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DIGITAL LITERACY AND CRITICAL THINKING IN RELATION TO EFL WRITING PERFORMANCE

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Abstract
Writing has always been one of the most challenging skills for students in anEnglish as a Foreign Languagecontext.This skill not only requires language proficiency but also involves strong critical thinkingskills to organize ideas.This study examined the relationship between digital literacy, critical thinking skills, and English writing performance among EFL students.This study applied a quantitative approach with a correlational design.The study participants were 37 students in the English Language Education program at Muhammadiyah University of Surakarta, chosen using purposive sampling.Researchers collected data from students' writing scores given by lecturersusing the ESL Composition Profile rubric, andfromquestionnaires regarding digital literacy and critical thinking skills. Because the collected data were not normally distributed, Spearman's rank correlation coefficient was used in the analysis.The results showed that digital literacy was notsignificantly corelated with students' writing performance(rho= -0.060, p= 0.725). Similarly, critical thinking skills were not significantly correlated withwritingperformance(rho= 0.170, p= 0.313), although the coefficient value for critical thinking was numerically higher. Interestingly, digital literacy and critical thinking skills were found to have moderate and significantly correlation with each other(rho= 0.471, p= 0.003). This study concludes that digital literacy and critical thinkingas measured in this study, were not significantly correlated with EFL students writing performance, suggesting that other factors, such as grammar mastery, may play a larger role. These findings also indicate that digital literacy and critical thinking skills are interrelatedas cognitive abilities

Keywords— critical thinking, digital literacy, EFL students, Spearman's rho, writing performance

Introduction

Writing is one of the productive skills in English that is considered very challenging for EFL students Alzubi & Nazim (2024). Many of them find writing difficult and stressful Sasmita & Setyowati (2021). This challenge is even greater in academic writing. The problem is, writing not only requires mastery of language aspects but also higher-order thinking skills to organize ideas logically and in a structured manner Yulandari & Suryadi (2025). EFL students at the college level often struggle to organize their thoughts, create a thesis statement, and choose precise academic terms Aldabbus & Almansouri (2022). Bulqiyah et al. (2021) added that students' writing challenges can generally be divided into three aspects: affective issues related to teacher and student attitudes during learning cognitive issues regarding perspectives on writing and linguistic issues such as grammar and text structure.

The first of these two abilities is digital literacy. The ability to use information technology to learn and work in the digital world is referred to as digital literacy Feng & Sumettikoon (2024). This skill is crucial because the high intensity of internet use requires students to be adept at managing information and facing online risks wisely Purnama et al. (2021). In terms of writing, digital literacy helps students filter the quality and reliability of sources used as references for their writing Haliq et al. (2023), while also aiding the process of searching for and evaluating

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academic references Rinekso et al. (2021). Angguni et al (2026) also demonstrated a relationship between EFL students' academic writing performances and their digital literacy. This shows that digital literacy helps improve writing performance, especially through improving the quality and credibility of the source material that students use in their writing.

The second ability, critical thinking, is also believed to contribute to the quality of EFL students' writing. Critical thinking is the ability to objectively assess information in order to make informed decisions Ariadila et al. (2023). This skill is crucial because it helps students construct consistent arguments in their academic writing Hamamah et al. (2022). However, critical thinking appears to support writing performance by helping students evaluate evidence, construct logical arguments, and organize their ideas in a structured and coherent manner. A study by Ilyas and Arifin (2025) of EFL students in Jakarta showed that critical thinking significantly helps students construct more coherent reason. All of these studies indicate that digital literacy and critical thinking are each associated with the writing performance of EFL students. However, the exact extent to which these two factors, when combined, are related to students' English writing performances remains to be determined.

