



The Influence of Islamic Religious Education (PAI) on Students' Mathematical Logical Thinking Skills in Junior High School

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Abstract: This study examines the impact of Islamic Religious Education (PAI) on students' mathematical logical thinking skills at SMP Roudlotul 'Ulum, Parongpong, West Bandung, under the Roudlotul 'Ulum Islamic Boarding School Foundation. The sample consisted of 28 ninth-grade students. A quantitative explanatory research approach was used, with probability sampling and simple random sampling. The instruments included validated questionnaires and tests. The normality test showed that the data were normally distributed ($p=0.200$). Correlation analysis revealed a strong relationship between PAI learning and students' mathematical logical thinking, with a correlation coefficient of 0.817 ($p=0.000$). Regression analysis showed that PAI learning contributed 71.4% to students' mathematical logical thinking, while other factors accounted for the remaining 28.6%. The linear regression equation $Y = 0.473 + 0.816 X$ indicates that each increase in PAI learning boosts students' logical thinking skills by 0.816. These findings highlight that PAI not only shapes students' religious character but also enhances their mathematical logical thinking. Therefore, an integrative and holistic approach to teaching is crucial.

Keywords: Integrative Learning, Junior High School Education, Educational Psychology.

INTRODUCTION

Logical thinking is one of the fundamental skills required in everyday life, particularly in solving complex and structured problems. In the context of education, this skill plays a crucial role, especially in mathematics, which demands systematic and critical thinking. Mathematics serves as a foundational discipline for other sciences and is an essential subject in school curricula. It requires students to comprehend abstract concepts by engaging in processes such as learning, recalling, and logical reasoning about real-world phenomena (Widyastuti & Pujiastuti, 2014). However, several factors influence learning outcomes. Effective learning involves students actively studying, writing, understanding, and solving problems both at school and home (Munif et al., 2023). Unfortunately, many students only listen to teachers, take notes, and answer questions when asked, which hinders the learning process and affects their performance (Fitriana, 2015).



In mathematics education, students often face difficulties, particularly in higher-order thinking, which results in an inability to solve problems effectively. This challenge may stem from the use of ineffective teaching methods (Nugraha & Mahmudi, 2015). Teachers must address this issue by adapting or improving teaching methods. Providing attention, creating a comfortable learning environment, and fostering openness with students can stimulate interest in mathematics. By cultivating a sense of enjoyment and motivation, students are more likely to develop a genuine interest in learning mathematics (Harningsih, 2019). While logical thinking development is typically associated with mathematics, it is not limited to this subject alone (Sholeh et al., 2023). Other disciplines, including Islamic Religious Education (PAI), also provide opportunities to foster logical thinking.

PAI involves a process of instilling and solidifying values that manifest in both outward behavior and inner spirituality (Abror et al., 2024). Islamic education aims to develop sensitivity toward moral and religious values, nurturing rational and pious individuals who contribute to their family's, community's, and humanity's well-being. This goal aligns with the belief in Allah SWT and aims to enhance students' religious character, guided by moral principles and Islamic teachings (Syafi'i et al., 2024). Teachers play a pivotal role in instilling religious behavior in students, which significantly impacts their spiritual development. However, the influence of religious education on students' cognitive and moral growth depends on various motivational factors that encourage their understanding of religious values.

The National Education System, as outlined in Indonesia's Law No. 20 of 2003, aims to develop students' potential to become holistic individuals faithful to God Almighty, morally upright, physically and mentally healthy, intelligent, creative, independent, and socially responsible (Enrekang & Parepare, 2018). This vision of an ideal Indonesian citizen underscores the importance of strong moral and intellectual foundations, which PAI helps to build (Habibulloh et al., 2024). By fostering students' faith, piety, and noble character, PAI contributes to shaping ethical individuals who adhere to religious principles (Syafi'i & El-Yunusi, 2024). This vision of an ideal Indonesian citizen underscores the importance of strong moral and intellectual foundations, which PAI helps to build. By fostering students' faith, piety, and noble character, PAI



contributes to shaping ethical individuals who adhere to religious principles (Durachman et al., 2021).

Islamic Religious Education (PAI) primarily aims to shape students' personalities based on Islamic values, while also fostering logical thinking skills (Sholeh, 2025). The pedagogical process in PAI often involves the analysis of Qur'anic verses, Hadith, and the application of Islamic principles in solving real-life problems. This provides students with opportunities to develop systematic and rational thinking skills. Previous research has shown that religion-based learning approaches can positively influence students' cognitive abilities. For example, a study by (Budiana, & Salim, 2024) highlighted that problem-solving-oriented PAI lessons can improve students' critical thinking skills, which is a crucial aspect of cognitive skill development.

