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The Cognitive and Affective Nexus : Critical Thinking, Creativity, Emotional Intelligence, and Academic Success

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Abstract: This study aims to analyze the direct and indirect effects of critical thinking and creative thinking on academic achievement, with emotional intelligence serving as a mediating variable. A quantitative method employing path analysis was utilized to analyze the relationships between these variables. The population in this study consisted of all students of SMA Al Husna Tangerang City in the academic year 2023/2024, totaling 127 students. Sampling was conducted using the Slovin formula, resulting in a total of 96 students. The results showed that: (1) Critical and creative thinking do not have a significant positive effect on emotional intelligence in students. These results suggest that high levels of critical and creative thinking are associated with stable and improving emotional intelligence. (2) Critical and creative thinking have no significant influence on student academic achievement. These findings indicate that enhancing critical and creative thinking skills can potentially improve student academic achievement. (3) Emotional intelligence has no significant effect on student academic achievement. This highlights the need to enhance students' emotional intelligence to effectively control and regulate emotions.

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Introduction

Academic achievement stands as a primary objective in the realm of Indonesian education. All activities undertaken by students in school are evaluated based on academic performance (Haidar & Antika, 2022; Ulfah & Opan Arifudin, 2023). Academic achievement is one of the results achieved when going through the learning process (Hamu et al., 2023; Mikaresti et al., 2023). Information about the *Programme For International Student Assessment* (PISA) which is conducted every three (3) years for students ranging from 15 years of age or junior high school level to college level, It tests knowledge and skills in reading, math, and science. In PISA, there are 8 levels of ability in the fields of mathematics, reading, and there are also 7 levels in science skills (De Bortoli et al., 2023).

Results on reading scores in the 2022 PISA *(Programme for International Student Assessment)* dropped 12 points to 359 from 2018 with a score of 371. Goals that play a role in the National Medium-Term Development Plan (RPJMN) in 2024. are based on pre-research data from 15 February 2024 regarding the results of the mid-semester assessment report card (PTS) at SMA Al-Husna Tangerang City, seen in Table 1 :

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Table 1. Final Grade Recap Data

Year	Class	Number of Students	Evidence	
			Passed	Failed
2023/2024	X Social	13	9	4
2023/2024	XI Social	25	14	11
2023/2024	XII Social	21	17	4
2023/2024	X Science	20	15	5
2023/2024	XI Science	31	28	3
2023/2024	XII Science	17	15	2
Total		127	98	29

Based on the results above, it shows the value of PTS (End of Semester Assessment) odd semester 2023/2024. The results show that 23% of students received incomplete scores. However, these scores can be improved through ongoing learning processes until the end of the semester. Learning outcomes are typically assessed based on both knowledge and skills (Wulandari et al., 2022). Therefore, critical and creative thinking skills are essential competencies that students should develop throughout the learning process (N. Hidayati, 2016). Furthermore, these skills have become crucial for success in the 21st century (Sarjana et al., 2024).

Critical thinking skills are classified as part of analytical or higher-order thinking abilities (Asmi et al., 2024; Estu Niana Syamiya, 2017; Nur Saidah Sulistianingsih et al., 2023). The process of critical thinking is closely intertwined with creative thinking (Himawan et al., 2024; Supiah et al., 2024). Fundamentally, critical thinking involves the systematic analysis, evaluation, and interpretation of information and arguments (Kurniawan, 2024). An individual is considered to possess critical thinking skills when they can objectively examine multiple perspectives of a problem, remain open to new evidence that challenges their views, engage in reasoning independent of emotions, require claims to be supported by evidence, draw logical conclusions based on available facts, and effectively solve problems (Nur Saidah Sulistianingsih et al., 2023; Sulthon et al., 2025; Widya et al., 2023). Critical thinking requires high concentration in order to make it easier for students to experience opportunities to argue orally and in writing (Hasmi Syahputra Harahap & Nurlina Ariani Harahap, 2021; Nadhiroh & Anshori, 2023b). Various methods exist to cultivate critical thinking skills in students (Thornhill-Miller et al., 2023). Especially parents, teachers, and even families who interact every day should be able to provide opportunities to ask questions to children so that we understand how their intellect processes (Estu Niana Syamiya & Ayu Kharmila, 2023; Mulyaningsih et al., 2024), And to train critical thinking and bring students into improving how to analyze and think from all the information obtained (Daniar & Sari, 2022; Farib et al., 2019).