This study is valuable because gaining an insight into the relationship between digital literacy, critical thinking, and writing performances provides a solid foundation for lecturers and curriculum designers to develop more effective and suitable teaching strategies for EFL students in today's digital age. While previous studies have examined the differences between digital literacy and critical thinking in relation to English as a Foreign Language (EFL) writing, there has been little research that examines these two variables together within a single study to determine how each relates to students writing performance. Moreover, of the previous studies, only one utilized actual objective writing scores provided by lecturers. Most studies have been limited to examining the students' own perspectives or perceptions. This gap prevents us from fully understanding whether these two thinking skills operate independently or whether they are related to each other in determining the actual writing outcomes of students.

To overcome this gap, this study seeks to answer three main questions: (1) Is there a significant relationship between digital literacy and the writing performance of EFL students? (2) Is there a significant relationship between critical thinking and the writing performance of EFL students? and (3) Is there a significant relationship between digital literacy and critical thinking itself? Based on previous research indicating that digital literacy and critical thinking are each associated with writing performance, this study hypothesizes that all three relationships are indeed significant. These three relationships are analyzed separately, rather than as a combined effect of digital literacy and critical thinking on writing performance. Therefore, the results are reported as associations, not as effects or cause-and-effect relationships. This study will ultimately provide specific recommendations for improving English writing instruction for EFL students. The results are expected to help English teachers design learning strategies that integrate digital literacy and critical thinking, raise students' awareness of the importance of these two skills, and provide insights for future curriculum developers and researchers in enhancing writing performance in the digital age.

Literature Review

Digital Literacy Practices in the Academic Context of EFL

Digital literacy refers to a person's skill to make use of information and communication technology for learning, working, and engaging in activities in a digital environment Feng & Sumettikoon (2024). Rinekso et al. (2021) found that postgraduate EFL students applied digital literacy by searching for scientific references, collaborating online, and independently managing digital learning resources. These findings provide evidence that digital literacy has indeed become integrated into students' daily academic activities. However, this research was only descriptive in nature and did not yet connect these digital habits with tangible results in the quality of students' writing. Haliq et al. (2023) went further and found that students with strong digital literacy tended to be more selective when choosing reference sources and rarely included quotations from sources of uncertain credibility in their academic essays. These research findings reinforce the hypothesis that digital literacy is indeed helpful for students in the early stages of writing namely, when

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searching for and selecting materials but the study cannot yet answer whether this assistance automatically improves students' final writing grades. Furthermore, Angguni et al. (2026) found a strong relationship between digital literacy and students' perceptions of their own academic writing abilities. However, because this correlation was only measured through student self-assessment and not actual writing scores, we still don't know for sure whether the relationship remains if writing is assessed objectively. This distinction is important because self-perceived writing performance does not always align with objective assessment results. Students may overestimate themselves due to unfamiliarity with clear assessment criteria, or underestimate themselves due to a lack of confidence. Rubric based assessments, on the other hand, measure writing based on defined criteria, not simply on personal impressions. Therefore, this study used actual writing scores assessed using the ESL Composition Profile, rather than student self-reports, to test whether the relationship reported by Angguni et al. (2026) holds when writing ability is measured objectively.

Critical Thinking and the Quality of Argumentation in EFL Writing

Critical thinking is essentially the ability to filter information objectively to make informed decisions Ariadila et al. (2023). Through their literature review, Hamamah et al (2022) concluded that critical thinking plays a significant role in helping students formulate basic ideas, weigh available evidence, and draw logical conclusions when writing. Unfortunately, this conclusion remains theoretical as it has not been directly tested through actual writing assessments. Meanwhile, Ilyas and Arifin (2025) found that EFL students in Jakarta with strong critical thinking skills were highly effective in incorporating supporting evidence into their arguments. This study used a measurement tool that focused on argument quality. However, this study did not indicate whether this relationship would persist if writing performance were measured by daily coursework grades or overall final course grades. This finding aligns with Wang & Shen, (2023) study of 140 English language students at a university of science and technology in China. They found that the tendency or character of critical thinking (critical thinking disposition) had no relationship with EFL argumentative writing performance, even though the students studied actually had a relatively strong tendency to think critically.

