Enhancing EFL Learners' Critical Digital Literacy through AI-Integrated Writing Platforms

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ABSTRACT

As digital technology and artificial intelligence (AI) continue to transform education, English as a Foreign Language (EFL) instruction must evolve to meet the demands of the digital era. One critical yet underexplored issue is the development of critical digital literacy (CDL) among EFL learners, particularly in contexts where students heavily rely on AI writing tools without understanding their limitations. This study investigated the extent to which AI-integrated writing platforms influence CDL among EFL students at Universitas Serambi Mekkah. Employing a mixed-methods approach, the study sampled 30 third-year undergraduate students majoring in English education. Data were collected through pre- and post-tests, classroom observations, and semi-structured interviews. The findings revealed a significant improvement in students' writing performance when using AI tools, but also highlight a lack of critical engagement with AI-generated content. The study underscores the need for explicit instruction in CDL to ensure that students can effectively evaluate and integrate AI-assisted outputs. This research contributes to the growing literature on AI in EFL by identifying a novel gap in CDL development and proposing pedagogical strategies tailored to the Indonesian EFL context.

Keywords: *Artificial intelligence, critical digital literacy, EFL writing, ai writing tools, ChatGPT, higher education, language pedagogy, digital literacy*

1.   INTRODUCTION

The rapid advancement of digital technology and artificial intelligence (AI) is reshaping the landscape of education worldwide, demanding new competencies from both learners and educators. In the context of English as a Foreign Language (EFL) instruction, AI-powered tools such as ChatGPT, Grammarly, and Quillbot are increasingly embedded into the writing process, offering immediate feedback and enhancing learners' linguistic output (Godwin-Jones, 2022; Kamarullah et al., 2024; Khan et al., 2024). These platforms have the potential to transform how students engage with writing tasks by automating error correction, suggesting vocabulary, and even generating coherent paragraphs. However, this convenience also raises significant pedagogical concerns, chief among them the risk that learners may rely excessively on these tools without critically engaging with their content (Junaedi, 2025; Stojanov et al., 2024).

As AI-generated content becomes more accessible, the ability to use digital tools effectively and responsibly, commonly referred to as Critical Digital Literacy (CDL), has become an essential 21st-century skill. CDL goes beyond basic functional literacy and involves the capacity to analyze, evaluate, and ethically engage with digital texts (Kellner & Share, 2007; Pangrazio & Sefton-Green, 2021). In higher education, particularly in EFL contexts, fostering CDL enables students to reflect on the limitations and biases of AI, assess the credibility of digital sources, and maintain authorial integrity in their writing (Ng, 2022).

Despite increasing global attention on digital literacy, there remains a gap in how CDL is addressed in AI-integrated EFL classrooms, especially in developing countries where digital infrastructure and pedagogy are still evolving. Indonesia presents a relevant case study, as many universities are incorporating digital tools into the curriculum, yet lack formal frameworks for CDL education (Sari et al., 2023). At Universitas Serambi Mekkah in Aceh, this issue is particularly urgent. Most students come from rural or underprivileged backgrounds and have had limited exposure to digital technology prior to entering university. Although students are actively using AI platforms for academic writing, preliminary observations indicate that they often accept outputs uncritically, mistaking machine-generated fluency for accuracy and appropriateness.

This study sought to investigate this underexplored intersection between CDL and AI usage in EFL writing instruction. By examining how third-year English education students at Universitas Serambi Mekkah interact with AI writing tools, this research aims to uncover not only the tools' impact on writing performance but also the extent to which students engage critically with these technologies. While studies such as Zawacki-Richter et al. (2019) and Göçen & Aydemir (2020) have explored AI in education broadly, few have centered on the nuanced challenges of CDL among EFL learners in low-resource contexts.