However, most existing research focuses on the development of critical or moral thinking skills, with limited exploration of the direct impact of PAI on mathematical logical thinking abilities. Research by (Rahim et al., 2024) discusses the potential relationship between Islam-based education and problem-solving abilities, but does not delve deeply into the application of logical thinking in mathematics. Furthermore, the research conducted by (Nurhikmah, 2024) emphasizes the importance of systematic thinking acquired through the integration of religious values, although its focus is more on the humanities than on the sciences, particularly mathematics. As a result, while PAI has been shown to improve cognitive skills such as critical thinking and systematic reasoning, there remains a significant gap in understanding its specific contribution to the development of mathematical logical thinking (Sholeh, 2023).

Most of the existing research uses qualitative approaches to explore the integration of religious values in education, while quantitative studies examining the causal relationship between PAI learning and mathematical logical thinking are still limited. Statistical data shows that despite interest in studying the integration of religious education in academic contexts, only 18% of studies have investigated the direct link between it and the development of logical thinking skills in mathematics (Nurhikmah, Mariati, Nursalam, 2024). Similarly, little attention has been given to how specific teaching strategies in PAI, such as group discussions or problem-based learning, directly affect students' mathematical logical reasoning. Therefore, this study aims to fill this gap in the literature by using a deductive quantitative approach to examine the influence of PAI on



students' mathematical logical thinking skills. The findings are expected to make a significant contribution to the development of both educational theory and practice, particularly in integrating religious values with the development of mathematical logical thinking skills in students.

METHOD

This study employs a quantitative method with an explanatory research approach. The aim of this research is to describe the relationship and influence between the independent variable (Islamic Religious Education, PAI) and the dependent variable (students' mathematical logical thinking ability). This study uses a causal-correlational design, which aims to examine the relationship or influence between the independent variable (variable X) and the dependent variable (variable Y) without direct manipulation. The research is conducted at SMP Roudlotul 'Ulum, Parongpong, West Bandung, under the management of the Roudlotul 'Ulum Islamic Boarding School Foundation. The population of this study consists of all students at SMP Roudlotul 'Ulum, while the sample includes 28 ninth-grade students. The sampling technique used is probabilistic with a simple random sampling method to ensure that each student has an equal chance of being selected as a participant. The demographic of participants includes students aged between 14 and 16 years, with similar educational backgrounds in Islamic education.

The research instruments used include validated questionnaires and tests, which have been tested for reliability. The validation process is carried out by testing the instruments using content validity, involving experts in the fields of education and Islamic religious education to ensure that the instruments are aligned with the research objectives. Furthermore, the reliability of the instruments is tested by calculating the Cronbach's Alpha value and comparing it with the Cronbach's Alpha value if an item is deleted using SPSS version 26.

Data analysis is conducted through normality testing using the Kolmogorov-Smirnov test and linearity testing to ensure that the data meet the necessary assumptions for further analysis. The research hypothesis is tested using correlation and simple linear regression analysis with SPSS version 26. If the data are normally distributed, the analysis proceeds with Pearson's correlation test and linear regression analysis to predict the dependent variable based on the independent



variable. However, if the data are not normally distributed, Spearman's correlation analysis is used without performing regression analysis.

RESULT AND DISCUSSION

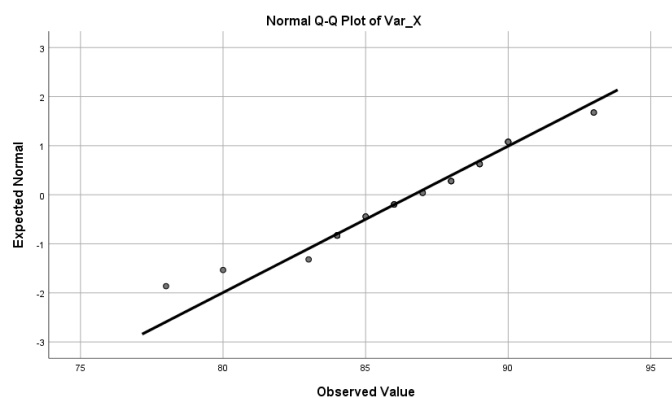
Results

The normality test was conducted to determine whether the data obtained came from a normally distributed population. In this case, the researcher used the Kolmogorov-Smirnov test for normality assessment.

