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# Students' Perceptions of AI-Based Instruction in Academic Writing Course at an Indonesian Private University

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## Abstract
This study aims to find out how students perceive the integration of AI technology in learning academic writing. This qualitative case study examined the perceptions of 27 English students at Universitas Muhammadiyah Makassar regarding the use of AI tools in their academic writing development. Data were collected through semi-structured interviews, providing rich insights into students' attitudes, perceived benefits, and potential drawbacks of AI-driven instruction. The findings of this study show that there are two types of perceptions towards the application of AI in writing learning: Perceived usefulness and perceived ease of use. Perceived usefulness can be observed through several indicators, including improved academic writing quality, increased efficiency in writing activities, enhanced learning, better grades, and meeting writing requirements. Furthermore, perceived ease of use also has six indicators, namely ease of understanding, ease of use, clarity and understandability, flexibility and adaptability, minimal effort required, and user-friendliness.

Keywords: AI based instruction; student perception; academic writing; private university

## Introduction

The integration of artificial intelligence (AI) technology holds significant importance in English language instruction, particularly within higher education, as it addresses key limitations inherent in traditional pedagogical approaches and offers substantial benefits to both learners and educators. AI-based instruction in English academic writing encompasses the utilization of artificial intelligence technologies and tools to support and enhance the development of academic writing proficiency in English (Dong, 2023; Zainal et al., 2022). This may include diverse applications, such as AI-driven writing assistants that provide immediate feedback on grammatical accuracy, vocabulary usage, and stylistic conventions; automated essay evaluation systems; and personalized learning platforms designed to adapt to individual student learning trajectories.

Academic writing is an important skill for students in higher education, as it enables them to effectively communicate their ideas, demonstrate their understanding of course material, and contribute to the scholarly discourse within their respective fields (Pineteh, 2013). In today's academic landscape, the ability to write clearly and concisely and have a strong grasp of the conventions of academic writing has become increasingly important.

One of the primary reasons for the growing emphasis on academic writing skills is the demand for students to produce high-quality written work, such as essays, research papers, and theses, as part of their degree requirements. These written assignments not only serve as a means of assessment but also help students to integrate into the academic community and engage in a dialogue with their disciplinary peers (Nikoulina, 2020).

Moreover, the ability to write effectively is not only essential for academic success but also for future professional and personal endeavours. Employers in a wide range of industries often prioritize strong communication skills, including the ability to write clearly and coherently, when evaluating job candidates. However, many students often face significant challenges in developing their academic writing skills. These challenges can include a lack of mastery of academic writing conventions, difficulties in analysing writing topics, and poor sentence-level skills. Studies have shown that students' linguistic and general literacy backgrounds, as well as their attitudes toward academic writing, can be significant factors in the development of their academic writing skills (Pineteh, 2013). Additionally, the privileging of middle-class literacy practices in higher education can further exacerbate these challenges for some students (Pineteh, 2013).

To address these challenges, researchers have proposed the integration of new technology, such as Artificial intelligence. The integration of Artificial Intelligence into the realm of education holds immense promise, particularly in the domain of writing instruction. As the information age has democratized knowledge, text-generating AI is poised to transform the very nature of the writing process and writing education (Kim & Tan, 2023; Barbe et al., 2023). In this context, AI-powered writing instruction emerges as a groundbreaking approach to enhancing students' academic writing skills.

AI-powered writing instructors utilize machine learning algorithms to provide personalized feedback and individualized guidance to students (Dong, 2023). These systems have the potential to address the challenges faced in traditional writing classes, where providing comprehensive feedback to each student can be a daunting task. One of the primary benefits of AI-powered writing instruction is the ability to offer scalable and efficient solutions. These AI systems can analyze student writing, identify areas for improvement, and provide targeted feedback in a timely manner, freeing up instructors to focus on higher-level interventions and strategic guidance (Dong, 2023).

Furthermore, AI-powered writing instruction can adapt to the unique learning styles and needs of individual students, leading to a more personalized and effective learning experience.

The potential of AI in writing instruction extends beyond personalized feedback. These systems can also assist students in generating information, checking grammar, and detecting plagiarism, all of which are crucial elements in the development of strong academic writing skills. The use of Artificial Intelligence in education has been a growing trend, and Indonesia's higher education sector is no exception. While e-learning has been a popular mode of instruction, the integration of AI technologies can help address some of the unique challenges faced by Indonesian students and institutions (Hastungkara & Triastuti, 2020).

One of the key areas where AI can have a significant impact is in language and writing programs. Indonesian students often prefer face-to-face interaction over virtual communication and may struggle with written assignments and assessments (Hastungkara & Triastuti, 2020). AI-powered tools can assist in areas such as language learning, writing assistance, and feedback generation, potentially enhancing the overall learning experience and outcomes for students. Recent research has highlighted the potential of AI in Indonesian education. Across various industries, including education, AI has been widely adopted, leading to improved processes and service quality. Additionally, studies have demonstrated the applicability of AI-based solutions at all levels of education, regardless of age, and their potential to address issues such as student dropout prevention and adaptive interventions (Wigati, 2023).

However, the successful implementation of AI in Indonesian higher education, particularly in language and writing programs, requires careful consideration of the unique cultural and educational contexts. As noted by Enzelina et al. (2023), lecturers in Indonesia have expressed concerns about the potential impact of AI on student motivation, pedagogical competence, and technological competency. To address these concerns, a more structured and integrated approach to the design and implementation of AI-based applications in education is needed. This could involve leveraging AI to enhance the flexibility and accessibility of language and writing programs while also ensuring that the technology is seamlessly integrated with effective teaching practices and student support. By addressing the unique needs and perceptions of both lecturers and students, Indonesia can harness the power of AI to improve the quality and effectiveness of its higher education system, particularly in the critical areas of language and writing.