Thinking skills and abilities encompass the capacity to conceptualize, interpret, apply, and evaluate knowledge. In the cognitive perspective, as well as how students and schoolgirls think, they are influenced by knowledge, feelings, desires, and what is in their thoughts (Alawiah et al., 2019; Wahyuni et al., 2018; Yudha et al., 2023) In critical thinking, a person can be part of activities that are active, brave, and able to consider in the process of understanding. They can offer comprehensive answers supported by various reasons, demonstrating courage in responding to multiple questions and posing challenging inquiries (Anwar, 2023; Hidayati et al., 2024; Nia et al., 2022).

Within the educational sphere, the development and continuous refinement of creative thinking skills are essential to foster positive and meaningful changes in students (Baynal

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Hubi et al., 2024; Febrianingsih, 2016; Hanany, 2020) Critical thinking is an important skill that medical students need to master due to the need to make complex judgments in healthcare settings. Examining medical students' critical thinking and associated factors can inform educators on how to equip students to be effective critical thinkers (Li et al., 2021; Nur Saidah Sulistianingsih et al., 2023; Suliyati et al., 2023). Creative thinking is also an important aspect that is assessed. Therefore, the ability to think creatively is one of the advantages for students because they are able to discover something new (Anditiasari et al., 2021; Faturohman et al., 2020; Hasanah et al., 2022). So creative thinking must also be trained and provided with a forum to express the ideas they have. Not a few students actually possess the ability to think creatively and are able to foster high creativity (Nadhiroh & Anshori, 2023a; Wardani & Suripah, 2023) Students are more active and able to provide ample space to hone creativity and independence according to their desires of students and students (Amtiningsih et al., 2016). To be able to keep up with these developments, individuals need logical, critical, creative, and innovative thinking patterns and must be able to adapt to changes, demonstrating are able to explain that creative thinking can align with emotional intelligence (Dalimunthe & Ariani, 2023)

The urgency of this research is that cleverness will definitely be associated with intellect, but when viewed from intellectual intelligence alone, it is not enough to make decisions (Handriani & Subhan, 2020). So, students need to be assessed from other intelligence, which can be associated with emotional intelligence (Afniola et al., 2020; Handayani et al., 2024). Emotional intelligence is a person's intelligence in regulating and control the emotions that exist within them (Caesarania et al., 2024; Estu Niana Syamiya & Ayu Kharmila, 2023). During the learning process, teachers in schools actively pursue students' interests to help them achieve their academic goals and attain satisfactory academic achievements. It can also be seen and assessed from how IQ (Intelligence Quotients) and EQ (Emotional Quotient) in each individual (Anisah & Suntara, 2020; Ruslan et al., 2023). Emotional intelligence will build good, committed worker personality traits and increase job satisfaction (Andriansyah et al., 2022).The research gap concerning the influence of critical and creative thinking on academic achievement, mediated by emotional intelligence, stems from the lack of studies that comprehensively integrate these three variables within a single mediation model. This is particularly evident in the limited exploration of the complex interplay among critical thinking, creative thinking, and emotional intelligence in relation to academic performance.. The purpose of the research is to find out, partially and simultaneously, how critical thinking, creative thinking, and emotional intelligence influence academic achievement. It is hoped that this research can add insight into more complex thinking in improving academic achievement and become a scientific contribution to further research.

Research Method

The quantitative method in this study is used to test the relationship between certain variables that influence the academic success of a particular population. According to Muhammad Darwin et al. (2021), a population in a study refers to a group consisting of many individuals with certain characteristics, serving as the main objective of the study. The population in this study consisted of students in grades X, XI, and XII. Specifically, the study's population comprised 127 students from SMA Al Husna Kota Tangerang.

Using the Slovin formula with a 5% margin of error, 96 students were selected as research respondents. However, it was found that 23% of the sample had outlier values,

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confirming the sample size of 96 students to be used as respondents. Before distributing the questionnaire to all respondents, a scatter plot was used for data visualization. Unfortunately, only 43 students participated in completing the questionnaire.

The results of the validity test obtained results regarding invalid questions. Of all the questions from critical thinking (X1), creative thinking (X2), and emotional intelligence (Z) there were 17 questions. In the data, there were invalid questions, so they were deleted, resulting that the total question results became 16 questions. The reliability test results indicate that all items within each variable demonstrate satisfactory reliability. Therefore, all questionnaire items are suitable for distribution to respondents in this study. The table below summarizes the findings of the instrument reliability test.

