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EXAMINING THE EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE TOOLS IN ENHANCING UNDERGRADUATE STUDENTS' RESEARCH AND ACADEMIC WRITING SKILLS

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Abstract: *The growing use of artificial intelligence (AI) tools in higher education has substantially influenced undergraduate students' research and academic writing practices. However, existing discussions often remain broad and descriptive, frequently combining student use, teacher readiness, policy, and ethics without clearly identifying the central construct under investigation. This study therefore focuses specifically on undergraduate students' perceived effectiveness of AI tools in research and academic writing within a Research Methodology course. Using a cross-sectional survey design, data were collected from 39 purposively selected undergraduate students enrolled in the Bachelor of Teaching Arabic as a Second Language programme at the Kulliyyah of Education, International Islamic University Malaysia, during Semester 2 of the 2025/2026 academic session. The questionnaire included demographic items, 35 Likert-scale items, and one open-ended section. The findings indicate that students perceived AI tools as useful for literature review, idea generation, paraphrasing, proofreading, readability improvement, and draft development. ChatGPT, QuillBot, Gemini, and Grammarly were the most frequently used tools. At the same time, students expressed reservations regarding trust, plagiarism prevention, and over-reliance on AI, while emphasising the need for ethical guidance, AI literacy training, and clearer institutional policies. The study contributes by offering a more focused conceptual framing of AI-assisted writing through five dimensions: research efficiency, writing quality enhancement, idea development, reference support, and academic confidence. Nevertheless, the study remains exploratory due to its small sample size, limited statistical analysis, and the absence*

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of reported internal consistency reliability and construct validity testing. Future research should involve larger samples, stronger psychometric evaluation, and more advanced inferential analysis.

Keywords: *Artificial intelligence; Academic writing; Undergraduate research; AI-assisted learning; Higher education; Educational technology*

Introduction

Artificial intelligence (AI) has emerged as a major force in higher education, shaping how students search for information, generate ideas, draft assignments, revise language, and complete research-related tasks. Tools such as ChatGPT, Grammarly, Gemini, and QuillBot are increasingly integrated into students' academic routines, particularly in writing-intensive courses. Research has shown that AI applications in higher education are expanding rapidly and are increasingly linked to teaching, learning, feedback, and knowledge support systems (Zawacki-Richter et al., 2019). More recent work on large language models further suggests that these tools offer substantial educational opportunities, including personalised support, writing assistance, and learner engagement, while also presenting significant pedagogical and ethical challenges (Kasneci et al., 2023).

In academic writing, the appeal of AI tools lies in their ability to support tasks such as summarising, paraphrasing, grammar correction, brainstorming, and drafting. For undergraduate students, these functions may be especially attractive because many are still developing their academic voice, research competence, and scholarly confidence. At the same time, the use of AI in formal academic work raises concerns about academic integrity, factual reliability, fabricated citations, over-reliance, and the need for transparent use policies (Perkins, 2023; Cotton et al., 2024). This makes the study of AI in academic writing not merely timely, but necessary. The issue becomes more important in research methodology courses, where students are expected to learn how to search literature, formulate arguments, synthesise sources, and write in academically responsible ways. In such contexts, AI may function either as a productive support tool or as a shortcut that weakens critical engagement, depending on how it is used. This tension forms the basis for examining how students themselves perceive the effectiveness of AI tools in actual academic writing tasks.

Problem Statement

Although artificial intelligence (AI) tools are increasingly used in higher education, the discussion of their role in research and academic writing is still often broad and descriptive. Existing studies frequently combine issues related to students, teachers, policy, and ethics in one general discussion. While these aspects are important, such breadth weakens the focus of the study and makes the main problem less clear. Therefore, this study narrows its focus to undergraduate students' perceived effectiveness of AI tools in research and academic writing within a specific course context.