As artificial intelligence becomes increasingly integrated into various aspects of our lives, it is crucial to understand the perceptions and attitudes of students towards this technology. Students, being key stakeholders, will be directly impacted by the integration of AI into their educational experiences and future careers. By investigating students' perceptions, we can gain valuable insights into their awareness, concerns, and expectations regarding the use of AI (Hingle & Johri, 2024). While the article acknowledges the importance of understanding student perceptions of AI in education generally and mentions the need to consider their awareness, concerns, and expectations (Hingle & Johri, 2024; Gherheș & Obrad, 2018; Chan & Hu, 2023), it identifies a significant research gap specifically concerning Indonesian students' perceptions of AI within the context of academic writing classes.

The article highlights the potential benefits of AI tools for writing instruction in Indonesia but lacks empirical investigation into how Indonesian students actually perceive the use of these tools in their writing development. This includes their views on AI feedback, its impact on their writing process, their trust in AI's assessment of their work, and any anxieties or reservations they

might have about using AI in such a crucial academic skill. This gap is particularly important given the article's recognition of Indonesian students' preference for face-to-face interaction (Hastungkara & Triastuti, 2020) and lecturer concerns about AI's impact on student motivation (Enzelina et al., 2023). Therefore, research specifically exploring Indonesian students' perceptions of AI within academic writing contexts is crucial for the informed and effective implementation of these technologies.

**Literature review**

Acquiring foreign language writing proficiency presents a multifaceted cognitive challenge, encompassing diverse skills ranging from grapheme-phoneme correspondence to extended composition, including argumentation and evidentiary support (Howell et al., 2018). Effective writing development necessitates engaging students in iterative processes of ideation, organization, and refinement, facilitated through activities such as brainstorming, discussion, outlining, drafting, self-monitoring, and revision (Raimes, 1992; Hyland, 2003a).

Academic writing is essential for research and sharing knowledge. It uses a clear, organized way of presenting ideas, mostly used by researchers and teachers in academic papers. Its purpose is to give arguments based on evidence and logic, helping readers fully understand a subject. This type of writing allows authors to examine ideas deeply, leading to solid theories or conclusions. Different fields use it in different ways. For example, scientists use it to share their research results, while literature experts use it to create detailed reviews based on the text (Ami, et al., 2020). Despite its importance, academic writing presents challenges that vary depending on the individual writer and their specific academic discipline. Addressing these challenges, whether through dedicated instruction, peer feedback, or self-reflection, is crucial for success in higher education and beyond (Barasa, 2024).

Academic writing demands the clear and understandable handling of lots of information, complicated ideas, theories, and research data. This means writers need to not only fully grasp the subject matter but also explain complex things simply for their audience. Academic papers must be very accurate, supported by evidence, and logically organized. Every claim needs to be backed up with reliable proof (Gupta et al., 2022).

Technology has become an integral part of the modern academic landscape, revolutionizing the way we approach and teach the art of academic writing. The rapid advancements in digital tools and online resources have significantly influenced the process of teaching and learning, particularly in the realm of academic writing (Said et al., 2022) (Stapleton & Radia, 2009). Recent studies have highlighted the vital role that technology plays in the academic writing of students at the tertiary level (Said et al., 2022).

On the positive side, technology has the potential to enhance the writing process in numerous ways. The use of software and online resources can lead to improvements in language proficiency and content development, as well as facilitate more efficient feedback mechanisms from teachers (Stapleton & Radia, 2009). Furthermore, technological assistance can enrich the teaching content, create a more vivid and authentic environment for language learning, and cater to diverse learning styles, ultimately improving learning outcomes (Shaji & Nagaraj, 2020).

The integration of technology into the classroom has become increasingly prevalent in recent years, particularly in the field of English academic writing. As technology continues to evolve and transform the way we communicate and learn, it is crucial to understand how students perceive the use of technology in their English writing courses. For instance, a study by Yagci et al. found that the vast majority of students supported the use of technology in their EFL teaching

and learning practices, as they believed it helped them acquire a wealth of resources and increased their motivation (Kustini et al., 2020). Furthermore, a study by Tai and Ting examined Taiwanese university students' attitudes toward the use of technology in their English writing courses, revealing that students generally held positive perspectives, recognizing the benefits of technology in improving their writing skills and overall academic performance.

Similarly, research on the integration of technology in Indonesian EFL curricula has shown that students have generally positive attitudes towards the use of technology in their language learning, with the heads of English Education Departments implementing various steps to promote the reliable integration of technology into the classroom (Hafifah & Sulistyo, 2020). The rapid advancements in artificial intelligence have profoundly impacted various aspects of our lives, and the academic writing landscape is no exception. As AI-powered writing tools like ChatGPT, Grammarly, and Quillbot become increasingly prevalent, exploring their implications for academic writing practices and the broader educational ecosystem is crucial.

Some institutions view AI tools as a significant threat, while others acknowledge the potential role they can play in education (Zhao et al., 2024). One perspective suggests that these tools could be a great equalizer, assisting authors who lack skills or confidence in academic writing or those with learning disabilities (Williamson, 2001). The rapid advancements in artificial intelligence have significantly impacted various sectors, including higher education in Indonesia (Su et al., 2019). The integration of AI-based applications in the teaching and learning process has become a growing trend, particularly in the realm of English writing assessment and evaluation (Su et al., 2019).