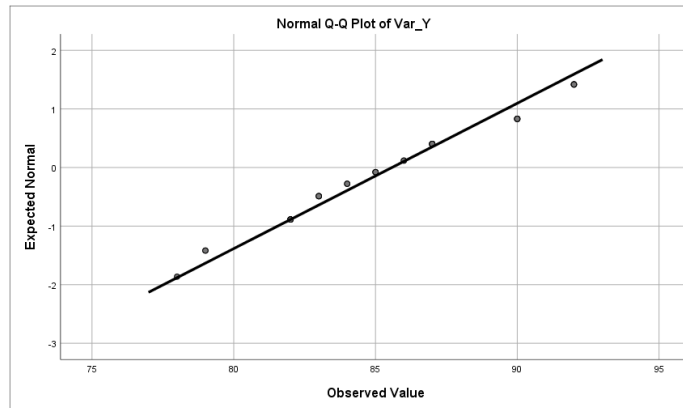
Table 1. Normality test Output

		Statistic	Sig.
Value	PAI Learning	.109	.200*
	Students' Logical		
	Mathematical	.106	.200*

Based on the data in Table 1, the significance value for PAI learning and students' logical mathematical thinking skills is 0.200. Since this significance value is greater than 0.05, according to the decision criteria, H_0 is accepted, indicating that the data is normally distributed.



Picture 1. Normal Q-Q Plot Var_X



Picture 2. Normal Q-Q Plot Var_Y

In the Normal Q-Q Plot of PAI learning and students' logical mathematical thinking skills, the points are scattered around and along the diagonal line, further confirming the data's normal distribution. The strength of the correlation value can be assessed as follows..

Table 2. Correlations

		Var_X	Var_Y
PAI Learning	Pearson Correlation	1	.817**
	Sig. (2-tailed)		.000
Students' Logical Mathematical	Pearson Correlation	.817**	1
	Sig. (2-tailed)	.000	

From the data in Table 2, the significance value between PAI learning and students' logical mathematical thinking skills is 0.000. Since this value is less than 0.05, H_0 is rejected, meaning that PAI learning significantly affects students' logical mathematical thinking skills.

Furthermore, the Correlation Coefficient value is 0.817, which, based on the correlation interpretation guidelines, indicates a very strong relationship between PAI learning and students'



logical mathematical thinking skills. The ** notation in the Correlations table confirms that the two variables are significantly correlated.

Table 3. Model Summary

Model	R Square
1	.714

Based on the data in Table 3, the R Square value or Determination Coefficient is 0.714, indicating that 71.4% of students' logical mathematical thinking skills can be attributed to PAI learning, while the remaining 28.6% is influenced by other factors beyond logical mathematical thinking skills.

Table 4. ANOVA^a

Model		Sig.
1	Regression	.000 ^b

The regression significance value from Table 4 is 0.000. Since this value is less than 0.05, it can be concluded that the linear regression model meets the linearity criteria, making it suitable for predicting the independent and dependent variables—PAI learning and students' logical mathematical thinking skills.

Table 5. Coefficients^a

Model		B	Sig.
1	(Constant)	.473	.000
	PAI Learning	.816	

From the Coefficients table, the regression equation is derived as $Y = 0.473 + 0.816X$. This indicates that if the value of PAI learning is zero, the students' logical mathematical thinking skills would be 0.473. The regression coefficient of 0.816 implies that for every unit increase in PAI



learning, students' logical mathematical thinking skills increase by 0.816. Moreover, since the significance value is less than 0.05, it can be concluded that PAI learning has a significant effect on students' logical mathematical thinking skills.

Dicsussion

Based on the results of this study, it can be concluded that Islamic Religious Education (PAI) significantly influences students' mathematical logical thinking abilities. The normality test using the Kolmogorov-Smirnov method indicated that the data is normally distributed, with a significance value of 0.200, which is greater than 0.05. This meets the assumption of normal distribution and allows for further analysis. This result is supported by the Normal Q-Q Plot, which shows that the data points are distributed around the diagonal line.

The correlation test between PAI learning and students' mathematical logical thinking abilities showed a very strong relationship, with a significance value of 0.000 (less than 0.05) and a correlation coefficient of 0.817. This indicates that the better the PAI learning, the higher the students' ability to think logically in mathematics. This result aligns with previous findings by (Tamphu, Suyitno, Susanto, Budiana, Salim, et al., 2024), which demonstrated that religious-based learning can strengthen critical thinking skills, an aspect that is also important for developing logical reasoning in mathematics. However, this study goes further by showing a strong connection between PAI and mathematical logical thinking, a relationship that has not been widely explored in previous research, which has mainly focused on critical or moral thinking skills.

Additionally, the linear regression analysis showed that the regression model met the linearity criteria with a significance value of 0.000. The coefficient of determination (R Square) of 0.714 indicates that PAI learning contributes 71.4% to students' mathematical logical thinking abilities, while the remaining 28.6% is influenced by other factors not examined in this study. The regression equation obtained, $Y = 0.473 + 0.816X$, shows that for every unit increase in PAI learning, students' mathematical logical thinking abilities will increase by 0.816. This indicates that although other factors influence students' mathematical logical thinking abilities, PAI learning still makes a significant contribution.