Previous studies have shown that AI can support learning efficiency, personalised learning, feedback, and writing assistance in higher education (Zawacki-Richter et al., 2019; Kasneci et al., 2023). In academic writing, AI tools are commonly associated with paraphrasing, proofreading, summarising, idea generation, and draft development. However, the literature also highlights important concerns, such as inaccuracy, over-reliance, plagiarism, and academic integrity (Perkins, 2023; Cotton et al., 2024). This indicates that the issue is not simply whether

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AI is useful, but how students perceive its usefulness in actual research and academic writing tasks. In language education, AI has also been linked to greater engagement, interaction, and learning support (Du & Daniel, 2024; Sahrir et al., 2025). At the same time, studies stress the importance of ethical use, lecturer guidance, and institutional support. However, these discussions are often presented separately and not synthesised into a single conceptual direction. As a result, the literature remains strong, but fragmented.

To address this limitation, the present study organises the literature into a unified student-centred model of perceived AI effectiveness in research and academic writing. In this model, the main construct is students' perceived effectiveness of AI tools, reflected through five related dimensions: research efficiency, writing quality enhancement, idea development, reference support, and academic confidence. This synthesis provides a clearer conceptual direction and allows the study to move beyond a general discussion of AI in higher education. The novelty of this study lies in its focused and course-based perspective. Rather than discussing AI from multiple broad angles at once, the study specifically examines how undergraduate students perceive the effectiveness of AI tools in supporting their research and academic writing in a Research Methodology course. By synthesising the literature into one unified model, the study offers a clearer basis for examining AI use in actual academic writing practice.

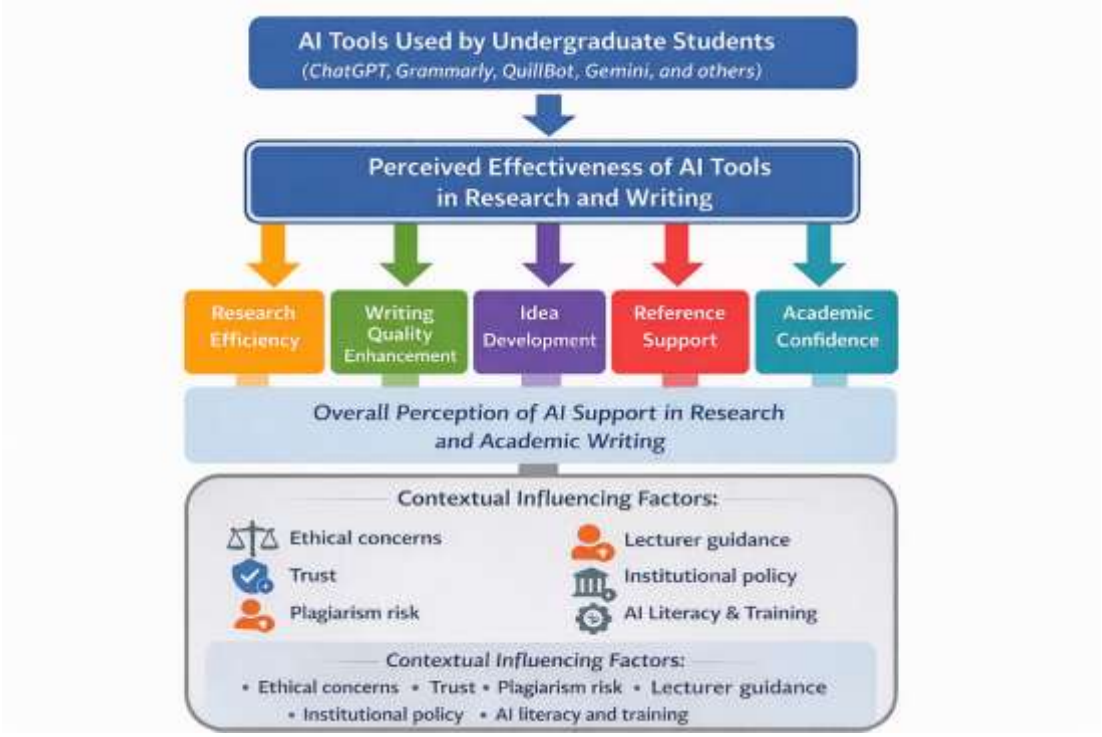

Figure 1: Conceptual Framework

Research Objectives

Accordingly, the study seeks to address the following research questions:

1- What types of AI tools are currently used by undergraduate students in a Research Methodology course for research and academic writing purposes?
2- How do undergraduate students in a Research Methodology course perceive the effectiveness of AI tools in enhancing their research and academic writing tasks?
3- What concerns and suggestions do undergraduate students raise regarding the responsible and ethical use of AI in academic work?

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Methodology

This study employed a mixed-methods survey design to examine undergraduate students' perceptions of the effectiveness of artificial intelligence (AI) tools in supporting research and academic writing. The quantitative component measured perceived effectiveness across selected dimensions, while the qualitative component captured students' reflections, concerns, and suggestions. A survey approach was appropriate as it enables the systematic collection of learners' self-reported experiences and perceptions within authentic learning contexts (Creswell & Creswell, 2018).

Data were collected using an online questionnaire administered via Google Forms. The instrument was primarily adapted from Monika et al. (2023), who developed a 40-item survey with Alpha Cronbach of 0.868 by measuring the usefulness of AI tools in areas such as grammar support, content generation, citation assistance, paraphrasing, and proofreading. It was also conceptually informed by the Artificial Intelligence and Academic Writing Questionnaire (AI-AWQ), which emphasises constructs such as perceived usefulness, ease of use, and ethical considerations (Khojasteh et al., 2025). The questionnaire consisted of three sections: (i) demographic information, (ii) Likert-scale items measuring perceived effectiveness across multiple dimensions of research and academic writing, and (iii) open-ended questions capturing students' perspectives on AI use. Although the instrument was adapted from prior studies with established theoretical and empirical grounding, internal consistency reliability (e.g., Cronbach's alpha) was not recalculated for the present sample, and construct validity was not examined using factor-analytic procedures. Therefore, the instrument is treated as an exploratory adapted measure, and the findings should be interpreted as preliminary.

The participants comprised 39 purposively selected undergraduate students enrolled in a Research Methodology course during Semester 2 of the 2025/2026 academic session. All participants had prior experience using AI tools such as ChatGPT, Grammarly, QuillBot, and Gemini. The sample size is considered acceptable for exploratory research, as studies suggest that a minimum of approximately 30 participants is sufficient for pilot or preliminary investigations (Johanson & Brooks, 2010; Bujang et al., 2024). However, the small sample limits the generalisability of the findings. Quantitative data were analysed using descriptive statistics, while qualitative responses were analysed thematically. Although appropriate for exploratory purposes, the reliance on descriptive analysis limits inferential interpretation. Future studies should employ larger samples, establish reliability and construct validity, and apply inferential statistical techniques to strengthen the robustness of findings.

Results And Findings

Demographic Background

As shown in Table 1, the majority of respondents were female (82.1%), while male students constituted 17.9% of the sample. This distribution reflects the gender composition of students enrolled in the Research Methodology course and provides context for interpreting subsequent findings.

Table 1: Sex of Respondent

Item	Frequency (N)	Percentage (%)
Male	7	17.9
Female	32	82.1
Total	39	100.0

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The Table 2 shows the year of study distribution of the 39 respondents. The findings indicate that the sample was heavily concentrated in Year 3, with all respondents (n = 39; 100%) identifying themselves as Year 3 students. In contrast, no respondents were from Year 1 (0%), while only one respondent each from Year 2 (2.6%) and Year 4 (2.6%) was recorded.

This distribution suggests that the data primarily reflect the perspectives of mid-programme undergraduate students, who are typically more exposed to research-related coursework and academic writing tasks. Consequently, the findings are particularly relevant for understanding AI tool usage within the context of Research Methodology courses, where students are actively engaged in research design and academic writing practices.