In the context of the Indonesian higher education system, researchers have explored the potential of AI-powered pedagogy in enhancing students' academic writing skills. One study highlighted the benefits and challenges of using AI in the teaching process and assessment, emphasizing the ability of AI-powered writing instructors to provide personalized feedback and instruction to students. (Dong, 2023) This approach is seen as a promising avenue for revolutionizing academic English writing, as AI-powered pedagogy can potentially improve students' performance and contribute to the existing literature on the use of AI in education (Dong, 2023).

The reliability and scientific rigor of computer-based intelligent evaluation systems have also been examined, with researchers exploring the mode of intelligent evaluation and data analysis in optimizing the precise teaching of English writing. This data-driven approach aims to lay the groundwork for the widespread adoption of AI technology in Indonesia's higher education system, facilitating the advancement of English writing evaluation models.

## Research method

### Research design

This study uses a qualitative case study research methodology. Case study research design and methods emphasize empirical inquiry to investigate phenomena within real-life contexts, particularly when the boundaries between the phenomenon and its context are not clearly evident (Yin, 2013). The research design is based on the interpretive paradigm, which aims to understand students' subjective perceptions in the context of their English academic writing learning. A case study approach was chosen to provide a deep insight into the practices and challenges of integrating AI-based applications into language lessons in the academic writing classroom.

### Research subject

This research has received approval from the Institute of Research, Development, and Community Service (LP3M) at Universitas Muhammadiyah Makassar. To ensure participant confidentiality, their names were replaced with codes, specifically P1 (Participant 1) and P2 (Participant 2). As a result, no participants were identified by their actual names. Additionally, all individuals involved in this study provided their informed consent by signing a voluntary participation agreement.

The research subjects consisted of 27 students drawn from two separate classes enrolled in the English Academic Writing course at Universitas Muhammadiyah Makassar, which formed the basis for a comprehensive assessment of students' perceptions of integrating AI-based instruction in the learning of Academic Writing. Subjects were selected based on criteria such as English proficiency level and willingness to participate in the study. The selected subjects demonstrated above-average academic ability, as indicated by a Grade Point Average (GPA) exceeding 3.25, as confirmed by the academic records provided by the head of the English education study program. Therefore, all students from both classes were included as research samples to ensure a good representation of academic performance within the scope of this study.

Table 1. Participants' profile (table by authors)

| No. | Participants | Participants' code | Sex | Class |
|---|---|---|---|---|
| 1. | NAS | S1 | Female | 6th semester |
| 2. | MLS | S2 | Female | 6th semester |
| 3. | HST | S3 | Female | 6th semester |
| 4. | GLL | S4 | Male | 6th semester |
| 5. | MFJ | S5 | Female | 6th semester |
| 6. | SFS | S6 | Female | 6th semester |
| 7. | NKE | S7 | Female | 6th semester |
| 8. | FFA | S8 | Female | 6th semester |
| 9. | NAF | S9 | Male | 6th semester |
| 10. | AW | S10 | Female | 6th semester |
| 11. | ADR | S11 | Female | 6th semester |
| 12. | MAH | S12 | Female | 6th semester |
| 13. | SNK | S13 | Female | 6th semester |
| 14. | AR | S14 | Female | 6th semester |
| 15. | SF | S15 | Female | 6th semester |
| 16. | DA | S16 | Female | 6th semester |
| 17. | II | S17 | Male | 6th semester |
| 18. | MAS | S18 | Male | 6th semester |
| 19. | MAI | S19 | Male | 6th semester |
| 20. | MRF | S20 | Male | 6th semester |
| 21. | WA | S21 | Female | 6th semester |
| 22. | NM | S22 | Female | 6th semester |
| 23. | AQ | S23 | Female | 6th semester |
| 24. | ARN | S24 | Male | 6th semester |
| 25. | SN | S25 | Female | 6th semester |
| 26. | ARP | S26 | Male | 6th semester |
| 27. | ZA | S27 | Male | 6th semester |

Research instrument

Questionnaires and in-depth interviews were used to investigate students' perceptions of AI-based learning in the Academic Writing course. The questionnaires and interviews were developed by adapting the theory of the Technological Acceptance Model (TAM) by Davis in 1989 (Davis, 1986).

Procedures of data collection

Data were collected through semi-structured interviews with 27 English language students from two different classes enrolled in the Academic Writing course. The interviews allowed for an in-depth exploration of students' experiences, learning strategies, and the challenges they faced in AI-based learning. Each interview lasted between 10 and 15 minutes and was conducted in person. In addition to the interviews, the researcher also distributed questionnaires to students to gain further insight into how teachers implement artificial intelligence-based learning in academic writing courses. This questionnaire was used as supporting data for the results of the interviews with students.

Data analysis

Data were analyzed using thematic analysis. Interviews were transcribed, and the transcripts were read several times to identify recurring themes. transcripts were read several times to identify recurring themes. Codes were assigned to segments of the data, and these codes were then grouped into broader themes, which were key aspects of how students perceive when artificial intelligence is integrated into academic writing learning. The themes that emerged from the analysis included teachers‘ strategies to encourage AI-based learning, the impact of AI on students’ skill development, and the challenges faced in the integration process. The findings were triangulated by comparing interview data with questionnaires to ensure the reliability of the results.

**Results**

There are two different types of perceptions that emerge from the data. From these patterns, we categorized the following themes: perceived usefulness and perceived ease of use. Perceived Usefulness (PU) has four indicators that reflect this: Students believe using AI tools will improve their academic writing quality, increase efficiency in writing activities, improve students’ self-efficacy, and meet writing requirements. In addition, Students' perceived ease of use also has six indicators: Ease of Learning, Ease of Use, Clarity and Understandability, Flexibility and Adaptability, Minimal Effort Required, and User-Friendliness.