EFL Writing Assessment and the ESL Composition Profile

Assessing EFL students' writing performance requires an instrument that captures the various components of writing quality, not just an overall impression. One of the most frequently used analytical instruments is the ESL Composition Profile by Jacobs, Zingraf, Wormuth, Hartfiel, and Hughey (1981), which assesses essays on five weighted components: content, organization, vocabulary, language use, and mechanics. Comparing four types of assessment rubrics with EFL learners in an EMI environment, Alghizzi and Alshahrani (2024) found that students assessed using the ESL Composition Profile experienced significant improvements in writing scores, while students assessed using a purely holistic rubric showed no significant improvement. The profile's component-based analytical structure makes specific strengths and weaknesses more visible to both assessors and students. Specifically in the Indonesian EFL context, Setyowati, Sukmawan, and El-Sulukkiyah (2020) similarly reported that the ESL Composition Profile serves as an effective and practical assessment tool for college-level students. Because this instrument separates language-related components (vocabulary, language use, mechanics) from ideational components (content, organization), it is well-suited for research that seeks to link specific cognitive skills such as digital literacy and critical thinking to specific sections of writing, rather than simply to the overall quality of writing. At the same time, Li (2022) cautions that even criterion-based analytical rubrics involve the role of raters, and therefore their reliability and internal validity need to be considered when interpreting relationships between writing scores and other variables. This study chose to use the ESL Composition Profile for these reasons; its component-based structure will also be referred to later when explaining which sections of writing are more, or less, related to digital literacy and critical thinking.

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Process

Conceptually, digital literacy and critical thinking are thought to be related to writing performance through two distinct, complementary pathways. Digital literacy primarily operates in the initial stages of writing, namely, when gathering sources, by supporting students' ability to locate and assess the reliability of the reference sources used Haliq et al. (2023). In contrast, critical thinking primarily operates at the idea development stage, aiding students' ability to select relevant evidence, construct coherent arguments, and organize ideas logically Hamamah et al. (2022). Because these two pathways address different needs in the writing process, digital literacy and critical thinking are conceptually thought to be related to writing performance, although the relationship between the two is not straightforward. In theory, digital literacy and critical thinking may be interconnected, as they both require students to assess the veracity of information, rather than simply accepting it at face value. Assessing the credibility of a source (digital literacy skills) and assessing the strength of an argument or evidence (critical thinking skills) both rely on the same fundamental skill: evaluative judgment. This overlap suggests that although conceptually distinct, they can develop simultaneously. Empirically, however, this relationship remains uncertain: Indah (2022) studied EFL students in Indonesia and found that the relationship between digital literacy and critical thinking was insignificant. This suggests that digital literacy does not necessarily translate into stronger critical thinking skills in practice. This discrepancy between theoretical assumptions and previous research findings warrants reexamining the relationship between digital literacy and critical thinking in the current study sample, in addition to examining their respective relationships with writing performance. It is important to note that in this study, digital literacy and critical thinking were treated as interrelated cognitive concepts, each examined for its relationship to writing performance, rather than as independent variables in a predictive model. This aligns with the correlational design used in this study, in which each relationship was tested separately and not combined into a single predictive framework.However, Ye & Liu (2023) research focuses more on modeling general thinking processes and does not specifically examine how digital literacy and critical thinking, as two distinct skills, relate to writing performance when measured using tangible indicators such as grades on daily class assignments.

