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(Research/Review) Article

Effect of Critical Thinking, Learning Independence, and Gotong Royong in P5 Merdeka Curriculum

Yusniar[1]*, Elpisah[2], Syarifuddin[3]

[1] Department of Master of Economic Education, Graduate School, Universitas Patompo, Makassar, Indonesia 1; e-mail: niar.saddam@gmail.com
[2] Department of Master of Economic Education, Graduate School, Universitas Patompo, Makassar, Indonesia 2; e-mail: niar.saddam@gmail.com
3 Department of Master of Economic Education, Graduate School, Universitas Patompo, Makassar, Indonesia 3; e-mail: niar.saddam@gmail.com
* Corresponding Author : Yusniar

Abstract: This study aims to analyze the effect of critical thinking ability, learning independence, and mutual cooperation attitude in the P5 dimension of the Merdeka Curriculum on the learning achievement of IPAS class V UPT SPF SDN Inpres Perumnas I Makassar students, both partially and simultaneously. This study used a quantitative approach with a total sampling method, involving the entire population of 40 students from two classes. Data were collected through questionnaires and analyzed using multiple regression, t-test, and F-test with the help of SPSS 26. The results showed that partially, critical thinking ability (X1), student learning independence (X2), and mutual cooperation attitude (X3) had a positive and significant influence on IPAS learning achievement (Y). Simultaneously, the three variables also jointly influence student learning achievement.This finding confirms that the P5 dimension in the Merdeka Curriculum, especially in the aspects of critical thinking, learning independence, and mutual cooperation, plays an important role in improving students' IPAS learning achievement. Therefore, implementing learning strategies that encourage these three aspects can be an effective step in improving the quality of education in elementary schools.

Keywords: Critical Thinking, Independent Learning, Cooperation, Academic Achievement, Merdeka Curriculum

1. Introduction

Education plays a pivotal role in shaping individuals and societies, serving as a cornerstone for intellectual and social development. At the elementary school level, social science education (IPS) holds significant importance in introducing students to the complexities of social, economic, and political structures. However, traditional instructional methods often fail to engage students actively, limiting their critical thinking, independent learning, and cooperative skills (Manassero et al., 2022). In Indonesia, the implementation of the Merdeka Curriculum aims to bridge this gap by fostering critical thinking, independence, and social collaboration through its P5 dimension. Despite these efforts, elementary students still struggle to actively engage in learning, particularly in social studies, where passive learning dominates the classroom (Jufriadi et al., 2022). Observations at SD Inpres Perumnas I Makassar indicate that students exhibit low enthusiasm and participation in class, demonstrating a lack of motivation and engagement in cooperative activities like gotong royong. This phenomenon raises questions about whether the P5 framework effectively enhances students' learning achievements and cognitive skills. Thus, this study aims to examine the influence of critical thinking, independent learning, and cooperative behavior on

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students' academic performance in IPS, addressing a crucial gap in contemporary educational discourse.

Numerous studies have underscored the significance of critical thinking in modern education. Manassero et al. (2022) argue that critical thinking is a fundamental 21st-century competency that enhances students' problem-solving abilities. Similarly, O'Reilly et al. (2022) highlight the role of critical thinking in both primary and higher education, emphasizing its pedagogical implications. Studies by Liang and Fung (2021) further suggest that developing critical thinking in students leads to improved cognitive flexibility and adaptability in real-world problem-solving. Alongside critical thinking, independent learning has emerged as a key factor in student achievement. Fatimah (2010) defines independence as a psychological condition developed through consistent training and exposure to decision-making processes. Students with high levels of independence tend to exhibit greater resilience, initiative, and responsibility (Desmita, 2016). Similarly, Redhana (2019) argues that self-directed learning is an essential 21st-century skill, enabling students to navigate complex and rapidly changing environments effectively.

Cooperative behavior, particularly the value of gotong royong, has been extensively studied in the context of Indonesian education. Utomo (2018) asserts that cooperation fosters social integration, problem-solving capabilities, and collective responsibility. However, Rudi Gunawan (2013) identifies a decline in cooperative values among elementary students, particularly in urban settings where individualism prevails. This observation aligns with Aviani's (2020) findings, which indicate that communal cooperation is more prevalent in rural areas compared to cities, where students exhibit diminished participation in group activities. Despite these findings, research on the combined impact of critical thinking, independent learning, and cooperative behavior on student achievement in the context of the Merdeka Curriculum remains limited. While studies confirm the individual significance of these factors, there is little empirical evidence exploring their simultaneous effects on elementary students' academic performance in social studies.

