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The Influence of Curiosity on College Students' Critical Thinking

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Abstract
Critical thinking is one of the key competencies college students must possess to face the challenges of higher education and the increasingly complex world of work. This ability enables college students to analyze information objectively, evaluate various alternative solutions, and make rational decisions based on available evidence. However, various educational evaluation results indicate that college students' critical thinking is still at varying levels and is not optimal. This study aims to analyze the influence of curiosity on college students' critical thinking. The analysis technique used in this study is multiple regression analysis, aimed at determining the accuracy of predictions and testing the research hypotheses of the independent and dependent variables. The results of the study showed that curiosity was the most consistent factor that had a positive and significant influence on critical thinking. This finding confirms that the development of college students' critical thinking does not only depend on individual internal factors, but is also influenced by the level of learning motivation that college students have.

INTRODUCTION

Critical thinking is a global competency that students must possess. In an era of global transformation and rapid technological development, critical thinking has become an essential competency for college students. These skills enable individuals to evaluate information objectively, analyze arguments sharply, and make decisions based on logical reasoning — a skill highly sought after in both the academic and professional worlds (Facione, 1990; Paul & Elder, 2014). In the context of higher education, critical thinking is viewed not only as part of intellectual intelligence (Sternberg & Sternberg, 2012) but also as a key outcome of the learning process itself (Lederer, 2007; Duro et al., 2013). Therefore, developing critical thinking among students is a crucial agenda in efforts to improve the quality of higher education.

However, many students struggle to understand the concept of critical thinking, feel less confident in applying it, and are unsure how to develop it. Moreover, they often struggle to demonstrate these skills in the context of academic assessments (Stupple et al., 2017). This challenge is generally seen in the inability to perform logical reasoning, in-depth analysis, and evaluate evidence in complex tasks (Park et al., 2021).

Dewey (1910) defined critical thinking as the active, persistent, and careful consideration of a belief or form of knowledge, considering the underlying reasons and

logical implications of that belief. This understanding emphasizes that critical thinking involves a deep cognitive dimension and cannot be separated from the social and moral context of decision-making. Critical thinking plays a central role in the learning process (Beyer, 1987; McPeck, 1981) and is considered a "core outcome in higher education" (Lederer, 2007). In higher education, critical thinking is crucial for meeting assessment criteria (Elander et al., 2007). By producing graduates with critical thinking skills, universities can foster innovation in the workplace and society (Davies, 2007; Snyder & Snyder, 2008).

Various studies indicate that students' critical thinking is still suboptimal. A meta-analysis by Niu et al. (2013), for example, showed that while learning interventions can improve critical thinking skills, the effects are relatively small and there is significant variation across studies. Furthermore, Park et al. (2021) demonstrated that improving critical thinking skills through education is highly dependent on the cultural context and teaching strategies used. These findings indicate that efforts to improve critical thinking still face numerous challenges, both pedagogically and institutionally. Therefore, new, more contextual and sustainable approaches are needed to develop students' critical thinking more effectively.

At the national level, various studies also demonstrate the weak critical thinking skills of Indonesian students. The Programme for International Student Assessment (PISA) consistently ranks Indonesian students at the bottom in literacy, numeracy, and science, reflecting the education system's suboptimal ability to foster higher-order thinking skills (HOTS), which are essential for global readiness (OECD, 2023). Based on data from the Programme for the International Assessment of Adult Competencies (PIAAC) conducted by the OECD in the Jakarta region, the proficiency level of adults (aged 16–65) in literacy and numeracy falls into a remarkably low category compared to all participating countries. The data reveals that nearly 70% of the literacy domain and 60% of the numeracy domain are below Level 1. Although tertiary-educated adults achieved higher scores, competency performance across all formal education levels in this region consistently remains approximately 60 points below the OECD average (OECD, 2016). This gap underscores the need for more effective and measurable strategies, particularly in higher education, to encourage the development of students' critical thinking abilities.

Another challenge to critical thinking is the emergence of Generative Artificial Intelligence (Gen-AI) technologies such as ChatGPT, DeepSeek, Gemini, and others. A study by Vendrell & Johnston (2026) showed that excessive reliance on AI has the potential to diminish students' cognitive abilities in processing information deeply. This phenomenon creates a new urgency: how students' internal factors can filter technological assistance to remain independent thinkers, rather than simply relying on answers from machines and robots.

