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Research Article

ChatGPT and Academic Writing: A Study of Japanese EFL Undergraduates

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Abstract

This study presents findings from a survey of 117 EFL undergraduate students across three universities in Kansai. The objective was to assess students' ease of use, familiarity, and willingness to adopt AI translation and writing generation tools for task completion and assignments. The survey findings indicated that while most respondents were already familiar with and have a favorable view of ChatGPT, its utilization in academic tasks is not as widespread as compared to translation tools. Gaining insights from the survey, we conducted a one-shot, three-week case study to train eight students on the effective use of ChatGPT to enhance their writing skills. The results provided evidence that ChatGPT was effective in improving students' essay quality. These findings contribute to the discussion regarding the evolving landscape of English learning, where technology can serve as a complementary tool to support learning outcomes, provided it is used judiciously and ethically.

本研究は、関西の3大学のEFL学部生117名を対象に行った調査結果を発表するものである。その目的は、AI翻訳ツールや文章生成ツールの使いやすさ、親近感、タスクの完成や課題への導入意欲を評価することであった。調査結果によると、ほとんどの回答者がChatGPTをすでに知っており、好意的な見方をしている一方で、学術的な課題での利用は翻訳ツールに比べてそれほど普及していないことがわかった。調査の結果から得られた知見をもとに、8人の学生にChatGPTの正しい使い方をトレーニングし、ライティング能力を効果的に向上させるためのケーススタディを3週間で実施した。その結果、ChatGPTが学生のエッセイの質を向上させるのに有効であるということが分かった。

With the rapid progress of OpenAI, applications that support learning are becoming increasingly available to university students. While the modern language learning paradigm in Japan underscores the role of an immersive approach and natural language acquisition, the pragmatic reality often leads to students prioritizing completing class tasks and assignments to earn credits, even if the accomplished goals do not truly reflect genuine learning outcomes (Nishino & Watanabe, 2008; Toyoshima & Yamanaka, 2023). Despite the widespread use of translation tools like Google Translate and DeepL for completing class tasks and assignments—as well as individual differences in usage among Japanese learners—there is little open discussion among teachers on how to effectively incorporate these tools into the classroom (Fukunaga & Yip, 2023). Students' reliance on these tools is often downplayed or even overlooked in academia.

Even more concerning for some is the advent of ChatGPT, an Artificial Intelligence (AI) chatbot as a distinct model from other AI tools. ChatGPT, capable of diverse applications and tasks, including generating contextually relevant responses in a conversational style, increases the likelihood of students becoming overly dependent on AI for their academic work. This raises concern that students may cease to develop higher-order cognitive skills such as critical thinking, creativity, and advanced writing skills.

Despite the considerable research on AI across diverse domains, understanding ChatGPT's influence on academic writing is still in its early stages (Sullivan et al., 2023; Nguyen et al., 2024). Research on the implementation of ChatGPT in EFL contexts has only recently begun. This highlights the need for a nuanced discussion on the evolving landscape of English learning, where technology can serve as a complementary aid to support learning outcomes, provided it is used judiciously and ethically (Hong, 2023; Bin-Hady et al., 2023; Sullivan et al. 2023). This study aims to understand EFL undergraduate students' familiarity with and attitudes toward AI-driven writing tools as a baseline for evaluating their current use in academic contexts. Building on this understanding, it examines how a structured three-week training program focusing on the effective use of ChatGPT impacts students' essay writing performance.

Literature Review

AI has emerged as a powerful and versatile self-learning tool, revolutionizing the way individuals acquire

knowledge and skills in an increasingly digital and interconnected world (Puaschunder, 2022; Hockly, 2023). AI can adapt to individual student needs, analyzing their performance and tailor exercises and content accordingly. This personalization can help students progress at their speed and address their specific weaknesses (Seo et al., 2021). Others also highlight AI's capacity to predict learning outcomes, offering educators ample opportunities to design materials based on learners' specific needs and current achievements (Pane et al. 2017; Kaminskiene & DeUrraza, 2020).

AI in Language Learning

The accessibility of various AI-powered apps enhances language practice by providing EFL students with opportunities to practice English in a controlled and supportive environment. Students can engage in conversations and receive instant feedback on pronunciation, grammar, and vocabulary, and improve their language skills at their own pace. In their study, Kazu and Kuvvetli (2023) discovered that Google's AI-powered speech recognition platform facilitated more enduring word retention.

