



ASSESSING THE IMPACT OF COGNITIVE STYLES AND CRITICAL THINKING SKILLS ON WRITING PROFICIENCY

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Abstract: The important variables were reported to have the potential to affect the students' performance in writing English essay. This present study investigates the predictive potential of cognitive styles and critical thinking skills variables on students' performance in writing English essay. The quantitative design has been used in this study, wherein a multiple regression analysis was carried out between independent variables and writing skills. The total population was 40, from which a sample of 26 students was drawn based on simple random sampling from English department students of Faculty of Teacher Training and Education, Universitas Lakidende Unaaha. Concerning the results of regression analysis, it was stated that cognitive styles and critical thinking skills (p-value are respectively 0.002 and 0.021) had a significant effect on student performance in writing English essay. In other words, increasing critical thinking skill by one unit is on average associated with an increase in writing score of 2.468 points, and for an increase in cognitive style, there is a corresponding increase of 0.766 points. However, from these standardized beta coefficients, it is evident that critical thinking skills alone (0.627), have a stronger influence on writing performance than cognitive styles (0.449). The constant of 35.741 gives the predicted value of writing performance when the independent variables are zero. These findings point out how important it is to foster critical thinking and awareness of cognitive styles if an attempt is made to boost students' performance in writing.

Keywords: *writing skills; critical thinking skills; cognitive styles; multiple regression; english essay.*

INTRODUCTION

The writing skill plays an important role in education and mainly serves as a tool for communication, expression of knowledge, and critical thinking. In general, writing proficiency in EFL contexts attains great significance since it actually provides the grounds on which learners can engage with academic materials and express ideas effectively, clearly, and coherently in written form. Writing is not a straightforward process (Abegglen et al., 2024; Berdanier & Lenart, 2020; Yaacob et al., 2022). It is an intricate process of interaction between cognitive, linguistic, and social elements (Berdanier & Lenart, 2020; Chicho, 2022). Moreover, this incompetence in language may hamper and thereby affect students' performance in writing negatively (Adjoe & Kimani, 2020; Teng et al., 2020); there it needs a

cognitive process to think creatively and critically (Wang, 2023; Yotta, 2023).

Cognitive style has been one very important cognitive variable often discussed in recent literature. It is referred as a multilevel construct in psychology that influences information processing, decision making, and learning efficiency (Razumnikova, 2024); such a style is believed to enhance their capacity to organize ideas, construct arguments, and hence achieve success in writing (Kalamatova et al., 2024; Thi & Nguyen, 2021). Moreover, Students with a Field Independent cognitive style often struggle with writing tasks that require broader thinking, while Field Dependent students tend to perform better in such contexts (Thùy et al., 2024).

Critical thinking skills signify the scope of activities that encompass analysis, evaluation, inference, and interpretation, among others

(Lustyantie et al., 2022; Ramli et al., 2019a, 2019b). This skill is indispensable in learning and problem-solving since an individual is able to engage with information actively and reflectively. Critical thinking, when developed in learners, comes in handy in writing: building well-reasoned arguments, analyzing evidence, and persuasively presenting their ideas (Karaer et al., 2024; Kazemian et al., 2021; Wu et al., 2024).

Moreover, several studies confirm that cognitive factors involve with writing development. Murtaza (2022) reports how cognitive processes underpin writing abilities, identifying universal cognitive mechanisms across languages. This result is further supported by study emphasizing the influence of cognitive style on information processing, idea organization, and task execution in writing, highlighting the importance of cognitive abilities such as ideation and transcription for enhancing writing skills in English language learners (Issa & Shyamala, 2021). And, Tambi, Murtadho, and Rafli (Tambi et al., 2019) provide empirical evidence of this relationship, demonstrating that students with a field independent cognitive style exhibited superior narrative writing ability in Bahasa Indonesia compared to their field dependent counterparts, thus reinforcing the link between cognitive style and writing proficiency. These studies collectively suggest that understanding and addressing cognitive factors are crucial for fostering effective writing instruction.

Some previous studies focused on those metacognitive strategies such as writing and underdeveloped critical thinking skills, AI-assisted writing, reflective writing, or those cognitive and motivational challenges (Anaktototy et al., 2023; Aziz et al., 2024; Safitri & Adani, 2024; Sajidin & Supeno, 2024; Shen & Teng, 2024). These studies assessed higher-order thinking in terms of writing complexity and its determinants. However, how cognitive style and critical thinking skills are predictors of performance in writing is a field that has plenty of room for further investigation.