Table 2: Age of Respondent

Year of Study	Frequency (N)	Percentage (%)
Year 1	0	0
Year 2	1	2.6
Year 3	37	94.8
Year 4	1	2.6
Total	39	100.0

The Table 3 presents the distribution of respondents based on their years of experience using artificial intelligence (AI) tools in academic writing. The findings indicate that the majority of students have moderate to extensive experience with AI tools. More than half of the respondents (n = 21; 53.8%) reported using AI in academic writing for one to two years, making this the largest group. This is followed by 15 respondents (38.5%) who indicated having more than two years of experience using AI tools. In contrast, a smaller proportion of students (n = 4; 10.3%) reported less than one year of experience.

Overall, the distribution suggests that most respondents were not novice users of AI but had sustained and meaningful exposure to AI tools in academic writing. This level of experience supports the reliability of their perceptions regarding the effectiveness, benefits, and challenges of AI-assisted research and writing reported in this study.

Table 3: Years of using AI in academic writing

Item	Frequency (N)	Percentage (%)
Less than 1 year	4	10.3
Between 1 – 2 years	21	53.8
More than 2 years	15	38.5
Total	39	100.0

The Table 4 illustrates respondents' self-reported familiarity with AI-related technologies. Most students indicated a moderate level of familiarity, with 26 respondents (66.7%) selecting this category. This suggests that most participants possess a functional understanding of AI tools sufficient for regular academic use. A substantial proportion of respondents also identified themselves as beginners (n = 13; 33.3%), indicating emerging competence and ongoing learning in the use of AI technologies.

Only a small number of students reported advanced familiarity (n = 3; 7.7%), while 2 respondents (5.1%) indicated having no prior familiarity with AI-related technologies. Overall,

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the distribution reflects a cohort that is largely moderately familiar with AI, with relatively few respondents at the extremes of no exposure or advanced expertise. This profile suggests that the findings primarily represent the perceptions of students who use AI tools pragmatically rather than at an expert level, which is appropriate for examining AI adoption in undergraduate academic writing contexts.

Table 4: AI Related Technology Familiarity

Item	Frequency (N)	Percentage (%)
None	2	5.1
Beginner	13	33.3
Moderate	26	66.7
Advanced	3	7.7
Total	39	100.0

The Table 5 summarises the AI tools currently used by undergraduate students for academic writing and research purposes. The results show that ChatGPT was by far the most widely used tool, with 37 respondents (94.9%) reporting its use. This indicates a strong reliance on generative AI for tasks such as idea generation, drafting, and content clarification. The second most frequently used tool was QuillBot (n = 23; 59.0%), followed by Gemini AI (n = 21; 53.8%), reflecting students' preference for tools that support paraphrasing, summarisation, and content refinement.

In addition, Grammarly was used by 17 respondents (43.6%), highlighting its role in grammar checking and language accuracy. In contrast, more specialised research-oriented tools such as Perplexity AI (n = 4; 10.3%), SciSpace (n = 2; 5.1%), Elicit (n = 1; 2.6%), and Jenni AI (n = 1; 2.6%) were used by a relatively small proportion of students. Furthermore, 6 respondents (15.4%) reported using other AI tools, suggesting some diversity in tool selection beyond mainstream applications.

Overall, the findings indicate that students predominantly rely on general-purpose generative AI and writing-support tools, while the adoption of advanced, research-specific AI applications remains limited among undergraduates. This pattern underscores the importance of guiding students towards more effective and ethical use of AI tools that align with academic research practices.

Table 5: AI tools currently used

Item	Frequency (N)	Percentage (%)
Grammarly	17	43.6
ChatGPT	37	94.9
Quillbot	23	59
Scispace	2	5.1
Elicit	1	2.6
Jenni.AI	1	2.6
Perplexity.AI	4	10.3
Gemini.AI	21	53.8
Others	6	15.4

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The "Others" category revealed heterogeneous and loosely defined responses, indicating varying levels of awareness and understanding of AI applications among the respondents. A substantial proportion of students (n = 17; 43.6%) either left the response blank or used symbols (e.g., "–"), suggesting that they did not use additional AI tools beyond those explicitly listed in the survey. This pattern indicates a strong reliance on mainstream AI tools such as ChatGPT, Grammarly, and Gemini, with limited exploration of alternative platforms.

