International Journal of Educational Research Open 5 (2023) 100296

Contents lists available at ScienceDirect

International Journal of Educational Research Open

journal homepage: www.elsevier.com/locate/ijedro

Exploring Artificial Intelligence in Academic Essay: Higher Education Student's Perspective

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ARTICLE INFO

Keywords:
Artificial intelligence
Academic essay
Writing
Higher education

ABSTRACT

Artificial Intelligence (AI) and academic essay writing merge to create a transformative intersection in education, each reciprocally refining and reforming the other. AI, through its innovative technologies and flexible learning strategies, elevates academic writing by offering dynamic, interactive learning settings, and personalized educational journeys. This study aimed to explore students' perceptions of AI usage in academic essay writing using a case study design. It involved 245 undergraduate students from 25 tertiary institutions in Eastern and Central Indonesian provinces, with data collected via Google form to gain insights into students' attitudes toward AI tools in writing academic essays. Findings indicated a positive reception of AI-powered writing tools, with students acknowledging their benefits in grammar checks, plagiarism detection, language translation, and essay outlines. AI was found to enhance students' writing abilities, self-efficacy, and understanding of academic integrity. However, some students expressed concerns about potential impacts on creativity, critical thinking, and ethical writing practices. The study emphasized a balanced approach to AI integration, where AI collaborates with human authors, and also identified popular AI tools used by Indonesian students. As such, the research highlighted AI's significant role in supporting academic writing while preserving human creativity and critical thinking, underscoring the importance of maintaining a balanced integration to sustain human ingenuity and critical thought in academic discourse.

Introduction

In recent years, the advancement of Artificial Intelligence (AI) has emerged as a pivotal force in reshaping educational paradigms, particularly within the realm of language instruction. This transformative surge of AI in education signals a shift towards more responsive and adaptive learning environments, optimizing language acquisition and instruction to suit the nuanced needs of individual learners and educators. AI, at its core, is a composite of technologies that enables machines to mimic cognitive functions associated with human minds, such as learning and problem-solving. In language education, AI empowers the creation of intelligent tutoring systems, a revolutionary stride (Chen et al., 2020; Cotton et al., 2023; Ali, 2020). These systems are capable of rendering tailored learning experiences, meticulously adapting to the unique learning trajectories, strengths, and areas for improvement of each student. They harness the power of machine-learning algorithms to monitor student performance meticulously and to dispense precise, focused feedback, facilitating more streamlined, and effective language acquisition (Pikhart, 2020; Divekar et al., 2022).

Expanding beyond tutoring systems, AI has been instrumental in pioneering language learning chatbots and virtual conversational partners, transforming how learners practice and refine their language proficiencies. These AI-powered entities facilitate interactive, authentic dialogues, enabling learners to immerse in realistic conversational settings and sharpen their linguistic skills dynamically. Furthermore, AI stands as a beacon for multilingualism and linguistic inclusivity, as it dismantles language barriers and fosters a multilingual ethos in educational spaces (Aldabe et al., 2023; Roll & Wylie, 2016). Continuing this

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https://doi.org/10.1016/j.ijedro.2023.100296
Received 1 August 2023; Received in revised form 29 September 2023; Accepted 8 October 2023
Available online 20 October 2023
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trajectory, the advancements of AI extend to sophisticated translation and language comprehension systems, offering real-time translation and interpretation services. This progression, as discussed by Liu (2022) and Salvagno et al. (2023), enables students to transcend linguistic boundaries, accessing and assimilating content across multiple languages, and cultivating a global, multicultural perspective.

Students in Indonesia hold substantial responsibility in elevating the standards of academic essay writing, employing a variety of refined practices and principles that are fundamental to effective communication and the dissemination of research. Academic essay writing is a meticulous process, weaving together extensive research, structured argumentation, and clear expression to contribute to scholarly discourse. To lay the groundwork for effective writing, students must immerse themselves in foundational concepts integral to scholarly writing. This includes crafting clear and concise titles that encapsulate the essence of the work (Maiorana & Mayer, 2018), and drafting compelling abstracts that succinctly present the core ideas, methodologies, and findings of the study (Altmäe et al., 2023). Undertaking comprehensive literature reviews is also crucial, allowing students to situate their work within the existing body of knowledge and to identify gaps that their research may address (Singh & Lukkarila, 2017).

Acknowledging the works of others is paramount in academic writing to maintain integrity and avoid plagiarism; hence, mastering the precise art of citation and referencing is non-negotiable (Roe & Perkins, 2022). A clear comprehension of the structural components of a scientific publication, encompassing the introduction, methods, results, and discussion sections, is indispensable for producing coherent and well-organized essays (Klimova, 2013; McMahan et al., 2017). Moreover, the adept use of specialized scientific terminology and adherence to specific stylistic conventions are essential to convey ideas accurately and coherently. And it is not just about structuring thoughts or using the right words; it is also about critical thinking. Students must rigorously analyze and interpret data, synthesizing information to construct well-substantiated arguments and insights, emphasizing the importance of critical acumen in sculpting robust academic essays. As such, academic essay writing is a multifaceted endeavor, requiring a confluence of research acumen, writing proficiency, critical thinking, and ethical scholarship. By mastering these aspects, students in Indonesia can significantly contribute to the advancement of scholarly communication and research dissemination.

Pertaining to the explanation above, Artificial Intelligence (AI) and academic essay writing intertwine to form a revolutionary convergence in education, mutually enhancing and reshaping one another. AI, with its groundbreaking technologies and adaptive learning mechanisms, enriches academic writing by providing dynamic, responsive learning environments, and bespoke educational experiences. It delves into the intricacies of language acquisition and offers tailored solutions, making the processes inherent in academic writing more streamlined and intuitive. Concurrently, academic essay writing demands meticulousness, clarity, structured argumentation, and ethical scholarship, principles that are refined and supported by AI's capabilities. Students, through integrating AI, navigate through the complexities of crafting concise titles, drafting compelling abstracts, conducting comprehensive literature reviews, and maintaining integrity through precise citation and referencing. The amalgamation of AI's transformative potential with the nuanced demands of academic essay writing facilitates a harmonious synthesis, enabling the transcendence of linguistic and cultural barriers and fostering well-substantiated, coherent arguments. This symbiotic relationship is not only a catalyst for global, multicultural perspectives in education but also a significant contributor to the evolution of scholarly communication and research dissemination.