Research Method

This study employs a quantitative, correlational design to examine the relationship between students' digital literacy, critical thinking skills, and English writing performance. The correlational design was deliberately chosen to ensure accurate measurement of the relationship between these variables. The quantitative approach was used to guarantee the objective measurement and testing of the relationship between digital literacy, critical thinking, and writing performance Creswell (2018). The research was conducted at Muhammadiyah University of Surakarta and included students enrolled in the English Language Teaching program. The study sample was selected using purposive sampling based on specific criteria: students actively participating in the program, those taking writing courses, and those effectively using digital media in their learning. According to Cohen J A (1992) guide to Statistical Power Analysis, a sample size of 37 participants meets the minimum requirement for detecting a significant-effects correlation ($r \geq 0.50$) at a significance level of 0.05 and a power of 0.80, where the minimum required sample size is 28 participants. This study also interprets smaller coefficients e.g., *rho* = 0.170 for critical thinking and writing performance, it is likely underpowered to reliably detect small to moderate relationships, this is acknowledged as a limitation of the study. Data were collected using two types of instruments: questionnaires and student writing scores. For the digital literacy variable, data were measured using a questionnaire consisting of 13 statements adapted from Nabhan & Habo (2025) Academic Writing Scale for Digital Literacy. This questionnaire uses a four-point Likert scale, ranging from "strongly agree" to "strongly disagree", resulting in a total possible score range of 13–52. Meanwhile, critical thinking skills were measured using a questionnaire containing 11 statements adapted from the Critical Thinking Questionnaire (CThQ) Kobylarek (2022), which also uses a 4-point Likert scale, resulting in a total possible score range of 11–44. On the other hand, students' English writing performance was assessed using the ESL Composition Profile rubric by Jacobs et al. (1981). This rubric consists of five assessment

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components: content, organization, vocabulary, language use, and writing mechanics, with a maximum total score of 100. Writing grades were assigned directly by the instructor based on essay assignments in the writing class the students took, not on a research specific writing test. Because the assessments were conducted by a single rater rather than multiple raters, inter-rater reliability could not be calculated. Therefore, the possibility of rater bias should be considered when interpreting these writing performance results. The data collection process took place in several stages: first, participants were given an informed consent form. Second, digital literacy and critical thinking questionnaires were distributed online to participants who had agreed to take part. Third, students' writing performance scores were obtained from the scores already assigned by the lecturer.

To maintain the quality of the questionnaire instrument, this study first conducted a validity test using Pearson's product-moment correlation and a reliability test using Cronbach's alpha coefficient. A questionnaire item is considered valid if it has a total item correlation coefficient $r \geq 0.30$ Sugiyono (2019) and/or a significance level $p < 0.05$. All 13 digital literacy items met this criterion, with item-total correlations ranging from $r = 0.448$ to $r = 0.697$ (all $p < 0.05$), so no items were dropped. This digital literacy scale demonstrated good reliability (*Cronbach's* $\alpha = 0.804$, 13 items). Similarly, all 11 critical thinking items also met validity criteria, with item-total correlations ranging from $r = 0.368$ to $r = 0.808$ (all $p < 0.05$); no items were dropped. This critical thinking scale also demonstrated good reliability (*Cronbach's* $\alpha = 0.834$, 11 items). After that, the data were analyzed using IBM SPSS Statistics through several stages. First, descriptive statistical analysis was run to describe the average value (mean), standard deviation, and minimum and maximum values of each variable. Second, a normality test was conducted to determine whether the data met the assumptions of parametric statistics. Because the results of the normality test indicated that some variables had non-normal distribution, the subsequent hypothesis testing switched to non-parametric statistics, namely Spearman's rank order correlation (Spearman's rho). This correlation analysis was used to determine whether there was a relationship between digital literacy and writing performance, between critical thinking skills and writing performance, and between digital literacy and critical thinking skills itself.

Results and Discussion

Descriptive Statistics

Before testing the hypotheses, a descriptive analysis was conducted to understand the three research variables. The results of this descriptive analysis are presented in Table 1.

Table 1. *Result of Descriptive Statistics*

Variabel	N	Min	Max	Mean	SD
Digital Literacy	37	38	52	42.05	3.559
Critical Thinking	37	30	44	34.89	3.187
Writing Performance	37	65	83	78.70	4.142

Table 1 shows that the average digital literacy score for students was 42.05, while the average critical thinking score was 34.89. Because digital literacy and critical thinking are measured with a different number of items, the mean scores of both should not be simply compared without formal statistical testing and such comparisons were not conducted in this study. The average writing performance score of 78.70 is on a different scale, so it cannot be directly compared with the other two variables. The relatively small standard deviation values for all three variables ranging from 3.19 to 4.14 when viewed from their respective averages indicate that the variation in scores between students tends to be homogeneous or similar, and does not show extreme differences in either digital literacy, critical thinking, or writing performance.