The flexibility of such tools accommodates different learning schedules and preferences, including busy work or school commitments. In fact, AI apps can serve as virtual conversation partners. This is particularly beneficial for EFL students who may not have regular access to native English speakers for practice. Zuo, D (2023) explored the impact of AI-powered speech evaluation programs on speaking skills. Their findings demonstrated that AI-driven feedback significantly enhanced the learners' speaking abilities, as reported by the participants themselves and indicated by a notable difference in pre- and post-test mean scores.

A Generative Pre-Trained Transformer represents the most recent advancement in the realm of OpenAI. The NLP model adopted by the chatbot has an astonishing capacity to stimulate real-life and human-like conversations. It has been recognized as an effective tool for reducing the cognitive load required to perform a task by supporting both learning and instruction (Zhai 2022). In a study on the effectiveness of incorporating ChatGPT as a supplementary language learning tool, Kim et al., (2023) corroborated its capability to fulfill given prompts. Zhou et al. (2023) also studied the advantages and disadvantages of ChatGPT by comparing its writing performance with that of intermediate English learners. They concluded that while ChatGPT falls behind in terms of creating semantic relationships between ideas in the text, it excels in certain linguistic elements and referential cohesion. They emphasize the importance of ongoing research to enhance the performance of AI-powered tools.

Challenges and Ethical Concerns

Recently, concerns have been raised about the unethical use of ChatGPT in discourse and essays. With the launch of the chatbot in 2023, prominent Japanese universities proactively prohibited its use in academic and scientific papers, emphasizing the importance of writing in the educational process (The Japan News, 2023). However, they did not specify the actions and responsibilities of teachers required to oversee and possibly prevent the use of ChatGPT by students.

For example, without robust plagiarism detection tools for identifying ChatGPT-generated content in academic papers at teachers' disposal, determining whether and to what extent students' writing assignments are generated by ChatGPT remains challenging. Even when experienced teachers observe writing of a quality that surpasses the students' actual writing skills, proving AI involvement is difficult. Thus, completely banning the use of ChatGPT in writing assignments may appear impractical. As Eaton (2023) argues, the arrival of ChatGPT necessitates a redefinition of plagiarism in the modern era, necessitating the formulation of new regulatory policies and educational guidance to ensure its appropriate use.

From a different perspective, even if all students have an equitable access to ChatGPT for their writing, those who are more adept with technology tend to outperform their peers who excel in writing but are less proficient with digital tools (Gašević et al., 2023). EFL students with little or no hands-on experience with the tool may struggle to operate and benefit from it in the absence of proper training. This struggle may stem from various factors, including limited language proficiency in understanding the chatbot's output and difficulties in crafting effective prompts.

Due to students' varying levels of language and technological proficiency, teachers need to offer targeted training and support. This ensures that all students can benefit equally from AI tools and develop a proper understanding of ChatGPT's platform and capabilities. Similarly, Godwin-Jones (2022) and Zhai (2022) emphasize the need to teach students how to use AI writing tools effectively and responsibly. They underscore the role of educators in guiding students to critically assess AI-generated suggestions, recognize its limitations, and integrate its outputs meaningfully into their work.

Given the above, the following research questions were formulated to guide the study: what are EFL undergraduate students' levels of awareness, the extent of their utilization, and their perspective on AI-driven writing tools in their academic work? How does a three-week training program on the capabilities of ChatGPT impact EFL undergraduate students' essay writing performance?

The current study endeavors to put forth an argument for the integration of ChatGPT in English writing curriculum, reinforced by insights drawn from student survey responses as well as a case-study conducted on guiding students on how to incorporate this writing-generation AI tools in their essay composition.

Methodology

This study comprises two phases. To gain a deeper understanding of students' awareness, the extent to which they leverage AI tools in their academic work, and their perspectives on the utilization of AI-driven writing generation tools and related applications, the authors conducted a survey. The survey was administered in Spring 2023, when ChatGPT was still new. Even if students were aware of it, its use was not yet widespread.

Incorporating insights gleaned from the survey, a three-week training program was carried out to familiarize students with the capabilities of ChatGPT as a supplementary tool for composing five-paragraph essays and to guide them on its ethical use. Writing samples were collected both before and after the training to assess the effectiveness of the instruction.

