

Perplexity AI on the Writing Efficiency of EFL Students in Higher Education: Students' Insights

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Abstract. *This research investigates the perceptions of eighth-semester students majoring in English Language Education at a university in North Sumatra regarding the use of Perplexity AI to enhance writing efficiency for English as a Foreign Language (EFL) learners. Surveys were distributed to gather data on students' views regarding the ease of use, knowledge enhancement, satisfaction, motivation, and engagement facilitated by Perplexity AI. The findings reveal that the majority of respondents perceive Perplexity AI positively, acknowledging its role in improving understanding, facilitating knowledge discovery, optimizing time usage, motivating learning, and enhancing productivity. These results provide insights into the potential of Perplexity AI to augment language learning processes and inform the integration of technology in English language education. While the study offers valuable insights, its generalizability may be limited by the sample size and context specificity. Future research should aim to broaden the participant pool and refine Perplexity AI's features to maximize its effectiveness in supporting EFL learners' writing proficiency.*

Keywords: AI, Students' Insights, Technological Integration, Writing Efficiency

Introduction

The use of technology in teaching English has been essential (Ahmadi, 2018; Gilakjani, 2017; Liang, 2021). The way English is taught has changed significantly as an outcome of technology integration into education, and it has become a crucial part of modern teaching methods (Haleem et al., 2022; Ahmadi, 2018). Technological developments have given educators a variety of tools and resources to improve their students' language learning experiences. A variety of internet resources and tools that focus on various aspects of learning a language, including vocabulary, grammar, listening, reading, and speaking comprehension is one of the main advantages (Chun et al., 2016; Rahman Hz & Daulay, 2021; Newton & Nation, 2020). In addition to making teaching English more lively and personalized, technology gives students the tools they need to get digitally literate to prepare for the challenges of the workforce of the 21st century (van Laar et al., 2017; Hz et al., 2023). In essence, technology appears essential in the English classroom, improving student performance and creating a more participative and comfortable environment (Ahmadi, 2018; Kaur, 2019; Chen Hsieh et al., 2017).

Technology serves a dual role in advancing knowledge discovery and optimizing time efficiency (Agustina et al., 2023; Haleem et al., 2022; Javaid et al., 2020). In the realm of knowledge acquisition, technological advancements, such as artificial intelligence, high-level data analysis, and cloud computing, expedite research processes and enable scientists to analyze vast datasets with greater efficiency. This not only facilitates global collaboration but also provides swift access to abundant informational resources, fostering a more effective

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and innovative environment for the creation of new knowledge (Szymkowiak et al., 2021; Van Den Berg, 2019; Agustina et al., 2023).

Concurrently, technology plays a crucial role in optimizing time efficiency for both individuals and organizations. Through the integration of diverse technological tools and innovations, processes are streamlined, monotonous tasks are automated, and overall efficacy is augmented. Tools such as digital calendars, communication platforms, and time management applications ensure efficient coordination and collaboration, guaranteeing timely task completion. The incorporation of predictive analytics, driven by artificial intelligence and machine learning, further enhances resource allocation and planning. This technological support enables individuals and organizations to focus on strategic initiatives, fostering increased productivity and overall performance across various sectors (H. Chun et al., 2015; Kamal, 2020).

In writing, technology can be used to improve students' writing accuracy (Hz et al., 2023; Lim & Phua, 2019; Barrot, 2023). A variety of technologies exist to support and improve writing accuracy, including Perplexity AI, ChatGPT, AI Essay Writer, Simplified, and others. These apps have been used to help people improve the accuracy of their writing. These apps are essential in helping users develop and polish their texts and offer helpful support in reaching higher writing accuracy. For instance, Perplexity AI application. These apps were launched in August 2022 and have been used by more than 500,000 users according to the number of downloads in the Play Store and App Store. Because accuracy is a main goal, this application was specially designed to motivate and improve students' writing skills. By using these innovative tools, teachers can help students develop a more precise and error-conscious writing style and also offer them a fun and engaging site to practice accuracy in real-life situations. Thus, the integration of these technologies is essential to modernizing and improving writing skills (Stanojević et al., 2018; Ghavifekr & Rosdy, 2015; Kasneci et al., 2023).

