

A Case Study on Student Adoption and Ethical Implications of AI Tools in Academic Writing

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ABSTRACT

This case study investigates the adoption patterns and ethical implications of AI-powered tools among university students for academic writing, aiming to bridge the gap between technological integration and pedagogical responsibility. We conduct a qualitative survey-based analysis involving undergraduate, postgraduate, and research scholars across disciplines at NGM College, focusing on their familiarity, usage frequency, and attitudes toward AI tools such as ChatGPT, Gemini, and Perplexity. The findings reveal a high level of familiarity with AI tools, with 48.6% of participants being "very familiar" and 47.2% "somewhat familiar," while ChatGPT emerges as the dominant tool (83.3%). Students primarily employ AI for writing assistance (81.9%), idea generation (75.0%), and research (72.2%), yet ethical concerns persist, as only 2.7% directly accept AI-generated content without modification. The study identifies a tension between efficiency gains and risks to academic integrity, with 51.4% of respondents using AI suggestions as inspiration but rewriting content independently. Moreover, the data highlights disciplinary variations in tool preferences and task-specific applications, underscoring the need for tailored pedagogical strategies. The research contributes to the growing discourse on AI in education by providing empirical evidence of student behaviors and proposing actionable recommendations for educators, such as redesigning assessments to emphasize critical thinking and integrating transparency mechanisms. These insights are particularly significant given the rapid proliferation of AI tools in academia, where balancing technological assistance with the preservation of original thought remains a pressing challenge. The study ultimately calls for a nuanced approach to AI integration, one that fosters responsible use while maintaining academic rigor and ethical standards.

KEYWORDS: Artificial Intelligence, Ethics, Student Adoption, Academic Writing.

1. INTRODUCTION

The integration of artificial intelligence (AI) into academic writing has transformed traditional pedagogical approaches, raising critical questions about efficiency, originality, and ethical boundaries in higher education. While

AI tools like ChatGPT and Gemini offer unprecedented support for tasks such as grammar correction, idea generation, and literature synthesis , their widespread adoption necessitates a deeper examination of user experiences and institutional responses. Academic writing, long regarded as a cornerstone of critical thinking and knowledge dissemination , now faces challenges in balancing technological assistance with the preservation of authentic scholarly voice. This tension is particularly evident in universities, where students increasingly rely on AI to navigate complex writing demands .

The rapid evolution of AI-powered writing assistants has outpaced the development of clear ethical guidelines, leaving educators and students to grapple with questions of authorship, plagiarism, and cognitive dependency. Studies suggest that while AI can enhance writing efficiency , its overuse may undermine the development of essential skills such as argumentation and synthesis . For instance, tools like Grammarly and ChatGPT are often employed for surface-level corrections, but their role in higher-order thinking tasks remains contested . Moreover, disciplinary differences influence how AI is adopted; STEM students may prioritize research automation, while humanities learners focus on stylistic refinement . These variations highlight the need for context-specific frameworks to guide AI integration.

This study addresses three research questions: (1) How familiar are university students with AI tools for academic writing, and which tools do they prefer? (2) What tasks do students delegate to AI, and how frequently do they use these tools? (3) What ethical concerns and pedagogical challenges arise from AI adoption in academic writing? By focusing on NGM College, a multidisciplinary institution, we capture diverse perspectives that reflect broader trends in higher education. Our objective is to provide empirical evidence that informs policy discussions, curriculum design, and faculty training programs.

The significance of this research lies in its dual focus on practical usage patterns and theoretical implications. Prior works have examined AI's technical capabilities Ho, C. C. (2024) or ethical dilemmas Iddrisu, H. M., Iddrisu, S. A., & Arminu, B. (2025). , but few bridge the gap between student behaviors and institutional strategies. For example, while 72.2% of participants in our study use AI for research, only 26.4% employ it for citation management, suggesting a need for targeted training in academic rigor. Furthermore, the finding that 51.4% rewrite AI-generated content underscores a conscious effort to maintain originality, complicating narratives of passive dependency. These insights challenge binary views of AI as either a threat or a panacea, advocating instead for a middle ground where technology complements human intellect.

