

Exploring the impact of critical thinking and digital literacy on students' academic essay writing skills

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Abstract: This study explores the influence of critical thinking skills and digital literacy on academic essay-writing skills among university students. Employing an associative quantitative approach, it examines the relationship between two independent variables—critical thinking skills and digital literacy—and the dependent variable, academic essay-writing ability. Data were collected through a cross-sectional survey of a sample of 150 students selected using simple random sampling and analyzed using Structural Equation Modeling (SEM) with SmartPLS software. The findings reveal that critical thinking skills exert a significant and dominant influence on academic essay-writing ability, whereas digital literacy makes a smaller but still significant contribution. These results underscore the importance of integrating critical thinking skills and digital literacy into the educational curriculum as a strategy to enhance the quality of students' academic writing. This research also offers recommendations for educators and policymakers to design more effective learning approaches that support the development of students' 21st-century skills.

Keywords: *Critical thinking, digital literacy, academic essay writing, structural equation modelling (SEM)*



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INTRODUCTION

Critical thinking and digital literacy are increasingly considered important components in academic essay writing. In this context, critical thinking plays a significant role in improving the quality of argumentation, clarity of expression, and coherence of texts, which are essential for creating effective academic writing. Students can not only logically organize their thoughts but also more thoroughly analyze and evaluate information through the use of critical thinking. For example, when students write about climate change, they need to consider various perspectives, including scientific data, public opinion, and government policy. By using critical thinking, students are able to evaluate the credibility of the information sources they consult, ensuring that the arguments they produce are not only compelling but also supported by reliable facts.

According to Teng & Yue (2023), metacognitive awareness, which includes the ability to categorize and compare facts and opinions, is an important aspect of academic writing quality. This awareness allows writers to reflect on their thought processes to identify biases or assumptions that may influence their arguments. This critical evaluation not only assists the author in selecting credible sources but also builds a strong argument. Safriyani et al. (2020) show that authors who are able to evaluate information sources critically tend to produce better-quality writing. By thinking critically, students can create essays that are not

only informative but also persuasive, as they can overcome objections and strengthen their positions (Johan, 2024).

Furthermore, the writing activity is an expression of critical thinking skills, as writing forces students to organize ideas coherently. Qoura & Zahran (2018) emphasize that a good writing process involves developing a clear structure, where each argument supports the others and contributes to the overall thesis. Writers who integrate various perspectives and counter-arguments in their essays demonstrate the ability to think critically about their arguments (Mehta & Al-Mahrooqi, 2015). This shows that writing is not just about conveying information, but also a deep reflective process. Therefore, teaching critical thinking through essay writing can encourage students to develop a deeper understanding of the topic they are discussing and improve their overall writing skills (Dewi, 2016).

In addition to critical thinking, digital literacy plays an increasingly important role in academic writing. Digital literacy includes the ability to use digital tools such as online databases and reference management software, as well as the skills to evaluate and utilize information effectively in cyberspace. In an era in which data is easily accessible via the Internet, assessing a source's reliability and relevance is crucial. As academic writing increasingly relies on digital sources, digital literacy has emerged as a skill that is inextricably linked to critical thinking. Lela Susanty (2024) emphasizes the importance of bridging the digital literacy gap among students to ensure that they have adequate competence in utilizing digital resources for academic writing. Deiniatur & Cahyono's (2024) research shows that access to digital tools such as online databases can improve students' ability to organize and present academic arguments more systematically.

Digital literacy is also closely related to positive attitudes towards academic writing. Developing digital literacy skills allows students to adopt a more constructive and proactive approach to writing. Şengül & Demirel (2022) noted that students with good digital literacy skills tend to be more confident in writing, as they feel more capable of finding and using relevant information. In addition, digital literacy supports academic resilience and self-efficacy, especially when facing the increasingly complex challenges of academic writing in the digital era (Solahudin et al., 2022). Thus, students who are skilled in digital literacy are better prepared to face academic tasks and better able to adapt to changes that occur in the world of education.

The relationship between critical thinking and digital literacy is increasingly being considered essential in Academic Essay Writing. In today's digital age, where information can be accessed easily and quickly, thinking critically is very important. Research has shown that digital literacy, which includes the ability to use information and communication technology effectively, can improve students' critical thinking skills. This is because digital literacy allows students to access, evaluate, and synthesize information more effectively and efficiently. Research conducted by

Cintamulya et al., (2023) showed that optimal digital literacy can improve critical thinking skills in writing scientific articles. In this study, students who were skilled in using various digital tools, such as academic databases and word processing software, could find relevant and quality information more quickly. They can also compare different sources of information and evaluate their credibility to develop a more solid argument. For example, students writing an essay on climate change can easily access scientific journals, news articles, and research reports to gain diverse perspectives, thus building a more comprehensive and evidence-based argument.