Students' perceived of usefulness (PU)

*Improved writing quality*

Students perceive AI tools as valuable aids in producing higher-quality writing due to the tools' ability to directly address common writing challenges. A key indicator of this perception is the belief that AI improves grammar, catching errors in syntax, punctuation, and mechanics that students might miss. Beyond error correction, students also perceive AI as helpful in expanding and refining vocabulary and suggesting stronger word choices and phrases to enhance the overall quality of their writing. Perhaps most importantly, students feel that AI enhances the clarity and coherence of their writing. This includes improvements in organization, logical flow of ideas, and the use of transitions to connect thoughts effectively. By addressing these fundamental aspects of writing, AI tools foster a perception among students that their writing is more polished, persuasive,

and, ultimately, of higher quality. There was a student who stated this, including the following participant's opinion:

> *Using AI improved the quality of my writing, especially after my lecturer taught me that AI can help us create perfect writing. For example, I use tools like Grammarly to check the grammar and usage of my writing, GPT chat is able to provide appropriate word choices, and other apps make my writing clear and cohesive (P5)*

This statement clearly demonstrates a perception of usefulness rooted in the belief that AI enhances writing quality. The user's perception is reinforced by external validation ("my lecturer taught me that AI can help us create perfect writing"), further solidifying their belief in AI's effectiveness. The specific examples provided by Grammarly for grammar and usage, GPT chat for word choice, and other apps for clarity and cohesion directly illustrate how AI tools are perceived as valuable for addressing specific writing weaknesses and improving overall writing quality. The users' reliance on these tools suggests a strong belief that they contribute to achieving "perfect writing," indicating a high degree of perceived usefulness in improving their work's technical and stylistic aspects.

*Increased efficiency in writing*

Students perceive AI writing aids as valuable tools for increasing efficiency and saving time and effort in their writing process. This perception is driven by several key indicators. Firstly, students experience a tangible time-saving benefit as AI tools reduce the time spent on various stages of writing, from planning and drafting to editing and formatting. This streamlined process allows them to complete assignments more quickly. Secondly, AI facilitates quick idea generation by assisting with brainstorming and offering content suggestions, effectively accelerating the initial stages of writing and overcoming writer's block. Finally, students find that AI simplifies complex writing tasks by breaking them down into smaller, more manageable steps. This task simplification makes the writing process less daunting and contributes to the overall perception that AI tools significantly enhance efficiency and reduce the effort required for successful writing. One of the participants in this study expressed his opinion about the efficiency of writing activities using AI writing apps:

> *In my opinion, the use of AI in learning is highly effective because it allows us to complete tasks in a short amount of time and requires less effort to obtain the information needed for writing (P2)*

This statement clearly demonstrates a perception of usefulness based on efficiency and reduced effort. The user perceives AI as highly effective because it facilitates faster task completion ("complete tasks in a short amount of time") and streamlines the information-gathering process ("requires less effort to obtain the information needed for writing"). This perception of usefulness is directly tied to the practical benefits of using AI, specifically its ability to save time and reduce the cognitive load associated with research and writing. The emphasis on speed and ease of access to information highlights the user's belief that AI significantly enhances productivity and makes the learning process more convenient and efficient.

*Improved students' self-efficacy in writing*

Students perceive that AI tools significantly boost their confidence in writing effectively and independently. This perception is built on several key indicators. Firstly, AI tools foster increased confidence in writing skills by providing guidance and constructive feedback, making students feel more capable and prepared for writing assignments. This support helps them overcome anxieties and approach writing tasks with greater assurance. Secondly, AI promotes autonomy in writing by enabling students to independently structure, edit, and refine their work with less reliance on external assistance. This newfound independence empowers them to take ownership of their writing process. Finally, as self-efficacy grows through successful interactions with AI tools, students develop a greater willingness to take on challenging writing tasks. They feel more motivated to attempt complex or unfamiliar assignments, knowing they have the support and skills to navigate the challenges effectively. In essence, AI tools contribute to a positive feedback loop, where successful writing experiences facilitated by AI assistance build confidence, foster independence, and encourage students to embrace more complex writing endeavours. This statement is evidenced by the opinion of one of the participants as follows:

> *with the use of ai in learning, I become more confident to write and do various writing tasks, and I can do it by myself (P9)*

This statement strongly reflects a perceived usefulness related to AI's impact on writing confidence and independence. The user perceives AI tools as enhancing their ability to perform writing tasks effectively and autonomously. This perceived usefulness stems from the belief that AI provides the necessary support and guidance to overcome writing challenges, leading to increased confidence in tackling various writing assignments independently. The phrase "I can do it by myself" indicates that the student believes AI has empowered them to take ownership of their writing process, suggesting a strong perception that AI is a valuable tool for improving writing skills and fostering self-reliance in writing tasks.