The remainder of this paper is organized as follows: Section 2 reviews foundational and contemporary literature on AI in academic writing, Section 3 details our qualitative methodology, Section 4 presents findings on tool usage and ethical attitudes, Section 5 discusses implications for pedagogy and policy, and Section 6 concludes with recommendations for future research. By structuring the analysis around user experiences rather than tool functionalities, we prioritize the voices of students—the primary stakeholders in this technological shift. This approach aligns with calls for human-centered AI research ensuring that educational innovations remain grounded in real-world needs.

2. LITERATURE REVIEW

The integration of AI tools in academic writing has garnered significant attention in recent years, with studies exploring various dimensions of their adoption, effectiveness, and ethical implications. Early research primarily focused on the technical capabilities of AI writing assistants, such as grammar checking and plagiarism detection. However, as these tools became more sophisticated, scholars began investigating their broader pedagogical impacts, particularly in higher education settings. For instance, Aljusid, H. (2024). examined how AI tools influence students' critical thinking abilities, finding that while they improve writing efficiency, they may inadvertently reduce opportunities for deep cognitive engagement.

A growing body of work has investigated student perceptions and usage patterns of AI writing tools. Kim, J., Yu, S., Detrick, R., & Li, N. (2025) conducted qualitative interviews with university students, revealing that many view AI as a "collaborative partner" rather than a replacement for human effort. This aligns with findings from Nelson, A. S., Santamaría, P. V., et al. (2024), who reported that students often use AI for brainstorming and drafting but maintain agency in the final composition. However, disciplinary differences emerge prominently; STEM students tend to use AI for data analysis and technical writing, while humanities students focus more on argument structuring and style refinement. Iddrisu, H. M., Iddrisu, S. A., & Arminu, B. (2025) The ethical dimensions of AI-assisted writing have also been extensively debated. [9] highlighted concerns about academic integrity, particularly the difficulty in distinguishing between human and AI-generated content. This challenge has prompted institutions to explore detection tools, though their reliability remains questionable. Qureshi, U. M., Tong, E. X. M., Chen, Z. V., Deng, C., et al. (2024). Meanwhile, Ilesanmi, F. O. (2024) proposed a framework for evaluating trust in AI tools, emphasizing the need for transparency in how these systems generate suggestions.

Pedagogical responses to AI writing tools have varied widely. Some educators advocate for outright bans, citing risks to academic integrity. Olowe, K. J., et al. (2024) while others propose integrating AI into curricula to teach responsible use. Pervaiz, H., Razzaq, S., & Tariq, M. (2025). For example, Qureshi, U. M. et al. (2024) demonstrated that structured AI interventions can improve second-language writing skills when combined with instructor guidance. Similarly, Richards, J. C., & Miller, S. K. (2008). found that students benefit from explicit training on how to critically evaluate and refine AI-generated content. Despite these advances, gaps remain in understanding how AI tools are adopted across different academic contexts and how they influence long-term writing development. Most studies focus either on technical evaluations of specific tools or broad ethical discussions, leaving the intersection of user experience and pedagogical practice underexplored.

This study builds on prior work by providing a detailed examination of AI tool usage patterns among diverse student populations, while also addressing the ethical and instructional challenges that arise. which focused narrowly on research scholars, our research includes undergraduates and postgraduates across disciplines, offering a more comprehensive view of AI adoption. Furthermore, we extend the findings of Ruan, M., Fan, J., et al. (2025) by analyzing not just satisfaction but also the specific tasks for which students employ AI, revealing nuanced patterns of dependency and autonomy. Our work thus contributes to the ongoing discourse by bridging the gap between user behavior and institutional policy, providing actionable insights for educators navigating the complexities of AI integration.

3. METHODOLOGY

This study employs a qualitative research design to investigate university students' adoption of AI tools for academic writing. The methodology was structured to capture both quantitative patterns of tool usage and qualitative insights into user experiences and ethical considerations. The research was conducted at NGM College, involving participants from diverse academic disciplines and educational levels to ensure comprehensive representation.

3.1 Participant Recruitment and Demographics

Table 1. Gender Distribution of the Participants

| Gender | Number of Participants | Percentage |
|--------|------------------------|------------|
| Male | 22 | 30.60% |
| Female | 50 | 69.40% |
| Total | 72 | 100% |

Participants were recruited through departmental announcements and voluntary sign-ups across undergraduate, postgraduate, and research scholar programs. The final sample consisted of 72 students, with demographic characteristics detailed in Tables 1–3. As shown in Table 1, female participants constituted 69.4% of the sample, while male participants accounted for 30.6%. This gender distribution reflects broader enrolment trends at the institution.