On the other hand, digital literacy also supports the development of high-level thinking skills needed to produce quality academic essays (Manggopa & Kumampung, 2023). Digital literacy skills include information analysis, synthesis, and evaluation, all of which are important components of academic writing (Haliq et al., 2023). By integrating these two skills, students will be able to produce better writing and be better equipped to contribute significantly to academic discussions.

However, although the link between critical thinking and digital literacy is clear, challenges remain. Many students still have difficulty in developing these two skills simultaneously. One reason for this is the lack of training and support for the effective use of digital tools. Therefore, educational institutions need to provide adequate training to students to develop the digital literacy necessary to support their critical thinking skills.

Although a number of studies have discussed the role of critical thinking or digital literacy in academic writing separately, studies that integrate both aspects into a single analytical framework are still relatively limited. Many previous studies have focused solely on one variable, such as critical thinking skills in constructing arguments (Teng & Yue, 2023; Johan, 2024), or digital literacy in accessing academic information (Şengül & Demirel, 2022; Cintamulya et al., 2023). However, research that explicitly explores how the simultaneous interaction between critical thinking skills and digital literacy impacts the quality of students' academic essay writing is still rare in the context of higher education in Indonesia..

In addition, although the relationship between critical thinking and digital literacy is clear, challenges remain. Many students still find it difficult to develop these two skills simultaneously. One reason for this is the lack of training and support in the effective use of digital tools. Therefore, educational institutions need to provide adequate training to students so that they can develop the digital literacy necessary to support their critical thinking skills.

Thus, critical thinking and digital literacy play an important role in improving academic essay writing skills. The integration of these two skills in education will help students produce more structured, informative, and persuasive writing. This will not only prepare them for future academic and professional challenges but also equip them with the ability to think

critically and creatively in dealing with complex issues. This study aims to explore the influence of critical thinking and digital literacy skills on academic essay writing skills to provide deeper insights into how these two skills can be developed to improve students' academic outcomes. The development of critical thinking and digital literacy skills should be a key focus in the educational curriculum so that students can reach their full potential in academic writing and other fields. Based on the description provided, the hypothesis in this study is:

H1: Critical thinking positively influences digital literacy

H2: Critical thinking positively influences academic essay writing

H3: Digital literacy positively influences academic essay writing

METHOD

This study employed a correlational research design. Correlation research aims to identify and analyze the relationship between two or more variables as well as to understand the causal relationship between these variables (Maison et al., 2021; Santillan et al., 2023; Wachira & Kihara, 2023). In this study, the variables studied include independent variables, namely critical thinking and digital literacy, as well as dependent variables, namely, academic essay writing skills. This study aimed to determine how critical thinking and digital literacy can affect students' academic essay-writing skills.

The population of this research comprises all students who are currently enrolled in the Indonesian Language and Literature study program at the Faculty of Language and Literature, Universitas Negeri Makassar. Since not all populations can be reached, researchers have used sampling techniques to obtain representative samples. The research sample consisted of 150 students in the 5th semester of the 2024-2025 academic year who were selected using a simple random sampling technique, where each student had the same opportunity to be chosen as a research sample (Astalini et al., 2021; Patrick & Osadebe, 2017). In quantitative research employing regression analysis or Structural Equation Modeling (SEM) approaches, a minimum sample size of 100–150 respondents is deemed sufficient for achieving robust and generalizable results (Hair et al., 2014).

This research instrument uses a questionnaire with a 1-5 Likert scale, ranging from strongly disagree to agree, to measure three main variables strongly. This format enables researchers to quantify subjective opinions and attitudes, making it a significant tool across various fields, including education and the social sciences (Carifio & Perla, 2007; Hartley & MacLean, 2006). The variable of academic essay writing skills was developed with indicators of critical thinking, collection, analysis, evaluation, and synthesis of references (Hasanah et al., 2023; Pratama, 2021; Pujiastuti, 2023). The instrument for measuring digital literacy was developed with indicators of

searching, processing, evaluating, and communicating information using digital technology (Haliq et al., 2023; Khosrow-Pour, D.B.A., 2018). The critical thinking instrument was developed with indicators of analyzing information, managing data, and making relevant decisions in the preparation of good academic essays (Indah, 2017; Safriyani et al., 2020). Experts have validated the instruments used, and they meet validity criteria. Data collection was conducted by distributing an online questionnaire via Google Forms.

This study used a Structural Equation Modeling (SEM) analysis technique with SmartPLS software. SEM is a statistical analysis technique used to test the relationships between variables in a theoretical model and to allow for the analysis of more complex relationships between latent variables (such as critical thinking and digital literacy that cannot be directly measured) and measurable variables (such as quantifiable academic essay writing skill scores) (Bauldry, 2015). SEM can be used to analyze the extent to which independent variables (critical thinking and digital literacy) affect dependent variables (academic essay writing skills) directly or indirectly.