Students across various countries are increasingly leveraging AI technology to enhance their writing processes. AI-powered tools offer valuable support in different aspects of writing academic essays, such as language correction, grammar checking, and proofreading (Alharbi, 2023; Dale & Viethen, 2021). These tools can help students identify and correct language errors and improve their manuscripts' overall clarity and coherence. Additionally, AI language models, like GPT-3, can assist students in generating content and providing suggestions for better sentence structures and vocabulary choices (Marzuki et al., 2023). AI-driven citation and reference management software aid students in organizing and formating their reference lists accurately (Zhang, 2012), ensuring compliance with various citation styles (Sharifi et al., 2021). Furthermore, AI-based plagiarism detection software helps students maintain academic integrity by identifying potential instances of unintentional plagiarism. AI technology also supports students in conducting literature reviews more efficiently. AI-powered search engines and databases facilitate the identification of relevant research articles and can offer personalized recommendations based on user preferences and previous search behavior (Behrooz et al., 2023; Chichekian & Benteux, 2022). Collaborative writing platforms with AI integration enable seamless teamwork among students in different locations (Calvo et al., 2011).

Despite the many advantages, some challenges remain in using AI technology for writing academic essays. Ethical considerations regarding data privacy and security must be addressed to protect students' intellectual property (Rodrigues, 2020; Lund & Wang, 2023; Ray, 2023). Additionally, students need to develop critical thinking skills to evaluate the quality and reliability of AI-generated content and avoid over-reliance on automated tools. Proper training and education on using AI technology effectively and responsibly are crucial (Chan, 2023; Tlili et al., 2023). Moreover, the digital divide in different countries may affect students' access to AI tools, highlighting the need for equitable technology distribution and training opportunities.

Thus, while students worldwide are embracing AI technology to enhance their academic essays, there remains a discernible gap in understanding the depth and breadth of its application, especially in specific regional contexts. Most notably, although AI has been a topic of global interest, the specific perceptions and experiences of students in tertiary institutions, especially those in Eastern Indonesia, appear underexplored. This study, therefore, seeks to bridge this gap by delving into the nuanced perspectives of these students, aiming to enrich the academic discourse on the use and implications of AI in academic writing. The researcher believes it is essential to explore these unique perceptions to present a more holistic view of AI's impact on academic essay writing.

Literature review

Artificial intelligence in writing academic essays

AI-driven writing tools have garnered attention for their ability to assist students in composing essays, offering grammar and style suggestions, and facilitating content generation. Gayed et al. (2022) demonstrated the positive impact of AI writing tools on students' writing proficiency and self-efficacy. Such tools have proven to be valuable aids for learners, especially in providing timely feedback and improving writing skills. However, Makarius et al. (2020) highlighted the need for further improvements in AI tools to enhance their contextual understanding and effectiveness across diverse subject areas. AI's integration into academic essay writing also raises questions about the role of educators and ethical considerations. Su et al. (2022)explored the impact of AI on the teaching process and concluded that while AI tools can be valuable in providing feedback, the guidance of teachers remains essential in fostering critical thinking and creativity. On the ethical front, Chaudhry et al. (2023) examined the implications of AI in plagiarism detection, stressing the need for clear guidelines and educating students about AI's limitations and proper use.

Looking ahead, researchers have identified several challenges and potential areas for future research. The interpretability of AI-generated writing remains an ongoing concern, with Theodosiou and Read (2023) proposing methods to enhance transparency and comprehension.

Moreover, AI's potential to encourage creativity in essay writing has been investigated by Mazzone and Elgammal (2019) & Dwivedi et al. (2023), opening new avenues for exploring AI's role beyond mere assistance. In conclusion, the literature review on artificial intelligence in writing academic essays illustrates the transformative impact of AI in education. AI-powered writing tools offer valuable support for students and educators, but challenges in contextual understanding, bias, and ethical use demand continued research and development. By striking a balance between human guidance and AI-driven automation, we can harness the full potential of AI to enhance the learning experience and promote academic excellence.

Higher education perceptions of artificial intelligence

Studies have explored the diverse functionalities of these AI tools and their impact on writing productivity, quality, and students' learning experiences. The integration of Artificial Intelligence (AI) in writing academic essays has become a significant area of interest in higher education. AI-powered writing tools have gained prominence as valuable aids for students and writers, offering diverse functionalities to support the writing process. Numerous studies have explored the effectiveness of AI writing tools in higher education settings. For instance, Miranty and Widiati (2021) & Almusharraf and Alotaibi (2023) investigated the impact of Grammarly, an AI-based grammar and style checker, on undergraduate students' writing skills. The study found that students who used Grammarly demonstrated improvements in grammar accuracy and writing quality compared to the control group. AI language models, like ChatGPT, have been investigated for their potential in assisting students with content generation. In a study by Farrokhnia et al. (2023) & Rospigliosi (2023) ChatGPT was utilized to aid graduate students in generating research proposals. The results indicated that the AI-generated content was valuable in providing initial ideas and structuring the proposals, though students still needed to refine and expand on the generated content. Ethical considerations surrounding the use of AI writing tools in higher education have been explored. Kreps et al. (2022) & Holmes et al. (2022) conducted a survey study to assess students' perceptions of AI tools and their understanding of AI-generated content's proper use. The findings emphasized the need for proper education and guidance on AI tool usage to avoid issues of plagiarism and ensure academic integrity.

Furthermore, researchers have examined the impact of AI-powered peer review systems in higher education. Li (2023) implemented an AI-based peer review system for essay drafts in a college writing course. The study revealed that students appreciated the timely feedback from the AI system, which helped them make improvements before submitting their final essays. AI tools have also been deployed to support academic research writing in higher education. (Lameras & Arnab, 2022) investigated the use of Zotero, an AI-powered reference management tool, among postgraduate researchers. The study found that Zotero significantly improved the organization and citation process, streamlining students' research workflow.

Additionally, studies have explored the use of AI-driven Automated Essay Evaluation systems for grading and feedback. Stahl et al. (2023) compared the performance of an AI grading system with human grading in assessing undergraduate essays. The results indicated a strong correlation between AI and human scores, supporting the reliability of AI grading for formative assessment. In summary, the literature on using AI in writing academic essays in higher education demonstrates the growing interest in AI-powered writing tools and their potential impact on student writing skills, productivity, and academic performance. While the benefits of AI tools are evident, ethical considerations, the need for proper education, and refining AI-generated content usage are essential to ensure responsible and effective integration of AI in higher education settings. Continued research will play a pivotal role in advancing AI writing tools' capabilities and uncovering new possibilities for enhancing the writing experience in higher education.