Table 2. Education Level of Participants

| Category | Percentage |
|------------------------------------|-------------------|
| Undergraduate | 49.30% |
| Master's (second year) | 24.70% |
| Master's (first year) | 19.20% |
| Remaining (PhD Coursework & Other) | 6.8% (Calculated) |
| Total | 100% |

Educational levels varied significantly, with undergraduates representing 49.3% of participants, followed by second-year master's students (24.7%) and first-year master's students (19.2%). A small proportion (6.8%) comprised PhD coursework students and others, as illustrated in Table 2.

Table 3. Departments of Participants

| Department | Percentage |
|---------------------|------------|
| Computer Science | 24.48% |
| Social Science | 23.04% |
| Basic Science | 2.88% |
| Arts and Humanities | 2.00% |

Disciplinary representation included Computer Science (24.48%), Social Sciences (23.04%), Basic Sciences (2.88%), and Arts and Humanities (2.00%), as shown in Table 3. This distribution enabled analysis of discipline-specific tool preferences and usage patterns.

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3.2 Survey Design and Data collection

The study utilized a structured survey divided into four sections to systematically gather data. The first section collected demographic information, including gender, education level, and department. The second section assessed general AI usage in academic work, probing familiarity with tools and frequency of use. Participants rated their familiarity on a scale from "not familiar" to "very familiar" and indicated how often they employed AI tools (daily, weekly, monthly, or rarely).

The third section concentrated on AI applications in academic writing. Participants identified the tools they used, such as ChatGPT, Gemini, and Perplexity, and their purposes, including grammar checking, idea generation, and paraphrasing. Tasks were categorized into five areas: Research Idea Generation, Research Discovery and Literature Search, Writing Assistance, Grammar and Paraphrasing, and Presentation. This categorization allowed for detailed analysis of how tools were used across the writing process.

The final section used open-ended questions. These questions invited participants to share their experiences with AI tools, perceived advantages, and ethical concerns. These qualitative responses provided depth to the quantitative data, revealing nuances that standardized questions could not capture.

3.3 Limitations

The study's scope was constrained by its single-institution sample, which may limit generalizability to other educational contexts. Additionally, the absence of statistical hypothesis testing precluded causal inferences about factors influencing AI adoption. Future research could expand geographic and institutional diversity while incorporating mixed-methods approaches to triangulate findings.

By detailing participant demographics, survey instrumentation, and analytical procedures, this methodology provides a transparent foundation for interpreting the study's findings. The deliberate inclusion of both quantitative and qualitative elements ensures a holistic view of AI tool usage, addressing not only "how often" but also "why" and "under what conditions" students integrate these technologies into their academic writing practices.

Table No. 4 AI tool for Research Idea Generation

| Purpose | Tool | Description |
|----------------------------------|---------------|--|
| Conversational Brainstorming | ChatGPT | Acts as an intelligent partner to discuss vague concepts, refine research questions, and suggest potential angles or hypotheses for a study. |
| Deep Research | Gemini | autonomously browse the web to sift through hundreds of websites, verify facts, and compile structured reports with citations, acting like a "research agent" |
| Topic Exploration with Citations | Perplexity AI | Allows researchers to ask broad questions and receive synthesized answers backed by real-time sources, helping to validate if an idea is viable. |
| Identifying Research Gaps | Elicit | Uses language models to automate research workflows, specifically helping to brainstorm research questions based on existing literature. |
| Finding Scientific Consensus | Consensus | Searches through research papers to provide evidence-based answers, helping researchers identify settled science versus areas of debate (which are good for new research). |

Table No.5 AI tool for Research Discovery and Literature search

| Purpose | Tool | Description |
|------------------------------------|------------------|---|
| Visualizing Paper Networks | Connected Papers | Generates a visual graph of similar papers starting from a single origin paper, helping you discover relevant studies you might have missed in a standard search. |
| Personalized Paper Recommendations | Research Rabbit | Often called "Spotify for research," it learns from your collections to visualize citation networks and suggest new, relevant papers over time. |
| Citation Context Analysis | Scite.ai | Helps discover how a paper has been cited (supporting, contrasting, or mentioning), ensuring you discover reliable and well-supported research. |
| Semantic Scientific Search | Semantic Scholar | An AI-enhanced search engine that filters search results by importance and influence rather than just keywords, helping you discover the most impactful papers quickly. |
| Cross-Disciplinary Discovery | Iris.ai | Maps out research abstracts to find connecting concepts across different fields, useful for discovering interdisciplinary connections. |
| Literature Gap Analysis | Litmaps | Visualizes citation networks to help researchers find "gaps" in the timeline of research, showing where a new study could fit in. |