Generation Z is a demographic group that grew up as digital natives with technologically advanced skills, but this generation's characteristics tend to desire instant gratification, which is contrary to the nature of critical thinking that requires perseverance and time for reflection (Twenge, 2019; Seemiller & Grace, 2016). With the ease of instant access to information through technology, it is feared that it will kill the process of critical

evaluation due to the tendency to accept information superficially (Kirschner & De Bruyckere, 2017).

In the Indonesian cultural context, critical thinking is also influenced by high power distance and a culture of "ewuh pakewuh" (reticence). These challenges often hinder individuals from openly debating or questioning teachers' or parents' arguments due to norms of obedience to authority (Hofstede, 2011; Suseno, 1984).

Research by Rahman et al. (2023) shows that the inquisitiveness dimension of critical thinking positively contributes to student activism but has no direct effect on the tendency towards radicalism. This finding indicates that the influence of critical thinking on radicalism is likely mediated by other psychological variables. Therefore, further studies are needed to identify psychological factors that bridge the relationship between critical thinking and students' tendencies toward complex socio-political behavior. This study aims to fill this gap by further examining the role of specific psychological variables in explaining the relationship between critical thinking and students' social behavior.

This suggests that improvements in critical thinking is not evenly distributed among university students. This condition indicates structural obstacles within the higher education process that have not optimally instilled critical thinking competencies, particularly when faced with cross-cultural contexts and the specific needs of each discipline.

Various interventions have been developed to improve critical thinking. These include problem-based learning (Awan et al., 2017), technology-based approaches (Chen, 2021), and individual strengths-based programs (Nair, 2025). Nair (2025) demonstrated that strengths-based training programs can significantly improve critical thinking skills. This type of intervention demonstrates that critical thinking can be developed, especially since it is categorized as a higher-order thinking skill (HOTS) in Bloom's Taxonomy, encompassing the abilities to analyze, evaluate, and create (Anderson & Krathwohl, 2001). Therefore, the approach used to develop this skill must be tailored to the context, characteristics, and needs of students (Awan et al., 2017; Chen, 2021; Nair, 2025).

Furthermore, Simonovic et al. (2022) found that cognitive reflection and attitudes toward critical thinking, such as self-confidence and the desire to evaluate information, were significant predictors of academic achievement. In fact, Stupple et al. (2017) emphasized that developing an instrument to measure critical thinking dispositions is essential to understanding students' attitudes and beliefs about critical thinking abilities. In other words, critical thinking is not only about cognitive skills but is also influenced by students' internal beliefs and attitudes.

However, there are still research gaps that need to be filled. Many studies focus on learning methods and their influence on critical thinking, but few have examined the relationship between psychological factors, environmental interactions, and learning approaches within a single comprehensive model. The majority of studies focus on teaching interventions (Awan et al., 2017). Furthermore, most research has been conducted in specific cultural and geographic contexts, necessitating studies that consider the diversity of educational contexts in Indonesia. For example, Park et al. (2021) highlighted the importance of cross-cultural approaches in fostering creativity and critical thinking among students, noting that cultural context has been shown to influence the effectiveness of interventions.

This research fills this gap by proposing a comprehensive mediation model to address the phenomenon of declining critical thinking amidst the rise of AI technology.

Therefore, research on critical thinking skills in college students is crucial for continued development. Critical thinking is a core skill in education, and most educators emphasize the importance of developing critical thinking skills to prepare students for "real-world" challenges (Halpern, 2014; Facione, 2015). The need for graduates who are able to think critically, not just academically, is a key requirement in facing global challenges and the complexities of the workplace. By designing an integrative learning model and psychological approach, it is hoped that more effective and sustainable strategies can be found for developing critical thinking in students.

Factors influencing critical thinking skills are classified into two categories: internal and external factors (Syah, 2009). Internal factors encompass characteristics originating from within the individual, including cognitive, affective, and self-awareness aspects (Facione, 1990; Sternberg & Sternberg, 2012). Cognitive abilities serve as the intellectual foundation for complex analytical and reasoning processes, with research demonstrating a significant correlation between cognitive abilities and performance on critical thinking tests (West et al., 2008). Furthermore, metacognition — the awareness and control of one's own thought processes — encourages individuals to plan, monitor, and evaluate critical thinking strategies more effectively (Rivas et al., 2022).