In summary, the literature on using AI in writing academic essays in higher education demonstrates the growing interest in AI-powered writing tools and their potential impact on student writing skills, productivity, and academic performance. While the benefits of AI tools are evident, ethical considerations, the need for proper education, and refining AI-generated content usage are essential to ensure responsible and effective integration of AI in higher education settings. Continued research will play a pivotal role in advancing AI writing tools' capabilities and uncovering new possibilities for enhancing the writing experience in higher education.

Students' essay writing in academia and their challenges

Students' essay writing within academia serves as a crucial aspect of scholarly discourse, reflecting their comprehension, critical thinking, and research capabilities. This process, while fundamental, is laden with hurdles, with students often struggling with structuring their essays effectively, constructing logical arguments, and ensuring clear, concise expression. Academic essays require extensive, discerning research, demanding the synthesis of information from diverse, credible sources and rigorous literature reviews, with plagiarism and proper citation presenting significant ethical concerns (Farrokhnia et al., 2023; Noroozi, 2022). Mastery of specialized terminology and stylistic conventions is essential for accurate, coherent expression across various academic disciplines. Meanwhile, the integration of evolving writing tools and technologies, including AI-powered aids, poses challenges and learning opportunities, requiring responsible, balanced use and continuous adaptation (Chan, 2023; George & Wooden, 2023; Latif et al., 2023). Overcoming these multifaceted challenges is vital for meaningful contributions to scholarly discourse and the advancement of academic and professional pursuits.

A substantial body of literature provides insights into the critical role of structured argumentation, critical thinking, and analytical depth in academic essays, with in-depth engagement revealing the intricate relationship between cognitive processes and writing skills (Jin et al., 2022; Liu et al., 2023; Simonovic et al., 2023). Recent advancements emphasize innovative pedagogical approaches, the integration of technology, and the transformative potential of AI in enhancing writing proficiency and fostering self-regulated learning. Engagement with contemporary discourse on academic integrity and ethical writing practices is pivotal, highlighting the importance of cultivating ethical awareness and upholding academic standards in the academic writing process. The amalgamation of these elements forms a comprehensive perspective on academic essay writing, intertwining ethical considerations, critical reasoning, technological advancements, and pedagogical innovations.

To comprehend the nuanced implications and perceptions of AI in essay writing effectively, it is vital to acknowledge the significance of individual student characteristics such as gender, epistemic beliefs, and higher-order skills, and their consequential influence on students' interactions with and attitudes towards AI tools. The seminal works of scholars like Kerman et al. (2022), Latifi et al. (2023), Noorozi et al. (2022) and Valero Haro et al. (2022) are pivotal, providing profound insights into how such individual characteristics and intricate belief systems impact student engagement with AI in academic writing. Kerman et al. (2022) and Latifi et al. (2023) particularly illuminate the multifaceted ways in which gender plays a pivotal role, suggesting a need for AI tools to be inclusively designed and gender-sensitive. They advocate for a development approach that ensures equitable benefits, irrespective of gender differences. In tandem, Noorozi et al. (2022) and Valero Haro et al. (2022) explore how epistemic beliefs and higher-order skills significantly shape students' attitudes, elucidating that students with advanced beliefs and skills are likely to perceive and interact with AI tools more positively and productively. The integration of these varied insights underscores the need for a tailored and nuanced approach in the application of AI in academic writing, emphasizing the

importance of recognizing and respecting the diversity of student characteristics and learning needs. This perspective, enriched by the thorough research of aforementioned scholars, demands an ethical, balanced, and informed approach to AI's integration in academic writing, aiming to enhance learning experiences while ensuring responsible and equitable access. The confluence of these diverse scholarly insights provides a roadmap for fostering academic excellence through the inclusive and thoughtful incorporation of AI in academic writing environments, while placing paramount importance on individual differences, ethical considerations, and equitable access to technological advancements in academia.

Methodology

Research design

This research was designed as a quantitative study (Creswell, 2012). We conducted an online survey using *Google Forms* and employed a convenience sampling method. Researchers also conducted interviews with students to gain deeper insights. Through this approach, we were able to explore students' perceptions of using AI in writing academic essays. This research aims to understand students' viewpoints on their use or avoidance of AI in composing academic essays, seeking to reveal the reasons behind their choice to embrace or forgo AI tools for writing tasks. Additionally, the study identifies the prevalent AI applications students typically use in the process of crafting academic essays.

Research participants

In this research study, a total of 25 tertiary institutions from both Eastern and Central Indonesian provinces were selected as participants. The participating institutions were chosen based on their willingness to be involved in the research and their representation of diverse geographical locations and academic programs. Within these institutions, 245 students at the undergraduate level were recruited as research participants. These students were drawn from various academic majors and semester levels, ensuring a comprehensive representation of the undergraduate population. The detailed demographic information of the participants is presented in Table 1.

Ethical considerations

In this research, strict ethical standards were followed. Measures ensured participant confidentiality and anonymity, and informed consent was obtained. Transparency was maintained in all aspects, including methodologies, analysis, and reporting. The study upheld intellectual property principles, followed institutional guidelines, and addressed ethical concerns promptly. These actions aimed to maintain research integrity, build trust with participants and the scholarly community, and produce reliable and respectful knowledge.

Table 1
Demographic information of the participants ($N = 245$).

Demographic	Value	Frequency	Percentage
Gender	Male	117	47,75
	Female	128	52,25
Age Range	16–18	49	20
	19–21	147	60
	22–25	30	12,25
	Older than 26	19	7,75
Type of University	Public	107	43,67
	Private	138	56,33
Major	Indonesian Language	107	43,67
	English Education	73	29,80
	Germany Language	43	17,55
	Arabic Language	22	8,97
Location of Universities	South Sulawesi	45	18,37
	Central Sulawesi	77	31,43
	North Sulawesi	32	13,06
	Gorontalo	23	9,39
	Maluku	12	4,89
	Bali	39	15,92
	Papua	17	6,94

Instrument

This study employed an online questionnaire disseminated via Google Forms to garner responses from student participants. The questionnaire, penned in Indonesian, was designed to preclude misunderstandings and transcend language barriers. The questionnaire was meticulously crafted by the researchers, drawing from comprehensive literature reviews (e.g. Chan & Hu, 2023; Kim et al., 2020; Lu, 2019; Shoufan, 2023) and remained accessible for responses for one month from March to April 2023.