Existing research provides substantial insights into the importance of critical thinking, independent learning, and cooperative behavior. However, most studies examine these variables in isolation rather than considering their combined influence on student learning outcomes. Moreover, research on the application of these competencies within the framework of the Merdeka Curriculum is still scarce. The study conducted by Hasan et al. (2019) emphasized the necessity of integrating critical thinking, creativity, collaboration, and communication within school curricula. However, the practical implementation and impact of these elements within the P5 dimension of the Merdeka Curriculum remain underexplored. Furthermore, while studies acknowledge the decline in cooperative values among students, there is little investigation into strategies that can effectively reintegrate gotong royong into elementary education. Empirical studies focusing on how these competencies affect students'

engagement and performance in IPS are minimal. Piaget's (2008) theory on cognitive development suggests that elementary students learn best through active engagement and collaborative experiences, yet current educational practices in Indonesia, particularly at SD Inpres Perumnas I Makassar, remain rooted in passive learning methods. The persistent reliance on conventional teaching techniques, such as lectures and rote memorization, fails to cultivate critical thinking, autonomy, and cooperative learning, ultimately impacting student motivation and academic achievement.

Based on these gaps, this study aims to analyze the influence of critical thinking, independent learning, and cooperative behavior on the academic performance of fifth-grade students in IPS at SD Inpres Perumnas I Makassar. This study offers a novel contribution by integrating these three competencies within the P5 framework, providing empirical evidence on their combined effects on elementary student learning outcomes. Unlike prior research that focuses on individual skill development, this study holistically examines how these competencies interact to create a more engaging and effective learning environment. The findings are expected to inform educators and policymakers on the necessity of shifting towards a more student-centered, interactive, and cooperative learning approach. Furthermore, by addressing the declining values of gotong royong among students, this research contributes to the broader discourse on character education and social responsibility in Indonesian schools.

2. Preliminaries or Related Work or Literature Review

Critical thinking

Critical thinking is an essential cognitive skill in the learning process, enabling individuals to analyze, evaluate, and construct logical arguments while making well-reasoned decisions (Yamin, 2007). Ennis (2011) defines critical thinking as a reflective thought process focused on making decisions based on rational reasoning. Meanwhile, Beyer (as cited in Surya, 2011) explains that critical thinking involves several key characteristics, including skepticism, the ability to assess arguments, the use of objective criteria, and an awareness of different perspectives. In the context of education, critical thinking plays a crucial role in helping students comprehend concepts, connect new information with prior knowledge, and enhance problem-solving skills (Hakim et al., 2016). Therefore, fostering critical thinking in education has become a priority in modern educational systems, particularly in preparing students to meet 21st-century challenges (Utami et al., 2017).

Several internal and external factors influence critical thinking ability. Mariyam (2007) identifies four primary factors affecting critical thinking: physical condition, motivation, anxiety, and intellectual development. High learning motivation enhances students' cognitive absorption and curiosity to explore ideas in greater depth (Desmita, 2016). Additionally, Florea & Hurjui (2015) emphasize that critical thinking is rooted in persuasive, logical, and

rational argumentation, involving evaluation and selecting the most appropriate solutions. Another contributing factor is self-regulation, which allows individuals to assess and adjust their thinking patterns when addressing problems (Facione, 2020). Thus, critical thinking is not only a reflection of cognitive intelligence but also encompasses evaluative and reflective skills that support individuals in making well-informed, fact-based decisions.

Independent learning

Independent learning is a crucial aspect of student development, emphasizing self-reliance, responsibility, and initiative in academic pursuits. Fatimah (2010) defines independent learning as a psychological condition developed through continuous practice, allowing individuals to face challenges and make decisions autonomously. Similarly, Desmita (2016) highlights that students with strong independence possess a competitive spirit, decision-making ability, initiative in problem-solving, self-confidence, and a strong sense of responsibility in their learning process. According to Nurhayati (2016), independent learning is the ability to take full responsibility for one's education by setting goals and implementing strategies without relying on external support. This self-directed approach fosters resilience and enhances cognitive flexibility, enabling students to navigate academic and life challenges with greater efficiency. Furthermore, the development of independent learning is closely linked to personal motivation, as students who demonstrate self-discipline and proactive learning behaviors tend to achieve higher academic performance (Hidayati & Listyani, 2010).