Conversely, external factors include environmental variables such as the quality of instruction students receive (Paul & Elder, 2006), family socioeconomic background (Pascarella & Terenzin, 2005), educational level (Prat-Sala & van Duuren, 2022), and access to educational resources (Rimiene, 2002). Furthermore, parental support and parenting styles also influence the development of critical thinking (Newman & Newman, 2020; Paul & Elder, 2006). All of these factors have the potential to indirectly influence the development of critical thinking. Thus, a comprehensive understanding of critical thinking must involve an evaluation of the dynamic interactions between cognitive, affective, and external environmental support potential.

Based on the in-depth explanation of the literature findings above, the researcher believes it is necessary to bridge the identified research gap. Although numerous studies have examined learning methods and their influence on critical thinking, most studies still focus solely on instructional approaches, and few integrate the role of psychological factors and environmental support into a comprehensive conceptual model.

Therefore, this research is crucial in its attempt to make a theoretical contribution. The selection of Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) as the research location was based on academic and demographic urgency. Jabodetabek is the largest higher education center in Indonesia, accommodating over 1.3 million students (B. P. Statistik, 2023). This region represents the diverse cultural backgrounds of Indonesian students, with higher levels of social pressure and academic competition than other regions (Sarwono & Meinarno, 2015). This metropolitan area exposes students to a vast and diverse array of information, necessitating critical thinking skills for survival compared to students in non-metropolitan cities (Trilling & Fadel, 2009).

The researchers hope that this research will uncover more effective and sustainable psychological strategies for developing graduates who are not only academically intelligent

but also creative and critical, ready to face the complexities of professional demands in the workplace. Therefore, the researchers are interested in pursuing the research topic "The Influence of Curiosity on College Students' Critical Thinking."

RESEARCH METHOD

This study employed quantitative research methods. The population was active undergraduate and graduate students at state and private universities in the Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) areas. The selection of these two levels was based on the Indonesian National Qualifications Framework (KKNI) levels 6 and 8, as stipulated in Presidential Regulation of the Republic of Indonesia Number 8 of 2012. At the undergraduate level (level 6), graduates are expected to have the ability to make sound decisions based on information and data analysis. Meanwhile, at the master's level (level 8), graduates are expected to be able to solve problems in science and technology, as well as manage research and development that benefits society and science. Both levels require mastery of high-level critical thinking as core competencies for university graduates in Indonesia.

According to data from the bps.go.id website, there are approximately 1.3 million university students in Jabodetabek. The sample size was determined based on the multivariate analysis guidelines by Hair et al., which indicate that the minimum sample size is the number of variables multiplied by the parameter estimate. The calculation of the minimum sample size is the minimum sample size = number of items from all variables multiplied by 10. Therefore, the minimum limit that must be met is 270 college students in Jabodetabek. However, the researcher obtained a sample size of 502 respondents to anticipate if there is invalid or incomplete data during the data collection process, taking into account the time and number of respondents. Therefore, the more samples taken, the more the samples represent the population so that the results of the statistical analysis still meet the requirements of sample adequacy. The analysis technique used in this study is multiple regression analysis, which aims to determine the accuracy of predictions and test the research hypotheses of the independent and dependent variables.

RESULTS AND DISCUSSION

Research Subject Overview

The sample in this study consisted of 502 students from Greater Jakarta (Jabodetabek) at public and private universities aged 18–25, consisting of undergraduate and postgraduate students. Student demographics, including gender breakdowns of males and females, are included for additional information.

Table 1. Description of Research Subjects

	Descriptive	Total (N = 502)	Percentage (%)
Gender	Male	199	39.6%
	Female	303	60.4%
Age	18 years	91	18.1%
	19 years	88	17.5%
	20 years	85	16.9%

	21 years	59	11.8%
	22 years	43	8.6%
	23 years	39	7.8%
	24 years	46	9.2%
	25 years	51	10.2%
Strata	S-1	377	75.1%
	S-2	125	24.9%
Region	Jakarta	161	32.1%
	Bogor	78	15.5%
	Depok	71	14.1%
	Tangerang	151	30.1%
	Bekasi	41	8.2%