Before dissemination, the research instruments underwent rigorous testing to ensure reliability and internal consistency, deploying various statistical methods to validate the coherence and dependability of the responses obtained. This ensured that the results derived were reflective of the true perceptions and attitudes of the participants, lending credibility and reliability to the findings. The questionnaire comprised four pivotal sections. The initial section solicited participant demographic details such as gender, age, major, qualifications, the nature of the university, and its location. The subsequent section leveraged a 5-point Likert scale to probe participants about their familiarity with AI, the frequency of AI usage in academic essay writing, and their perceptions, beliefs, and expectations regarding the advantages and disadvantages of using AI in writing.

Data collection and analysis

The Google Forms survey link was sent to particular students at public and private institutions throughout Indonesia. We solicited help from our networks, particularly those who are now teaching in institutions. To contact potential participants, the survey link was sent via multiple media such as WhatsApp Groups and Facebook pages. Using these strategies, we hoped to elicit answers from a varied range of students in order to better understand their attitudes on the employment of AI in academic essay writing.

We used the Statistical Package for the Social Sciences (SPSS) version 27 to analyze the data. To assure accuracy, we first imported the replies from Google Forms into Microsoft Excel and did data inspection and cleansing. The data was then loaded into SPSS for coding and analysis. We did an internal reliability study, which yielded a Cronbach's alpha score of 0.94, suggesting that all 41 questionnaire questions had excellent internal consistency. We used descriptive statistics to collect quantitative data to answer the research objectives and obtain insights into students' impressions of the usage of AI in academic essay writing,

Findings

Student perceptions of AI usage in academic essay writing

Knowledge of AI in academic essay writing

The data in Table 2 provides a quantitative summary of respondents' perspectives and experiences using AI-powered writing tools for academic essays. Overall, 38.4 % of respondents "Agree" and 20.8 % "Strongly agree" that they are aware of the availability of AI-powered writing tools. Furthermore, when it comes to using AI-powered grammar and spelling checks, 30.4 % "Strongly agree," and 26.5% "Agree." Similarly, a sizable proportion of respondents (35.4 %) "Strongly agree" and (27.4 %) "Agree" that they are aware of AI-based plagiarism detection approaches to assure the originality of academic work. According to the statistics, respondents have used a variety of AI-powered tools to improve their academic writing. For example, while

Table 2
Knowledge of AI in Academic Essay Writing (N = 236).

Attribute	Level of Agreement				
	1	2	3	4	5
I am aware that AI-powered writing tools for academic essays exist.	8,1	14,7	18	38,4	20,8
In my essay writing, I employed AI-powered grammar and spelling checkers.	7,1	15,4	20,6	26,5	30,4
I am familiar with AI-based plagiarism detection techniques that I may use to ensure the originality of my academic work.	7,4	11,2	18,6	27,4	35,4
I have utilized AI methods for content summaries to comprehend challenging research publications.	15,9	17,5	20,8	25,6	20,2
I am familiar with AI-generated citation and reference tools that I use to prepare my academic work.	5,3	14,3	20,3	33,7	26,4
I have made use of AI-driven language translation technologies to access academic information written in languages other than my own.	4,1	4,8	11,2	34,6	45,3
I'm aware of AI writing helpers that provide context-specific word and phrase suggestions to improve essay writing.	6,4	16,3	20,5	35,2	21,6
I've used AI-generated essay outlines to efficiently arrange my ideas before writing.	5,9	12,8	22,6	32,3	26,4
I am aware of AI-powered services that recommend research topics and sources for essay preparation.	4,8	6,3	22,5	30,8	35,6
I am confident in my knowledge of AI-powered writing tools for academic essay writing.	7,1	15,3	21,5	31,5	24,6

Level of agreement: 1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly agree.

(34.6 %) "Strongly agree" and (45.3 %) "Agree" that they have used AI-driven language translation technologies to access academic information in different languages, (32.3 %) "Strongly agree," and (26.4 %) "Agree" that they have used AI-generated essay outlines for efficient idea arrangement.

The findings reveal a generally favorable response of AI-powered writing tools, with a considerable number of respondents being aware of and actively using such tools to better their academic writing experience. As AI technology advances, these tools are anticipated to play an increasing role in assisting students and researchers in their academic endeavors.

The frequency and extent to which students use artificial intelligence (AI) technologies in their essay-writing process

The data provided in Table 3 shows the effect of AI technology on respondents' writing abilities in the setting of academic essay writing. The majority of respondents (37.2 %) "strongly agree" and (28.1 %) "agree" that employing AI technology in essay writing has improved their overall writing abilities. Furthermore, a sizable proportion of respondents (33.6 %) and (26.4 %) "Agree" that AI-powered grammar and spelling checks have aided them in discovering and fixing writing errors, leading to their writing skill improvement. Furthermore, data show that AI-based plagiarism detection systems have significantly affected respondents' sense of academic integrity and the value of uniqueness in writing, with (35.6 %) "Agree" and (36.6 %) "Strongly agree." Similarly, AI-generated content summaries increased writing comprehension for (37.4 %) of "Agree" and (30.3 %) "Agree" respondents, assisting them in extracting key concepts from difficult research publications. Also, artificial intelligence writing assistance and AI-generated essay outlines have shown to be effective tools for improving the clarity, coherence, and organization of responders' work. According to the research, 35.5 percent "agree" and 39.6 percent "strongly agree" with the good influence of AI writing aids on writing style, while 43.2 percent "agree" and 31.1 percent "agree" with the usefulness of AI-generated essay outlines inefficient concept organization.

Table 3
The frequency and extent to which students use artificial intelligence.

Attribute	Level of Agreement				
	1	2	3	4	5
I examine and enhance my works using AI-powered grammar and spelling checkers	4,6	11,2	21,3	37,5	25,4
I use AI-based plagiarism detection technologies to assure the originality of my academic writing	2,2	2,4	17,6	32,2	45,6
AI-generated content summaries assist me in understanding difficult research articles for inclusion in my writings	4,5	16,4	36,7	23,6	18,8
AI technologies help me generate citations and references in a variety of formats automatically	4,5	14,6	24,2	28,2	28,5
I utilize language translation AI to access academic literature written in languages other than my native language	0,6	8,1	25,3	26,4	39,6
AI-powered writing helpers provide context-specific word and phrase suggestions to help me improve my essay writing.	8,5	18,3	18,3	32,6	22,3
AI-powered systems suggest research subjects and suitable sources to help me prepare my essay.	4,2	4,9	11,3	34,5	45,1
Artificial Intelligence (AI) tools assist me in tailoring the style and tone of my essays to certain academic criteria.	7,5	11,1	18,3	27,3	35,8
I utilize AI-generated essay outlines to successfully arrange my ideas before writing.	5,9	10,8	21,6	33,3	28,4
AI-powered time management tools assist me in keeping track of my essay writing work and meeting deadlines.	3,1	4,8	12,2	32,6	47,3

Level of agreement: 1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly agree.