RESULTS AND DISCUSSION

Results

SEM (Structural Equation Modeling) analysis is carried out through two main interrelated stages, namely measurement model analysis and structural model analysis, to ensure the reliability and compatibility of the resulting model. Each stage has specific objectives and procedures supporting the research results' validity and strength.

Measurement Model Analysis

The analysis of the measurement model is carried out in two main stages, namely, the validity test and the reliability test, to ensure that the instrument used can accurately measure the construct. The validity test consisted of convergent and discriminant validity. Convergent validity measures the extent to which the indicators in one construct are highly correlated. This test used two parameters: factor loading and Average Variance Extracted (AVE). A valid loading factor must have a value greater than 0.5 or 0.7, which was considered valid in this study; a value of 0.6 is considered valid (HairJr. et al., 2021).

Meanwhile, the received AVE value must be greater than 0.5 to ensure the measured construct has a fairly good variance (HairJr. et al., 2021). Discriminatory validity aims to ensure that a construct is distinguishable from other constructs tested using the heterotrait–monotrait ratio (HTMT). The accepted HTMT value must be less than 0.85 or 0.90, indicating good discriminatory validity (Henseler et al., 2014). Reliability tests were conducted to measure the internal consistency of the constructs. The two types of reliability tests used were Composite Reliability (CR) and Cronbach's alpha,

which must be greater than 0.7, indicating good reliability. In contrast, the accepted Cronbach’s alpha value is generally greater than 0.7, to ensure the internal reliability of the indicators on a single construct. Table 1 presents the results of the reflective measurement model analysis.

Table 1. Results of Reflective Measurement Model Analysis

Construct/Factors	Item	Outlier Loadings	Cronbach’s Alpha	Composite Reliability (rho_A)	Average Variance Extracted (AVE)
Critical Thinking	CT1	0.723	0.779	0.798	0.531
	CT2	0.611			
	CT3	0.810			
	CT4	0.747			
	CT5	0.737			
Digital Literacy	DL1	0.614	0.768	0.779	0.528
	DL2	0.836			
	DL3	0.627			
	DL4	0.668			
	DL5	0.852			
Academic Essay Writing	WAE1	0.752	0.825	0.834	0.539
	WAE2	0.606			
	WAE3	0.792			
	WAE4	0.819			
	WAE5	0.773			
	WAE6	0.635			

Based on the results of the analysis of the reflective measurement model in Table 1, all indicators in Critical Thinking, Digital Literacy, and Academic Essay Writing constructs can be used because they have a loading factor of ≥ 0.6 , in accordance with the minimum threshold set. The Critical Thinking construct shows indicators with a fairly good contribution, although CT2 (0.611) has a loading near the lower boundary. In the Digital Literacy construct, DL1 (0.614) and DL3 (0.627) showed a lower contribution than the other indicators, while DL5 (0.852) had the strongest contribution. All indicators had adequate loading for Academic Essay Writing s, although WAE2 (0.606) and WAE6 (0.635) were in the minimum range. The reliability of the construct is rated well, with Cronbach’s Alpha and Composite Reliability values above 0.7, indicating strong internal consistency. Convergent validity is also achieved with an AVE value slightly above 0.5 for all constructs. Overall, the model is adequate for further research, although indicators with loadings close to the threshold need to be evaluated to ensure their optimal contribution to the construct being measured.

Table 2. HTMT

Construct	Heterotrait-monotrait ratio (HTMT)
Digital Literacy <-> Critical Thinking	0.836
Academic Essay Writing <-> Critical Thinking	0.744
Academic Essay Writing <-> Digital Literacy	0.588

The results of the discrimination validity analysis through the HTMT test in Table 2 show that all construction pairs have sufficient discrimination validity because all HTMT values are below the threshold of 0.90. Thus, the constructs in this model are conceptually different, and the validity of discrimination between constructs is acceptable. Thus, this model is feasible for further analysis.

Structural Model Analysis

Structural model analysis in SEM modeling includes important steps, such as path coefficient evaluation, which measures the strength and significance of relationships between latent constructs. This coefficient shows the influence of one construction on another. Figure 2 shows the bootstrapping results of the SEM model.