Similarly, other works address relationships between cognitive style and writing skill. For example, Simonovic et al. (2022) found out that cognitive styles had significant influences for their attitudes and beliefs and on their academic writing performance, by exploring cognition fast-related to university students. The results of a study in which 191 university students took part showed that participants who were better able to adapt their cognitive style to the demands of a given task scored higher on writing essays, making it clear

that both cognitive flexibility and plasticity are necessary qualities for writing quality, data from the research. Cisneros et al. (2023) investigated the effects of daily choral singing and creative writing on French children's cognitive development. While the study primarily focused on creative activities, it underscored the role of cognitive stimulation in improving children's writing abilities, suggesting that cognitive engagement through varied tasks can enhance writing performance. In the same way, metacognitive strategy knowledge was correlated significantly with their writing performance (Huang & Zhang, 2022; Qin & Zhang, 2019).

Wawrzyniak et al. (2022) focused on primary school students, showing that cognitive strategies applied through physical activities also improved children's writing skills. This underscores the broader applicability of cognitive interventions beyond traditional classroom settings. Similarly, Faisca et al. (2023) conducted a cognitive subtyping study on university students and identified distinct cognitive profiles that correlated with different levels of writing achievement.

Despite these insights, several limitations still befall the existing research. Since most of such research has a small sample size, they generally cannot allow the generalization of findings. Another primary limitation of the literature is that many studies use cross-sectional designs; hence, it is difficult to make inferences regarding causality between cognitive style and writing outcomes.

Other studies have focused on the efficacy of different instructional practices in improving critical thinking and writing skills. Ijirana et al. (2022) study confirmed that a team project-based STEM-metacognitive skills learning model has proven to be an effective method in fostering critical thinking skills, especially in virtual environment. Chang et al. demonstrated how an annotation-supported Socratic questioning approach positively influenced both argumentative writing performance and enhanced critical thinking skills in flipped language classrooms (2024).

Indeed, over the past decade, an increasing number of studies have evaluated the interrelationship between students' critical thinking skills and writing skills. Those previous studies have found a positive relationship between the two variables. These effectively increased the critical thinking levels of students, thereby improving their writing performance since according to Listiqowati et al. (2022). Similarly, Hazaymeh and Alomery (2021) supported the visual mind mapping strategy that may be effective

in developing critical reading and thinking abilities which could have a trickle-down effect on writing. Writing and critical thinking are intertwined with one another; the relationship has been confirmed by research conducted in which Fahim & Masouleh (2021) found that students who participated in higher-order thinking activities performed better than their peers on writing quality essay.

Further, few studies have examined how cognitive style might interact with critical thinking skills (both of which can affect the writing performance of students) in relation to their cause-and-effect relationships. However, those researches have treated cognitive style and critical thinking as independent variables rather than examining their interaction. The current literature requires a more understanding of how cognitive style and critical thinking ability jointly affect students' skills in writing English essays.

Addressing the identified research gaps is crucial, as English as a Foreign Language (EFL) writing proficiency is fundamental to academic success and lifelong learning. By examining the together influence of cognitive style and critical thinking, this study aims to provide a more nuanced understanding of the cognitive foundations of writing performance. By employing multiple regression analysis, this quantitative study could provide further detail on how such interacting cognitive variables contribute to writing success. These findings will offer practical implications for educators by informing the design of instruction that caters to diverse cognitive profiles and fosters critical thinking development. Specifically, the present study aims to investigate: (1) Do cognitive styles predict the students' performance in English essay writing? (2) Do critical thinking skills predict the students' performance in English essay writing? (3) Do cognitive styles and critical thinking skills variable predict the students' English essay writing?

METHOD

This study employed a quantitative research design with a correlational study to examine the effect of cognitive styles and critical thinking skills on the students' performance in writing English essay.

This study involved 26 students randomly selected from 45 undergraduate students English Education Study Program of Teacher Training and Education of Universitas Lakidende Unaaha. The random selection process was conducted using a simple random sampling. The inclusion criteria for

participants required that they had completed the basic writing courses as part of their program.