In real classroom conditions, researchers have observed a substantial number of students experiencing difficulties in writing well. As noted by (Kumayas & Lengkoan, 2023; Qamariah et al., 2020; Handayani & Johan, 2018), these difficulties manifest in various forms, including struggles with grammar, such as subject-verb agreement, tenses, punctuation, and sentence structure. These observed challenges underscore the necessity for targeted interventions to address these writing hurdles and enhance students' overall proficiency.

This technology can be used in places where researchers study to help students who have difficulty in writing. Through contextual observation, researchers have noted that a large number of students continue to have difficulty writing well. As stated by (Kumayas & Lengkoan, 2023; Qamariah et al., 2020; Handayani & Johan, 2018) these difficulties come in many forms, including difficulties with grammar, which include subject-verb agreement, tenses, punctuation, and sentence structure. The observed difficulties highlight the need for targeted interventions to address these writing challenges and enhance students' overall proficiency.

Previous research has investigated the effects of Artificial Intelligence on EFL students' writing skills, both on a global scale and in the Indonesian context (Gayed et al., 2022; Nazari et al., 2021; Hz et al., 2023; Marzuki et al., 2023). These studies investigated various perspectives including students' perspectives regarding Artificial Intelligence (AI) on writing skills, which then produced various conclusions. However, evidence regarding EFL students' perspectives on writing skills using Perplexity AI is still limited, because this application is relatively new in the world of technology. Therefore, students need to use Perplexity AI to enhance their writing skills, as this tool delivers more accurate and focused feedback. Perplexity AI assists students in identifying areas that require improvement, such as grammar, sentence structure, and word choice, by evaluating the writing's complexity and clarity. This helps students improve their writing skills in a focused and effective way. Additionally, using this technology makes learning deeper and more interactive while preparing students for the increasingly complex communication needs of the real world.

Teaching writing with Perplexity AI is hypothesized to offer significant benefits for students. The integration of Perplexity AI into writing instruction holds the potential to enhance various aspects of students' writing skills. By providing real-time feedback and personalized guidance, the application can assist students in refining their grammar, vocabulary, and overall writing proficiency. The interactive nature of Perplexity AI fosters an engaging learning experience, allowing students to practice and improve their writing in a dynamic virtual environment. Additionally, the adaptability of the AI system enables it to cater to individual learning needs, promoting a personalized and effective learning journey. As this hypothesis is explored further, it is anticipated that Perplexity AI could emerge as a valuable tool in the educational arsenal, contributing to the development of more competent and confident writers among students. To that extent, this study aims to investigate the effect of the use of Perplexity AI in the writing skills process from the perspective of students.

Theoretical Framework

The theoretical framework for this study is grounded in the principles of educational technology integration, writing instruction, and language acquisition theories. Firstly, it draws from educational technology integration theories, emphasizing how the incorporation of tools like Perplexity AI can enhance language learning experiences through personalized feedback and interactive learning environments (Haleem et al., 2022; Chun et al., 2016). Secondly, it integrates theories of writing instruction and feedback mechanisms, highlighting the significance of timely and targeted feedback in improving writing skills (Lim & Phua, 2019; Barrot, 2023). Lastly, the framework incorporates theories of language acquisition and proficiency development, recognizing that effective writing instruction must address grammar, vocabulary, and overall writing proficiency (Ahmadi, 2018; Newton & Nation, 2020). By synthesizing these theoretical perspectives, the study aims to investigate how the utilization of Perplexity AI influences EFL students' writing efficiency and proficiency.

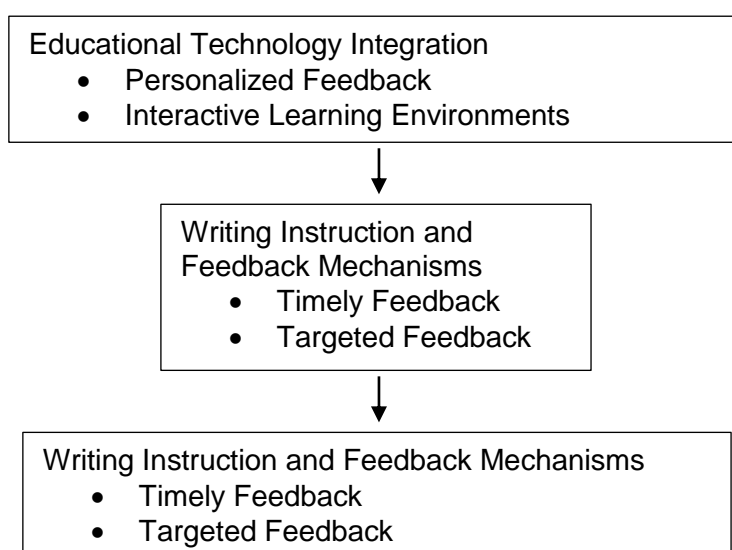


Figure 1.