Several internal and external factors influence the development of independent learning skills. Mina, Israwati, & Vitoria (2017) emphasize the role of instructional models, such as Lesson Study, in enhancing student engagement, self-confidence, and competency mastery. Ali & Asrori (2017) identify key determinants, including genetic inheritance, parenting styles, educational systems, and societal environments, all of which contribute to shaping students' independence. Supportive educational environments that encourage student autonomy, constructive feedback, and democratic participation are vital in fostering independent learning (Kartadinata in Ali & Asrori, 2017). Additionally, Desmita (2016) categorizes independent learning into intellectual, emotional, social, and economic dimensions, with each aspect influencing students' ability to manage their education effectively. These factors collectively determine the extent to which students develop autonomy, reinforcing the necessity of structured training and reinforcement throughout their academic journey. By nurturing independent learning from an early stage, educational institutions can better equip students with the skills necessary for lifelong learning and academic success.

Gotong royong character

The reinforcement of the gotong royong character in education has been a crucial initiative in Indonesia, particularly through the National Movement for Mental Revolution (GNRM) and the Character Education Strengthening (PPK) program launched by the Ministry of Education and Culture in 2016 (Khotimah, 2019). Gotong royong, as one of the core values

in Pancasila, is embedded in the national curriculum as mandated by Permendikbud No. 20 of 2018, which integrates religious, nationalistic, independent, cooperative, and integrity-based values in education. However, challenges persist in implementing gotong royong, as many students in elementary schools tend to exhibit individualistic behavior, influenced not only by technological advancements but also by socio-cultural factors (Utomo, 2018). Research by Aviani (2020) highlights that communal cooperation remains prevalent in rural areas but has significantly declined in urban settings. Similarly, Hanafi (2016) notes that Indonesia's traditional culture of mutual cooperation has shifted toward individualism, impacting students' willingness to participate in collaborative school activities such as maintaining cleanliness or assisting peers. To address this, Perpres No. 87 of 2017 emphasizes character education that instills values such as solidarity, mutual assistance, inclusivity, empathy, and social responsibility (Utomo, 2018). Educational institutions must adopt habitual reinforcement methods, as suggested by A. Mustika Abidin (2018), to cultivate a culture of cooperation among students through repetitive and meaningful participation in collective activities.

Academic achievement

Academic achievement is a crucial measure of a student's ability to acquire and apply knowledge, skills, and attitudes gained through the learning process. Hamdani (2011) defines academic achievement as the outcome of an activity undertaken individually or collectively, reflecting perseverance and diligence in learning. Similarly, Djamarah (2012) states that academic achievement is the result of persistent effort in mastering educational content, leading to meaningful cognitive and behavioral changes. Sardiman (2011) emphasizes that academic achievement is influenced by various internal and external factors, including intellectual ability, motivation, emotional well-being, and environmental conditions. Ahmadi & Supriyono (2013) categorize these influences into physiological, psychological, and sociocultural factors, with aspects such as intelligence, parental support, and school environment playing significant roles. Furthermore, academic achievement is assessed across three domains: cognitive, affective, and psychomotor (Prakosa in Darmadi, 2017). Cognitive achievement involves comprehension, application, and critical analysis, while affective achievement encompasses attitudes, collaboration, and appreciation of learning. The psychomotor domain refers to students' ability to demonstrate practical skills, such as coordination and physical dexterity. Comprehensive assessment tools, including tests, observations, and self-evaluations, are essential for measuring academic achievement accurately (Woolfolk, 2016). Additionally, a supportive learning environment, characterized by parental involvement and interactive teaching strategies, significantly enhances student performance (Slavin, 2018). Ultimately, academic achievement serves as both a reflection of students' mastery of educational content and a basis for evaluating and improving

instructional methods, ensuring that learners develop the competencies necessary to succeed in an ever-evolving academic and professional landscape.