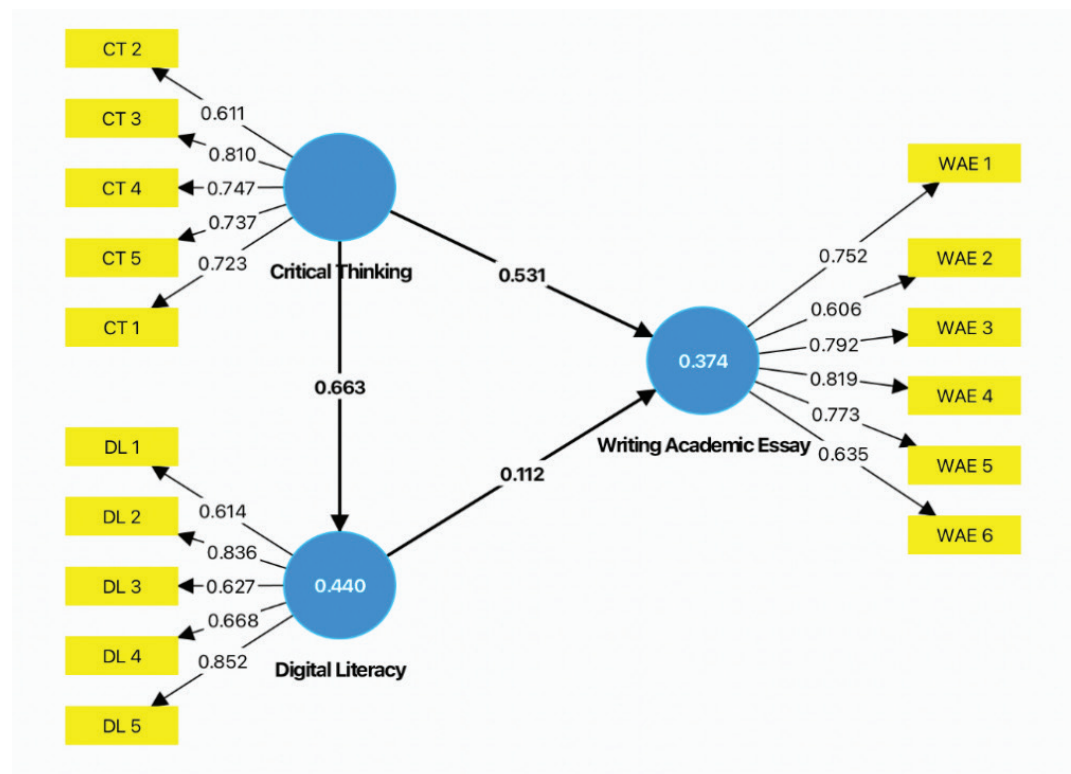


Figure 1. SEM Analysis

Figure 1 shows the results of the SEM analysis, which explains the relationship between latent variables (constructs) and their indicators. A summary of the results of the hypothesis test is presented in Table 3.

Table 3. Summary of Hypothesis Test Results

Path	Hypothesis	Path Coefficient (β)	p-Value	T-Statistics	Decision
Critical Thingking->Digital Literacy	H1	0.663	0.000	15.632	Positive and significant
Critical Thingking->Academic Essay Writing	H2	0.531	0.000	6.752	Positive and significant
Digital literacy ->Academic Essay Writing	H3	0.112	0.153	1.429	Positive and not significant

Based on the results of the hypothesis test in Table 3, Critical Thinking (β: 0.663; p-value: 0.000<0.05; t-statistics: 15.632) plays a significant role in improving Digital Literacy (β: 0.531; p-value: 0.000<0.05; t-statistics: 6.752) and Academic Essay Writing s (β: 0.112; p-value: 0.153 <0.05; t-statistics: 1.429), as shown by the results of the analysis that support the positive relationship between these constructs. Although digital literacy positively influences the writing of academic essays, this influence is not significant. This indicates that digital literacy alone is not enough to affect academic essay writing skills significantly; therefore, other factors that can interact with digital literacy are needed to have a more meaningful impact on these skills.

Table 4. R-Square

Construct	R-square	R-square adjusted
Digital Literacy	0.440	0.436
Academic Essay Writing	0.374	0.365

Table 4 explains that the R-Square value shows that the Critical Thinking variable can explain 44% of the variability in Digital Literacy. Factors outside the model influenced the rest (56%). The R-Square score was in the moderate category, indicating that Critical Thinking strongly influences Digital Literacy. The R-Square value shows that the variables Critical Thinking and Digital Literacy can explain 37.4% variability in Academic Essay Writing . Other factors outside the model influenced the remaining variables (62.6%). This R-Square score is in the moderate category, indicating that Critical Thinking and Digital Literacy have a sufficient influence on Academic Essay Writing. However, other factors are more dominant.

Thus, this model shows that critical thinking contributes considerably to explaining the variability of digital literacy. At the same time, academic essay

writing is influenced by a combination of critical thinking and digital literacy, with a moderate contribution. However, most of the variability in academic essay writing is influenced by other factors not identified in this model.

Discussion

The results of this study show that critical thinking has a significant influence on the ability to write academic essays, as well as on digital literacy. Although there is a link between digital literacy and academic essay writing, its influence is not significant. In this discussion, we will further explain the findings and the reasons why digital literacy does not significantly influence academic essay writing.