Three research instruments were utilized in collecting the data. The *Group-Embedded Figure Test* (GEFT) was administered to identify the participants' cognitive styles. The test challenges the participants to recognize a simple graph embedded in the complex figure consisting of three sections within 20 minutes. The maximum possible score is 18, with higher scores indicating a field-independent cognitive style, and lower scores reflecting a field-dependent style (Witkin et al., 1971). Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 2002) was given to assess participants' critical thinking skills. It comprised 17 items measuring abilities (inference, recognition of assumptions, deduction, interpretation, evaluation of arguments). The correlation between testing occasions is 0.73-0.89 suggesting that the results are consistent over time. And the third is essay writing test in English. The respondents were asked to write a five-paragraph essay consisting of 250 – 400 words. It was limited for 100 minutes. The test aimed to measure their writing performance. The scoring rubric was a modification of Heaton's analytical rubric for writing performance evaluating 5 aspects: content, organization, vocabulary, language use, and mechanics where each aspect score ranging from 1 to 100.

Data were analyzed using multiple regression analysis to test the research hypothesis, specifically whether cognitive styles and critical thinking skills together predict essay writing performance. Statistical analysis was conducted using SPSS for Windows (version 23), with the significance level set at $\alpha = 0.05$.

The normality of the three variables—Cognitive Styles, Critical Thinking Skills, and Writing Skills—was assessed using both the Kolmogorov-Smirnov and Shapiro-Wilk tests. In all cases, the null hypothesis of normality could not be rejected at the 0.05 significance level, as the p-values exceeded 0.05. For Cognitive Styles, the p-values were 0.200 (Kolmogorov-Smirnov) and 0.780 (Shapiro-Wilk). For Critical Thinking Skills, the p-values were 0.170 and 0.093, respectively, and for Writing Skills, 0.200 and 0.392. These results indicate that there is insufficient evidence to suggest that the data deviate from a normal distribution. Given these findings, it is appropriate to proceed with parametric tests that assume normality.

The linearity of the relationship between Cognitive Styles and Writing Skills was assessed

using an ANOVA for linearity, which indicated that the assumption of linearity was met, with a p-value of 0.093, surpassing the significance threshold of 0.05. This suggests a linear relationship. Additionally, a moderate positive correlation between critical thinking skills and writing skills was found, with a correlation coefficient of 0.486,

indicating that approximately 23.7% of the variance in writing skills can be attributed to critical thinking skills.

RESULTS AND DISCUSSION

Descriptive statistic

Table 1. *Descriptive statistic of dependent and independent variables*

Variables	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Cognitive Styles	25	1	17	9.00	3.753	14.083
Critical Thinking Skills	25	6	13	9.72	1.429	2.043
Writing Skills	25	47	90	66.60	12.169	148.083
Valid N (listwise)	25					

Descriptive statistics for the cognitive styles, critical thinking skills, and writing skills variables are shown in Table 1. For all variables, the sample size is 25. Cognitive style scores ranged from a minimum of 1 to a maximum of 17 with a mean of 9.00. The standard deviation is 3.753 thus at a level of moderate dispersion. This dispersion is further quantified by a variance of 14.083. Scores of critical thinking skills are less spread: from 6 to 13 with a mean of 9.72. The standard deviation is 1.429, showing a lesser dispersion than that of cognitive styles. The variance of 2.043 reflects a

lower spread. The writing performance suggests the highest scores ranging from 47 to 90, with a mean of 66.60. The standard deviation is 12.169, showing a fair degree of variability in the scores. This greater dispersion is further supported by the variance of the three variables, with 148.083 being the highest. Valid N (participant) 25: There were no missing values in any of the three variables of the 25 cases which contained data in the analysis.

Correlation between variables

Table 2. *Variables' correlation*

Variables	Writing Skills	Cognitive Styles	Critical Thinking Skills
Writing Skills	1	0.252	0.486**
Cognitive Styles	0.252	1	-0.314*
Critical Thinking Skills	0.486**	-0.314*	1

Note: * $p < 0.05$, ** $p < 0.01$

The results of the correlation analysis presented in Table 2 indicate a significant positive correlation between students' Writing Skills and Critical Thinking Skills ($r = 0.486$, $p < 0.01$). This suggests that individuals with stronger critical thinking abilities tend to demonstrate superior writing skills. Furthermore, the correlation between Writing Skills and Cognitive Styles is positive but not statistically significant ($r = 0.252$, $p > 0.05$). Additionally, there exists a significant negative correlation between Cognitive Styles and Critical

Thinking Skills ($r = -0.314$, $p < 0.05$). This implies that individuals with certain cognitive styles may be inclined to exhibit lower critical thinking skills, or vice versa.