Among respondents who specified additional tools, AI Canva was the most frequently cited (n = 4; 10.3%), primarily used for creating visual materials, presentations, and academic posters, rather than for core research or writing tasks. Other tools mentioned on a one-off basis (n = 1; 2.6% each) included Microsoft Copilot, Copilot, Meta AI (via WhatsApp), and NotebookLM, which were generally used for content drafting, summarisation, idea generation, or document organisation. The presence of duplicate entries such as "Copilot" and "Microsoft Copilot" suggests some inconsistency in students' understanding of AI tool branding and categorisation. Additionally, several respondents explicitly stated "no" or "nothing" (n = 2; 5.1%), further reinforcing that many students did not engage with AI tools beyond those commonly used. A small number of responses also repeated tools already listed (e.g., Gemini), indicating overlap between predefined and open-ended categories.

Overall, the "Others" responses highlight that undergraduate students' use of AI remains concentrated on general-purpose and productivity-oriented tools, with limited adoption of specialised research-focused AI platforms. This finding suggests a need for greater AI literacy, clearer classification of AI tools, and guided exposure to research-oriented applications within undergraduate research methodology courses.

Part B: Survey on Examining the Effectiveness of Artificial Intelligence Tools in Enhancing Undergraduate Students' Research and Academic Writing Skills.

Part B of the questionnaire examined undergraduate students' perceptions of the effectiveness of AI tools in supporting research and academic writing using a four-point Likert scale (Strongly Disagree to Strongly Agree). Consistent with the quantitative survey methodology, descriptive statistics were used to analyse response distributions across 35 items measuring key dimensions of AI-assisted research and writing.

Table 6: **Examining the Effectiveness Of Artificial Intelligence Tools in Enhancing Undergraduate Students' Research and Academic Writing Skills**

Questionaire Item	SD	D	A	SA
1- AI tools have improved my efficiency in conducting literature reviews in conducting research projects/works.	1 (2.6%)	1 (2.6%)	17 (43.6%)	21 (53.8%)
2- Using AI tools has increased the accuracy of my research findings in comparison to findings of other studies.	0	4 (10.3%)	18 (46.2%)	18 (46.2%)
3- AI tools have helped in generating better research data and findings.	0	2 (5.1%)	18 (46.2%)	18 (51.3%)
4- AI tools like Grammarly and Quillbot have enhanced the	0	2 (5.1%)	19 (48.7%)	19 (48.7%)

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organization and structure of my research projects/works.				
5- AI tools like ChatGPT have facilitated the identification of relevant research information and sources.	0	2 (5.1%)	19 (48.7%)	19 (48.7%)
6- I feel more confident in citing sources accurately due to AI tools like ChatGPT and Gemini.	0	7 (17.9%)	16 (41%)	17 (43.6%)
7- I feel more confident in citing sources accurately due to AI tools.	0	6 (15.8%)	18 (46.2%)	16 (41%)
8- AI tools have improved the quality of my academic writing skills.	0	3 (7.7%)	19 (48.7%)	18 (51.3%)
9- Using AI tools has expedited the process of data analysis in my academic writing skills.	0	4 (10.3%)	19 (48.7%)	17 (43.6%)
10- AI tools have increased the creativity in my research writing skills.	0	4 (10.3%)	20 (51.3%)	16 (41%)
11- I believe AI tools have positively impacted my research writing skills.	0	0	23 (59%)	17 (43.6%)
12- AI tools have aided in identifying potential research gaps while conducting research on problem statement.	0	0	22 (56.4%)	18 (46.2%)
13- I find AI tools user-friendly and easy to navigate during conducting research.	0	3 (7.7%)	18 (46.2%)	20 (51.3%)
14- AI tools have reduced errors in my research writing.	1 (2.6%)	5 (12.8%)	19 (48.7%)	16 (41%)
15- AI tools have improved the clarity and coherence of my research projects/works.	0	1 (2.6%)	24 (61.5%)	15 (38.5%)
16- Using AI tools has expanded the scope of my research ideas.	0	1 (2.6%)	20 (51.3%)	20 (51.3%)
17- AI tools have helped in managing references and citations effectively.	0	4 (10.3%)	24 (61.5%)	14 (35.9%)
18- AI tools have made collaboration with member of research projects more efficient.	0	4 (10.3%)	21 (53.8%)	16 (41%)
19- I trust the suggestions and recommendations provided by AI tools.	0	11 (28.2%)	17 (43.6%)	15 (38.5%)
20- I feel AI tools have enhanced the overall quality of my research output.	0	5 (12.8%)	20 (51.3%)	15 (38.5%)
21- AI tools have helped in paraphrasing and summarizing research content effectively.	0	3 (7.7%)	17 (43.6%)	19 (48.7%)

