POTENTIAL RISKS OF CHATGPT-ASSISTED ESSAY WRITING ON KNOWLEDGE RETENTION AMONG EFL LEARNERS IN INDONESIA

By:

Hendi Pratama[1], Stephanie Priyanto Putri[2], Seful Bahri[3]

Universitas Negeri Semarang, Central Java, Indonesia[1,2,3]

hendipratama@mail.unnes.ac.id[1], esphe88@yahoo.com[2], seful.bahri@mail.unnes.ac.id[3]

Abstract: This study investigates the impact of ChatGPT-assisted essay writing on knowledge retention among English as a Foreign Language (EFL) learners, comparing it with traditional Google-based research and a hybrid approach that combines both tools. A total of 150 undergraduate students from an Indonesian university participated in the study and were divided into three groups: ChatGPT-only, Google-only, and hybrid. To measure knowledge retention, a 20-item multiple-choice post-test was administered one week after the essay-writing activity. For the qualitative phase, open-ended online surveys were used to explore students' perceptions of the tools, learning experiences, and challenges encountered. Using a mixed-methods approach, quantitative data were analyzed through descriptive statistics and ANOVA, revealing that the Google-only group achieved the highest mean score, followed by the hybrid group, while the ChatGPT-only group had the lowest performance. Thematic analysis of qualitative data identified four key themes: efficiency, depth of understanding, challenges, and learning outcomes. Results suggest that when ChatGPT supports efficiency in writing, it often limits critical engagement and deep learning. In contrast, Google encourages active information processing, enhancing content comprehension and long-term retention. The hybrid approach offers a balanced strategy by combining the strengths of both tools. These findings contribute to the growing discourse on AI in education by emphasizing the need to evaluate not only usability and writing quality but also cognitive outcomes such as retention and understanding. The study highlights the pedagogical importance of integrating AI tools thoughtfully, rather than relying on them as stand-alone solutions for academic tasks.

Keywords: artificial intelligence, ChatGPT, EFL writing, Google, knowledge retention

INTRODUCTION

AI, particularly ChatGPT, is transforming education, especially in English as a Foreign Language (EFL) learning. AI tools provide personalized feedback, enhance engagement, and help learners develop language skills through cognitive tasks like essay writing (Wang et al., 2024; Barrot, 2023; Song & Song, 2023; Xiao & Zhi, 2023).

EFL learners benefit from AI's ability to improve motivation, reduce anxiety, and boost confidence (Al-Raimi & Mudhsh, 2024; Malik et al., 2023). Additionally, interactive AI systems foster behavioral, cognitive, and emotional engagement, offering learners diverse opportunities to develop language proficiency (Zhou & Hou, 2024; Marzuki et al., 2023).

However, the use of AI tools like ChatGPT raises concerns about academic integrity (Cotton et al., 2023), overreliance (Yuan & Sawaengdist, 2024), and critical thinking erosion (Putra et al., 2023). Students may bypass essential cognitive processes, such as idea generation and structuring arguments, relying instead on AI-generated content.

Relying heavily on ChatGPT can lead to academic plagiarism and hinder students' ability to develop essential writing skills. Studies have shown that frequent use of ChatGPT is associated with increased plagiarism rates, particularly when students use it to generate content directly rather than as a learning aid (Sarwar et al., 2025). Over-reliance on AI tools can lead to a decline in students' critical thinking and

analytical writing abilities, as they may bypass the cognitive processes involved in crafting original work (Rezaei et al., 2024; Shakil & Siddiq, 2024). Moreover, due to its limitations in understanding nuanced academic contexts, ChatGPT can sometimes produce inaccurate or shallow content, potentially misleading learners who lack the experience to critically evaluate AI-generated information (Al-Sofi, 2024; Yuan & Sawaengdist, 2024).

In contrast, traditional tools like Google, which require more active searching, evaluation, and synthesis of information, may encourage deeper engagement with the material (Catalá, 2016). However, the extent to which these tools impact knowledge retention and the learning process remains unclear. This study explores the comparison of knowledge retention after academic writing assisted by ChatGPT and Google, aiming to evaluate their respective effects on students' understanding and retention of content.