Participants

The study included 117 EFL students from three universities in the Kansai region of Japan. These students were enrolled in either their first, second, or third year of study and ranged in age from 18 to 22. To maintain the authenticity of responses and encourage honesty, the survey was carried out anonymously. Emphasizing anonymity aimed to alleviate any apprehensions the students may have had over openly expressing their thoughts about ChatGPT.

Instrument

To collect data from students, an electronic survey using Google Forms was administered, and the link was shared with 117 EFL students across three universities. The survey was anonymous and structured into five distinct sections, with particular attention given to formulating Likert-scale items to maximize student engagement and elicit a high degree of responsiveness.

In the first section, students were asked about their comfort level with everyday technology usage, their familiarity with widely used translation tools such as Google, Line, and DeepL, and their awareness of AI-driven writing generation tools such as Grammarly and ChatGPT. The second and third sections inquired about the frequency with which students used f these tools when completing assignments and graded homework, and when preparing for tests. The fourth section of the survey prompted students to share their perceptions regarding the effectiveness of AI integration in the classroom. Finally, in the fifth section, students were asked about their willingness to develop ethical AI skills aimed at enhancing their language proficiency.

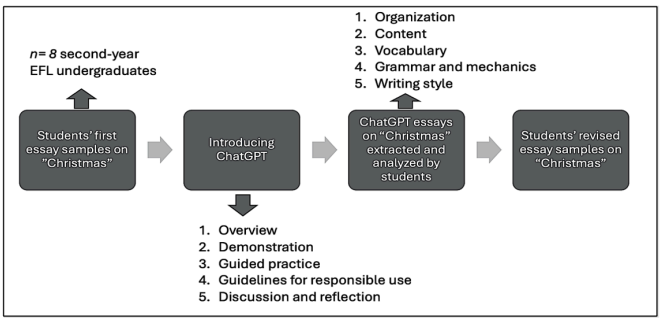
Three-Week Training Program on ChatGPT

In December 2023, a case study was conducted to implement a three-week training initiative. The primary goal was to familiarize students with the ChatGPT environment and its capabilities as a tool for generating essay samples. This approach aimed to provide students with exposure to multiple essays written on the same topic, a resource typically not included in a textbook. The selection of this time frame aligned with the end of the semester, coinciding with the conclusion of students' essay-writing instruction and the anticipated submission of their initial essays.

During the first week, eight students were instructed to create an essay outline on a given theme and, subsequently, use this outline to create an original version of an essay that they were expected to develop in subsequent weeks. The following week, students were introduced to ChatGPT, which included a basic overview of its functionalities. The explanation covered its dual role as both a writing assistant and a supplementary tool for enhancing learning and skill improvement. Using the essay outline from the previous week, students input their outlines into ChatGPT to generate sample essays. Following this, students scrutinized the essays generated by ChatGPT, carefully focusing on organization, content, vocabulary, grammar and mechanics, and writing style. During the final week, students were allocated time to revise their essay within the classroom setting, without the assistance from ChatGPT. A visual presentation of this is shown in Figure 1.

Figure 1

ChatGPT Training Program



Data Analysis

To analyze the survey data on students' awareness, the extent of their utilization of AI tools in academic assignments, and their perspectives on the matter, descriptive statistics were applied using Excel. Furthermore, to assess the impact of the multi-week training program, which introduced ChatGPT as a supplementary tool for generating guiding models to improve essay writing skills, comparisons were made between students' essays on the same topic submitted before and after the training. Both sets of essays were independently evaluated by three instructors using a standardized rubric for structure, coherence, grammar, and content development.

Prior to grading, a calibration session was conducted to align the instructors' understanding of the rubric and minimize variability in scoring. Any discrepancies in scores were resolved through discussion and consensus. To further enhance reliability, essay scores were averaged across the three instructors' assessments. Subsequently, a paired-sample t-test was conducted using the average scores to determine whether the training led to a statistically significant improvement in overall essay performance. Additionally, the three essay sets –those submitted before and after the training, as well as essays generated by ChatGPT–were thoroughly examined to identify significant similarities and differences among the samples.