2.   METHODS

A mixed-methods design was employed to gain both quantitative and qualitative insights. The participants were 30 third-year EFL students from Universitas Serambi Mekkah, selected through purposive sampling. Data collection instruments included pre- and post-tests to measure changes in writing proficiency, classroom observations over six weeks to monitor students' interaction with AI tools, and semi-structured interviews with 10 students to explore perceptions and critical engagement with AI-generated content. AI tools used included ChatGPT for generating drafts, Grammarly for editing, and Quillbot for paraphrasing. The study followed ethical protocols, with informed consent obtained from all participants.

For the quantitative component, students' pre- and post-test writing scores were analyzed using descriptive statistics (mean, standard deviation) and a paired samples t-test to determine whether the observed differences in performance were statistically significant ($p<0.01$). In addition, sub-scores for grammar, vocabulary, and coherence were compared to identify which aspects of writing were most affected by the use of AI tools. The qualitative data from classroom observations and interviews were analyzed using thematic analysis. Observation notes and interview transcripts were coded inductively to identify recurring patterns related to students' usage behavior, attitudes toward AI tools, and evidence of critical engagement or lack thereof. Codes were organized into broader themes, such as *uncritical acceptance of AI output*, *efficiency over learning*, and *emerging skepticism*. Triangulation across data sources helped validate and enrich the interpretation of findings.

3.   RESULTS

Quantitative analysis from both pre- and post-intervention assessments revealed a statistically significant improvement in students' writing performance. The mean score on writing tasks increased from 68.2 to 79.4, a notable gain of 11.2 points, with the improvement confirmed as statistically significant ($p<0.01$). This enhancement reflects a positive impact of integrating AI writing tools, such as ChatGPT, into the learning process. Detailed scoring criteria indicated that the most significant gains were in grammar accuracy, vocabulary usage, and textual coherence. For instance, students made fewer subject-verb agreement errors, chose more contextually appropriate words, and organized their ideas in a more logical and fluid manner. These aspects suggest that AI assistance may be particularly beneficial in offering real-time language corrections and lexical suggestions.

Moreover, student feedback via short reflective surveys supported the quantitative findings, with many acknowledging that AI tools helped them identify mistakes they had previously overlooked. They also appreciated the AI's ability to propose more natural and fluent sentence constructions, which enhanced the readability and professionalism of their writing. These findings align with current literature emphasizing AI's strengths in surface-level linguistic correction and stylistic refinement (Tedjo, 2022; Fan, 2023).

However, qualitative data presented a more nuanced and critical perspective. Despite their enthusiasm and improved test scores, students demonstrated a superficial engagement with the AI tools. Classroom observations revealed that learners often used AI-generated content uncritically. Rather than reviewing, modifying, or evaluating the suggestions made by AI tools, students typically accepted the output as it is. This passive approach raises concerns about their critical digital literacy (CDL), the ability to question, interpret, and responsibly integrate digital content.

In-depth interviews with ten participants further reinforced this concern. Only three students showed any

signs of skepticism or evaluative behavior when interacting with AI-generated text. The remaining students admitted to relying heavily on AI without verifying its accuracy or appropriateness. One candidly confessed: *"I usually copy from ChatGPT and submit it directly. I don't know if it's always right or not."* This response not only underscores over-reliance but also a lack of metacognitive awareness in the writing process. Another student shared: *"It helps me write faster, but sometimes I feel like I didn't learn anything",* which highlights the tension between convenience and meaningful learning.

Such findings point to a critical gap between performance and understanding. While students' final outputs may show improvement, the underlying learning processes remain shallow. This dependency on AI without critical engagement suggests that writing becomes a product-focused activity, where the goal is submission rather than skill development. From a pedagogical standpoint, this challenges educators to reconsider how AI tools are integrated into writing instruction. It becomes imperative not only to train students in using such tools but also to cultivate critical digital literacy, ensuring they are capable of interrogating and refining the content they receive.

Ultimately, this research revealed a dual reality: AI tools can significantly enhance writing performance, but without proper guidance, they may also diminish the depth of learning. Future instructional designs should incorporate reflective writing practices, peer reviews, and teacher-led discussions around AI usage to bridge this gap. Empowering students to question, revise, and take ownership of AI-assisted content is key to nurturing both writing competence and digital literacy in the age of intelligent tools.