Essay writing is a crucial skill for English as a Foreign Language (EFL) learners, encompassing linguistic competence and cognitive processes. Writing essays enables learners to structure their thoughts, practice grammar, and develop fluency, but it often presents challenges such as coherence, vocabulary use, and grammatical accuracy (Belkhir & Benyelles, 2017). Despite its complexity, essay writing supports knowledge retention by requiring students to engage deeply with content, apply critical thinking, and articulate ideas effectively. Studies highlight that composing essays reinforces memory

by encouraging learners to process information actively rather than passively consuming it (Razak & Saeed, 2014).

Cognitive strategies and tools like concept mapping and pre-writing activities improve EFL learners' essay writing, fostering better coherence and knowledge retention (Chang et al., 2020). Integrating interactive tools such as online platforms also foster collaboration and feedback, improving retention and writing quality (Sulistyo et al., 2019).

Challenges such as limited vocabulary, grammatical errors, and a lack of writing practice remain barriers to success in essay writing for many EFL learners (Ahmed, 2019). Addressing these difficulties through technology-enhanced learning tools improves writing performance and enhances information retention by creating meaningful learning experiences (Rashtchi, 2019).

Computer-Assisted Language Learning (CALL) tools, like grammar checkers and automated evaluators, improve writing skills and offer interactive feedback (Mohammadi et al., 2012; Chen et al., 2023). Research shows that CALL significantly improves EFL learners' writing skills, with better grammar, coherence, and vocabulary. Tools like Microsoft Word and automated scoring systems provide timely feedback, leading to greater accuracy and independent learning (Zaini & Mazdayasna, 2015; Fang, 2010). Jahangard et al. (2020) found that CALL also boosts motivation and creativity in writing. CALL made writing more engaging and less stressful, while tools like blogs enhanced peer interaction and feedback (Sulistyo et al., 2019).

Artificial Intelligence (AI) has revolutionized EFL writing instruction by offering personalized, real-time feedback through tools like ChatGPT and AWE systems, helping learners improve grammar, coherence, and vocabulary while promoting independent learning (Chen et al., 2023). AI tools benefit EFL learners by offering detailed feedback on structure, vocabulary, and organization, leading to improved grammar and coherence. They also ease linguistic challenges, allowing learners to focus on creativity and critical thinking (Song & Song, 2023).

AI platforms boost EFL learner engagement by offering interactive, real-time feedback through tools like ChatGPT, which simulate conversational learning in a low-pressure setting. This reduces anxiety, encourages autonomy, and motivates students to take linguistic risks. By adapting to individual learning styles and proficiency levels, AI keeps learners challenged without being overwhelmed. This personalized support fosters confidence, sustains interest, and promotes independent learning habits as key factors in second language success (Fang, 2010).

A major concern is students' over-reliance on AI tools, which can weaken critical thinking and limit independent language use, as they may depend too much on automated suggestions (Song & Song, 2023). Another drawback is that AI tools often misunderstand language nuances and cultural context, which can lead to inaccurate or unhelpful feedback, especially in tasks needing deeper cultural understanding (Chen

et al., 2023). AI feedback lacks the empathy and personal touch of human instructors, which can also introduce errors or unclear explanations, confusing students and affecting their confidence (Jahangard et al., 2020; Fang, 2010; Currie et al., 2023). Ethical concerns, such as plagiarism and access disparities, also arise (Yuan & Sawaengdist, 2024; Ferrara, 2023).

Much of the existing research has focused on their efficiency, user perceptions, and language production quality. However, there remains a notable gap in empirical studies examining the cognitive outcomes associated with AI-assisted writing, especially knowledge retention, a critical indicator of meaningful learning. Most prior studies (e.g., Barrot, 2023; Xiao & Zhi, 2023) highlight students' increased motivation or reduced writing anxiety, yet few investigate whether these tools genuinely support long-term understanding. This lack of focus on cognitive retention in English as a Foreign Language (EFL) learning contexts poses an important gap in the current literature.

This study aims to fill the gap by comparing the effects of ChatGPT-only, Google-only, and hybrid AI-traditional tool usage on knowledge retention after essay writing. Its novelty lies in evaluating both the technological usability and pedagogical impact of these tools from a cognitive perspective. Using a mixed-methods approach, the study explores whether AI tools enhance or hinder deep learning, focusing on which tool or combination leads to better retention of academic

content among undergraduate EFL learners, offering a balanced view of AI integration in writing instruction.