The principles of educational technology integration, writing instruction, and language acquisition

Material and Method Design

A qualitative case study is the most appropriate method for this research because it is going to explore students' perceptions regarding the effect of using Perplexity AI on the efficiency of writing English texts. According to (Baxter & Jack, 2008) case studies are a kind of research that makes it easier to investigate a phenomenon in its context by showing and comprehending various aspects of phenomena through the use of various information

sources. Using this method will give researchers a comprehensive understanding of how students perceive the application of Perplexity AI and how it affects their ability to write English texts efficiently. Several information sources will shed light on the phenomenon and enable an in-depth investigation of contextual factors that could affect these perceptions because of the case study's set of information sources.

Participants and Techniques of Data Collection

The research used purposive sampling to select a sample of 39 English education studies with previous experience writing English texts in a university located in the North Sumatra Province. Because all of the participants were also a student in university, the selection of the participants was based on their proficiency and experience writing texts in English as well as their involvement in English education. The participants ranged in age from 21 to 22 years old and had intermediate English language proficiency. Students are allowed to use mobile phones in class, and their teacher allows them to use the application. The research will be set up in a city with widely available internet access.

This qualitative research employed two primary data collection methods: a modified questionnaire incorporating elements from specific teaching methods or learning approaches (Jurgelaitis et al., 2019) and semi-structured interviews. These approaches were utilized to thoroughly investigate and comprehend the influence of Perplexity AI on the writing efficiency of EFL students in higher education, as revealed through the perspectives of the students. The adapted questionnaire, inspired by (Jurgelaitis et al., 2019) concentrated on qualitative aspects related to incorporating Perplexity AI into writing instruction, aiming to capture the nuanced experiences and perceptions of students engaging with this technology. Simultaneously, semi-structured interviews facilitated a more in-depth qualitative exploration, enabling students to express their distinctive viewpoints and illuminate the complexities of their interactions with Perplexity AI. By employing this qualitative methodology, the study sought to reveal detailed, context-specific insights into how EFL students perceive and navigate the integration of AI in enhancing their writing efficiency within the realm of higher education.

Technique of Data Analysis

There were two methods used to analyze the data, namely quantitative and qualitative. In quantitative, the results of the student questionnaires will be analyzed to produce a variety of assessments of how this application is perceived by the students. This involves using statistical techniques to collect a variety of assessments about how students perceive this application. In qualitative, the interview results will be developed and given a deeper analysis. Qualitative analysis aims to provide a comprehensive and in-depth analysis of the information collected from the interviews. To gain a deeper understanding of the subjective experiences and perspectives related to the use of the apps, a deeper interpretation of participant responses is required.

Results and Discussion

Results

The research information was gathered by giving out surveys to students in their eighth semester studying English Language Education at a university in North Sumatra. The surveys were given to all eighth-semester students, and the obtained results include data about how students see the use of Perplexity AI in making writing more efficient for those learning English as a Foreign Language (EFL) in college. The questions in this survey are grouped into several indicators that align with the research variables, including ease, knowledge, satisfaction, motivation, and activeness. The following is the overall graph of the percentage of respondents for each indicator.

Table 1.

The Response to Statement Perplexity AI is Easy to Understand

Statements	Respondents	Percentages (%)
Strongly Agree	7	17,95%
Agree	23	59%
Neutral	8	20,51%
Disagree	1	2,56%
Strongly Disagree	-	-

The presented data indicates that 39 respondents have provided feedback on a statement or question related to the Perplexity of AI is easy to understand. About 17,95% of respondents or 7 individuals stated strongly agree, while the majority of respondents, approximately 59% stated agree. Around 20,51% or 8 respondents, remain neutral on the statement. Only one respondent, approximately 2,56% stated disagreed, and there is no indication of strongly disagreement.

Based on the data, it can be concluded that the majority of respondents tend to agree or strongly agree that Perplexity AI is easy to understand with a small portion holding a neutral stance, and almost none expressing disagreement. Therefore, it can be inferred that respondents generally have a positive perception regarding the ease of understanding the Perplexity of AI.