Table 2. Instrument Reliability Test Results

Variables	Cronbach' Alpha	Description
Critical Thinking (X1)	0,739	Accepted
Creative Thinking (X2)	0,729	Accepted
Emotional Intelligence (Z)	0,637	Accepted

The data analysis procedures in this study included tests for normality, multicollinearity, heteroscedasticity, and the assumptions underlying path analysis. The analysis was performed using SPSS (Statistical Package for the Social Sciences) software. Additionally, multiple regression analysis and path analysis model testing were carried out. Hypothesis testing is the next stage in the form of F test, Partial Test, and Sobel Test for mediation testing. There are also steps in the Sobel Test, namely by formulating the path from X to M as coefficient a and the path M to Y as coefficient b, so that the calculation can be done by multiplying the two coefficients, namely ab. The the next coefficient equation is formed as ab = (c - c'), where c is the coefficient of indirect influence on variable X on variable Y, which is mediated by variable M.

Results and Discussion

The results of the data obtained and the distribution of questionnaires were then the researchers with the help of SPSS Version 22, so as to get the statistical description data, which can be seen in the table below:

Table 3. Statistical Description

Variables	N	Min	Max	Mean	Std. Deviation
Critical thinking	96	20.00	30.00	25.0521	2.16853
Creative thinking	96	23.00	35.00	28.2396	2.43113
Emotional intelligence	96	8.00	15.00	12.5833	1.57391
Academic achievement	96	2.00	5.00	3.0208	0,98386
Valid N (listwise)	96				

The table above presents the results of the descriptive statistical analysis for the variables of critical thinking, creative thinking, and emotional intelligence, including the minimum, maximum, mean values, and standard deviations based on data from 96 respondents. Additionally, the normality test was conducted to assess whether the data for all research variables follow a normal distribution.

Normality testing has been carried out with the results of the normality test using the Kolmogorov-Smirnov test, namely a significant value of 0.200> 0.05, which means that the data is normally distributed. Researchers conducted a test to examine the mediating role of

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emotional intelligence in the relationship between critical thinking,creative thinking, and academic achievement.

Table 4. Summary of Values in the *Sobel Test*

Variables	Unstandarized	Standarized		Sig
	B	Std. Error	Beta	
Z to Y	0,097(b)	0.064(Sb)	0,155	0,131
X1 to Y	-0,014	0,047	-0,030	0,771
X2 to Y	0,013	0,042	0,033	0,749
X1 to Z	0,170(a1)	0.073(Sa1)	0,235	0,021
X2 to Z	0,186(a2)	0.064(Sa2)	0,288	0,004

Table 4 presents the values utilized in the subsequent t-test, which will then serve as the basis for conducting the Sobel test, as detailed below:

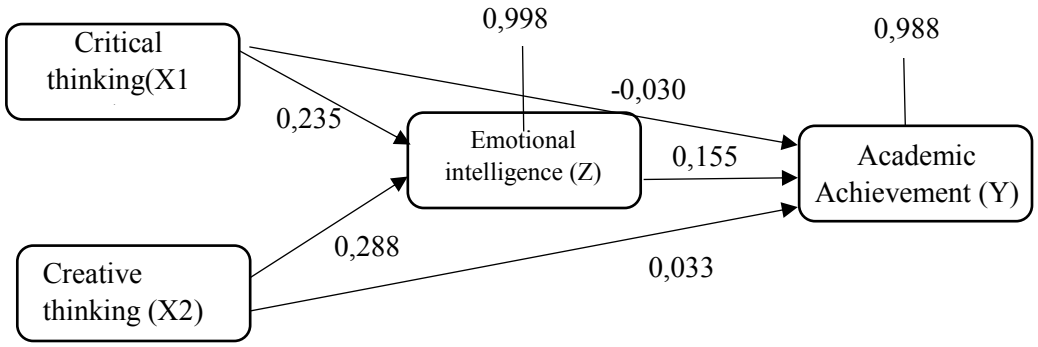

Figure 1. *Sobel Test* path analysis framework

Referring to the figure above, the Sobel test formula for the path analysis of critical and creative thinking on academic achievement—mediated by emotional intelligence—can be interpreted as follows. The effect of critical thinking on emotional intelligence is 0.235, while creative thinking influences emotional intelligence with a coefficient of 0.288. The direct effects of critical and creative thinking on academic achievement are -0.030 and 0.033, respectively. Emotional intelligence's direct effect on academic achievement is 0.155. Additionally, the overall contribution of emotional intelligence exceeds that of academic achievement, with values of 0.998 and 0.988, respectively.