*Meeting writing requirement*

Students' perceptions of a tool's effectiveness in fulfilling assignment guidelines and expectations centre around its ability to ensure adherence to specific criteria. A primary indicator of this is the tool's capacity to guarantee that writing meets the precise instructions outlined in the assignment prompt, including requirements for word count, formatting, and overall structure. Furthermore, students value the tool's assistance with accurate citation and referencing, ensuring that their academic or professional writing adheres to required citation styles like APA, MLA, or Chicago. This feature helps maintain academic integrity and avoids plagiarism. Finally, students appreciate tools that consider the target audience, offering suggestions on how to adjust tone, style, and language to effectively communicate with the intended readers, whether they be academic peers, professionals, or the general public. These combined features contribute to the perception that the tool is instrumental in helping students successfully navigate and fulfil all aspects of their writing assignments. This kind of perception can be described by the following participants:

> *In my opinion, the use of AI is very suitable for my needs as a student because it allows me to complete writing tasks easily because I can adjust how many words, how the writing style is and can easily cite expert opinions (P11)*

This statement expresses a strong perception of usefulness based on the adaptability and control AI offers in completing writing tasks. The user perceives AI as highly suitable because it

provides customizable features that directly address their needs as a student. The ability to "adjust how many words" and control "how the writing style is" demonstrates perceived usefulness related to achieving specific assignment requirements and tailoring the output to desired preferences. Furthermore, the ease of "cit[ing] expert opinions" highlights a perceived usefulness in streamlining research and ensuring academic integrity.

Students perceived ease of use (PEOU)

*Ease of learning*

Students' perceived ease of learning for AI-based instruction hinges on how prepared they feel to use these tools. Key factors include the system's intuitiveness, ensuring that the interface and features are easy to understand and use without requiring complex instructions. Clear and concise guides or tutorials are essential for user comprehension, providing readily accessible information on effectively utilizing the system. The learning curve, or the time and effort required to become proficient, significantly impacts perceived ease of use. A steep learning curve can deter students, while a gradual and manageable curve promotes a more positive learning experience. Finally, the availability of robust support resources, such as help desks, FAQs, or online tutorials, is crucial in smoothing the learning process and addressing any challenges students may encounter. These factors collectively determine how easily students can adapt to and effectively utilize AI-based tools for academic writing. One participant stated this as follows:

*In my opinion, AI applications are very easy for us to learn how to use and very easy to access (P1)*

The statement, "In my opinion, AI applications are very easy for us to learn how to use and very easy to access," directly and strongly addresses Perceived Ease of Use (PEOU) within Davis's Technology Acceptance Model (TAM). The user explicitly states two key aspects of PEOU: ease of learning ("very easy for us to learn how to use") and ease of access ("very easy to access"). The first part emphasizes the low effort required to acquire the skills necessary to operate the AI applications, suggesting a minimal learning curve and intuitive design. The second part highlights the effortless availability and attainability of these applications, encompassing factors such as ease of downloading, online accessibility, and potentially low cost or technical requirements. While the statement's primary focus is PEOU, it implicitly suggests a level of Perceived Usefulness (PU). The user wouldn't likely comment on the ease of use and access if they didn't perceive some value or benefit in using the applications in the first place. However, PU is not explicitly articulated; the statement focuses solely on the ease of interacting with and obtaining the technology. The positive language ("very easy") clearly indicates a positive attitude towards the applications, stemming directly from the high PEOU. This positive attitude, in turn, strongly suggests a high behavioural intention to use AI applications. In summary, this statement provides a clear example of how a strong perception of ease of use can drive positive attitudes and potential adoption, even without explicitly mentioning specific benefits or usefulness. It underscores the crucial role of user-friendly design and accessibility in promoting technology acceptance.

*Ease of use*

Students generally find AI writing tools user-friendly due to their intuitive design and focus on streamlined functionality. These tools prioritize simplicity of operation, requiring minimal training or technical expertise to navigate and utilize effectively. This ease of use is further enhanced by their efficiency in task completion, enabling users to accomplish writing tasks quickly and effortlessly, minimizing the time and cognitive load associated with the process. Moreover,

accessibility is a key factor, with essential features and functions readily available and easily accessible. The design often adapts to diverse user needs and preferences, ensuring a smooth and efficient user experience for all. Finally, error minimization is crucial, as these tools are designed to reduce the likelihood of user errors by providing clear guidance and suggestions, minimizing frustration, and ensuring a smoother writing process. These combined factors contribute to a positive user experience, making AI writing tools accessible and user-friendly for students of varying technical proficiencies. The following are students' opinions that imply this:

> *AI is very easy to operate because its applications are very simple (P8)*

The statement "AI is very easy to operate because its applications are very simple" reflects a limited understanding of perceived ease of use. While the simplicity of AI applications is a contributing factor, it's not the sole determinant. Perceived ease of use encompasses a broader spectrum of factors, including the user's overall experience with the AI system. This includes the intuitiveness of the user interface, the clarity of instructions, the ease of learning and navigating the system, and the availability of helpful resources and support. For example, an AI application with a complex interface may not be perceived as easy to use, even if its core function is simple. Conversely, an application with a sophisticated function may still be perceived as easy to use if it has a well-designed interface, clear instructions, and readily available support. Therefore, while the simplicity of AI applications plays a role, a more nuanced understanding of perceived ease of use requires considering the user's overall experience with the system, including its design, functionality, and support.