First, critical thinking was found to influence the ability to write academic essays significantly. Critical thinking skills allow individuals to organize ideas logically, analyze arguments, and evaluate evidence objectively. Academic essay writing requires skills in formulating and structuring clearly structured arguments and the ability to explore various perspectives and provide evidence supporting the opinions presented. Therefore, critical thinking strongly supports this process, as it involves understanding and the synthesis and evaluation of information in depth, which is essential in academic essay writing.

Critical thinking mostly enhances academic writing by facilitating the structuring of ideas. Effective academic writing necessitates a coherent structure, which exemplifies critical thinking. Research findings demonstrate that students' critical thinking skills are manifested in their writing, which is cultivated through the systematic arrangement of ideas in academic essays. These findings correspond with Johan's assertion that composing argumentative essays necessitates advanced cognitive abilities, particularly critical thinking, which is directly linked to enhanced writing ability (Johan, 2024). Indah's research underscores that writing performance is intrinsically linked to critical thinking, suggesting that organized writing assignments might enhance essential phases of critical and creative thought (Indah, 2017). The findings of this study demonstrate that students who practice critical thinking are more adept at structuring their thoughts logically, hence improving the clarity and efficacy of their academic articles.

Moreover, critical thinking enhances the assessment of evidence and arguments. Research findings indicate that assessing evidence and references significantly aids pupils in utilizing pertinent evidence and references for their academic essays. Smith and Peloghitis also assert that critical thinking instruction in writing courses ought to encompass practical guidance on implementing ways to mitigate prejudice, thereby aiding students in making more reasonable decisions in their writing (Smith & Peloghitis, 2020). This method underscores the necessity of rigorously evaluating the authenticity and dependability of sources, which is essential for constructing well-supported arguments in academic writing. Furthermore, Hamamah et al. (2022) revealed that improving writing skills

simultaneously improves students' critical thinking abilities, as writing practice provides opportunities for students to develop more nuanced and critical ideas in their academic work. This reciprocal relationship suggests that as students refine their writing through critical thinking, they become more skilled at evaluating the arguments they encounter.

Critical thinking encourages the exploration of various perspectives, organizing ideas, and evaluating evidence. Mehta & Al-Mahrooqi (2015) emphasized that students who do not have critical thinking skills may find it difficult to engage in reasoning and argumentation, which is crucial for synthesizing claims from various sources in academic writing. These limitations can hinder one's ability to present a complete argument. In contrast, Wang and Shen's research shows that students with strong critical thinking dispositions tend to perform better than their peers on writing assignments as they are better able to integrate a variety of viewpoints into their essays (Wang & Shen, 2023). Considering and articulating these perspectives is essential for producing comprehensive and persuasive academic writing.

The integration of metacognitive skills and critical thinking, as substantiated by the analysis results, might enhance students' academic essay writing proficiency. Magno found comparable research findings, elucidating how metacognitive skills facilitate the enhancement of critical thinking, hence promoting superior writing outcomes. (Magno, 2010). By increasing awareness of their own thought processes, students can refine their writing strategies, leading to more effective communication of their ideas. The interaction between metacognition, critical thinking, and writing confirms the multifaceted nature of academic writing as a critical thinking process.

The results of the study strongly support the statement that critical thinking has a significant influence on the ability to write academic essays. Critical thinking is the cornerstone of effective academic writing, and it allows students to organize ideas logically, critically evaluate arguments, and explore various perspectives. As educational practice evolves, the integration of critical thinking in the teaching of writing will be crucial for developing proficient writers capable of engaging in complex academic discourse.

Furthermore, the results also show that critical thinking significantly affects digital literacy. Critical thinking skills support individuals in assessing and evaluating the information found in cyberspace more selectively and wisely. Digital literacy includes technical skills in using digital devices and the ability to access, assess, and use information effectively and critically. With critical thinking skills, individuals can assess the credibility and relevance of the information they encounter online and utilize digital resources more effectively for their academic and professional needs.

The relationship between critical thinking and digital literacy is increasingly recognized as an important aspect of the contemporary educational landscape. Critical thinking skills enable individuals to navigate the vast amount of online information, allowing them to effectively assess

and evaluate the credibility and relevance of digital content. This ability is especially important in an era characterized by information overload, where the ability to discern facts from disinformation becomes vital for academic and professional success.

Critical thinking is defined as the ability to engage in reflective and independent thinking, which includes evaluating arguments and assessing evidence (Indrawatiningsih, 2018). Research shows that the development of critical thinking skills is beneficial not only for academic performance but also for improving digital literacy. For example, a study by Xu et al., (2023) highlighted that emotional engagement significantly affects educational attainment and digital literacy, suggesting that critical thinking is essential for effectively identifying credible information in digital contexts. Furthermore, integrating critical thinking into digital literacy education promotes a more nuanced understanding of information, allowing students to utilize digital resources more effectively (Cintamulya et al., 2023).