Multiple regression analysis

Upon verifying that the assumptions were met and analyzing the correlations among the variables, the multiple regression analysis was conducted. The results of the regression analysis are presented in Tables 3 and 4.

Table 3. *Summary of regression model*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.647	0.418	0.360	4.525	1.338

From Table 3, it can be observed that the regression model has an R value of 0.647, indicating a moderate positive relationship

between the combination of independent variables (Critical Thinking Skills and Cognitive Styles) and the dependent variable, Writing Skills. The R

Square value of 0.418 signifies that approximately 41.8% of the variance in students' Writing Skills scores can be explained by these two independent variables. The Adjusted R Square value of 0.360 indicates that about 36% of the variance in Writing Skills can be accounted for by the model after considering its complexity. The Standard Error of the Estimate, which is 4.525, suggests that, on average, the model's predictions deviate from the actual Writing Skills scores by approximately 4.525 points. The Durbin-Watson value of 1.338 indicates a potential positive autocorrelation within the residuals.

From Table 3 above, the R value of the regression model is 0.647, indicating a moderate positive relation of the combined independent

variables (cognitive styles and critical thinking skills) and the dependent variable, writing skills. This also gives an R Square of 0.418, meaning about 41.8% of the variation in the students' scores on writing English essay are accounted for by these two independent variables. The Adjusted R Square value of 0.360 shows that about 36% of the variation in writing skills is explained by the model, given its complexity. The Standard Error of the Estimate, which is 4.525, suggests that, on average, the model's predictions deviate from the actual writing skills scores by approximately 4.525 points. The Durbin-Watson value of 1.338 indicates a potential positive autocorrelation within the residuals.

Table 4. *Analysis of variance (ANOVA)*

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	294.352	2	147.176	7.187	.004 ^b
	Residual	409.561	20	20.478		
	Total	703.913	22			

a. Dependent Variable: Writing Skills

b. Predictors: (Constant), Critical Thinking Skills, Cognitive Styles

The overall ANOVA of the regression analysis shows that the regression model as a whole is statistically significant, with $F(2, 20) = 7.187$ and $p = 0.004$. This proves that both variables taken together have a strong effect on the students' writing skills. In other words, it can be said that there exists evidence of this combined effect of two independent variables on explaining the variation in the dependent variable, students' writing ability.

In addition, the R-squared value of 0.418 ensures that the given regression model explains approximately 41.8% of the total variance in the set of writing skills. In other words, nearly half of the variation in writing skills among individuals can be the result of differences in critical thinking skills and cognitive style. These results substantiate the role of both cognitive style and critical thinking skills in writing proficiency.

Coefficients of regression

Table 5. *Coefficients of regression*

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	35.741	8.253		4.331	.000
	Cognitive Styles	.766	.307	.449	2.498	.021
	Critical Thinking Skills	2.468	.707	.627	3.492	.002

a. Dependent Variable: Writing Skills

Through regression analysis, it was found that cognitive styles ($p = 0.021$) and critical thinking skills ($p = 0.002$) significantly influence writing skills. More accurately, with each increase of one unit in critical thinking skills, writing skills increase on average by 2.468 points, while for every increase in cognitive styles by one unit, writing skills increase by 0.766 points. In respect to the standardized beta coefficients, critical

thinking skills are stronger, with a Beta of 0.627 compared to the cognitive styles variable with a Beta of 0.449. The constant of 35.741 defines the predicted value of writing skills when both independent variables equal zero. Such findings then support the importance of cognitive styles and critical thinking skills in writing ability development.

The present study aimed to investigate the role of cognitive styles and critical thinking skills in writing abilities. To this aim, a multivariate regression analysis was performed in order to determine the relationship between these two independent variables, cognitive styles and critical thinking skills, and their influence on the dependent variable, which is students' performance in writing.

The results of the regression analysis indicate that the cognitive styles and critical thinking skills together significantly impact writing skills, accounting for approximately 36% of the variance. This aligns with previous research emphasizing the multifaceted nature of writing, influenced by cognitive, linguistic, and social factors (Macapagal, 2024; Nawaz et al., 2024). Furthermore, it supports the notion that language proficiency alone may not guarantee strong writing skills; cognitive processes like critical thinking are equally vital (Teng et al., 2020; Wang, 2023; Yotta, 2023).