Table 2.

The Response to Statement Perplexity AI Assist in Discovering New Knowledge

Statements	Respondents	Percentages (%)
Strongly Agree	7	17,95%
Agree	30	77%
Neutral	2	5,13%
Disagree	-	-
Strongly Disagree	-	-

From the provided data, it can be concluded that 77% of the total 39 respondents agree, and 17,95% strongly agree with the statement that Perplexity AI assists in discovering new knowledge." In contrast, only about 5,13% hold a neutral perspective on the statement, with no respondents expressing disagreement or strong disagreement.

The conclusion drawn is that the majority of respondents express support for the statement, indicating a positive perception of the role of Perplexity AI in facilitating the discovery of new knowledge. The lack of respondents expressing disagreement or strong disagreement also reflects a substantial consensus among them regarding the positive role of Perplexity AI being perceived as beneficial in facilitating the search for and understanding of new knowledge for users.

Table 3.

The Response to Statement Perplexity AI Help Use Time as Efficiently as Possible

Statements	Respondents	Percentages (%)
Strongly Agree	10	25,64%
Agree	26	67%
Neutral	3	7,69%
Disagree	-	-
Strongly Disagree	-	-

From the data results, it can be observed that the highest percentage is in the agreed category, reaching 67% of the total respondents, equivalent to 26 individuals. This indicates that the majority of respondents hold a positive view regarding the statement that Perplexity

AI helps use time as efficiently as possible. Additionally, 25,64%, or 10 respondents, strongly agree, contributing positively to the overall perception of the role of Perplexity AI in optimizing time usage.

Although there is a small number of respondents, approximately 769% or 3 individuals, who remain neutral on the statement, the dominance of agreement and the absence of negative responses suggest a solid consensus regarding the effectiveness of Perplexity AI in facilitating efficient time usage. Therefore, it can be concluded that there is strong support for the positive view regarding the effectiveness of Perplexity AI in optimizing time usage.

Table 4.

The Response to Statement Perplexity AI Can Motivate to be More Competent in Writing English

Statements	Respondents	Percentages (%)
Strongly Agree	6	15,38%
Agree	21	54%
Neutral	9	23,08%
Disagree	3	7,69%
Strongly Disagree	-	-

The data indicates that out of a total of 39 respondents, approximately 15,38% or 6 respondents strongly agree, while the majority, around 54% or 21 respondents agree with the statement that Perplexity AI can motivate them to be more competent in writing English. There are 9 respondents, or approximately 23,08%, who hold a neutral position on the statement. A small number, about 7,69% or 3 respondents, express disagreement, while none strongly disagree.

Based on the data, it can be concluded that the majority of respondents have a positive view regarding the statement, with a small portion expressing disagreement. The presence of neutral respondents indicates some variation in perspectives regarding the ability of Perplexity AI to motivate individuals to become more competent in writing English.

Table 5.

The Response to Statement Perplexity AI Can Enhance Productivity

Statements	Respondents	Percentages (%)
Strongly Agree	4	10,26%
Agree	17	44%
Neutral	15	38,46%
Disagree	2	5,13%
Strongly Disagree	1	2,56%

The data indicates that the majority of respondents, around 44% or 17 individuals, agree with the statement that Perplexity AI can enhance productivity. Meanwhile, approximately 38.46% or 15 respondents remain neutral on the statement. The number of respondents who strongly agree is 10,26% or 4 individuals. On the other hand, only about 5,13% or 2 respondents express disagreement, and 2,56% or 1 respondent strongly disagrees.

Considering the largest number of respondents who agree, it can be concluded that the majority hold a positive view regarding the Perplexity AI's capability to enhance productivity. Despite some respondents being neutral and a small portion expressing disagreement, the majority provide support for the statement. So Perplexity AI has the potential to enhance productivity, and the majority of respondents responded positively to the statement.

Discussion

Overall, Perplexity AI has received positive feedback from students in this research environment. In the development of the questionnaire, students consistently expressed that they find Perplexity AI easy to understand, helpful in discovering new knowledge, and significantly facilitating the use of time in the writing process. From the gathered data, it is evident that students not only view Perplexity AI as a helpful tool but also as a motivator that encourages them to be more competent in writing in English. The increase in motivation is identified as a factor that enriches their learning experience. Furthermore, it is observed that the overall use of Perplexity AI enhances the productivity of students in producing written work. These findings provide a deeper understanding of the positive contributions of Perplexity AI to the efficiency and writing skills of EFL students in higher education. Therefore, the results of this research serve as a strong foundation to support the implementation of Perplexity AI in the context of English language learning at the university level.

