institutions to recognize the evolving role of AI in research and provide formal support mechanisms for its responsible use. Participants emphasized the importance of structured AI literacy programs, ethical training, institutional guidelines, and transparent academic policies to ensure equitable and ethical AI integration across disciplines. Although AI adoption is already evident among doctoral scholars, the lack of clear ethical frameworks has led to inconsistent practices and uncertainty about acceptable use.

Promoting AI literacy, strengthening critical engagement, and reinforcing academic integrity emerged as essential requirements for maximizing the positive impact of AI in doctoral research. The findings suggest that AI should be understood as a tool that enhances human potential rather than replacing human intellectual contribution. When used responsibly, AI can serve as a valuable partner in academic research by improving efficiency, supporting learning, and enabling new approaches to knowledge exploration.

In conclusion, this study finds that AI tools significantly assist PhD scholars in managing repetitive and time-consuming research tasks, particularly in literature review, grammar correction, citation management, and information organization. However, participants consistently emphasized that the core of doctoral research still depends on deep

critical thinking, originality, contextual understanding, and thoughtful interpretation, capacities that AI systems cannot independently replicate. Therefore, AI should be regarded as a supportive academic assistant rather than a substitute for human scholarship. For AI to be integrated effectively and ethically into academic research, scholars must remain reflective, responsible, and critically aware of both the opportunities and limitations of AI technologies. Universities also play a crucial role in supporting this transition by providing training, developing policies, and fostering open academic discussion on ethical and responsible AI use in research.

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Citation

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