Data Normality Tests

The Shapiro-Wilk test was used to find the most appropriate data correlation analysis technique. The results of this normality test are shown in Table 2.

Table 2. *Results of the Shapiro-Wilk Normality Test*

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Variable	Statistic	df	Sig.	Decision
Digital Literacy (TOTAL.DL)	0.876	37	0.001	Not normally distributed
Critical Thinking Skills (TOTAL.CT)	0.884	37	0.001	Not normally distributed
English Writing Performance (SCORE.Y)	0.706	37	0.000	Not normally distributed

Based on Table 2, The p-values for all three variables were below 0.05, indicating that none of them were normally distributed. Given the small sample size, the Shapiro-Wilk test was preferred over the Kolmogorov-Smirnov test. Therefore, to test the hypotheses in this study, the Spearman correlation was used instead of the Pearson correlation.

Hypothesis Testing (Spearman's Rho Correlation)

The results of the analysis of the relationship between variables using Spearman's rho correlation can be seen in Table 3.

Table 3. *Results of Spearman's Rho Correlation Between Variables*

		Digital Literacy	**Critical Thinking**	**Writing Performance**
Digital Literacy	Correlation Coefficient	1.000	.471**	-.060
	Sig. (2-tailed)	.	.003	.725
	N	37	37	37
Critical Thinking	Correlation Coefficient	.471**	1.000	.170
	Sig. (2-tailed)	.003	.	.313
	N	37	37	37
Writing Performance	Correlation Coefficient	-.060	.170	1.000
	Sig. (2-tailed)	.725	.313	.
	N	37	37	37

Based on Table 3, a very small and insignificant correlation value (*rho* = -0.060, p = 0.725) indicates that there is no significant relationship between digital literacy and English writing performance in EFL students in this sample. A weak and insignificant correlation value (*rho* = 0.170, *p* = 0.313) also indicates no significant relationship between critical thinking and English writing performance, although numerically it is larger than digital literacy. This insignificant finding should not be taken as definitive proof that the relationship is completely absent in the wider population, given the limited power of this sample to detect small to medium-sized effects. On the other hand, this study found a statistically significant relationship with a moderate level (*rho* = 0.471, *p* = 0.003) between digital literacy and critical thinking. Referring to Cohen (1992) guide for interpreting correlation coefficients (approximately 0.10 = small, 0.30 = medium, 0.50 = large), the coefficients for digital literacy and critical thinking with writing performance (*rho* = -0.060 and 0.170) fall into the very small to small category. Meanwhile, the coefficient between digital literacy and critical thinking (*rho* = 0.471) is in the medium to large range.

The first finding found no significant relationship between digital literacy and English writing performances in EFL students. This is in line with a study by Parrella et al. (2021), which found no statistically significant relationship between digital media use and students' self-assessments of their writing performances. Although digital literacy is expected to help students

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filter the quality and reliability of reference sources during the writing process Haliq et al. (2023), this study found that this was not always reflected in the final quality of writing assessed by lecturers, This pattern may actually illustrate how strong the influence of grammar and sentence structure mastery is on writing quality, when assessed using the ESL Composition Profile although, because grammar mastery is not measured as a separate variable here, this interpretation is still only a guess and cannot be confirmed. If this explanation holds, it could be understood through Skill Acquisition Theory Suzuki (2024), which states that language accuracy is a procedural skill that must be honed through intensive and deliberate practice until it becomes automatic. This differs from digital literacy, which operates more at the information-seeking and filtering level, rather than at the language production stage itself. This possibility is further strengthened by research on raters' thought processes when evaluating writing Tavassoli et al. (2022), which shows that raters using multi-element analytical rubrics like the ESL Composition Profile tend to place particular emphasis on language accuracy. Refinements to the scale structure and function of these rubrics Chang (2023) may also mean that grammatical mastery has a greater influence on final scores than less directly observable skills, such as source selection or information filtering, although whether this pattern holds in the current sample cannot be confirmed without directly measuring grammatical mastery. In other words, the ability to filter and select digital information appears to be helpful in the early stages of the writing process namely, when searching for and gathering writing materials but may not be sufficient on its own to guarantee the quality of the final written product, which may still depand on specific language skills such as grammar and vocabulary Bulqiyah et al. (2021). This non-significant finding is consistent with the view that digital literacy and writing performances are conceptually related but distinct constructs; improving one does not necessarily lead to improving the other, particularly when writing quality is assessed using a comprehensive rubric that may weight grammar more heavily than specific indicators of information literacy skills.