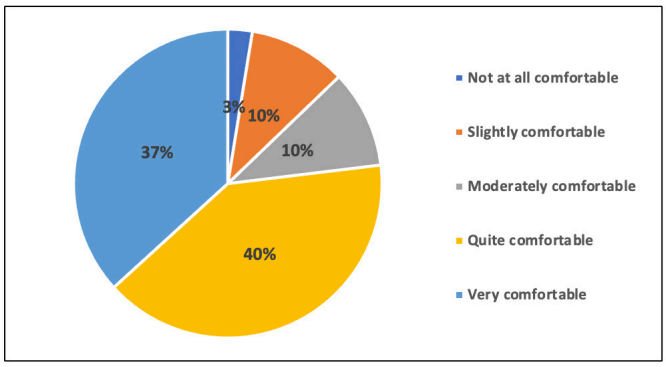
Results

Descriptive Analysis of Survey Responses

The results from the descriptive analysis of the survey responses indicated that 40% of the participants considered themselves very comfortable using technology in daily life (Figure 2). Only 3% expressed strong discomfort, while the remaining participants—57%—reported feeling "quite," "moderately," or "slightly" comfortable.

Figure 2

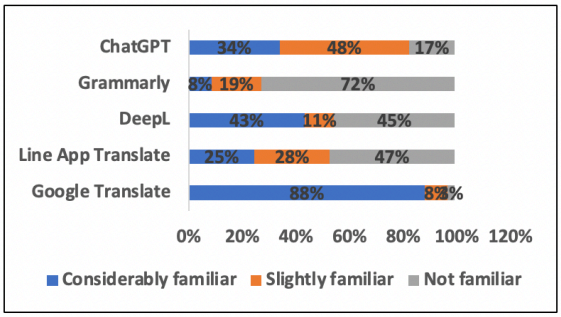
Comfort Level with Daily Technology Use



When respondents were asked about their familiarity with existing translation tools and AI-driven writing generation tools, Google Translate emerged as the most recognized, with 88% reporting they were either considerably or slightly familiar with it. ChatGPT followed closely, with 82% indicating familiarity at either level, while DeepL ranked third at 54%. Additionally, familiarity with LINE App Translate and Grammarly was reported at 53% and 27%, respectively (Figure 3).

Figure 3

Level of Familiarity with AI Tools



With regard to the frequency of using AI tools to complete homework assignments or to prepare for tests, more than 50% of participants reported that they always (approximately 13%) or often (almost 45%) use translation

tools such as Grammarly, Line App Translate, and DeepL (see Figures 4 & 5). However, this percentage dropped to 19% for writing generation tools such as Grammarly or ChatGPT.

Figure 4

Using AI for Homework Assignments

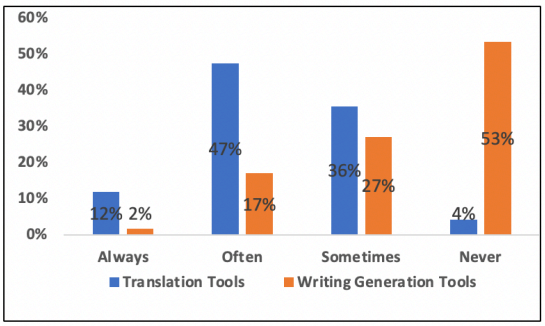


Figure 5

Using AI to Prepare for Tests

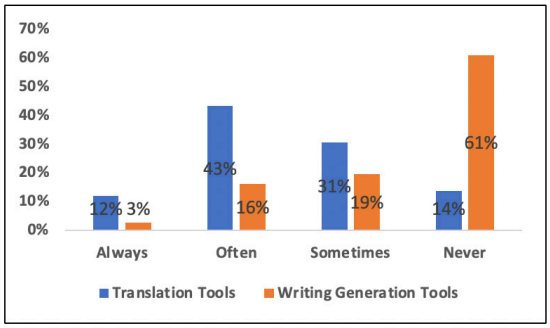
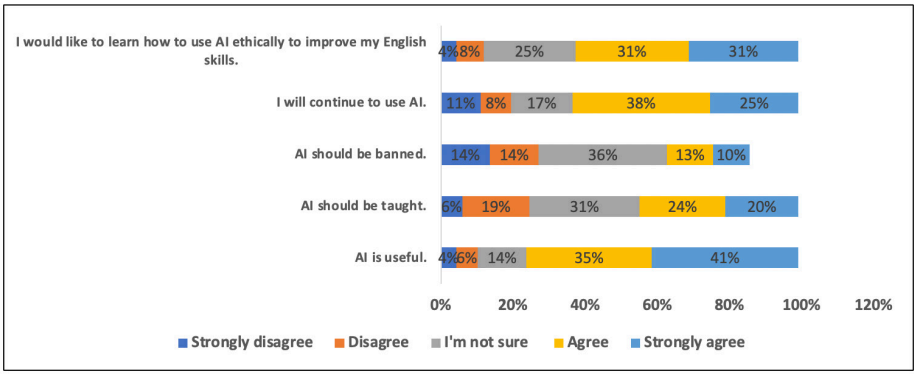