Furthermore, the interaction between critical thinking and digital literacy can be observed in various educational strategies. For example, interactive digital worksheets have been shown to improve students' critical thinking skills, thereby improving their overall digital literacy (Utaminingsih et al., 2024). Similarly, critical thinking and digital literacy should not be viewed as separate entities; both are interrelated and mutually reinforcing skills in the higher education environment (Manggopa & Kumampung, 2023). This view is supported by findings showing that optimizing digital and information literacy in scientific article writing significantly improves students' critical thinking skills (Cintamulya et al., 2023).

The importance of critical thinking in developing digital literacy is increasingly emphasized by the need for educational institutions to inculcate these skills in students. As Kola & Molise (2023) note, there is a global demand for universities to implement learning activities that encourage critical thinking, which is critical for navigating the complexities of digital information. In addition, the ability to think critically is increasingly recognized as a basic learning outcome in higher education, as it equips students with the tools necessary to interact with digital content thoughtfully and responsibly (Danvers, 2018).

Available evidence strongly supports the statement that critical thinking significantly influences digital literacy. By developing critical thinking skills, educational institutions can improve students' ability to access, assess, and effectively utilize digital information. This synergy prepares students for academic success and equips them with the skills necessary to thrive in a digitally technology-driven world.

Although there is a relationship between digital literacy and academic essay writing, the influence of digital literacy on the quality of academic essay writing was not significant in this study. One of the main reasons for this is that digital literacy focuses more on technical skills related to using

digital tools and resources, such as the ability to search for information online, use word processing software, or access collaborative platforms. As Khosrow-Pour, D.B.A., (2018) stated, digital literacy includes the skills of finding, consuming, creating, communicating, and sharing digital content. Other research also shows that the concept of digital literacy focuses on computer literacy, media literacy, cultural literacy, and disciplinary literacy (Tinmaz et al., 2022). Writing an academic essay requires more in-depth and complex skills, such as organizing ideas logically, building solid arguments, and presenting ideas clearly and coherently. Although digital literacy skills allow individuals to access more information, not all aspects of these skills contribute directly to their ability to write effective academic essays.

Another factor that may affect the insignificance of the influence of digital literacy on Academic Essay Writing is that the quality of academic essays is highly dependent on other cognitive skills, such as understanding the rules of academic writing, the ability to structure in-depth arguments, and experience in writing. In this case, although digital literacy allows writers to acquire and access a variety of references that can enrich their essays, the skill of formulating and developing ideas critically determines essay quality. Therefore, although digital literacy can be helpful in acquiring relevant information, it does not significantly impact the quality of writing itself, which is influenced more by critical thinking skills and deeper writing skills.

Overall, the results of this study emphasize the importance of critical thinking in improving academic essay writing skills and digital literacy. Critical thinking skills prove to be instrumental in organizing arguments and structuring academic essays logically and systematically. On the other hand, although digital literacy provides wider access to information that can support writing, its influence on the quality of academic essay writing is not significant. This shows that although digital skills are important in the academic world, developing effective writing skills still depends more on mastering critical thinking skills and in-depth knowledge of academic writing techniques. Therefore, education must focus more on developing critical thinking, integrated with academic writing training, to improve essay writing quality.

CONCLUSION

Based on the results of the research and discussion described above, it can be concluded that critical thinking skills significantly positively influence digital literacy. This shows that the higher a person's critical thinking ability, the better their digital literacy ability. In addition, critical thinking skills have a positive and significant effect on academic essay writing ability, indicating that improving critical thinking skills can help improve the quality of academic essay writing. On the other hand, although digital literacy positively influenced academic essay writing ability, the influence was not significant. This leads to the understanding that digital literacy alone, without being

supported by critical thinking skills, is not sufficient to improve academic essay-writing skills significantly. Thus, the study concluded that, although digital literacy contributes to improving academic essay writing ability, the main influence in this regard comes from critical thinking skills. These findings demonstrate the importance of developing critical thinking skills in the context of education, especially in improving students' writing skills. This study also has limitations, such as limited sample coverage and a context that may differ from the broader situation. Further research is recommended to consider other factors that affect academic essay writing ability and test this model in different educational contexts with a more diverse sample to obtain a more comprehensive picture.