METHODOLOGY

This mixed-methods study examined the impact of AI tools on knowledge retention among 150 undergraduate EFL learners after essay writing. Participants were divided into three groups: ChatGPT-only (37), Google-only (54), and a hybrid group (59). They completed weekly essays on "The Mechanism of US Election" to assess their understanding. The ChatGPT group relied on AI-generated content, the Google group used traditional research, and the hybrid group used ChatGPT for drafts and Google for verification.

Data was collected using both quantitative (post-tests) and qualitative (surveys) methods. Knowledge retention was measured a week after submission with a 20-question multiple-choice test. No formal reliability or validity tests were conducted due to the exploratory nature of the study. As this is a preliminary investigation, the multiple-choice questions used to measure knowledge retention were developed and refined through iterative discussions among three educational researchers with expertise in EFL and assessment. This approach reflects what Aiken (2000) and Haynes et al. (1995) refer to as *content validation through expert consensus*, a common initial step in educational instrument development.

Survey responses were analyzed thematically, while ANOVA

identified performance differences. This methodology provides a comprehensive evaluation of AI tools' impact on EFL learners' knowledge retention and learning outcomes.

RESULTS AND DISCUSSION

This section delves into quantitative and qualitative phase results, as follows.

Quantitative Phase Results

The descriptive statistics reveal that participants' mean scores across the three groups varied, indicating differences in performance based on the research methods used. Group "Google" achieved the highest mean score of 9.315 (out of a maximum score of 20) with the lowest standard deviation (SD = 2.433), suggesting more consistent performance among participants. Group "Combined" followed with a mean score of 8.966 and a standard deviation of 2.632. Group "GPT" had the lowest mean score of 7.784 and the highest variability (SD = 2.790), indicating less consistent performance in this group. The data are normal across all grous as confirmed by the Shapiro-Wilk test.

The ANOVA results showed a significant difference in mean scores among the groups ($F = 3.997$, $p = 0.020$), with $\omega^2 = 0.038$, indicating that the groupings explain 3.8% of the variance. Group "GPT" performed worse than Group "Google," with a mean difference of -1.531 ($p < 0.05$), and also underperformed compared to Group "Combined" (-1.182, $p = 0.080$). No significant difference was found between Group "Google" and Group "Combined." These results suggest that combining Google and ChatGPT yields similar outcomes,

while ChatGPT alone results in weaker performance.

Qualitative Phase Results

The rise of technology in education has profoundly reshaped how learners approach research and composition, especially in English as a Foreign Language (EFL) context. This study delves into how EFL students employed ChatGPT, Google, or a combination of both tools to draft essays and acquire new knowledge. The analysis reveals distinct patterns of efficiency, depth of understanding, and learning outcomes across the three groups. By examining the positive, negative, and neutral sentiments tied to each tool, we gain insights into their impacts on learners' academic experiences.

Group "GPT"

Participants in the ChatGPT-exclusive group relied heavily on AI to draft their essays, using prompt-driven processes with minimal manual research. As A.P.S. explained, *"I copied the questions and pasted them under my instructions in the ChatGPT box… I did this process several times because GPT couldn't generate an essay with exactly 700 words."* Many found ChatGPT's speed and efficiency valuable, allowing them to focus on refining content. However, participants often encountered irrelevant responses, requiring additional editing. L.A.S. shared their frustration: *"ChatGPT gave long and hard-to-understand answers, so I just submitted them as is."* This raised concerns about the lack of meaningful retention of information. In other words, ChatGPT's usefulness depended on how prompts were formulated.

Group "Google"

Participants in Group "Google" used the traditional research process, finding and synthesizing information from multiple credible sources. Y.S. described their strategy: *"I started by reading articles in Indonesian first, to make it easier to understand… Then I moved on to English articles."* Many participants valued Google for its depth of information and credibility. C.N.A. noted, *"Google helps understand the topic through credible sources, while the process of reading and filtering information improves my thinking skills."* This hands-on approach not only strengthened content understanding but also promoted critical thinking skills as students evaluated sources for relevance and reliability. In fact, some participants found it time-consuming, recognizing the importance of focus and organization in managing Google-based research.