The second finding indicates that critical thinking skills are also not significantly related to students' writing performances, although the correlation coefficient (*rho* = 0.170) is slightly higher than the correlation between digital literacy and writing. This finding aligns with a study by Wang & Shen (2023) that observed 140 English language students at a university of science and technology in China. Their study showed no significant correlation between critical thinking tendencies and argumentative writing performances in EFL students (with a significance value of 0.668, well above the 0.05 threshold), even though the students in their study initially had relatively strong critical thinking tendencies. Several factors may explain why this study's results differ from other studies that reported a significant relationship, such as the study by Ilyas and Arifin (2025). First, there are differences in the measurement tools: both studies used assessment tools specifically designed to explore and measure argumentation quality, whereas writing performance in this study was measured by the total course grade, which includes five indicators content, text organization, vocabulary, language use, and writing techniques according to assessment standards established by the teaching team. This combination of various aspects likely caused the specific contribution of critical thinking to be "mixed" with other factors in the total grade, making its relationship difficult to distinguish using this comprehensive assessment tool. Second, considering the characteristics of the sample, this study used a much smaller sample size (N = 37) than Wang & Shen (2023) study, which included 140 English majors. Had the sample been larger, especially focusing on English majors, the still-unclear relationship between critical thinking and writing performance might have been more clearly clarified. Third, there's the learning environment. The students in this study were recruited from a regular writing class on campus, where assignments were not specifically designed to train argumentation. However, previous studies that have shown significant results typically used assignments or training that focused specifically on how to construct and evaluate arguments. This shows that critical thinking can only be recognized as a writing performance if the writing assignment requires clear argumentative reasoning, not if it's assessed generally through course evaluations that combine various indicators. This aligns with the idea that critical thinking and writing performances are interconnected. However, this relationship is often obscured when writing performance is assessed solely by the overall grade, rather than by specific indicators that assess the quality of a person's argument.

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Although the third finding was not the primary focus of this study, the results showing a strong correlation between digital literacy and critical thinking skills *(rho* = 0.471, *p* = 0.003) warrant discussion. This relatively strong correlation suggests that both cognitive abilities tend to develop concurrently in students. These findings are consistent with the view that digital literacy and critical thinking complement each other in students' thinking processes. This was also demonstrated by Amin & Adiansyah (2023) in their study of biology education students at Ternate State Islamic University. They found that digital literacy was associated with stronger critical thinking skills: students who were accustomed to sorting and evaluating the validity of digital information tended to show more comprehensive analytical thinking, and vice versa. On the other hand, the results of this study differ from those of Indah (2022). In their research on EFL (English as a Foreign Language) students at two Islamic educational institutions in Indonesia, they found no statistically significant relationship between the two variables. This difference in results can again be explained by differences in sample characteristics and the measurements used in the study. Amin & Adiansyah (2023) study included students whose academic duties routinely required a combination of examining digital resources and analytical thinking, whereas the institutions studied by Indah (2022) may differ in the extent to which digital technology is integrated into daily academic activities. Overall, this suggests that the strength of the relationship between digital literacy and critical thinking is not uniform across all environments, but rather is shaped by the degree to which the students' educational context necessitates a combination of digital information use and critical analysis.