Table No.6 AI tool for Research Discovery Writing Assistant

| Purpose | Tool | Description |
|-------------------------------|--------------------|--|
| Drafting & Autocomplete | Jenni AI | Acts as an interactive co-writer that predicts the next line of your text and suggests content based on your research questions to help overcome writer's block. |
| Academic Language Editing | Paperpal | An AI writing assistant specifically trained on academic manuscripts to offer real-time language suggestions, consistency checks, and vocabulary improvements that match scholarly tone. |
| LaTeX & Technical Writing | Writefull | Integrated directly into tools like Overleaf, it provides language feedback tailored to scientific writing and includes a "Sentence Palette" to help you find the right academic phrases for different sections. |
| Argument & Structure Feedback | Thesify | Provides instant feedback on the structure, strength of arguments, and clarity of your essay or thesis, helping you refine the logic before you submit. |
| Research-Backed Drafting | SciSpace AI Writer | An academic assistant that not only helps write text but can also insert citations from its database of papers directly into your draft as you write to ensure accuracy. |
| Co-Writing & Paraphrasing | QuillBot Co-Writer | An all-in-one workspace that combines research, drafting, and paraphrasing tools, allowing you to build drafts with integrated grammar checks and citation generation. |

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Table No.7 AI tool for Research Grammar and Paraphrasing tools

| Purpose | Tool | Description |
|--------------------------------|-------------|--|
| Academic Editing & Feedback | Paperpal | An AI assistant trained specifically on scholarly manuscripts that provides real-time language suggestions, consistent terminology checks, and style edits to match academic standards. |
| Technical & Scientific Grammar | Trinka AI | Designed for technical and medical writing, it corrects advanced grammar errors, ensures compliance with style guides (like APA/IEEE), and flags inconsistencies in technical terms. |
| Fluency & Paraphrasing | QuillBot | A widely used paraphrasing tool that offers multiple modes (e.g., Fluency, Formal) to rewrite sentences or paragraphs, helping researchers improve flow and avoid plagiarism. |
| Sentence Refinement & Tone | Wordtune | Focuses on sentence-level rewriting, offering options to shorten, expand, or change the tone of your text (casual to formal), making it useful for refining clunky sentences. |
| LaTeX-Integrated Editing | Writefull | Tailored for LaTeX users (often via Overleaf), it uses AI trained on millions of journal articles to provide feedback on sentence structure and academic vocabulary directly in your code. |
| Integrity-Focused Paraphrasing | Scribbr | Offers a free paraphrasing tool combined with a strong focus on academic integrity, ensuring that rephrased content remains unique and can be easily checked for plagiarism. |

Table No.8 AI tool for Research Presentation

| Purpose | Tool | Description |
|----------------------------|--------------------|--|
| Drafting Decks from Notes | Gamma | A flexible tool that transforms documents, outlines, or rough notes into polished, professional slide decks (or webpages) instantly, allowing for non-linear storytelling. |
| Design & Layout Automation | Beautiful.ai | Uses "Smart Slide" technology to automatically adjust the layout and design as you add or remove content, ensuring your slides always look professionally designed without manual tweaking. |
| Google Slides Integration | SlidesAI | An extension specifically for Google Slides that allows you to paste large blocks of text (like a research abstract) and automatically converts them into a structured presentation with bullet points and images. |
| Visuals & Creative Design | Canva Magic Design | Ideal for visually rich presentations, this tool generates full presentation drafts from a simple prompt and offers extensive libraries of graphics, images, and layouts to customize the look. |
| PowerPoint Workflow | Microsoft Copilot | Integrated directly into PowerPoint, it can summarize long presentations, generate slides from Word documents, and suggest design improvements using the "Designer" pane. |
| Academic Poster Design | Mind the Graph | specifically designed for researchers to create scientific posters and graphical abstracts, offering a library of scientifically accurate illustrations to make complex data visually accessible. |