*Flexibility and adaptability*

Students perceive AI writing tools as adaptable due to their versatility in handling various writing tasks and their potential to cater to diverse learning styles. These tools can assist with various writing formats, from essays and research papers to creative writing and summaries, offering features like brainstorming, outlining, drafting, and editing. This adaptability allows students to use the same tool across different assignments and disciplines. Furthermore, AI tools can accommodate different learning styles by providing various forms of feedback and support. Visual learners might benefit from highlighted errors and colour-coded suggestions, while auditory learners could utilize text-to-speech features. The ability to customize settings and choose from different functionalities allows students to tailor the tool to their specific needs and preferences, creating a more personalized and effective learning experience. This is reinforced by the statements of several students, one of which is as follows:

> *In personalized learning, AI is very helpful because its easy access allows it to adapt to the learning needs and preferences of the user. Additionally, AI offers a more engaging and flexible tutoring system (P13)*

This statement focuses almost entirely on Perceived Ease of Use (PEOU) within Davis's Technology Acceptance Model (TAM). The user directly addresses the effort required to use AI, stating that it "does not require special skills or intense training." This directly translates to a perception of low effort and ease of interaction with the technology. The justification provided, "because the application is very easy to use," further reinforces this focus on PEOU. This explanation suggests that the user attributes the lack of required skills or training to the inherent simplicity and user-friendliness of the AI applications themselves. This simplicity could be due to

factors like intuitive interfaces, clear instructions, and straightforward functionality. The user's focus is on how easy AI is to use, not necessarily on what benefits it provides. It's reasonable to infer that the user sees *some* value in using AI; otherwise, the ease of use would be irrelevant. The positive sentiment ("very easy to use") expresses a positive attitude, which is directly linked to the high PEOU. This positive attitude, in turn, suggests a higher likelihood of behavioral intention to use the technology. In summary, this statement is a clear example of how a strong perception of ease of use can drive positive attitudes and potential adoption, even without explicit mention of specific benefits or usefulness. It underscores the importance of user-friendly design in promoting technology acceptance.

*User-friendliness*

Students perceive AI writing tools as user-friendly and intuitive due to a combination of factors, including their simplified interfaces, reliance on natural language processing, and integration with familiar digital environments. Most AI writing platforms feature clean layouts with clear instructions and readily accessible functions, minimizing the need for extensive technical expertise. The use of natural language processing allows students to interact with the tools using everyday language, making input and navigation feel natural. Furthermore, many AI tools are accessible through web browsers or integrate with commonly used software, leveraging students' existing familiarity with these digital environments. This convergence of simplified design, natural language interaction, and integration with familiar platforms contributes to the overall perception of these tools as being user-friendly and intuitive to operate. This is illustrated by the following student statements:

> *The use of AI in learning academic writing is very friendly to each user and is able to respond to the user's wishes very easily (P2)*

This statement strongly emphasizes Perceived Ease of Use (PEOU) within Davis's Technology Acceptance Model (TAM) while also touching upon aspects of Perceived Usefulness (PU) related to responsiveness and personalization. The phrase "very friendly to each user" directly addresses the user-friendliness of the AI system, a key component of PEOU. This suggests that the AI tools are perceived as intuitive and easy to navigate and require minimal effort to learn and operate. The second part of the statement, "is able to respond to the user's wishes very easily," further reinforces PEOU by highlighting the system's responsiveness and adaptability to user input. This suggests that users perceive the AI as readily understanding and fulfilling their requests, further reducing the effort required to achieve desired outcomes. While the primary focus is on ease of use, the concept of "responding to the user's wishes" also touches upon PU. This suggests that AI is not only easy to use but also effective in meeting individual user needs and preferences, indicating a degree of personalization and adaptability that contributes to its perceived usefulness. The positive language ("very friendly," "very easily") clearly indicates a positive attitude towards using AI in academic writing, driven by the strong perception of the ease of use and the system's responsiveness. This positive attitude, in turn, suggests a higher likelihood of behavioral intention to use the technology. In summary, this statement primarily highlights PEOU through its emphasis on user-friendliness and responsiveness while also implicitly suggesting a degree of PU related to personalization and meeting user needs. This demonstrates the importance of ease of use as a key driver of technology acceptance, particularly in educational contexts where user experience can significantly impact adoption rates.

**Discussion**

The findings presented offer valuable insights into student perceptions of AI-based instruction in academic writing. These perceptions centered around Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are crucial for understanding the potential adoption and effectiveness of AI tools in this educational context.

Perceived usefulness (PU): The driving force behind acceptance

The indicators of Perceived Usefulness (PU) demonstrate that students' attraction to AI writing tools is fundamentally rooted in the tangible benefits these tools offer for enhancing their writing and overall academic performance. Students are not simply adopting AI for novelty's sake; rather, they are drawn to the practical advantages they perceive in using these technologies. These perceived benefits encompass a range of improvements, from enhanced writing quality (e.g., better grammar, clearer arguments, improved organization) to increased efficiency in the writing process (e.g., time saved on editing and formatting) and even enhanced learning outcomes (e.g., improved understanding of writing concepts and self-assessment of writing skills). This focus on tangible outcomes suggests that students view AI as a valuable tool for achieving their academic goals, whether those goals are related to producing higher-quality work, managing their time more effectively, or developing a deeper understanding of the writing process itself. This emphasis on concrete benefits underscores the importance of clearly communicating the practical advantages of AI writing tools to encourage student adoption and engagement.

The perception that AI improves writing quality is a significant driver of Perceived Usefulness (PU) within Davis's Technology Acceptance Model (TAM). Students' belief that AI tools contribute to higher-quality writing directly influences their acceptance and adoption of these technologies. This perception of improved quality is multifaceted, encompassing several key aspects of writing. Firstly, students recognize AI's ability to enhance the mechanical correctness of their writing (Song & Song, 2023). Tools that automatically detect and correct grammatical errors, spelling mistakes, and punctuation issues contribute to a sense of polished and professional output. Secondly, students perceive that AI can improve the clarity and coherence of their arguments. By analyzing text for logical flow, identifying potential weaknesses in reasoning, and suggesting improvements in structure and transitions, AI assists in crafting more persuasive and effective arguments. AI tools are seen as beneficial for enhancing the overall organization of written work. They can help students structure their ideas logically, create coherent outlines, and ensure smooth transitions between paragraphs, resulting in a more organized and reader-friendly final product. This personalized approach not only boosts engagement but also helps students develop their language skills more effectively, accelerating their progress and improving overall proficiency (Yong, 2020). This holistic perception of improved writing quality, encompassing mechanics, argumentation, and organization, significantly contributes to the perceived usefulness of AI writing tools and positively influences students' attitudes and intentions towards using them. Emerging AI-powered writing tools have the potential to enhance students' writing proficiency, providing them with real-time feedback, personalized guidance, and improved efficiency in the writing process (Dong, 2023).