Group "Combined"

Participants in the combined-tools group utilized ChatGPT for drafts and Google for research and verification. D.F.S. summarized their approach: *"I searched for data on Google, then used ChatGPT to draft the essay… This process involves thinking because I had to verify relevant information."* M.S.R. highlighted how Google provided references, while ChatGPT summarized or outlined the essay. This approach allowed quick idea generation with accuracy. While it reduced some challenges, balancing AI-generated content with manual research remained difficult, particularly in maintaining tone and style. Overall, participants saw it as a

practical mix of automation and manual effort.

Emergent Themes Across the Groups

The thematic analysis revealed four key themes across participant groups: Efficiency, which captures the ease and speed of generating content, especially with ChatGPT; Depth of Understanding, reflecting cognitive engagement and comprehension in the writing process; Challenges and Frustrations, including issues like irrelevant outputs, information overload, or difficulty verifying content; and Learning outcomes, which address participants' perceptions of knowledge retention and skill development. These themes provide a structured framework for understanding participants' experiences, offering valuable insights into the educational implications of the tools.

Efficiency

Efficiency emerged as a dominant theme, with each tool's praised for its strengths for expediting essay writing. ChatGPT group valued its quick draft generation, though the output often needed refining. One participant, N.S., shared, "*I copied the instructions into ChatGPT and it immediately provided an answer, though not always perfect*." However, this efficiency came at the expense of quality, as many participants had to refine the output. In contrast, the Google group focused on thorough research, with A.K. stating, "*It took time to cross-check sources, but it ensured accuracy*." The combined approach optimized efficiency, using ChatGPT for idea generation and Google for validation. M.R.

explained, "*ChatGPT gave a starting point, and Google refined the details*," making this method the most balanced and efficient.

Depth of Understanding

Cognitive engagement varied across groups, with ChatGPT providing structured essays but not encouraging deeper understanding. F.N. observed, *"The tool gives you answers, but if you don't check or analyze them, you don't really learn anything new."* This passive learning approach limited retention and comprehension. The manual research process fostered active engagement through reading and synthesizing multiple sources. The hybrid approach balanced efficiency and depth, with Y.S. stating, *"ChatGPT helped me organize my ideas, and Google filled in the gaps with more detailed explanations."* This combination promoted both deeper learning and efficiency, highlighting that while Google fosters engagement, ChatGPT complements manual research.

Challenges and Frustrations

Each group reported distinct challenges that influenced their perceptions of the tools. ChatGPT users struggled with irrelevant or simplistic responses, often requiring extensive editing. R.A. shared, *"Sometimes the answers were off-topic, and I had to rewrite large parts of the essay myself."* This undermined the perceived reliability of the tool for academic tasks. Group "Google" Participants frequently reported difficulties managing the sheer volume of information available online. P.K. explained, *"It's easy to get overwhelmed when you're reading too many articles, and not all*

of them are useful." The hybrid approach reduces some challenges but raises issues with tone consistency between AI-generated content and manual research. D.S. remarked, *"It was hard to make the tone consistent because the writing styles from ChatGPT and Google sources were different."* These underscore the need for clear strategies to help students use these tools effectively.

Learning Outcomes

The learning outcomes across groups revealed a trade-off between speed and depth for each tool. The "GPT" group completed their essays quickly but had lower retention. E.L. observed, *"I finished the essay fast, but I didn't absorb much."* This reflects surface-level learning. In contrast, the manual research process promoted deeper understanding, though it was less efficient. A.N. from "Google" Group shared, *"Reading so many sources made me feel more confident about what I learned."* The hybrid approach was the most balanced outcomes, combining efficiency with comprehensive learning. O.S. noted, *"Using both tools helped me write faster without sacrificing the depth of my understanding."* This study provides new insights into the impact of ChatGPT-assisted writing on knowledge retention compared to traditional and hybrid methods.

Convenience and Ease of Use of ChatGPT

This study confirms the high convenience of ChatGPT, praised in previous research for quickly generating structured drafts, making it ideal for time-constrained students. Such efficiency aligns with findings

by Xiao and Zhi (2023) and Malik et al. (2023), who emphasized ChatGPT's utility in simplifying complex writing tasks. In contrast, Google-assisted research requires more active engagement, supporting Catalá's (2016) view that traditional tools promote deeper learning. The hybrid approach combines the efficiency of ChatGPT with the cognitive engagement of Google, highlighting the strengths of both tools.