Nevertheless, in line with the hypothesis, critical thinking skills were more vital determinants of writing performance compared to cognitive styles (Hu & Saleem, 2023; Nejad et al., 2022; Valeyeva et al., 2022). This is evident in such studies as Listiqowati et al. (2022) and Fahim & Masouleh (2012), which found that critical thinking is positively related to writing performance. Critical thinking denotes the ways in which learners have the potential to analyze, evaluate, and synthesize information so that they would logically build an argument and convey ideas persuasively (Karaer et al., 2024; Wu et al., 2024).

While cognitive styles also contributed significantly to the prediction of writing performance, their impact was weak. That consequently implies that though individual preferences for processing information (Razumnikova, 2024) play their role, they may not be as crucial, however, than critical thinking in determining the outcomes of writing. However, it would be beneficial to conduct additional research on the relationship between cognitive styles and critical thinking since it is reasonable that changes in styles would also have implications on the level of critical thinking skills that can be effectively applied by an individual using writing tasks. This leads to supporting the idea that various cognitive styles result in different writing task approaches, and the efficacy of such approaches is determined by the individual critical thinking skills (Simonovic et al., 2022).

The intriguing negative correlation between cognitive styles and critical thinking skills speaks to further attention. It would suggest there could be an interaction wherein a type of cognitive style, if any, was detrimental to developing high levels of critical thinking or vice-versa-higher levels of critical thinking capability were found less among individuals possessing particular cognitive styles. It is plausible that the field-dependent cognitive style-that is, reliance on external cues and context-may impede independent, analytical thinking critical to accomplishment. The nature and direction of this relation remain to be specified and would presumably require a more theoretically detailed examination of the operative processes.

This result points out that the model explains 36% of the variation in the dependent variable; thus, writing proficiency is determined by factors other than Cognitive styles and critical thinking skills. Examples include language proficiency, prior writing experience, motivation, and the learning environment. This has been hinted at by Anaktototy et al. (2023) and De Smedt et al. (2018). Further research should integrate these variables in the development of a comprehensive model of writing development.

Moreover, the possible presence of positive autocorrelation in the residuals demands further investigation. In addition, autocorrelation can affect the validity of statistical inference from a regression model. If large autocorrelation were detected, consideration of model adjustments or other alternative techniques able to handle autocorrelation would be made.

This study underlines the important role of critical thinking in writing, together with the nuanced influence of cognitive style. These findings have some very important implications for educators: writing instruction should focus not only on the development of critical thinking skills but also on an appreciation for diverse ways of cognizing about learning. Educators should foster a multifaceted environment that stimulates both analytical rigor and cognitive flexibility as a means of empowering students to become effective and confident writers.

CONCLUSION

These findings suggest that cognitive styles and critical thinking skills play a significant role in determining the English essay writing performance of undergraduate students. These results verify that both are sizable contributors to writing skills, but critical thinking abilities predict more. This is in line with what has been suggested in other research

regarding the interpretive function of written language and its links to both linguistic competence and cognitive processing. This supports the idea that understanding a language is an insufficient condition for writing; brain functions such as critical thinking are necessary too.

The strong positive effect of critical thinking skills for writing implies the role of analysis and evaluation in writing. With the instruction of information analysis, argumentation evaluations, and idea synthesis students will be able to produce more organized content. Cognitive styles are significant but somewhat weaker factors, and it is possible that an individual's preferred style of processing information may mean they use critical thinking differently in relation to writing outcomes.

The study's findings have important implications for education, particularly in developing learning strategies that can enhance students' writing abilities. Educators can focus on fostering students' critical thinking skills through explicit instruction and activities that promote analysis, evaluation, and synthesis. Simultaneously, recognizing and accommodating diverse cognitive styles in instructional design and writing assignments can create a more inclusive and effective learning environment.

On the other hand, differences in cognitive styles and critical thinking skills are not enough to account for successful academic writing. There are other additional factors that contribute to writing development such as language proficiency, prior writing experiences, motivation and learning environment. These variables need to be considered in future research developing models of writing development. In addition, we need to investigate more how cognitive styles and critical thinking may interact with writing skills as well as how interventions targeting both factors can affect the quality of writing. The current study's relatively small sample size suggests that research on a larger sample could strengthen the obtained results and enhance their generalizability.

This research generally points to the great roles of both cognitive styles and critical thinking skills in predicting students' performance in writing English essays. Emphasizing the development of critical thinking skills and recognizing the students' cognitive styles can help educators to create a learning environment where all learners become successful and confident writers. It thus sets out to provide a foundation for further research on how cognitive factors influence writing

development and how this can help educators in elaborating teaching methods.

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