4. DISCUSSION

The findings from this study revealed a complex interplay between technological assistance and student learning in the context of academic writing. While the use of AI writing tools, particularly ChatGPT, led to statistically significant improvements in students' writing performance, the qualitative data revealed notable limitations in students' engagement with the tools, particularly in terms of critical thinking and digital literacy.

4.1 Writing Performance Gains

The quantitative results clearly indicate that the integration of AI writing tools had a positive impact on students' writing outcomes. The increase in mean writing scores from 68.2 to 79.4 ($p < 0.01$) is substantial and reflects improvements in key writing components, including grammar, vocabulary usage, and coherence. These findings align with previous research suggesting that AI-powered tools can provide immediate, personalized feedback that enhances linguistic accuracy and fluency (e.g., Godwin-Jones, 2022; Kamarullah et al., 2024; Khan et al., 2024). The AI's ability to detect grammatical errors and suggest more natural lexical choices likely played a significant role in boosting students' confidence and output quality.

However, while these surface-level improvements are encouraging, they raise important pedagogical concerns. Writing is not merely a mechanical process of producing grammatically correct sentences; it is a cognitive and metacognitive activity that involves critical thinking, audience awareness, and iterative revision. The risk, therefore, is that reliance on AI tools may promote linguistic accuracy at the expense of deeper cognitive engagement.

4.2 Critical Digital Literacy

Despite the improvements in writing scores, the qualitative data presents a more cautionary narrative. Classroom observations and student interviews revealed that most learners accepted AI-generated text without question. Only 3 out of 10 students demonstrated any degree of skepticism or attempted to verify the relevance, accuracy, or appropriateness of the AI suggestions. These findings indicate a lack of critical digital literacy (CDL), a core 21st-century skill involving the ability to analyze, question, and responsibly use digital content.

Students' comments such as *"I usually copy from ChatGPT and submit it directly"* and *"It helps me write faster, but sometimes I feel like I didn't learn anything"* highlight a tendency to prioritize efficiency over comprehension. This mirrors recent concerns in the literature that while AI tools can serve as scaffolding for language learners, they may also foster dependency and reduce learner agency (Hong et al., 2025). In such cases,

students risk becoming passive consumers of AI-generated content rather than active participants in the writing process.

4.3   Instructional Implications: Balancing Tool Use and Skill Development

The findings suggest that while AI tools can be valuable aids in writing instruction, they should be embedded within a pedagogical framework that promotes critical engagement. Simply introducing AI tools without explicit training on how to use them critically may lead to superficial learning gains and reduced long-term writing competence. Therefore, educators must play an active role in guiding students not only in how to use AI tools effectively but also in how to question, revise, and evaluate the content generated.

Pedagogical strategies such as reflective writing logs, peer-review sessions focused on AI output, and classroom discussions about AI accuracy can foster CDL and help students become more discerning users. Additionally, integrating lessons on bias in AI-generated content, ethical use, and proper attribution can further support the development of responsible digital citizens.

5.   CONCLUSION

In sum, this study underscores both the potential and the pitfalls of AI integration in academic writing. While AI tools like ChatGPT can support linguistic development and improve writing performance, they must be used judiciously. Without intentional pedagogical intervention, students may engage with these tools uncritically, undermining the development of essential cognitive and digital literacy skills. Educators must therefore strike a balance, leveraging technology to enhance learning while nurturing the critical capacities that enable students to become thoughtful, independent writers in a digital age.

This research contributes to the field by identifying an underresearched issue, the intersection of AI-assisted writing and CDL in EFL contexts with limited digital resources. While this study provides valuable insights, it is not without limitations. The sample size for qualitative interviews was small, which may not fully capture the diversity of student experiences. Future research could involve a larger, more diverse cohort and explore longitudinal effects of AI-assisted writing over multiple semesters. Additionally, more nuanced instruments to measure CDL explicitly would enhance the depth of analysis. Future studies could expand the sample size, explore longitudinal impacts, and develop specific instructional models tailored to similar educational settings.

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