3. Proposed Method

This study employs a quantitative ex post facto research design, conducted at UPT SPF SDN Inpres Perumnas I Makassar during the 2024/2025 academic year, with a total population of 40 fifth-grade students using a total sampling technique. The research aims to analyze the effect of critical thinking, independent learning, and cooperative behavior (gotong royong) on students' academic achievement in IPAS within the P5 dimension of the Merdeka Curriculum. Data collection methods include questionnaires, observations, and literature reviews, with Likert-scale-based responses for questionnaire analysis. Primary data is collected from student responses, while secondary data is obtained from previous research, books, and official documents. Data analysis involves descriptive and inferential statistics, including multiple regression analysis, tested using SPSS 26. The study examines assumption tests (normality, homogeneity, linearity), classical assumption tests (multicollinearity, heteroscedasticity, autocorrelation), and hypothesis testing (t-test for partial effects, F-test for simultaneous effects, and dominant variable analysis). The coefficient of determination (R^2) is used to measure the extent to which independent variables explain variations in academic achievement. By integrating critical thinking, independent learning, and cooperative behavior into the learning process, this study seeks to provide empirical evidence on their combined impact on student performance in IPAS, offering insights for educators and policymakers in enhancing character-based learning approaches.

4. Results and Discussion

Classical Assumption Test

Table 1. Normality Test Results

Variables	N	Mean	Std. Dev	Test Statistics	Asymp. Sig. (2-tailed)	Monte Carlo Sig. (2-tailed)
Critical Thinking Skills (X1)	40	19.65	2.14	0.115	0.2	0.186
Student Learning Independence (X2)	40	16	1.89	0.101	0.2	0.361
Mutual Cooperation Attitude (X3)	40	23.53	2.15	0.122	0.14	0.133
Science Learning Achievement (Y)	40	26.3	2.62	0.105	0.2	0.299

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

Table 1 shows that the regression model, the interfering variables or residuals have a normal distribution. The results of the analysis provide evidence that the data is normally distributed, to see that the data is normally distributed is located at the Asymp. Sig. (2-tailed) value ofCritical Thinking Ability (X1)0.200,Student Learning Independence (X2)0.200,Mutual Cooperation Attitude (X3)0.140, andScience Learning Achievement (Y)0.200 has a significance value > 0.05. So based on these results it can be stated that the

data used in the study is normally distributed and the data can be used for the next testing stage.

Table 2. Multicollinearity Test

Variables	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constants	2,029	2,521	-	0.805	0.426	-	-
Critical Thinking Skills (X1)	0.436	0.172	0.356	2,533	0.016	0.363	2,755
Student Learning Independence (X2)	0.461	0.164	0.333	2,808	0.008	0.509	1,965
Mutual Cooperation Attitude (X3)	0.354	0.149	0.290	2.377	0.023	0.481	2,079

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

Table2. shows for each variable, namelyCritical Thinking Skills(X1) has a tolerance value of 0.363 > 0.10, a tolerance valueStudent Learning Independence(X2) is 0.509 > 0.10 and the tolerance valueMutual Cooperation Attitude(X3) is 0.481 > 0.10. While the Value Influence Factor (VIF) valueCritical Thinking Skills(X1) 2.755 < 10.0 Value Influence Factor (VIF) valueStudent Learning Independence(X2) 1.965 < 10.0 and the Value Influence Factor (VIF) valueMutual Cooperation Attitude(X3) 2.079 < 10.0. then it can be concluded that there is no multicollinearity.

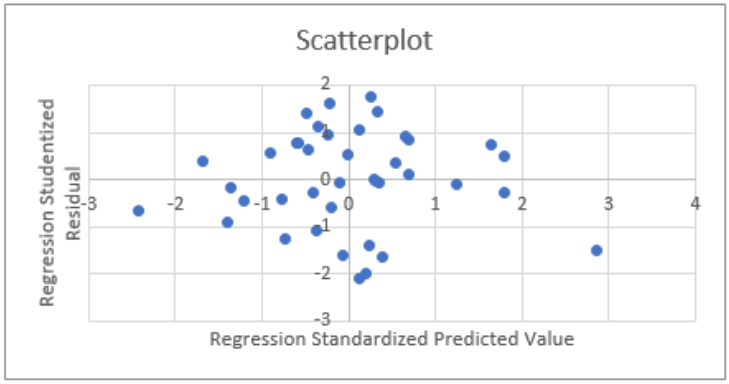

Figure 1. Heteroscedasticity Testing

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

On figure 1. To find out whether there is a symptom of heteroscedasticity, it can be done by using a heteroscedasticity graph between the predicted values of the dependent variable and the independent variable. From the scatterplots above, it can be seen that the points are spread randomly and are spread both above and below the number 0 and the Y axis, it can be concluded that there is no heteroscedasticity in the regression model, so the regression model is suitable for use in conducting testing.