3.4 AI Familiarity and Usage

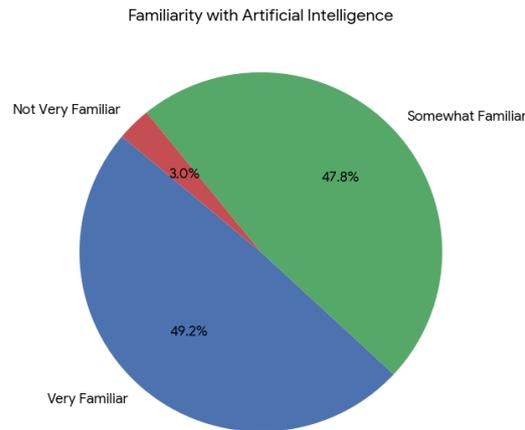


Figure 1 Familiarity with Artificial Intelligence

The survey results provide comprehensive insights into students' engagement with AI tools for academic writing, revealing patterns of adoption, task-specific applications, and ethical considerations. The findings demonstrate widespread familiarity with AI technologies, with 48.8% of participants reporting being "very familiar" and 47.2% "somewhat familiar" with these tools, while only 3% indicated limited familiarity. This high level of awareness reflects the rapid integration of AI into academic workflows across disciplines.

3.5 Frequency of use pattern

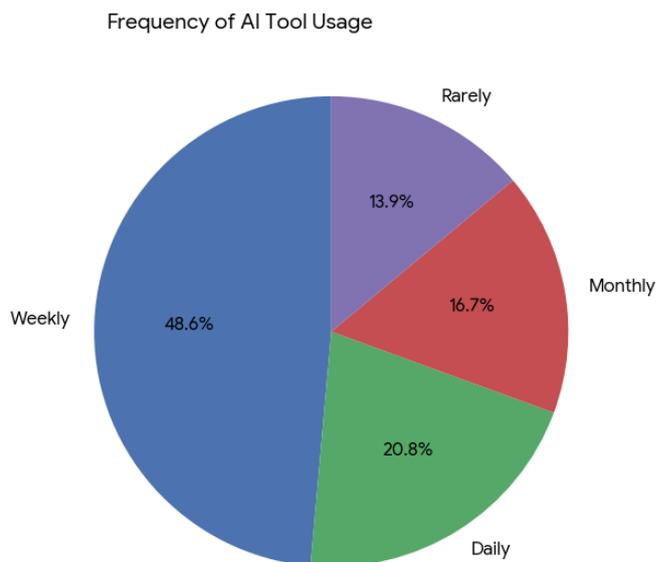


Figure 2 Frequency of use pattern

Frequency of use patterns revealed that nearly half of participants (48.6%) employ AI tools on a weekly basis, while 20.8% use them daily and 16.7% monthly. Only 13.9% reported rare usage, indicating that AI assistance has become

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a regular rather than exceptional component of academic writing processes. This frequent engagement suggests that students perceive tangible benefits from these tools, though the nature of these benefits varies by task and discipline.