The impact of AI in writing academic essays skill

The data presented in Table 4 shows that the use of AI technologies in essay writing has had a positive impact on respondents' writing abilities. The majority of participants agree or strongly agree that AI tools have enhanced their general writing skills (37.2 %), assisted in identifying and correcting errors (33.6 %), and improved their comprehension of complex research articles (30.3 %). Additionally, respondents find AI-powered writing aids (39.6 %) and AI-generated essay outlines (43.2 %) helpful in improving the clarity, coherence, and organization of their work. AI technologies have also contributed to personal growth, with respondents reporting increased self-editing abilities (32.1 %) due to critically assessing their own work. Furthermore, AI-based plagiarism detection systems have raised awareness of academic integrity and the importance of originality in writing (36.6 %). In addition to skill development, AI technologies have expanded respondents' perspectives and writing capabilities. AI-driven language translation technologies have introduced them to a wide range of academic information (38.7 %), while the context-specific word and phrase choices have helped broaden their vocabulary and enhance the quality of their writing (33.7 %). Overall, the data highlights the positive influence of AI in various aspects of essay writing, from enhancing writing abilities to aiding in error detection and providing valuable tools for organization and self-improvement. The findings suggest that AI technologies play a significant role in supporting and empowering individuals in their academic writing endeavors.

The integration of AI with human writers

The data presented in Table 5 reflects respondents' opinions regarding the integration of AI technologies as writing helpers in the essay writing process. The majority of participants seem to support the

Table 4
The Impact of AI in Writing Academic Essays.

Attribute	Level of Agreement				
	1	2	3	4	5
Using AI technologies in my essay writing has enhanced my general writing ability.	5,3	9,2	20,2	28,1	37,2
AI-powered grammar and spelling checks have assisted me in identifying and correcting writing errors, which has contributed to my writing ability growth.	6,6	12,1	21,3	26,4	33,6
AI-based plagiarism detection systems have raised my understanding of academic integrity and the value of uniqueness in writing.	7,3	8,4	12,1	35,6	36,6
AI-generated content summarizing has improved my capacity to extract essential ideas from difficult research articles, which has improved my writing comprehension.	4,8	11,4	16,1	37,4	30,3
Using AI writing aids has increased the clarity and coherence of my works, favorably improving my writing style.	5,3	9,4	10,2	35,5	39,6
AI-generated essay outlines have helped me arrange my ideas more efficiently and enhance the organization of my work.	3,5	8,7	13,5	43,2	31,1
The use of AI tools in my essay writing has forced me to critically assess and critique my own work, which has resulted in increased self-editing abilities.	5,7	10,5	15,9	35,8	32,1
Artificial intelligence-based language translation technologies have introduced me to a wide range of academic information, extending my viewpoint and writing repertoire.	8,5	14,2	17,3	38,7	21,3
AI technologies that provide context-specific word and phrase choices have helped me broaden my vocabulary and enhance the quality of my writing.	6,8	15,7	14,2	29,6	33,7
I feel that employing AI technologies has improved my writing abilities and greatly impacted my academic essay writing.	5,3	6,5	8,3	44,5	35,4

Level of agreement: 1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly agree

idea of employing AI as an assistant to human authors, with (44.5 %) "Strongly agree" and (34.7 %) "Agree" stating that AI should be used as a writing helper. Additionally, respondents believe that AI can be valuable in identifying grammatical and spelling problems (40.3 % "Agree" and 31.4 % "Agree") and providing content recommendations and ideas (36.1 % "Agree" and 31.6 % "Agree"). However, respondents also express the importance of maintaining human control and creativity in the writing process. While many agree that AI can suggest research topics and sources (42.3 % "Agree" and 30.6 % "Agree"), they emphasize the need for human writers to engage in critical analysis and synthesis. Similarly, respondents believe that AI-generated outlines can be useful (39.1 % "Agree" and 34.6 % "Agree"), but human authors should have the freedom to adapt and expand on them to suit their writing style.

The data also shows that respondents believe AI can be beneficial in content summarizing and synthesis (43.4 % "Agree" and 28.5 % "Agree"), citation and referencing (38.6 % "Agree" and 33.2 % "Agree"), language translation (39.6 % "Agree" and 26.5 % "Agree"), and identifying areas for improvement during the editing process (40.2 % "Agree" and 33.1 % "Agree"). Overall, the data highlights a balanced perspective on the role of AI in essay writing. Respondents support the collaboration between AI technologies and human authors, leveraging AI's efficiency while preserving human originality and critical thinking. This suggests that a harmonious integration of AI and human efforts can lead to more effective and comprehensive essay-writing processes

Table 5
Students' perspectives on how AI should collaborate with human writers in the future.

Attribute	Level of Agreement				
	1	2	3	4	5
I contend that AI should be employed as a writing helper to assist human authors during the essay writing process.	3,8	6,3	10,7	34,7	44,5
AI should be used to discover probable grammatical and spelling problems, with human authors making the ultimate choice on fixes.	7,3	8,3	12,7	40,3	31,4
I like AI to supply content recommendations and ideas, while human authors keep creative control over the essay's direction and reasoning.	8,1	11,3	12,9	31,6	36,1
AI should assist human authors by suggesting research topics and suitable sources, but human writers should still undertake critical analysis and synthesis.	4,4	9,3	13,4	42,3	30,6
I contend that AI-generated outlines can be useful, but human authors should be free to adapt and expand on them to fit their writing style.	5,6	7,3	13,4	34,6	39,1
Artificial intelligence (AI) should be employed for content summarizing and synthesis, supporting human authors in reducing complicated material into brief and comprehensible paragraphs.	7,4	6,1	14,6	43,4	28,5
I involving artificial intelligence to assist in correct citation and referencing, but human authors must guarantee the authenticity and appropriateness of the sources mentioned.	6,8	8,3	13,1	38,6	33,2
While AI may assist with language translation, human authors should verify the translated content to guarantee context and correctness.	7,3	8,5	18,1	39,6	26,5
AI should be used to discover possible areas for improvement during the editing process, while human authors give the final tweaks and improvements.	8,1	5,4	13,2	40,2	33,1
I believe that AI and human authors should work in tandem to maximize AI efficiency while keeping human originality and critical thinking in essay writing.	5,6	7,3	16,1	35,6	35,4

Level of agreement: 1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly agree.