Table 3. Multiple Linear Regression

Variables	B	Std. Error	Beta	t	Sig.
Constants	2,029	2,521	-	0.805	0.426
Critical Thinking Skills (X1)	0.436	0.172	0.356	2,533	0.016
Student Learning Independence (X2)	0.461	0.164	0.333	2,808	0.008
Mutual Cooperation Attitude (X3)	0.354	0.149	0.290	2.377	0.023

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

Based on the output of table 3 above in the Coefficients column, the following multiple linear regression equation model is obtained:

Y= 2.029+ 0.436X_1+ 0.461X_2 + 0.354X_3

From the equation model above, it can be explained as follows:

a. The constant coefficient is 2.029
b. The X1 coefficient is 0.436, meaning that every 1 unit change in Critical Thinking Ability (X1) and other variables are considered constant, will increase Science Learning Achievement.Students of Class V of UPT SPF SDN INPRES Perumnas I Makassarof 0.436.
c. The X2 coefficient is 0.461, meaning that every change in Student Learning Independence (X2) of 1 unit and other variables are considered constant, will increase Science Learning Achievement.Students of Class V of UPT SPF SDN INPRES Perumnas I Makassarof 0.461.
d. The X3 coefficient is 0.354, meaning that every change in the Mutual Cooperation Attitude (X3) of 1 unit and other variables are considered constant, will increase the Science Learning Achievement.Students of Class V of UPT SPF SDN INPRES Perumnas I Makassar of 0.354.

Hypothesis Significance Test

Table 4. Simultaneous Test

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	199.205	3	66,402	34,547	.000b
	Residual	69.195	36	1,922		
	Total	268,400	39			
a. Dependent Variable: Science Learning Achievement (Y)						
b. Predictors: (Constant), Mutual Cooperation Attitude (X3), Student Learning Independence (X2), Critical Thinking Ability (X1)						

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

In table 4 Simultaneous test shows that there is a significant influence between independent variables (X) simultaneously on the dependent variable (Y) which can be seen in the table above, namely with a sig. value. F test of 0.000 at a significance level of 0.05. This value is smaller than 0.05 which indicates that all independent variables consist of;Critical Thinking Skills(X1),Student Learning Independence(X2) and the attitude of mutual cooperation (X3) together have an influence on the achievement of learning science (Y) in Class V students of UPT SPF SDN INPRES Perumnas I Makassar.

Table 5. Simultaneous Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,029	2,521		0.805	0.426
	Critical Thinking Ability (X1)	0.436	0.172	0.356	2,533	0.016
	Student Learning Independence (X2)	0.461	0.164	0.333	2,808	0.008
	Mutual Cooperation Attitude (X3)	0.354	0.149	0.290	2.377	0.023

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

In table 5. Partial test is a test to determine the influence of each independent variable on the dependent variable. The decision-making criteria can be done by comparing the probability value or sig. with a significance level of 0.05. If the probability value ⩾ 0.05 then the influence between the independent variable (X) on the dependent variable (Y) is not significant. Conversely, if the probability value <0.05 then the influence between the independent variable (X) on the dependent variable (Y) is significant.

Table 6. Termination coefficient test

Model Summaryb					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.862a	0.742	0.721	1.38639	1,759
a. Predictors: (Constant), Mutual Cooperation Attitude (X3), Student Learning Independence (X2), Critical Thinking Ability (X1)					
b. Dependent Variable: Science Learning Achievement (Y)					

Source: SPSS 26 Data Processing Results (primary data processed, 2024)

Table 7. TablesUnstandardized Coefficients Beta

Model		**Unstandardized Coefficients**		**Standardized Coefficients**
		B	**Std. Error**	**Beta**
1	(Constant)	2,029	2,521	
	Critical Thinking Ability (X1)	0.436	0.172	0.356
	Student Learning Independence (X2)	0.461	0.164	0.333
	Mutual Cooperation Attitude (X3)	0.354	0.149	0.290

Based on table 7. above, it can be seen that the Unstandardized Coefficients Beta value of Critical Thinking Ability (X1) is 0.436, Student Learning Independence (X2) is 0.461 and Mutual Cooperation Attitude (X3) is 0.354. Of the three X Variables, the highest Beta coefficient variable is the Student Learning Independence Unstandardized Coefficients Beta variable with a value of 0.461. Thus, the most dominant variable influencing Science Learning AchievementClass V Students of UPT SPF SDN INPRES Perumnas I Makassar are Student Learning Independence.