Unique Insights on Knowledge Retention

A significant contribution of this study is its focus on knowledge retention, a dimension previously unexplored in the context of AI-assisted essay writing. The findings demonstrate that the ChatGPT-only group performed the worst in retention tests, while the Google-only group achieved the highest scores. The hybrid group performed similarly to the Google-only group, suggesting combining tools can offset some of ChatGPT's drawbacks. When existing research examines AI tools' impact on writing quality and efficiency (Song & Song, 2023; Barrot, 2023), none address long-term retention. The retention gap between ChatGPT and Google users may stem from ChatGPT's surface-level engagement, as noted by Farrokhnia et al. (2023).

Undermining Critical Thinking and Higher-Order Skills

The findings substantiate concerns about ChatGPT undermining critical thinking and higher-order cognitive skills. Participants in the ChatGPT-only group exhibited passive learning behaviors, relying on AI-generated

content with minimal scrutiny aligning with Putra et al. (2023) and Cotton et al. (2024). Conversely, Google-assisted research promoted critical thinking, as students actively engaged in finding and integrating credible sources, supporting Marzuki et al. (2023). The hybrid approach, combining both tools, balanced efficiency with depth, echoing Barrot's (2023) support for integrated tool usage.

Hindrance to Deep Learning and Retention

The study's qualitative findings show that ChatGPT promotes superficial learning, hindering deep comprehension and retention. Participants described the process as mechanical, with minimal revisions, supporting Farrokhnia et al. (2023)'s critique of AI-generated outputs lacking active cognitive engagement. In contrast, Google-assisted writing encourages deeper learning by requiring students to search, evaluate, and synthesize information, aligning with Catalá's (2016) research. The hybrid group demonstrated that combining ChatGPT and Google can balance both approaches, offering a practical solution for improving learning outcomes.

Student Perceptions vs. Learning Outcomes

One intriguing finding of this study is the discrepancy between students' perceptions of learning and actual retention outcomes. Despite achieving lower scores in post-tests, participants in the ChatGPT-only group often perceived their learning as effective due to the tool's ease of use. This finding reflects Xiao and Zhi's (2023) observation that students associate convenience with learning,

even when the outcomes do not substantiate this belief. Such misconceptions highlight the need for critical evaluation of AI-generated content. Educators must guide students to scrutinize the quality and relevance of ChatGPT outputs, a sentiment echoed by Dergaa et al. (2023), who caution against over-reliance on AI in academic settings.

Synergistic Potential of Combining ChatGPT and Google

The hybrid approach proved effective, achieving retention outcomes similar to Google-only users. By combining ChatGPT for drafts and Google for verification, participants overcame the limitations of each tool. This supports Barrot's (2023) view that integrating AI with traditional methods optimizes learning. The model also emphasizes the importance of scaffolding students' use of multiple tools to balance ChatGPT's efficiency with the depth of traditional research.

However, the study has limitations. It was conducted at a single university in Indonesia, limiting generalizability, and cultural differences may affect tool usage (Xiao & Zhi, 2023). The unequal participant distribution across groups could introduce bias, though ANOVA reduces this risk. Additionally, the lack of supervision may have led to inconsistent tool usage, impacting retention outcomes. Finally, focusing on retention without evaluating essay quality echoes Malik et al.'s (2023) call for assessing both process and product in AI's educational impact.

CONCLUSION

This study explored how ChatGPT, Google, and their combination affect EFL learners' essay writing and knowledge retention, an area rarely addressed in AI-assisted writing research. Results showed that while ChatGPT offers speed and convenience, it lacks in fostering deep engagement and retention. The Google-only group performed best in post-tests, highlighting the cognitive value of manual research. The hybrid approach, using ChatGPT for drafts and Google for validation, offered a balanced solution, combining efficiency with deeper learning.

The study has key pedagogical implications: while AI tools like ChatGPT can streamline writing, their standalone use may promote passive learning and limit critical thinking. Educators should encourage a blended approach, integrating AI tools within active learning frameworks. However, the study has limitations, including the lack of statistical validation for the multiple-choice instrument used to measure knowledge retention, which was developed through expert discussions in this preliminary phase.

Additionally, the study was conducted at a single institution with unequal group sizes and did not assess the quality of the students' written outputs. Future research should employ validated instruments, expand to broader populations, and investigate the impact of AI use on writing quality, learner autonomy, and long-term academic development.

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