REFERENCES

- Astalini, A., Darmaji, D., Kurniawan*, D. A., & Chen, D. (2021). Investigating student perceptions based on gender differences using E-Module Mathematics Physics in Multiple Integral Material. *Jurnal Pendidikan Sains Indonesia*, 9(4), 602–619. <https://doi.org/10.24815/jpsi.v9i4.21297>
- Bauldry, S. (2015). Structural equation modeling. In *International Encyclopedia of the Social & Behavioral Sciences* (pp. 615–620). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.44055-9>
- Carifio, J., & Perla, R. J. (2007). Ten common misunderstandings, misconceptions, persistent myths and urban legends about Likert scales and Likert response formats and their antidotes. *Journal of Social Sciences*, 3(3), 106–116. <https://doi.org/10.3844/jssp.2007.106.116>
- Cintamulya, I., Mawartiningsih, L., & Warli, W. (2023). The effect of optimizing digital and information literacy in writing scientific articles on students' critical thinking skills. *AL-ISHLAH: Jurnal Pendidikan*, 15(2), 1987–1998. <https://doi.org/10.35445/alishlah.v15i2.3062>
- Danvers, E. (2018). Who is the critical thinker in higher education? A feminist re-thinking. *Teaching in Higher Education*, 23(5), 548–562. <https://doi.org/10.1080/13562517.2018.1454419>
- Deiniatur, M., & Cahyono, B. Y. (2024). Digital literacy practices of novice English as a foreign language teacher in writing research articles for publication. *Journal of Education and Learning (EduLearn)*, 18(1), 165–172. <https://doi.org/10.11591/edulearn.v18i1.20899>
- Dewi, D. K. (2016). Improving critical thinking in academic writing through portfolio in higher education. *Proceedings of the 1st UPI International Conference on Sociology Education (UPI ICSE 2015)*. 1st UPI International Conference on Sociology Education, Bandung, Indonesia. <https://doi.org/10.2991/icse-15.2016.89>
- Hair Jr., J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Evaluation of reflective measurement models*. 75–90. https://doi.org/10.1007/978-3-030-80519-7_4
- Haliq, A., Zamzani, Z., Wiedarti, P., & Akhiruddin, A. (2023). Self-access in digital literacy: evaluating the quality of information and reliability of sources in academic essay writing. 4(1), 85–96. <https://doi.org/10.26858/interference.v4i1.44561>
- Hamamah, H., Sahiruddin, S., & Junining, E. (2022). On critical thinking and academic writing in EFL/ESL contexts: A literature review. *Proceedings of the 1st International Conference on Language, Literature, Education and Culture, ICOLLEC 2021, 9-10 October 2021, Malang, Indonesia*. Proceedings of the 1st International Conference on Language, Literature, Education and Culture, ICOLLEC 2021, 9-10 October 2021, Malang, Indonesia, Malang, Indonesia. <https://doi.org/10.4108/eai.9-10-2021.2319667>
- Hartley, S. L., & MacLean, W. E. (2006). A review of the reliability and validity of Likert-type scales for people with intellectual disability. *Journal of Intellectual Disability Research*, 50(11), 813–827. <https://doi.org/10.1111/j.1365-2788.2006.00844.x>
- Hasanah, M., Silangit, S. Z. P., Jamil, R. P., & Amanda, W. N. (2023). Analisis tingkat kemampuan berpikir kritis siswa SMA Nurul Iman Tanjung Morawa. *Pedagogi: Jurnal Ilmiah Pendidikan*, 9(1), 16–22. <https://doi.org/10.47662/pedagogi.v9i1.540>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Indah, R. N. (2017). Critical thinking, writing performance and topic familiarity of Indonesian EFL learners. *Journal of Language Teaching and Research*, 8(2), 229. <https://doi.org/10.17507/jltr.0802.04>
- Indrawatiningsih, N. (2018). Arguments in critical thinking ability. *Proceedings of the 1st Annual International Conference on Mathematics, Science, and Education (ICoMSE 2017)*. 1st Annual International Conference on Mathematics, Science, and Education (ICoMSE 2017), Malang, Indonesia. <https://doi.org/10.2991/icomse-17.2018.4>