5. Discussion

The Influence of Critical Thinking Skills on Science Learning Achievement

The results of research activities in both cycles I and II in class X LAS for the subject of the Science Project are presented in tables 1 and 3. From the data found, student creativity increased for all observation categories in cycle II compared to cycle I. So, it can be concluded that using the Project Based Learning model provides increased creativity in students because Project Based Learning can involve active, innovative and skilled students and can develop ideas and concepts through projects that have been made.

In this stage of activity, students' abilities begin to appear in the indicator of high curiosity when students are given basic questions about the project to be carried out. In the aspect of authenticity (originality), students put forward thoughts, problem-solving ideas that are different from others, so that students are able to create unique and interesting projects. In the aspect of elaboration, students are able to explain in more detail the concept of the project that has been created, in the aspect of flexibility, students are able to answer questions well. This is in accordance with research that project-based learning allows students to find new ideas that make students more creative.

The Influence of Student Learning Independence on Science Learning Achievement

Student learning independence (X2) also has a significant impact on science learning achievement, with a p-value of 0.008 and t-value of 2.808 > t-table 1.684. Learning independence encourages students to be more active, responsible, and self-initiated in their learning process (Slameto, 2015). Maslow (Ali & Asrori, 2017) categorized independence into safe independence (fostering trust, responsibility, and awareness) and unsafe independence (leading to riskier behaviors). A strong sense of independence enhances students' ability to grasp and apply academic concepts effectively.

The Influence of Mutual Cooperation Attitude on Science Learning Achievement

The mutual cooperation attitude (X3) significantly affects science learning achievement, with a p-value of 0.023 and t-value of 2.377 > t-table 1.684. In the context of character education, mutual cooperation is a core element of the Pancasila Student Profile, which promotes teamwork, solidarity, and social harmony (Kemendikbudristek, 2022). This finding supports Latifah (2022), who found that collaborative activities such as group assignments and classroom duties enhance students' cooperative character, leading to improved social interactions and academic success.

The Combined Influence of X1, X2, and X3 on Science Learning Achievement

The simultaneous test results indicate that all three independent variables (critical thinking, student independence, and mutual cooperation) collectively have a significant effect on science learning achievement, with an F-test Sig. value of 0.000 (<0.05). This reinforces previous studies that highlight how integrating critical thinking skills (Aizikovitsh-Udi & Cheng, 2015), learning independence (Maslow in Ali & Asrori, 2017), and mutual cooperation (Mulyani et al., 2020) contributes to students' academic success. These findings emphasize the importance of an educational approach that integrates critical thinking, independent learning, and cooperation, particularly in implementing the Independent Curriculum (Kurikulum Merdeka) in Indonesia.

6. Conclusion

Based on the results and discussion of the collected data, the following conclusions can be drawn:

a. Critical Thinking Skills (X1) have a positive and significant effect on the Science Learning Achievement of fifth-grade students at UPT SPF SDN INPRES Perumnas I Makassar.

b. Student Learning Independence (X2) has a positive and significant effect on the Science Learning Achievement of fifth-grade students at UPT SPF SDN INPRES Perumnas I Makassar.

c. Mutual Cooperation Attitude (X3) has a positive and significant effect on the Science Learning Achievement of fifth-grade students at UPT SPF SDN INPRES Perumnas I Makassar.

d. Critical Thinking Skills (X1), Student Learning Independence (X2), and Mutual Cooperation Attitude (X3) collectively influence the Science Learning Achievement (Y) of fifth-grade students at UPT SPF SDN INPRES Perumnas I Makassar.

e. The most dominant variable influencing Science Learning Achievement is Student Learning Independence (X2).

7. Limitation

This study has several limitations that should be considered when interpreting the findings:

a. The study was conducted only on fifth-grade students at UPT SPF SDN INPRES Perumnas I Makassar, which may limit the generalizability of the results to other schools or grade levels.

b. The sample size of 40 students may not be large enough to fully represent the broader student population, affecting the robustness of the conclusions.

c. The research utilized a cross-sectional approach, meaning it only captures data at a single point in time. It does not account for long-term changes in students' learning achievement.

d. Some data, particularly those related to learning independence and mutual cooperation attitudes, may be influenced by students' subjective self-perceptions, which could lead to response bias.

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