3.6 . Most Popular AI Tools Among Students with their usage percentages

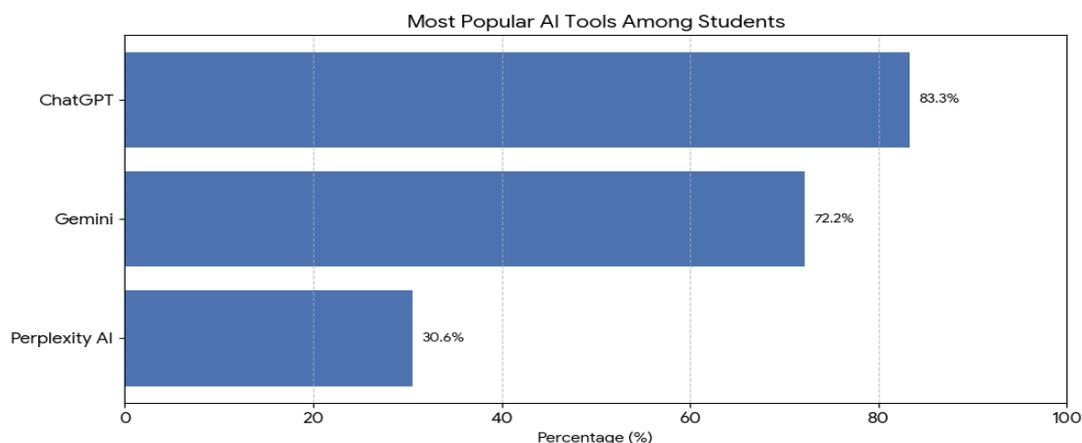


Figure 3. Most Popular AI Tools Among Students with their usage percentages

The use of certain platforms was clearly dominant. ChatGPT was the most widely used (83.3%), followed by Gemini (72.2%) and Perplexity AI (30.6%). This suggests that conversational AI interfaces are popular in academic contexts. They are likely popular due to their versatility in handling various writing tasks. The popularity of these tools varies across disciplines, though there are differences in specific uses and the intensity of their use.

3.7 Purposes of using AI tools

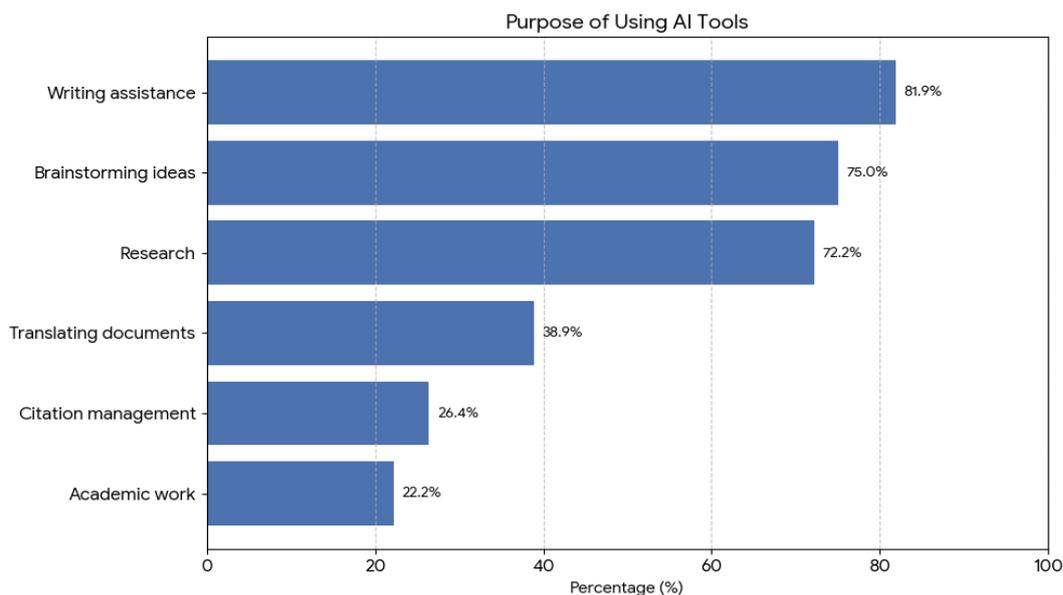


Figure 4. Purposes of using AI tools

The purposes for employing AI tools showed significant variation, with writing assistance being the most common application (81.9%), followed by brainstorming ideas (75.0%) and research tasks (72.2%). Less frequent uses included translating documents (36.9%) and citation management (26.4%), suggesting that students primarily leverage AI for creative and compositional tasks rather than technical academic mechanics. This pattern may reflect

both the strengths of current AI tools and students' prioritization of support for cognitively demanding writing phases