Although the relationship between digital literacy and critical thinking was not statistically significant on its own, these findings have practical implications for teaching writing in English as a foreign language. Because writing performance in this study appears to be closely linked to the language components of the assessment, writing teachers may want to continue prioritizing the explicit teaching of grammar and sentence structure, rather than assuming that digital literacy or critical thinking training in general will automatically improve students' writing scores. At the same time, given the close relationship between digital literacy and critical thinking, teachers may consider integrating digital literacy tasks such as evaluating online resources alongside critical thinking tasks such as constructing arguments from those resources in writing courses, not because it is expected to directly improve writing scores, but because such integration may support the broader academic skills that students need, even if its effect on writing scores cannot be comprehensively observed using the methods employed here.

This study has several limitations that should be acknowledged. First, the relatively small sample size (*N* = 37) limits the generalizability of the findings and may limit statistical power in detecting small to moderate effect sizes, particularly for the relationship between critical thinking and writing performances. Second, writing performances were assessed using a single holistic score derived from an overall rubric, rather than through analytical assessments of individual components such as content, organization, vocabulary, language use, and mechanics; this may obscure the specific contributions of digital literacy and critical thinking to specific writing sub-skills. Third, this study relied on self-report questionnaire data for digital literacy and critical thinking, which are susceptible to social desirability bias. Future research is recommended to utilize analytical writing rubrics, involve larger and more diverse samples from various institutions, and, where possible, employ direct performance-based measures of digital literacy and critical thinking to gain a more precise understanding of their relationship to writing performances.

Conclusion

This study inspected the relationship between digital literacy, critical thinking, and English writing performances in EFL students in the Department of English Education at Muhammadiyah University of Surakarta. Based on Through Spearman's rho correlation analysis involving 37 students, this study found no significant relationship between digital literacy and writing performance (*rho* = -0.060, *p* = 0.725) or between critical thinking and writing performance (*rho* = 0.170, *p* = 0.313) in this sample. Meanwhile, digital literacy and critical thinking were significantly correlated with each other at a moderate level (*rho* = 0.471, *p* = 0.003).

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By examining digital literacy, critical thinking, and English writing performances together within a single study, As a rarely researched combination in the EFL context in Indonesia, this study contributes to the broader language education literature. Unlike most previous studies that found significant associations between writing performances and either digital literacy or critical thinking, this study suggests that this relationship is not consistent across different samples, contexts, and assessment methods, and should therefore not be generalized without further testing.

These findings indicate that digital literacy and critical thinking, as measured in this study, were not significantly related to writing performance scores in this sample. This should not be interpreted as evidence that digital literacy and critical thinking are unrelated to writing performance in general, nor as evidence that language factors such as grammar and vocabulary are the sole determinants of writing performance. Rather, it indicates that, in this sample and assessment method, a link with the language-focused components of the writing rubric cannot be ruled out as a contributing factor, although this was not directly tested here. Therefore, lecturers and curriculum developers are advised not to treat digital literacy and critical thinking training as a substitute for explicit instruction in grammar, sentence structure, and academic vocabulary. Such training should be integrated alongside, rather than replacing, direct instruction in language accuracy. Given the significant correlation between digital literacy and critical thinking, lecturers may also consider designing writing assignments that integrate both skills for example, through assignments that require students to critically evaluate digital sources before composing essays while remaining aware that any relationship with writing grades will depend on strengthening foundational language skills.

This study has several limitations that should be considered when interpreting the results. The sample consisted of only 37 students from a single university selected through purposive sampling, limiting the generalizability of the findings. Writing performance was assessed using a single holistic score provided by the lecturer, rather than by multiple independent raters, which could introduce rater bias. Furthermore, the correlational design used here cannot establish causal or predictive relationships between the variables. Future research is recommended to use larger and more diverse samples from multiple institutions, use standardized writing tasks scored by multiple raters, and consider regression or structural equation modeling to examine the combined and relative contributions of digital literacy and critical thinking to writing performance. Future research could also benefit from measuring additional variables that may influence writing performance, such as grammar mastery, vocabulary knowledge, writing anxiety, motivation, and amount of writing practice.

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