Preference for using AI in writing academic essays

Reason for using AI in writing

In the survey, students were given a list of ten potential reasons for their preferences for AI in writing academic essays. Among these reasons, the top five most selected ones were identified. The data shows that a majority of respondents find AI valuable for various aspects of the writing process. They appreciate the ability to write in different languages (55 %), which highlights the significance of language translation capabilities. Additionally, a substantial number of participants value the time-saving aspect of AI, as it allows them to produce content quickly (60 %) and work on multiple projects simultaneously (65 %).

The data also reveals that many students appreciate AI's role in suggesting appropriate essay ideas (67 %), extracting meaningful data from large datasets (69 %), and analyzing data for data-driven writings (70 %). Furthermore, a considerable percentage of respondents acknowledge AI's contribution to ensuring uniqueness and avoiding accidental plagiarism (73 %), improving language by providing sentence recommendations (75 %), and enhancing article quality by spotting flaws (83 %). These findings demonstrate the students' recognition of AI's potential in supporting and enhancing the academic writing process, leading to more efficient and effective outcomes. The summary of the data can be seen in Fig. 1.

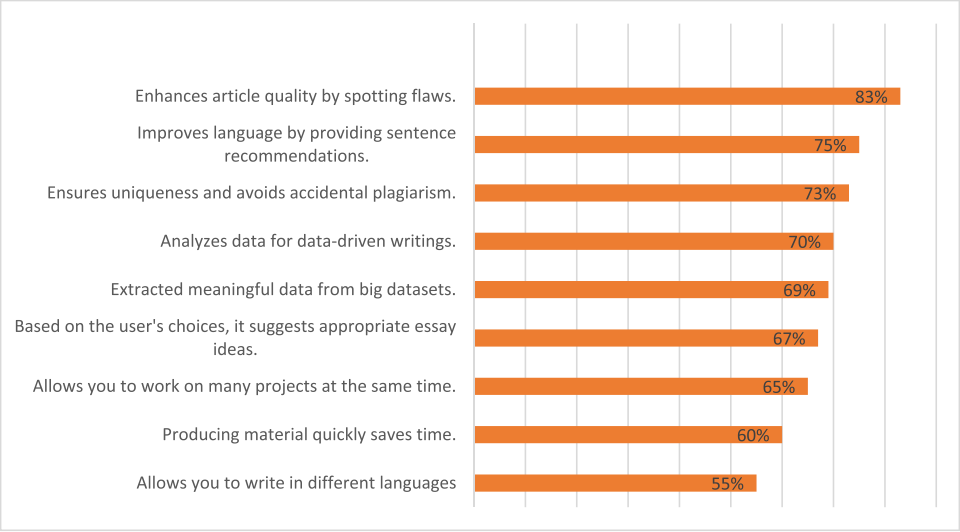


Fig. 1. The participants' reasons for using AI in writing academic essays ($N = 245$).

Reason for not using AI in writing

As shown in Fig. 2, the data reveals the students' top reasons for not using AI in writing academic essays. The most common concern is the fear of lacking originality and innovation in their work (86 %). They also worry about the potential limitation of critical thinking skills when relying on AI (75 %) and the possibility of over-relying on technology (73 %). Misinformation and inaccuracies are another prominent worry (70 %), as well as concerns about the ethical implications of unintentional plagiarism (69 %). Difficulties with handling complex subjects (53 %), limited customization choices (51 %), inadvertent prejudice in the material (49 %), and the time-consuming nature of adjustments and fixes (43 %) are also significant factors contributing to their preferences. The data shows that while students recognize the benefits of AI, they still prioritize their own creativity, critical thinking, and ethical writing practices, leading them to be cautious about using AI extensively in their academic essays.

Popular types of AI academic essay writing tools for Indonesian higher education students

The data presented in Fig. 3 showcases the widespread adoption of AI-powered applications among Indonesian students, particularly those from eastern and central Indonesia, in their academic essay writing endeavors. Topping the list is Doctranslator/Google Translate, with an impressive 92 % usage rate. This tool serves as a valuable language translation companion, enabling students to access and comprehend research materials written in different languages, broadening their academic horizons. Following closely at 88 %, Chat GPT3,5/ChatGPT4 captures students' attention with its advanced language processing capabilities. As an AI writing assistant, it offers context-specific word and phrase suggestions, empowering students to craft well-structured and articulate essays, enhancing their writing proficiency. Turnitin ranks third with an 85 % usage rate, highlighting its crucial role in ensuring academic integrity. This powerful plagiarism detection tool helps students maintain originality and avoid unintentional plagiarism, emphasizing the importance of ethical writing practices. Grammarly follows at 81 %, being a trusted companion in grammar and spelling checking. With English being a second language for many students, Grammarly assists in identifying and rectifying writing errors, leading to more polished and error-free academic papers. Quillbot, at 75 %, serves as a reliable paraphrasing tool, aiding students in expressing ideas in their own words while maintaining proper citation from credible sources,

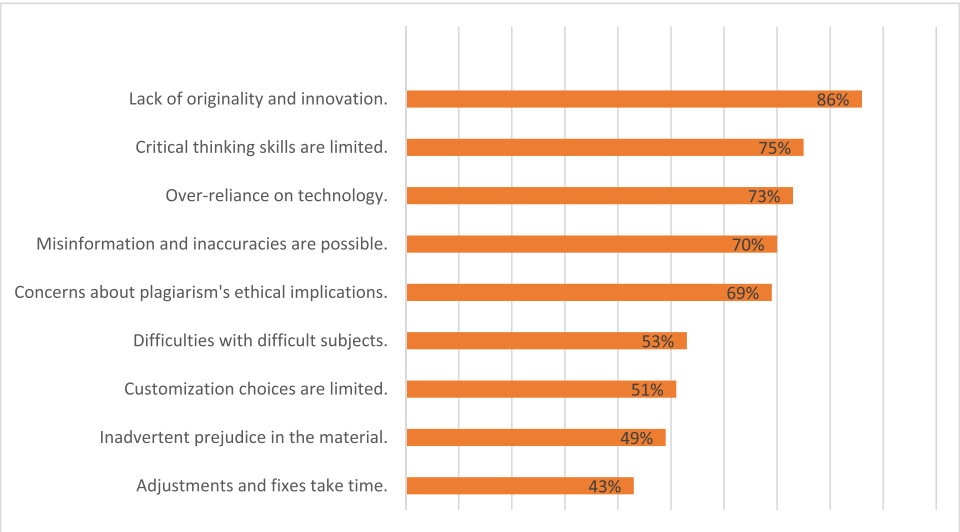


Fig. 2. The participants' reasons for not using AI in writing academic essays ($N = 245$).