Based on the table, it can be seen that from a total of 502 respondents, 199 (39.6%) were men and 303 (60.4%) were women, with an age range of 18 years for 91 (18.1%) respondents, 19 years for 88 (17.5%) respondents, 20 years for 85 (16.9%) respondents, 21 years for 59 (11.8%) respondents, 22 years for 43 (8.6%) respondents, 23 years for 39 (7.8%) respondents, 24 years for 46 (9.2%) respondents, and 25 years for 51 (10.2%) respondents. The level of education taken by respondents was S-1 for 377 (75.1%) and S-2 for 125 (24.9%). The respondents' areas were spread across Jakarta 161 (32.1%) respondents, Bogor 78 (15.5%) respondents, Depok 71 (14.1%) respondents, Tangerang 151 (30.1%) respondents, and Bekasi 41 (8.2%) respondents.

Results of the Regression Analysis of the Research Variables

The hypothesis was established by examining the R-square value to determine the percentage of variance in the dependent variable (DV) explained by the independent variable (IV). The R-square values are as follows:

Table 2. Regression Analysis Summary Model

R	R Square	Adjusted R Square	Std. Error of the Estimate
.716[a]	.513	.508	6.85804

The table shows that the Adjusted R Square value is 0.508, or 50.8%. This indicates that self-efficacy, curiosity, parental support, learning environment, and learning motivation influence critical thinking by 50.8%. Other variables, besides the variables in this study, can influence by 49.2%. Next, a test was conducted to determine whether all independent variables (IV) significantly influence the dependent variable (DV).

Table 3. ANOVA — Overall Effect of IV on DV

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	24584.341	5	4916.868	104.542	.000[b]
Residual	23328.201	496	47.033		
Total	47912.542	501			

The table shows that the F test result is 104.542, with a significance level of 0.000 (sig < 0.05). Therefore, the null hypothesis (H0), which states that "there is no significant effect

of the curiosity variable on critical thinking," is rejected. This means that there is a significant effect of the curiosity variable on critical thinking. The next step is to observe the regression coefficient value of each IV against the DV. If the significance value is < 0.05, the regression coefficient is significant, meaning that in this study, the independent variable (IV) has a significant influence on the dependent variable (DV).

Table 4. Regression Coefficient

Variable	B	Std. Error	Beta	t	Sig.
Critical thinking (constant)	3.078	2.223	–	1.385	.167
Curiosity	.331	.046	.308	7.155	.000*

The regression equation from the table is as follows: Critical thinking = 0.331 curiosity.

These results indicate that the curiosity variable has a significant influence on critical thinking (sig < 0.05). The curiosity variable has a coefficient value of 0.331 with a significance level of 0.000 (sig < 0.05), meaning H0 is rejected. Thus, it can be seen that curiosity has a significant influence on critical thinking.

The obtained regression values were then subjected to a proportion analysis for each variable by entering each variable one by one into a multiple regression analysis. The proportion of variance was assessed using the R-squared (R^2) change value. If the F-change value was < 0.05, the proportion of variance contributed significantly.

Confirmatory Factor Analysis (CFA) Results

Before testing the structural model, the researchers first conducted a Confirmatory Factor Analysis (CFA) using Mplus software to ensure that each indicator or item accurately represented its latent variable. The researchers observed the loading factor values for each indicator to ensure that all instruments significantly contributed to measuring the research variables before proceeding to hypothesis testing. The following are the CFA results for each research variable:

Table 5. Direct and Indirect Influences

Connection	Koef.	S.E	P-Value	Significant
Curiosity → Critical thinking	0.334	0.110	0.002	Yes

The table above reveals the direct effect of the independent variable (IV) on the dependent variable (DV): curiosity has a positive relationship with critical thinking, with a coefficient of 0.334 (33.4%), significant at 0.002 (< 0.05).

CONCLUSION

The curiosity variable significantly influences students in Greater Jakarta (Jabodetabek). The majority of respondents (45.4%) have a moderate level of critical thinking, indicating that students' critical thinking in Greater Jakarta (Jabodetabek) is developing but has not yet reached an optimal level. The results of the study indicate that curiosity contributes 50.8% to critical thinking, while the remaining 49.2% is influenced by variables other than those in this study. The significance of the regression coefficient for

curiosity on the dependent variable in this study, critical thinking, indicates that the variable has a positive and significant relationship with critical thinking.

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