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22- AI tools have facilitated the integration of diverse research perspectives.	0	3 (7.7%)	19 (48.7%)	17 (43.6%)
23- I believe AI tools have reduced the time required for proofreading and editing.	0	1 (2.6%)	20 (51.3%)	18 (46.2%)
24- AI tools have helped in avoiding plagiarism in my academic projects/works.	2 (5.1%)	10 (25.6%)	15 (38.5%)	15 (38.5%)
25- I feel more confident in conducting statistical analyses with AI-powered tools.	0	3 (7.7%)	19 (48.7%)	17 (43.6%)
26- AI tools have improved my ability to present complex data effectively.	1 (2.6%)	3 (7.7%)	19 (48.7%)	17 (43.6%)
27- AI tools have contributed to increasing the impact of my research.	0	2 (5.1%)	20 (51.3%)	19 (48.7%)
28- AI tools have helped in generating insightful visual representations of data.	0	3 (7.7%)	20 (51.3%)	18 (46.2%)
29- I find AI tools helpful in suggesting relevant keywords for my research.	0	2 (5.1%)	17 (43.6%)	21 (53.85)
30- AI tools have increased the speed of initial draft creation in my research projects/works.	0	2 (5.1%)	18 (46.2%)	20 (51.3%)
31- AI tools have helped in enhancing the readability of my research projects/works.	0	3 (7.7%)	22 (56.4%)	15 (38.5%)
32- I trust the accuracy of grammar and spell check features in AI tools.	1 (2.6%)	5 (12.8%)	17 (43.6%)	16 (41%)
33- AI tools have facilitated better communication of my research findings.	0	2 (5.1%)	21 (53.85)	17 (43.6%)
34- AI tools have contributed to improving the overall academic quality of my research projects/works.	1 (2.6%)	3 (7.7%)	19 (48.7%)	17 (43.6%)
35- I believe AI tools have positively influenced my decision-making in research.	0	1 (2.6%)	21 (53.85)	18 (46.2%)

Based on Table 6, the overall findings indicate consistently high levels of agreement across all measured constructs. More than 90% of respondents agreed or strongly agreed that AI tools enhanced efficiency in conducting literature reviews, generating research ideas, paraphrasing content, proofreading, and developing initial drafts. These results demonstrate that AI tools function as effective cognitive and technical support mechanisms, aligning with the study's methodological aim of capturing students' perceived learning benefits within an authentic course context (*Research Methodology*).

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With respect to academic writing quality, a substantial majority of respondents reported improvements in clarity, coherence, organisation, readability, and overall writing quality. Similarly, items related to research productivity and workflow efficiency, such as time savings in editing, faster draft creation, and improved presentation of complex data, received strong positive endorsement. These findings validate the survey instrument's design, which operationalised AI effectiveness across multiple interrelated dimensions of research and writing, as outlined in the methodology section.