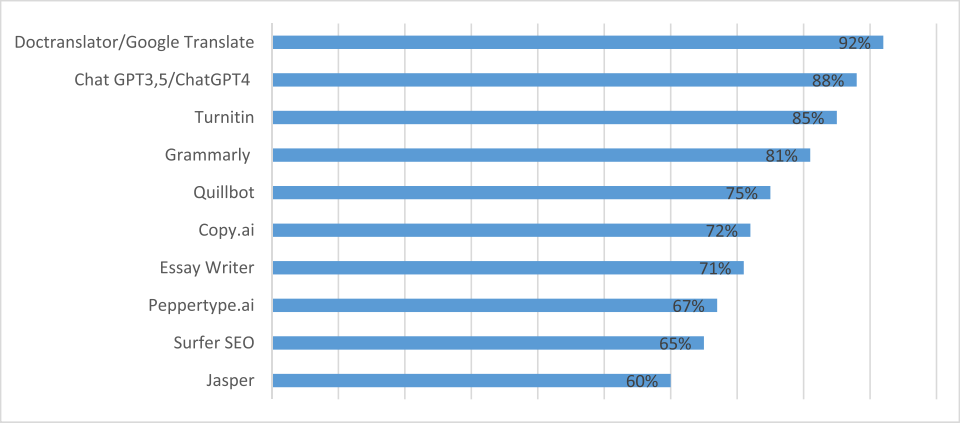


Fig. 3. Popular types of AI academic essay writing tools for Indonesian Higher Education Students ($N = 245$).

contributing to well-crafted and properly cited essays. Copy.ai and Essay Writer, with usage rates of 72 % and 71 %, respectively, provide content generation and efficiency-boosting features. These AI-powered tools offer content summaries, essay outlines, and time-saving capabilities, allowing students to organize their ideas efficiently and maximize their writing productivity. Peppertype.ai, at 67 %, continues to gain popularity among students for its language enhancement capabilities. By providing sentence recommendations and language improvements, it helps students refine their writing style and produce high-quality academic essays. Surfer SEO and Jasper, with usage rates of 65 % and 63 %, respectively, offer valuable SEO optimization and language enhancement features. Recognizing the significance of optimizing their essays for search engines, students utilize these tools to make their work more discoverable and refine their writing skills. In conclusion, these popular AI applications are highly valued by Indonesian students, particularly those from eastern and central Indonesia, as essential aids in their academic essay writing journey. From language translation and plagiarism detection to grammar checking, paraphrasing, content generation, and language enhancement, these AI-powered tools contribute significantly to students' success in their academic pursuits.

Discussions

This study highlights the positive reception of AI-powered writing tools in academic essay writing. A considerable portion of participants were aware of these tools and their benefits, with the majority agreeing that AI-enhanced grammar, plagiarism detection, and language translation tools are valuable in improving writing processes, a finding corroborated by Marzuki et al. (2023). The data reveals extensive use of AI-generated essay outlines for efficient idea arrangement, aligning with Guo et al. (2023)'s observations of AI's role in organizing thoughts and structuring essays effectively. These AI-powered tools are gaining popularity, anticipated to sustain their crucial role in academic pursuits as the technology advances, a sentiment echoed by George and Wooden (2023), who highlighted AI's potential in reforming academic writing practices. The study aligns with Zhao (2022) and Golan et al. (2023) who explored AI's impact on academic writing quality and its applications in supporting authors and evaluating written works. The synthesized insights from Bahroun et al. (2023) further spotlight the symbiosis of AI technologies and educational paradigms, indicating a paradigm shift in academic writing due to technological advancements in AI, reflective of broader innovations in educational technology.

In assessing the impact of AI in academic essay writing, the data revealed a favorable influence of AI technology on the respondents. The majority concur that AI tools have not only refined their writing capabilities but have also deepened their grasp of academic integrity. This is substantiated by Liu et al. (2021), who articulated that AI elevates students' English writing competence, self-efficacy, and self-regulated learning while significantly mitigating cognitive load. This reflection is also harmonious with the insights of Hapsari and Wu (2022), who emphasized AI's role in fostering learning autonomy and promoting reflective thinking among students. AI-powered content summaries and essay outlines have proven instrumental in ameliorating the clarity and coherence of students' work (Jaiswal et al., 2022), a sentiment echoed by Storey (2023) who noted the profound impact of AI in refining logical flow and argumentative structure of academic essays. The cumulative data underscores the transformative potential of AI in elevating academic writing standards and facilitating students in crafting superior essays. AI-driven language translation technologies have broadened their academic information access and refined their writing quality through context-specific word and phrase selections (Liang, 2022). Similarly, Mannuru et al. (2023) highlighted the revolutionary impact of AI in transcending linguistic barriers, enabling access to diverse academic resources and enhancing multicultural understanding among students.

Researchers also found indications of the need for AI integration with humans. The data from indicates that respondents generally have a positive view of integrating AI technologies as writing helpers in the essay writing process. A significant majority agree that AI should be used as an assistant to human authors and can be valuable in identifying writing issues and providing content suggestions. However, they also emphasize the importance of maintaining human control and creativity in writing. While many believe AI can assist in suggesting research topics and sources, they still value human engagement in critical analysis and synthesis. This is in line with Angulo et al. (2023) who noted that the human cognitive component must be articulated alongside intelligent artifacts, necessitating a methodical approach in the realm of joint cognitive systems. Similarly, (Abbass, 2019) explained social integration of AI into the human social system will demand some kind of interaction on some level in society, implying that humans will actively engage in some decision-making and affect AI operations. This aligns with our findings that respondents support a balanced approach to AI integration, where AI technologies work collaboratively with human authors, ensuring efficiency while preserving originality and critical thinking in the essay writing process.