In the context of time efficiency in the use of perplexity AI, the average score of 4,3% indicates that this technology has proven to be a highly efficient tool in supporting the learning process for students. This high achievement not only signifies that perplexity AI is highly valued for its positive contribution to time efficiency but also reflects the satisfaction and comfort level of students with its usage. Students believe that this technology can enhance their understanding and processing of learning materials, enabling them to utilize their time more optimally. Thus, the adoption of perplexity AI in the learning environment not only has the potential to improve learning efficiency but also creates a more adaptive and high-quality learning experience for students.

In the evaluation context, a low rating of 3,9% for Perplexity AI responses, indicating difficulties in understanding, highlights a substantial challenge in the technology's ability to provide clear and comprehensible answers. This rating reflects significant user dissatisfaction with the quality of the generated responses. The importance of addressing this issue is underscored by the need for substantial improvements in Perplexity AI's communication aspects, including clarity, readability, and contextual relevance. Efforts should be directed toward enhancing the technology's capability to deliver responses that not only meet but exceed user expectations. The pursuit of perfection in readability and comprehension is crucial for both improving current ratings and ensuring that users derive significant value from the application of Perplexity AI in problem-solving and information-delivery scenarios.

The findings of this research indicate that the use of Perplexity AI can improve students' writing performance by providing explanations or answers that are easy to understand following the statements in Table 1. These results align with statements made by previous researchers such as (Ahmadi, 2018; Kaur, 2019; Chen Hsieh et al., 2017), asserting that technology in English language learning should be employed to facilitate human tasks. In essence, perplexity AI is recognized for significantly easing the learning process for students in the domain of writing. This discovery contributes positively to the general notion that the integration of technology, particularly perplexity AI, can serve as an effective means to improve students' abilities and performance in the context of English language learning, providing meaningful additional support to their writing processes.

Respondent 1 highlights the exceptional impact of Perplexity AI on writing. Perplexity AI excels in explaining complex concepts clearly and provides detailed feedback for immediate error correction. This experience enhances the respondent's awareness of writing weaknesses and boosts confidence. Based on the interview with Respondent 1, it can be concluded that the use of Perplexity AI significantly improves writing quality, serving as both a tool and a guiding source for enhanced performance.

The other result of our research indicates that Perplexity AI can assist in discovering new knowledge under the statements in Table 2. Modern technology has opened wide doors for the discovery and addition of new knowledge. In this context, Perplexity AI emerges as a highly relevant innovation. With its ability to assist in discovering new knowledge, Perplexity AI plays a crucial role in expanding the scope of information accessible to users. Technology

not only facilitates access to existing information but also significantly contributes to guiding users in the process of exploration and the discovery of new knowledge (Agustina et al., 2023; Van Den Berg, 2019; Szymkowiak et al., 2021). Thus, the interconnection between technology like Perplexity AI and the addition of new knowledge becomes increasingly evident, illustrating how technological advancements can serve as primary drivers in the development of science and discoveries.

Based on the statement submitted by respondent 3 who expresses a profound appreciation for the substantial advantages of Perplexity AI in broadening their knowledge. Perplexity AI responses are described as enlightening and motivating, offering clear insights without confusion. The user highlights the ease of understanding complex concepts and credits Perplexity AI as a steadfast companion in their quest for knowledge. In summary, the testimonial underscores the positive impact of Perplexity AI in facilitating accessible and comprehensible knowledge exploration.

Another finding that researchers obtained and presented in Table 3 is about the Perplexity of AI helping use time as efficiently as possible. Perplexity AI emerges as a valuable technological tool not only in assisting with knowledge acquisition but also in playing a central role in optimizing time usage. This is relevant to the responses of some experts, namely (Haleem et al., 2022; Javaid et al., 2020) who stated that the existence of technology allows for time efficiency, speeding up various activities, and providing convenience in completing daily tasks. Perplexity AI, with its ability to simplify information and provide quick, easily understandable responses, illustrates the connection between technology and efficient time utilization. Users can quickly navigate through various information, enabling more effective time allocation. In essence, the integration of technology, as demonstrated by Perplexity AI, showcases its potential to improve overall time management and productivity in daily activities.