3.8 Awareness of AI tools and usage of AI for academic writing

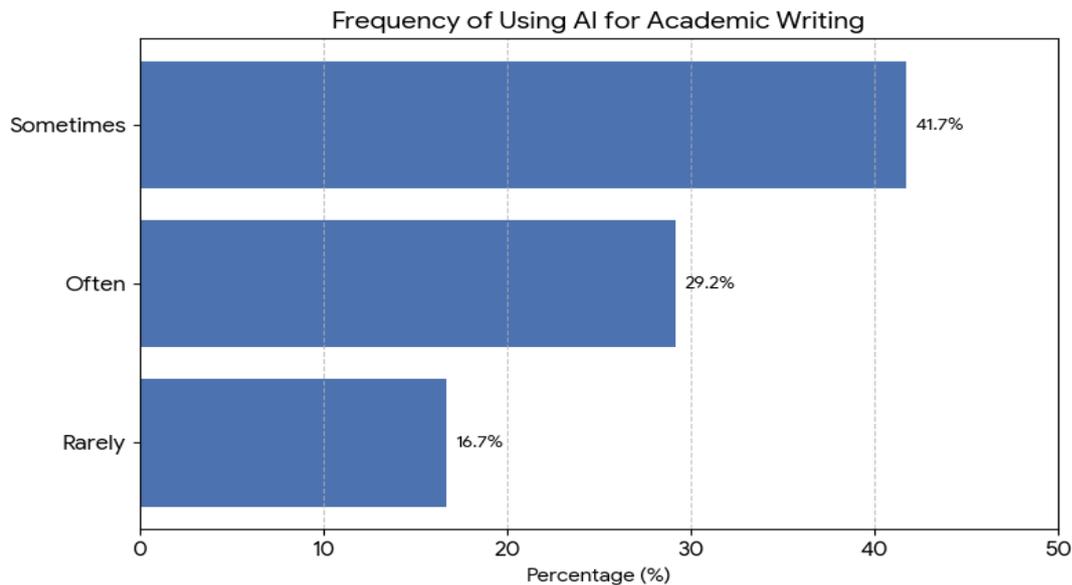


Figure 5. Awareness of AI tools and usage of AI for academic writing

The frequency of AI use for academic writing specifically showed that 41.7% of participants employ these tools "sometimes," while 29.2% use them "often" and 16.7% "rarely." This distribution indicates that even among regular AI users, application to academic writing specifically remains measured rather than ubiquitous, possibly reflecting task specific appropriateness judgments or concerns about over-reliance.

Discussion

The findings of this study present a complex landscape of AI tool adoption in academic writing, revealing both transformative potential and significant challenges. The high familiarity and frequent use of AI tools among students suggest these technologies have become deeply embedded in academic workflows, necessitating a shift from reactive policy-making to proactive pedagogical integration. The data challenge binary perspectives that frame AI as either an existential threat to academic integrity or an unqualified boon for student productivity. Instead, they reveal nuanced patterns of adoption where students actively negotiate the boundaries between assistance and authorship, often developing sophisticated strategies for balancing efficiency with originality.

Theoretical implications emerge regarding the nature of writing as a cognitive process in AI-mediated environments. The prevalence of AI use for higher-order tasks like idea generation and argument development, rather than mechanical editing alone, suggests these tools are reshaping fundamental aspects of how students engage with the writing process. This aligns with sociocultural theories of writing that emphasize distributed cognition, where thinking is not confined to individual minds but extends into technological tools and social contexts. The findings indicate that AI tools are becoming active participants in students' cognitive ecosystems, potentially altering traditional models of writing development that assume solitary authorship.

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Practically, the study highlights urgent needs for institutional frameworks that guide responsible AI use while preserving academic rigor. The data suggest that blanket prohibitions on AI tools are likely ineffective given their widespread adoption, while unregulated use risks undermining essential writing skills. Educators might instead develop scaffolded approaches that teach students to use AI critically for instance, by designing assignments that require explicit documentation of AI-assisted processes alongside final products. Such approaches could foster transparency while helping students develop metacognitive awareness of how and when to employ these tools effectively .

CONCLUSION

This case study has illuminated the complex landscape of AI tool adoption in academic writing, demonstrating how students navigate technological assistance while confronting ethical and pedagogical challenges. The findings reveal that AI tools have become deeply embedded in student writing practices, with high familiarity levels and strategic deployment across various writing stages. Students predominantly use these tools for idea generation, research, and writing assistance rather than mechanical tasks, indicating a focus on cognitive rather than procedural support. The study challenges simplistic narratives of AI as either a threat or a solution, instead presenting a nuanced reality where students actively negotiate the boundaries between assistance and authorship.

Looking ahead, the research underscores the need for continued investigation into how AI tools shape long-term writing development and disciplinary knowledge production. Future studies should explore longitudinal effects of AI adoption on writing proficiency and critical thinking, particularly as tools evolve to handle more sophisticated academic tasks. The findings also highlight the urgency of developing pedagogical frameworks that foster responsible AI use while preserving academic integrity. By bridging empirical observations with theoretical implications, this study contributes to ongoing discussions about balancing technological innovation with educational values in higher education.

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