The second findings asked about their preferences for using AI in academic essay writing, and the data revealed some interesting insights. The majority of respondents found AI to be valuable for various aspects of the writing process. They appreciated AI's ability to assist them in writing in different languages and the time-saving feature that allows them to produce content quickly and work on multiple projects simultaneously. Many students also appreciated AI's role in suggesting essay ideas, extracting meaningful data from large datasets, and analyzing data for data-driven writings. Moreover, a considerable percentage of

respondents acknowledged AI's contribution to ensuring uniqueness and avoiding accidental plagiarism, improving language with sentence recommendations, and enhancing article quality by spotting flaws. These results provide more insights into the beneficial of AI in Education that have been reported in previous studies in different contexts such as Australia (Rampersad, 2020), Malaysia (Samsurijan et al., 2022), India (Chatterjee & Bhattacharjee, 2020), Turkey (Serkan, 2021), and USA (Simhadri & Swamy, 2023).

However, despite recognizing these benefits, the students expressed concerns about AI's impact on their creativity, critical thinking skills, and ethical writing practices. They worried about the potential loss of originality and innovation, over-reliance on technology, and the risk of misinformation and unintentional plagiarism. Other factors contributing to their preferences against AI use included difficulties with complex subjects, limited customization choices, inadvertent prejudice in the material, and the time-consuming nature of adjustments and fixes. This concern aligns with the findings of Booyse and Scheepers (2023), who suggested AI reflects the spirit of the technology, resulting in unequal participation and dominance by the decision makers who bring in the technology. Overall, the data reflects a cautious approach to AI adoption, with students valuing AI's support but also emphasizing the importance of maintaining their own writing abilities and ethical considerations.

Finally, the next point of discussion focused on popular AI tools that higher education students use. Indonesian students, especially those from eastern and central Indonesia, have embraced AI-powered applications to elevate their academic essay writing experience. Among the popular choices, Doctranslator/Google Translate stands out for its exceptional language translation capabilities, enabling access to a wide array of research materials in different languages. Chat GPT3,5/ ChatGPT4 follows closely, impressing students with its advanced language processing features, providing context-specific word suggestions and enhancing essay structure. Turnitin takes the third spot, playing a crucial role in upholding academic integrity by detecting potential plagiarism, reinforcing ethical writing practices. Grammarly is another trusted companion, assisting students in identifying and correcting grammar and spelling errors, ensuring polished and error-free academic papers. Moreover, Quillbot has gained popularity for its reliable paraphrasing abilities, helping students express ideas in their own words while maintaining proper citation. Copy.ai and Essay Writer offer valuable content generation and efficiency-boosting features, providing content summaries, essay outlines, and time-saving capabilities. These aids allow students to organize their thoughts effectively and maximize writing productivity. Peppertype.ai's language enhancement capabilities, providing sentence recommendations and improvements, help students refine their writing style, leading to high-quality academic essays. Additionally, Surfer SEO and Jasper are valued for their SEO optimization and language enhancement features, aiding students in making their work more discoverable and refining their writing skills for broader audiences. These results corroborate those of (Jiang et al., 2021), (Fuchs, 2023), (Meo & Talha, 2019), and (Fitria, 2021) who have found similar AI tools in writing. In conclusion, AI-powered tools have become essential aids for Indonesian students, empowering them in various aspects of their academic essay writing journey, from language translation and plagiarism detection to grammar checking, paraphrasing, content generation, and language enhancement, all contributing to their academic success.

In a nutshell, this research offers critical insights into the transformative potential of AI in academic writing, serving as a practical guide for educators, policy-makers, and developers to enhance AI tool integration and development in education. It illuminates user preferences, benefits, and concerns, providing a nuanced understanding for future innovations to balance user needs and ethical considerations effectively. By detailing a variety of AI tools, this study acts as a comprehensive resource for academicians and students, aiding optimal, informed choices in AI tool selection, and highlights the positive reception and profound impact of AI, pointing to its significance in reshaping educational practices and enhancing academic outcomes. In sum, this study is a pivotal contribution to the discourse on AI in education, bridging technological, user, and ethical dimensions in academic writing.

However, this study is not without limitations, particularly the dependence on data self-reported by participants and the possible effects of individual student attributes, which might introduce bias and question the reliability of the outcomes. To address these concerns, subsequent studies should broaden participant selection throughout various regions of Indonesia and incorporate insights from lecturers to obtain a comprehensive understanding of AI in education. Utilizing diverse research approaches, like qualitative and mixed methods, and undertaking comparative or longitudinal research, will also yield more profound understandings of the significance and influence of AI in academic writing.

Conclusions

The study has examined the positive reception and impact of AI-powered writing tools among respondents for academic essay writing. The findings indicated that AI technologies, such as grammar and spelling checks, plagiarism detection, language translation, and AI-generated essay outlines, are widely recognized as valuable assets that improved the writing process and support students and researchers in their academic pursuits. Moreover, the data highlights that AI has a positive influence on academic writing by enhancing students' writing abilities, self-efficacy, and understanding of academic integrity. AI-powered content summaries, essay outlines, and language translation technologies have also been instrumental in improving the clarity, organization, and access to academic information for students. The study emphasized the need for a balanced approach to AI integration, where AI technologies work collaboratively with human authors, enhancing efficiency while preserving originality and critical thinking in the essay writing process. Respondents generally view AI as a helpful assistant in identifying writing issues and providing content suggestions but underscore the importance of maintaining human control and creativity.

Furthermore, the students value the utility of AI in writing but have concerns regarding its impact on creativity, critical thinking, and ethics, emphasizing the need to maintain human involvement. This study illuminates preferences for specific AI tools like Doctranslator/Google Translate, Chat GPT3,5/ChatGPT4, and others, renowned for their diverse capabilities, enhancing academic writing efficiency and efficacy. The findings underscore AI's pivotal support in academic writing, stressing balanced human-AI interaction, and suggest an expanding role for these tools in academia due to ongoing advancements in AI technology. As such, the practical implication of this study lies in illuminating the transformative impact and valued utility of AI-powered tools in academic writing, providing educators, developers, and students with insights and actionable guidance on the balanced integration and optimal utilization of AI technologies to enhance writing processes while preserving human creativity and critical thinking.

This study has limitations, however, notably the reliance on self-reported data and the potential influence of individual student characteristics, which may introduce bias and affect the validity of the findings. To mitigate these issues, future research should diversify participant selection across different regions of Indonesia and consider the input from lecturers to gain a holistic view of AI in education. Employing a variety of research methods, including qualitative and mixed methods, and conducting comparative or longitudinal studies, will also provide deeper insights into the role and impact of AI in academic writing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence

the work reported in this paper.

Acknowledgments

The authors are grateful for the financial support from the Endowment Education Funding of Indonesia (LPDP) through centre for Higher Education Funding (BPPT) for this research.

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