Figure 6 shows a diverse range of opinions among respondents regarding the acceptance level of AI. A significant number of respondents, comprising 76%, find AI to be useful, with 41% strongly agreeing and 35% agreeing. Regarding AI instruction, 44% believe it should be included in education, while 31% remain uncertain about the necessity of such instruction. Interestingly, 34% express the belief that AI should be banned, and a comparable 31% are unsure about this stance. A majority of respondents (63%) reported planning to continue using AI, indicating a generally positive outlook. Moreover, a substantial 62% expressed an interest in learning how to use AI ethically to enhance their language skills. The findings underscore a varied landscape of attitudes and perceptions regarding AI, emphasizing the importance of understanding and addressing diverse perspectives in the context of AI education and adoption.

Figure 6

Acceptance Level of AI



Comparison of Students' Pre- and Post-Essays

Table 1 presents the mean scores and standard deviations for each scale of the rubric, as well as students' total grades both before and after instruction. Based on these findings, the total mean score before instruction was 46 (*SD*=10.27), while the mean score rose to 57.37 (*SD*=13.5) after instruction.

Table 1

Descriptive Statistics for Students' Grades Before and After the Instruction

n = 8		Organization	Content	Vocabulary	Grammar & Mechanics	Style	Grade (100)
Pre-Instruction	Total	94	64	40	79	91	368
	Mean	11.75	8	5	9.875	11.375	46
	SD	2.22	2.39	1.32	1.89	3.07	10.27
Post-Instruction	Total	110	89	68	92	100	459
	Mean	13.75	11.12	8.5	11.5	12.5	57.37
	SD	2.86	3.4	3.42	2.23	2.95	13.5

The Shapiro-Wilk test was conducted to assess the normality of the pre-and post-intervention grades. The results indicated that both pre-intervention ($W = 0.94$, $p = 0.68 > 0.05$) and post-intervention grades ($W = 0.95$, $p = 0.8 > 0.05$) grades are normally distributed, as both p-values exceeded 0.05.

Although the paired t-test results indicated a statistically insignificant difference in various aspects of students' writing skills post-instruction, including organization, content, vocabulary, grammar and mechanics, and overall writing style ($t = 3.89$, $p < .01$), the mean scores increased notably. This suggests that the instructional program on using ChatGPT effectively enhanced students' essay writing abilities.

Discussion

The results of this study contribute to the rapidly growing research on the effectiveness of ChatGPT as a supplementary learning tool that can benefit both EFL teaching and learning. The fact that most respondents indicated a high familiarity with translation tools and ChatGPT suggests a strong baseline for the integration of more advanced AI-driven applications and tools into educational settings. This familiarity may also have a positive impact on students' readiness and engagement with such tools in the classroom. However, the lower percentage (19%) of participants frequently using writing generation tools like Grammarly or ChatGPT indicates potential areas for growth in understanding the applications and benefits of these tools for academic writing and preparation.

As per students' acceptance of AI, the survey results revealed a diverse range of students' opinions and feelings reflecting the complexity and challenges of adoption and acceptance for some learners. However, many students expressed interest in the continued use of AI and its ethical usage to improve their writing skills. This indicates a generally positive outlook on the use of technology.

Despite the statistically insignificant result from the paired t-test, there was a clear improvement in the mean scores across all assessed aspects of writing. For example, the overall mean score increased from 46 to 57.37, suggesting a notable improvement in students' essay writing abilities. This increase aligns with the objectives of the ChatGPT integrated instruction program to improve students' use of ChatGPT to support their essay writing. While not statistically significant, the practical improvement suggests the intervention was beneficial in a real-world classroom context. This finding is consistent with Godwin-Jones (2022) and Zhai (2022) who argue in favor of AI-driven tools and their integration into writing instruction and practice. They maintain that not only can such tools benefit both students and teachers, but teacher intervention can also facilitate students' acquisition of meta-linguistic competence.