Based on the response given by respondent 5 who expressed high satisfaction with the efficiency of Perplexity AI, emphasizing its assistance in optimizing time utilization. The AI's ability to provide clear and to-the-point responses eliminates the need for repetitive readings or restating questions, contributing to a sense of time savings. The user's experience highlights the convenience and effectiveness of Perplexity AI, allowing them to focus on other tasks and deriving a personal sense of satisfaction from its use. So, it can be concluded that Perplexity AI can significantly contribute to time management and user contentment.

The other results of our research also indicate that perplexity AI can enhance the quality of students' writing. This is evidenced by the statement that Perplexity AI can motivate students to be more competent in writing English in Table 4. Following theories presented by (Stanojević et al., 2018; Ghavifekr & Rosdy, 2015; and Kasneci et al., 2023), certain technologies have the potential to facilitate students' writing. This is attributed to the fact that perplexity AI incorporates artificial intelligence features that make human tasks more creative. Within the features available in perplexity AI, users can modify each sentence according to their preferences, aligning with the writing style they desire. Moreover, with perplexity AI, users can also choose specific words to use. For example, consider a student who wants to express the idea of "the weather is beautiful." Using perplexity AI, the student can creatively rephrase it as "the weather is splendid" or "the weather is delightful," thus enhancing the overall quality and expressiveness of their writing.

From Respondent 2 statement, it is evident that the use of Perplexity AI in the writing process has a significant impact on improving the quality of their writing. The respondent highlights that the AI not only explains complex concepts clearly but also provides a strong motivation to enhance competence in writing English. Additionally, the experience of using this AI is described as having a companion guiding through each stage, offering constructive guidance, and consistently encouraging to achieve excellence in writing. Therefore, it can be concluded that Perplexity AI is not just a tool but also a significant source of motivation in enhancing the quality of writing, aligned with the experiences and perceptions of Respondent 2.

The next are the results obtained and presented by researchers in Table 5 about how Perplexity AI can increase productivity. Perplexity AI is a testament to technological advancements, serving as a tool that can significantly enhance productivity. In the realm of information processing and assistance, this technology simplifies tasks, providing quick and efficient solutions. Its ability to facilitate understanding and offer precise answers aligns with the broader theory that with technology, like Perplexity AI, at our disposal, we can truly boost productivity significantly. The integration of technology not only simplifies processes but also aligns with the general principle stated by some experts, namely (Kamal, 2020; H. Chun et al., 2015) that technology empowers us to achieve more in less time, ultimately leading to improved productivity.

Based on the response given by respondent 5 who expressed a profound positive impact on productivity since utilizing Perplexity AI, likening it to a fantastic assistant that has brought about significant improvements. Highlighting the tool's accurate instant responses and exceptional support in handling complex questions and tasks efficiently, the user emphasizes how Perplexity AI has dynamically transformed their work and learning approach. So, it can be concluded that Perplexity AI plays a crucial role in creating a more optimal and dynamic environment, aiding in the effective achievement of daily goals, and thus enhancing user productivity.

Conclusion

This research indicates that students have a positive response to Perplexity AI in improving their academic writing performance. Positive findings include easy understanding, assistance in discovering new knowledge, time efficiency, motivation, and increased productivity. Students see Perplexity AI as a helpful tool, both in writing and as a source of motivation. These conclusions can provide a strong foundation to encourage the use of Perplexity AI in English language learning at the university level. In the context of its use by educators, Perplexity AI can be an effective tool to enhance students' writing skills, as long as they maintain creativity. These findings can serve as a reference for future researchers to explore specific aspects of using Perplexity AI and its potential for further development. Additionally, for students using technology, maximizing its benefits involves understanding its features while preserving creativity and being aware of shortcomings. Active participation in the learning process with Perplexity AI is expected to help students achieve optimal results in developing their English writing skills. While this study provides valuable insights, its main limitation is the restricted number of participants from a single educational institution with a uniform educational background. Therefore, careful consideration is needed when generalizing the findings. For future research, it is recommended to broaden the participant pool by involving diverse educational institutions. This approach can offer a more comprehensive understanding of user perceptions regarding Perplexity AI in English language learning. Involving institutions at both university and high school levels will provide a holistic perspective, enriching the research findings to support the development and implementation of Perplexity AI in various educational settings.

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