Students are drawn to AI writing tools largely due to the perception that these tools increase efficiency and enhance learning, both key components of Perceived Usefulness (PU) in TAM. The perceived efficiency comes from AI's ability to automate tedious tasks like grammar checking, citation formatting, and even drafting, freeing students to focus on higher-level writing aspects

like developing ideas and refining arguments. This saves time and reduces effort, which is especially valuable for students with multiple deadlines. These AI-powered tools have demonstrated remarkable capabilities in enhancing efficiency and elevating the learning experience, paving the way for a more personalized and dynamic educational ecosystem (Zastudil et al., 2023). Simultaneously, students see AI as a learning tool, not just a shortcut. The feedback provided by AI goes beyond simple error correction, offering explanations and suggestions for improvement in grammar, style, and argumentation. Some AI tools also offer interactive exercises and personalized learning paths, allowing students to practice and track their progress. AI solutions can provide personalized feedback for students, support teachers in assessment activities, and assist in the creation of high-quality educational content (Mello et al., 2023). This combination of increased efficiency and enhanced learning, including improved understanding of writing principles and promotion of self-reflection, strongly contributes to the perceived usefulness of AI writing tools and encourages their adoption.

The belief that using AI tools will lead to improved grades is a powerful driver and significantly influences students' adoption of these technologies for academic writing. Grades serve as a primary metric of academic success for students, and the perception that AI can positively impact this metric creates a strong incentive for its use. This belief stems from the understanding that AI can assist with various aspects of writing that directly contribute to higher grades, such as ensuring grammatical accuracy, improving clarity and organization, strengthening argumentation, and adhering to specific formatting and citation styles. Similarly, research on the integration of AI and computational sciences in the learning process has demonstrated a positive impact on student attitude, motivation, and performance, particularly in STEM-related subjects. (García-Martínez et al., 2023). By addressing these areas, AI tools are perceived as reducing the risk of errors that could negatively affect grades and increasing the likelihood of producing polished, well-structured, and persuasive writing that meets or exceeds assignment criteria. This direct link between AI usage and the desired outcome of improved grades significantly strengthens the perception of the technology's usefulness and fosters a positive attitude toward its adoption. Consequently, this belief in grade improvement becomes a key factor in predicting students' behavioral intention to use AI tools for their academic writing.

The perception that AI tools help students meet specific writing requirements is a significant contributor to Perceived Usefulness (PU). Academic writing assignments often come with detailed instructions regarding formatting, citation styles (e.g., APA, MLA, Chicago), length, and specific content expectations. Furthermore, AI tools like automated essay scoring systems (e.g., E-rater, Grammarly) offer instant feedback on grammar, style, and coherence (Gerlich, 2025). Students perceive AI as valuable because it can assist in navigating and adhering to these diverse requirements. For example, AI tools can automate citation formatting, ensuring accuracy and consistency and thus reducing the risk of plagiarism and improving the overall presentation of the work. Similarly, some AI tools can analyze text for adherence to specific style guides, flagging potential issues with tone, word choice, or sentence structure. Another study, "Application of Artificial Intelligence Powered Digital Writing Assistant in Higher Education" (Nazari et al., 2021), also supports the benefits of AI writing tools, particularly for non-native English speakers in postgraduate studies. AI-based personalized learning platforms can analyze student data and tailor the learning experience to individual needs, leading to improved learning outcomes and increased student engagement (Kamalov & Gurrib, 2023). By simplifying the process of meeting these technical and stylistic requirements, AI reduces the cognitive load on students, allowing them to focus on the content and argumentation of their writing. This perception of AI as a tool that

facilitates compliance with assignment guidelines directly contributes to its perceived usefulness, fostering positive attitudes and increasing the likelihood of adoption among students seeking academic success.

Students' adoption of AI writing tools is strongly driven by the perceived usefulness (PU) of these tools for specific writing tasks, a key concept in TAM. AI offers targeted support throughout the entire writing process. Brainstorming can generate ideas and organize thoughts; during drafting, it assists with text generation and sentence structure; in revision, it identifies errors and inconsistencies; and in editing, it helps with proofreading and formatting. This task-specific support enhances the overall perceived usefulness of AI, making students more likely to adopt and use these tools for various stages of their writing workflow, ultimately fostering a positive attitude and increasing adoption rates. In one study (Dong, 2023), students used an AI tool and, while initially surprised by the feedback, ultimately found it helpful in identifying areas for improvement in their writing. These tools, designed to provide real-time feedback, personalized guidance, and efficient grading, have the potential to revolutionize the way students engage with and improve their academic writing skills. (Sari, 2024) (Dong, 2023).

Perceived ease of use (PEOU): Enabling effective utilization

While Perceived Usefulness (PU) is a primary driver of technology adoption according to TAM, Perceived Ease of Use (PEOU) is a crucial supporting factor. Even if students recognize the potential benefits of AI writing tools, if they perceive these tools as complex, difficult to learn, or cumbersome to use, their perceived usefulness is significantly diminished. A highly useful but difficult-to-use tool is less likely to be adopted than a moderately useful but easy-to-use one (Liang et al., 2023). The indicators of PEOU highlight that students are more inclined to integrate AI into their writing process when they find the tools intuitive, requiring minimal effort to learn and operate. This ease of interaction fosters a positive user experience, making the perceived benefits of the technology more readily accessible and encouraging sustained use. Therefore, while PU creates the initial attraction, PEOU ensures that the perceived benefits are realized in practice, ultimately driving the adoption and effective integration of AI writing tools.