In terms of higher-order research skills, students largely agreed that AI tools supported the identification of research gaps, integration of diverse perspectives, expansion of research ideas, and enhancement of research impact. The strong agreement in these areas suggests that AI tools are perceived not merely as language-support utilities but as research facilitation tools. This reinforces the appropriateness of the survey's construct coverage and supports the methodological decision to include both writing-focused and research-oriented items.

However, comparatively lower—but still positive—levels of agreement were observed for items related to trust in AI suggestions and plagiarism prevention. While a majority of students agreed that AI tools assisted in these areas, a notable minority expressed reservations. This nuanced response pattern strengthens the credibility of the findings by demonstrating response variability rather than uniform positivity, which is consistent with rigorous survey-based research. It also reflects students' emerging critical awareness of ethical and reliability concerns associated with AI use.

In alignment with the study's methodology, the use of closed-ended Likert-scale items enabled systematic comparison across dimensions, while the results were further contextualised through open-ended responses reported elsewhere. Taken together, the findings from Part B provide robust empirical evidence that AI tools are perceived as highly effective in enhancing undergraduate research and academic writing, while simultaneously highlighting the need for structured pedagogical guidance and ethical frameworks, as anticipated in the research design.

PART C: Responses from the Open-Ended Questionaires

From the open ended responses, few themes can be concluded such as shown below which are six key themes of students' perspectives on improving the use of AI in research and academic writing.

Theme 1: Ethical Use and Academic Integrity

A dominant theme concerned the ethical use of AI in academic work. Respondents emphasised the need to obey ethical guidelines, avoid misuse or illegal use of AI, and maintain academic integrity. Several students highlighted that while AI can support academic tasks, over-reliance on AI may undermine learning and originality. The call for clear ethical boundaries suggests students' awareness of the risks associated with plagiarism, misrepresentation, and uncritical dependence on AI-generated outputs.

Theme 2: Institutional Policy and Governance

Students repeatedly stressed the importance of clear institutional policies governing AI use in universities. Respondents suggested that formal guidelines would help students use AI responsibly and consistently, preventing misuse while encouraging meaningful engagement

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with AI tools. The absence of standardised policies was perceived as a gap that could lead to confusion, uneven practices, and ethical violations.

Theme 3: AI Literacy, Training, and Capacity Building

A strong theme emerged around the need for training and capacity building. Students recommended organising workshops, structured training sessions, and continuous guidance to help them understand how to use AI effectively and wisely. Specific emphasis was placed on learning how to prompt AI properly and interpret outputs critically. This theme highlights the importance of AI literacy as a foundational skill rather than assuming intuitive or self-directed mastery.

Theme 4: Role of Educators and Guided Implementation

Respondents emphasised the role of lecturers, teachers, and parental observation in guiding responsible AI use. Several suggested that lecturers should integrate AI intentionally into assignments or coursework, making AI use explicit, structured, and pedagogically guided rather than informal or hidden. This reflects students' preference for transparent and guided AI integration within formal learning activities.

Theme 5: Human Judgment and Critical Oversight

Another recurring theme was the recognition that AI tools are supportive but imperfect. Students acknowledged that AI outputs may contain errors and require human interpretation, verification, and judgment. Many cautioned against relying solely on AI, reinforcing the view that AI should function as a complementary tool, not a replacement for critical thinking, academic reasoning, or scholarly expertise.

Theme 6: Technical Improvement and Expanded Applications

Students also highlighted technical and functional considerations, such as limitations in file uploading, processing delays, and system constraints. Suggestions included upgrading platform capabilities to improve usability. Beyond academic writing, respondents proposed expanding AI use to administrative and research support functions, including managing student applications, analysing course feedback, supporting research grant processes, and assisting with data analysis, translation, and transcription. These suggestions reflect students' broader vision of AI as an institutional productivity tool.