Discussion

The research findings indicate that critical thinking does not have a significant effect on emotional intelligence. Consequently, these results suggest that emotional intelligence does not influence critical or creative thinking. This conclusion contrasts with the study by Hidayat and Haryo Basuki (2020), which reported a significant impact of critical and creative thinking on emotional intelligence within a learning context. Nevertheless, the current findings align with prior research conducted by Angellena et al. (2020a) and Mohamad Ihsan Rahmatilah et al. (2024), which similarly observed no significant relationship between these variables.

The study's results provide a partial explanation for each of the variables examined. However, the data analysis reveals that none of the variables significantly influence academic achievement. These findings contradict the conclusions drawn by Nurfitriyanti et al. (2020). According to the data analysis conducted by Rochani and Suharsono (2023), there is no significant relationship between academic achievement and the variables of critical and

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creative thinking. Similarly, studies by Angellena et al. (2020b), Puspitasari et al. (2021), and Siringoringo (2023) have demonstrated that critical thinking does not significantly impact academic achievement. Therefore, it can be concluded that the null hypothesis (H_0) is accepted, while the alternative hypothesis (H_1) is rejected.

From the conducted research results, it can be concluded that there is no influence of emotional intelligence on academic achievement. The results of this study are in line and in accordance with (Fadloli et al., 2024; Kirana et al., 2023)which explains that emotional intelligence has no effect on academic achievement. However, the study was not in accordance with (Nova Tri Handriyanto et al., 2023; Puspitasari et al., 2021; Syafitri Ardeliyani, Atariq Dery, 2023)) which has significant results on the relationship between emotional intelligence and students' Creative Thinking Ability which explains that the effect of emotional intelligence on academic achievement has a positive and significant effect.

The results of the research that has been conducted prove that there is no effect between critical and creative thinking on academic achievement mediated by emotional intelligence. However, this study's findings differ from those of Lin Mas Eva and Mei Kusrin (2015), who reported a significant relationship between emotional intelligence, creative thinking, and mathematics learning achievement. Moreover, the influence of critical and creative thinking on academic achievement, when mediated by emotional intelligence, was found to be insignificant in studies by Thornhill-Miller et al. (2023) and Zirak and Ahmadian (2015).

The implications of this study suggest that strong emotional intelligence positively influences students' critical thinking abilities in problem-solving. When emotional intelligence is well-developed, it enhances critical thinking skills, which in turn have a direct impact on learning outcomes. Therefore, to foster critical thinking, students need to effectively manage their emotions during the learning process. The initial step involves recognizing the influence of emotional intelligence on critical thinking skills. With this awareness, students are better equipped to take proactive measures to enhance their individual critical thinking abilities. Likewise, schools should strive to offer activities that broaden students' insights and stimulate their cognitive development. The goal is to help students develop resilience and effectively regulate their emotions during learning activities, both within and beyond the school environment. Teachers play a crucial role by innovating instructional strategies that inspire and motivate students to enhance their competencies, thereby fostering the growth of their emotional intelligence in the learning process. Ultimately, students' critical thinking skills in learning can be enhanced. Readers interested in further research on the same variables should consider selecting samples from various levels, including elementary school children, junior high school students, or college students.

Conclusion

This study, yields several key conclusions: (1) The characteristics of respondents' learning outcomes, as measured by midterm assessment (PTS) report card scores, generally indicate good performance with scores exceeding the minimum competency criteria (KKM); (2) Critical and creative thinking do not have a significant effect on students' emotional intelligence. This finding suggests that critical and creative thinking skills may not directly influence emotional intelligence, and other factors may play a more important role in shaping emotional intelligence; (3) Critical and creative thinking do not have a significant influence on student academic achievement. This result indicates that enhancing critical and creative thinking skills may not necessarily lead to improved academic performance, and other

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variables may be more crucial in determining academic success. Emotional intelligence was found to have no significant effect on academic performance. This finding implies that emotional intelligence may not be a key determinant of academic success in this context, and other factors such as cognitive abilities or learning strategies may play a more important role. These findings provide insights into the complex relationships between critical and creative thinking, emotional intelligence, and academic achievement.

Recommendation

It is recommended that teachers enhance their knowledge and understanding to generate innovative approaches that support educational development, with particular emphasis on the role of critical and creative thinking in academic achievement as mediated by emotional intelligence. Additionally, future researchers are encouraged to contribute further insights and expand the body of knowledge, providing valuable reference material for subsequent studies on critical and creative thinking, academic achievement, and emotional intelligence.

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