- Johan, A. (2024). An analysis of critical thinking skills through argumentative essay writing. *English Journal Literacy Utama*, 8(1), 36–45. <https://doi.org/10.33197/ejlitutama.vol8.iss1.2023.5.455>
- Khosrow-Pour, D.B.A., M. (Ed.). (2018). *Encyclopedia of information science and technology, fourth edition*: IGI Global. <https://doi.org/10.4018/978-1-5225-2255-3>
- Kola, M., & Molise, H. (2023). Assessing the Implementation of critical thinking skills in the university: A focus on technology education. *E-Journal of Humanities, Arts and Social Sciences*, 500–515. <https://doi.org/10.38159/ehass.2023451>
- Lela Susanty. (2024). Critical analysis of the research on digital literacy. *Sinergi International Journal of Education*, 2(1), 12–25. <https://doi.org/10.61194/education.v2i1.149>
- Magno, C. (2010). The role of metacognitive skills in developing critical thinking. *Metacognition and Learning*, 5(2), 137–156. <https://doi.org/10.1007/s11409-010-9054-4>
- Maison, M., Darmaji, D., Kurniawan, D. A., Astalini, A., Kuswanto, K., & Ningsi, A. P. (2021). Correlation of science process skills on critical thinking skills in junior high school in Jambi city. *Jurnal Penelitian Fisika Dan Aplikasinya (JPFA)*, 11(1), 29–38. <https://doi.org/10.26740/jpfa.v11n1.p29-38>
- Manggopa, H. K., & Kumampung, D. R. H. (2023). Effective strategies using digital literacy for empowering critical thinking in higher education. *International Journal of Information Technology and Education*, 2(3), 153–167. <https://doi.org/10.62711/ijite.v2i3.135>
- Mehta, S. R., & Al-Mahrooqi, R. (2015). Can thinking be taught? Linking critical thinking and writing in an EFL context. *RELC Journal*, 46(1), 23–36. <https://doi.org/10.1177/0033688214555356>
- Patrick, P., & Osadebe, U. (2017). Evaluation of undergraduate students' performance in test and measurement achievement test with samples from probabilistic and non- probabilistic sampling procedures. *Asian Journal of Assessment in Teaching and Learning*, 7, 26–31. <https://doi.org/10.37134/ajatel.vol7.3.2017>
- Pratama, R. R. (2021). Implementation of the Quantum learning model to improve critical thinking skills students of elementary school. *Kalam Cendekia: Jurnal Ilmiah Kependidikan*, 9(1). <https://doi.org/10.20961/jkc.v9i1.53851>
- Pujiastuti, I. P. (2023). Profil kemampuan berpikir kritis siswa SMA negeri dan swasta dalam pembelajaran biologi. *SAINTIFIK*, 9(1), 75–81. <https://doi.org/10.31605/saintifik.v9i1.397>
- Qoura, A. A., & Zahran, F. A. (2018). He effect of the 6+1 trait writing model on ESP university students critical thinking and writing achievement. *English Language Teaching*, 11(9), 68. <https://doi.org/10.5539/elt.v11n9p68>
- Safriyani, R., Laras, A. M., Nur, H. M., & Wichda, E. F. (2020). Critical thinking in English academic essay: Indonesian teacher's voices. *Proceedings of the International Conference on English Language Teaching (ICONELT 2019)*. International Conference on English Language Teaching (ICONELT 2019), Surabaya, Indonesia. <https://doi.org/10.2991/assehr.k.200427.028>
- Santillan, J. K. T., Bearneza, F. J. D., & Carlos Hilado Memorial State University, Talisay City, Negros Occidental, Philippines. (2023). Extent of parent's involvement and levels of attitude and achievement of students in mathematics. *International Journal of Social Science and Human Research*, 06(02). <https://doi.org/10.47191/ijsshr/v6-i2-45>
- Şengül, M., & Demirel, A. (2022). The relationship between the digital literacy levels of Turkish language teacher candidates and their attitudes towards digital writing. *International Journal of Education and Literacy Studies*, 10(4), 19–26. <https://doi.org/10.7575/aiac.ijels.v.10n.4p.19>
- Smith, G., & Peloghitis, J. (2020). Critical thinking and debiasing: Experimentation in an academic writing course. *JALT Postconference Publication*, 2019(1), 443. <https://doi.org/10.37546/JALTPCP2019-51>
- Teng, M. F., & Yue, M. (2023). Metacognitive writing strategies, critical thinking skills, and academic writing performance: A structural equation modeling approach. *Metacognition and Learning*, 18(1), 237–260. <https://doi.org/10.1007/s11409-022-09328-5>
- Tinmaz, H., Lee, Y.-T., Fanea-Ivanovici, M., & Baber, H. (2022). A systematic review on digital literacy. *Smart Learning Environments*, 9(1), 21. <https://doi.org/10.1186/s40561-022-00204-y>
- Utaminingsih, S., Amalia, I., & Sumaji, S. (2024). Management of mathematics learning based on interactive digital worksheets to improve students' critical thinking ability. *Journal of Curriculum and Teaching*, 13(1), 159. <https://doi.org/10.5430/jct.v13n1p159>
- Wachira, M. W., & Kihara, A. (2023). Effect of mobile network operator facilitated digital credit on the financial health of youth borrowers in Kibera, Nairobi County, Kenya. *Journal of Business and Strategic Management*, 8(5), 25–47. <https://doi.org/10.47941/jbsm.1470>
- Wang, J., & Shen, D. (2023). The relationship between critical thinking disposition and argumentative writing performance of EFL learners in China. In Y. Chen, M. T. Anthony, & Y. Ke (Eds.), *Proceedings of the 2022 2nd International Conference on Modern Educational Technology and Social Sciences (ICMETSS 2022)* (pp. 98–106). Atlantis Press SARL. https://doi.org/10.2991/978-2-494069-45-9_13
- Xu, T., Park, K. H., & Tian, X. (2023). Structural relationship on factors influencing digital literacy of college students. *International Journal of Emerging Technologies in Learning (iJET)*, 18(19), 147–159. <https://doi.org/10.3991/ijet.v18i19.38319>