Overall, the open-ended responses indicate that students view AI as highly beneficial but requiring structured governance, ethical safeguards, and pedagogical guidance. The themes collectively emphasise the need for institutional policies, AI literacy development, educator involvement, and responsible research culture, ensuring that AI enhances research quality without compromising academic integrity or scholarly judgement.

Discussions

The findings of this study demonstrate that undergraduate students perceive artificial intelligence (AI) tools as highly effective in supporting both research processes and academic writing skills. Consistent with the quantitative results from Part B of the survey, students reported strong agreement that AI tools enhance efficiency in literature review, idea generation, paraphrasing, proofreading, and initial draft development. These findings align with earlier studies that highlight the role of AI as a cognitive and technical scaffold that supports writing productivity and research efficiency in higher education contexts (Zawacki-Richter et al., 2019; Kasneci et al., 2023).

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Importantly, the results extend existing literature by showing that AI tools are not only perceived as language-support utilities but also as research facilitation tools. High levels of agreement were observed for items related to identifying research gaps, integrating diverse perspectives, expanding research ideas, and enhancing research impact. This suggests that undergraduate students increasingly view AI as an aid in higher-order research thinking, particularly within research methodology courses. Such findings support the argument that AI, when used appropriately, can contribute to deeper engagement with research tasks rather than merely automating surface-level writing activities.

Nevertheless, the findings also reveal areas of caution. Lower levels of agreement were recorded for trust in AI-generated recommendations and the role of AI in avoiding plagiarism. These results resonate with concerns raised in the literature regarding the accuracy, transparency, and ethical implications of AI-assisted academic work (Perkins, 2023; Cotton et al., 2024). Students' hesitation indicates a developing critical awareness and suggests that they do not blindly accept AI outputs, but rather recognise the need for verification and human judgement. This nuanced response pattern strengthens the credibility of the findings and reflects responsible student engagement with AI technologies.

The qualitative themes further contextualise these quantitative trends. Students strongly emphasised the importance of ethical guidelines, institutional policies, AI literacy training, and lecturer guidance. The call for structured workshops, proper prompting skills, and explicit integration of AI into coursework highlights a gap between students' extensive AI use and the lack of formal pedagogical frameworks. This finding reinforces the methodological rationale of the study, which sought to capture students' perceptions within an authentic instructional setting, and underscores the need for universities to move beyond ad hoc AI adoption toward systematic, policy-informed integration.

Conclusion

This study examined undergraduate students' perceptions of the effectiveness of artificial intelligence (AI) tools in supporting research and academic writing within a research methodology course. The findings provide robust evidence that AI tools are widely perceived as beneficial in enhancing research efficiency, writing quality, creativity, and overall academic productivity. Students reported positive impacts across multiple dimensions of the research process, including literature review, idea generation, citation management, clarity and coherence of writing, data presentation, and the communication of research findings. These results affirm the growing role of AI as a facilitative resource in contemporary undergraduate research practices.

Nevertheless, the study also underscores critical ethical, pedagogical, and instructional concerns that must be addressed for AI integration to be sustainable. Students expressed apprehension regarding over-reliance on AI, the accuracy and transparency of AI-generated outputs, and the potential erosion of critical thinking and independent scholarly judgement. The qualitative findings further highlight the need for clear institutional policies, explicit ethical guidelines, and structured AI literacy training. Importantly, the findings reinforce the pivotal role of instructors in mediating students' use of AI by modelling responsible practices, guiding effective prompting strategies, and fostering critical reflection on the implications of AI for research and academic writing.

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Overall, this study concludes that AI tools should be positioned *as supportive learning aids rather than substitutes for human cognition and scholarly reasoning*. For AI integration to be pedagogically sound and ethically responsible, higher education institutions must establish coherent governance frameworks, embed AI literacy and ethical awareness within research methodology curricula, and invest in professional development to equip instructors with the competencies required to guide AI-enhanced learning effectively. Future research may extend this work through mixed-method or longitudinal designs, comparative analyses across disciplines and language contexts, and investigations into the long-term effects of AI use on students' independent research skills and academic identity development.

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