Through a side-by-side comparison of essays generated by ChatGPT and those submitted by students after receiving instruction, several insights emerged. Firstly, we identified instances where students reused specific vocabulary from ChatGPT in their essays, including conceptual words like "festivity," "joy," and "gratitude," adjectives such as "magical," "merry," and "sparkling," and verbs like "decorate," "wrap," and "carol." These terms were notably absent in students' pre-instruction essays. Students also expressed their satisfaction, noting that they were able to learn various Christmas-related words to describe and write about the holiday from different perspectives—something they previously could only do in Japanese.

Furthermore, we observed notable improvements in formatting and style, areas that had previously shown little progress despite regular corrections. There was also a noticeable enhancement in grammar structure, with more precise paragraph organization and overall structure. This could imply that the student's writing was significantly influenced by the instruction that included ChatGPT. Students benefited by the language patterns and stylistic features presented by ChatGPT. This could also suggest that students may internalize and implement more advanced language and organizational skills in their own writing with exposure to well-structured, AI-generated content, which can serve as an effective learning tool. Similarly, Marzuki et al. (2023) found that AI writing tools had a positive impact on the writing quality of EFL students in Indonesia, particularly in content development and organizational structure.

Limitations

The first limitation of this study was the small sample size ($n = 8$) of the intervention, which likely limited the statistical power of the analysis. This may have made it challenging to detect statistically significant differences despite meaningful practical improvements reported earlier. Future studies should consider using larger and more diverse sample sizes to enhance the statistical power of the analysis and increase the generalizability of the findings. This approach would provide a more robust evaluation of the intervention's effectiveness and help detect statistically significant differences with greater confidence.

Another noteworthy limitation was the restricted duration of the training (three weeks), which may not have adequately reflected the long-term effects or sustainability of the intervention's outcomes. This study encourages conducting longer and more comprehensive experiments to further investigate the potential of integrating AI responsibly into classroom settings. This will allow for deeper engagement, more opportunities for practice, and potentially more substantial and lasting improvements in students' writing skills.

Additionally, the study used a quasi-experimental design without incorporating a control group which may have limited the ability to fully isolate the instructor's influence on students' grade improvements and attribute the changes exclusively to the intervention. A randomized controlled trial with both larger experimental and control

groups would help distinguish the effects of the intervention from other variables, such as the instructor's influence. Additionally, future studies could explore using multiple instructors to examine whether the outcomes are consistent across different teaching styles and contexts.

Moreover, the survey relied on students' self-reported familiarity, ease of use, and willingness to accept AI in English learning. Future studies could substantiate the findings by incorporating qualitative data, such as student interviews, to gain deeper insights into their experiences and perspectives.

Conclusion

This study examined students' familiarity with, usage of, and acceptance levels toward AI-driven tools and applications in their academic work. It also explored the impact of ChatGPT-integrated instruction on enhancing students' essay-writing skills. The findings underscore the need to promote digital literacy among students. Despite their familiarity with translation tools, only a small percentage of participants frequently used AI writing tools, revealing opportunities for educational initiatives to enhance awareness of AI's diverse applications and ethical use. The findings also highlight varying levels of AI acceptance and adoption among students, suggesting the importance of gradually integrating these tools and providing personalized support to address resistance or challenges.

This study also demonstrated the pedagogical potential of integrating ChatGPT into English writing instruction for EFL learners. While the paired-sample t-test results did not reveal statistically significant improvements, the practical increase in students' mean scores across various writing aspects, such as organization, vocabulary, grammar, and content, indicates that the intervention had a meaningful impact in real-world classroom settings. For instance, the overall mean score rose from 46 to 57.37, highlighting students' progress in essay writing after receiving ChatGPT-supported instruction. This suggests that AI tools can effectively enhance writing abilities by providing models of well-structured content and stylistic features.

A key finding was students' adoption of advanced vocabulary and improved organizational skills, as they reused specific terms and structures from ChatGPT-generated content in their essays. This indicates that frequent exposure to high-quality AI-generated language can help learners internalize and apply advanced linguistic patterns in their own writing. Moreover, teacher intervention plays a critical role in guiding students to use AI tools effectively, ensuring the development of meta-linguistic competence rather than dependency on technology.

Despite the limitations cited earlier, the findings align with broader research advocating for AI integration in language learning, offering evidence on how tools like ChatGPT can enhance students' writing skills and engagement in EFL contexts, reinforcing the potential role of. AI in supporting language development.

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