Ease of Learning, a key component of Perceived Ease of Use (PEOU), plays a crucial role in adopting AI writing tools (Shi-ying et al., 2021). If students perceive that AI tools are easy to learn, they are more likely to view them as usable and potentially useful. A low learning curve implies that students can quickly grasp the tool's functionalities, navigate its interface, and understand its output without requiring extensive training or technical expertise. This ease of learning reduces the perceived effort associated with using the technology, making it more appealing and less intimidating. When students can quickly become proficient with AI writing tools, they are more likely to explore their features, experiment with different applications, and ultimately integrate them into their writing workflow. This ease of learning directly contributes to a positive user experience (Mali, 2022). It reinforces the overall perception of ease of use, which, in turn, positively influences students' attitudes towards and intention to use AI in their academic writing.

Clarity and understandability directly impact the adoption of AI writing tools. Suppose the feedback and information generated by AI are presented in a confusing or complex manner. In that case, students are less likely to perceive the tools as easy to use, even if they are technically functional (Roscoe et al., 2017). Clear and understandable output ensures that students can readily interpret the AI's suggestions, identify areas for improvement in their writing, and effectively apply

the feedback to enhance their skills. This clarity encompasses several aspects: the language used should be concise and accessible, technical jargon should be minimized or explained, and the presentation of information should be visually clear and well-organized. When students can quickly grasp the meaning and implications of the AI's output, they are more likely to perceive the tool as user-friendly, reducing the cognitive effort required to utilize it effectively. This enhanced understandability directly contributes to a higher PEOU, positively influencing students' attitudes towards and intention to use AI in their academic writing (Açikgöz & Perez-Vega, 2021).

Flexibility and adaptability greatly impact how students adopt AI writing tools. Suppose students find these tools adaptable to different writing tasks, like essays or reports, and accommodating to various learning styles (Song & Song, 2023). In that case, they perceive them as easier to use and, therefore, more useful. Flexibility means the tool works well with different writing formats and purposes, while adaptability means it adjusts to individual learning preferences and skill levels. Features like customization options and personalized learning paths enhance this adaptability. When AI tools fit seamlessly into students' existing workflows and cater to their individual needs, they feel more in control and find the tools easier to use, leading to a higher PEOU and increased likelihood of adoption (Chen et al., 2020).

The minimal effort required significantly affects students' acceptance of AI writing tools. This concept refers to the extent to which students believe that using these tools is free from mental and physical strain (Fontenelle-Tereshchuk, 2024). If students perceive that interacting with AI requires excessive cognitive load, complex procedures, or cumbersome interfaces, they are less likely to adopt it, even if they recognize the potential benefits. Conversely, when students feel that using AI tools is straightforward, intuitive, and requires minimal effort, they are more likely to perceive them as easy to use (Barret et al., 2019). This perception of low effort can be achieved through automated processes, clear and concise instructions, intuitive navigation, and seamless integration with existing workflows. When students experience using AI as a smooth and effortless process, it enhances their overall perception of ease of use, positively influencing their attitudes towards the technology and increasing their intention to use it in their academic writing.

User-friendliness is crucial for student acceptance of AI writing tools. When students perceive these tools as user-friendly and intuitive, they are more likely to find them easy to use, directly influencing their intention to adopt and utilize them. User-friendliness encompasses a variety of factors that contribute to a positive user experience, such as a clear and intuitive interface, easy navigation, simple and understandable instructions, and consistent functionality. An intuitive design allows students to quickly grasp how to use the tool without extensive training or complex manuals (Scherer et al., 2018). When AI tools are perceived as user-friendly, students experience a sense of comfort and control, reducing the cognitive load and frustration often associated with learning new technologies. This positive perception of user-friendliness directly contributes to a higher PEOU, which in turn fosters positive attitudes towards AI writing tools and increases the likelihood of their adoption and effective integration into students' academic writing practices.

## Conclusion

Student perceptions of artificial intelligence-based instruction are primarily positive and shaped by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Students are attracted to AI due to the tangible benefits it offers, which contribute to a strong PU. These benefits include improved writing quality, enhanced grammar, clearer argumentation, and better organization; increased efficiency through time and effort savings on tasks like formatting and drafting; and

enhanced learning via feedback and self-reflection promotion. The belief that AI can lead to improved grades and facilitate meeting specific writing requirements further strengthens PU. Moreover, students perceive AI as particularly useful for various stages of the writing process, from brainstorming to final editing. However, the analysis also highlights the crucial role of PEOU. Even highly useful tools are unlikely to be adopted if perceived as difficult to use. Factors contributing to PEOU include ease of learning the tool's functionalities, the clarity and understandability of AI-generated feedback, flexibility and adaptability to different writing tasks and learning styles, minimal effort required for use, and overall user-friendliness through an intuitive interface and easy navigation. This analysis underscores the interconnectedness of PU and PEOU. While PU generates the initial attraction to AI writing tools by highlighting their potential benefits, PEOU ensures that these benefits are readily accessible and realized in practice. Ultimately, both PU and PEOU are essential for fostering positive attitudes towards AI and increasing the likelihood of its adoption and effective integration into students' academic writing workflows.

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