The results of this study align with the concept of holistic education, which aims to develop students' potential comprehensively, including cognitive, affective, and psychomotor aspects. The



integration of religious education with the development of logical thinking abilities has a positive impact on students' cognitive development, particularly in understanding more complex mathematical concepts. This study also provides practical implications, namely that PAI teachers can strengthen teaching strategies by integrating logical principles into teaching materials, such as through the application of problem-solving based on relevant religious values.

To enhance PAI learning to better support cognitive development, methods that prioritize critical and logical thinking in every learning process can be developed. For example, more frequent use of problem-based learning approaches, which require students to apply mathematical concepts in real-life contexts related to Islamic principles, could be implemented. This approach will not only improve students' mathematical logical thinking abilities but also foster better character in accordance with Islamic values. Capie dan Tobin (Sumarmo et al., 2012) measured logical thinking ability based on mental development theory using the Test of Logical Thinking (LOLT). This test includes five components: correlational reasoning, proportional reasoning, correlational reasoning, combinatorial reasoning, and controlling variables. Logical thinking skills include: 1) Drawing conclusions based on appropriate comparisons, 2) Estimating or drawing conclusions based on probability, 3) Structuring evaluations and guidance for several cases, 4) Verifying, 5) Drawing conclusions or predictions based on the relationship between two factors, and 6) Determining collaboration with several factors (Nurhikmah, 2024a). Teaching through logical thinking methods can help other students understand the logical thinking process and enhance their ability to adopt strategies similar to those used by some students when solving linear equations and explaining their reasoning. There are many other strategies that can be employed in teaching mathematics to improve logical skills (Sagala et al., 2023). Therefore, logical thinking skills not only help students understand mathematical concepts but also contribute to the overall development of their analytical skills. For this reason, it is crucial for educators to integrate teaching strategies that encourage students to think logically, creatively, and analytically in every learning process.

Education is a key factor in guiding individuals towards a better, higher standard, and more ethical life. In Islam, education is often referred to as At-Tarbiyah, which relates to Arriyadhah (practice). This practice aims to train both the physical and mental aspects, as stated in Surah Al-



Qasas, verse 77, which emphasizes the importance of balancing worldly life and the hereafter. This verse outlines the ways one should live to possess good and noble character. In PAI, education encourages students to believe and adhere to religious teachings in daily life. According to Article 37, paragraph 1 of the law, religious education aims to shape students into individuals who believe and are devoted to God (Choli, 2019). Character refers to the traits or ethics that distinguish an individual, and in the KBBI, it is defined as the mental, habitual, moral, or ethical traits that differentiate one person from another (Fahmi & Susanto, 2018). The formation of character is an essential aspect of education, including in PAI, because character or ethics are the primary goals of education. According to Ibn Faris, the concept of Islamic education involves guiding students by considering their potential in areas such as learning stages, ethics, physical health, mental state, religion, and social relations. This leads to the comprehensive concept of Akhlaq education, which balances the relationship between humans and God, between humans and each other, and between humans and their environment. Akhlaq is an inherent part of human nature, encompassing both positive and negative impulses, which is why Islamic education prioritizes this process, as it aims to form students' akhlaq or character. Akhlaq is a crucial foundation in human life, determining the success of students' potential.

The primary goal of PAI learning is to shape students' personalities or akhlaq, reflecting that their behavior and thinking patterns are influenced by their everyday lives. Therefore, teachers should set a good example, as Ki Hajar Dewantara emphasized with the principle "ing ngarso sung tulodo ing madyo manguk karso" (provide an example in front, offer guidance in the middle, and give encouragement from behind). This method should be applied in teaching, as teachers are role models. With PAI as the foundation of learning, it helps form students' personalities, making them knowledgeable and religious. Thus, the implementation of PAI in schools serves as a key pillar for character education, teaching the importance of akhlaq formation, with the principles of aqidah, fiqh, and akhlaq as the foundation of Islamic behavior (Ainiyah, 2013). According to (Azhari, 2018) character formation in PAI aims to strengthen faith, improve understanding, and internalize Islamic teachings for students.

In PAI, character formation involves instilling religious values and shaping students' personalities to become devout and faithful individuals. According to (Apriyadi, 2021), religiosity



has five components: 1) Religious belief, 2) Worship/practice of religion, 3) Religious knowledge, 4) Religious experience, and 5) Impact/outcome. These components are interconnected, highlighting that worship is the proof of obedience to God. PAI also plays an essential role in enhancing students' social character, enabling them to communicate effectively with others, both verbally and non-verbally, adapting to different situations. Key components of social activities include cooperation, empathy, social behavior, openness, problem-solving skills, trust-building, and, most importantly, communication. Effective communication allows individuals to understand what actions are required (Nurhaliza, 2024). Ultimately, in the learning process, the focus should not only be on achieving the goal but also on how the learning process unfolds, ensuring that teachers provide materials that students receive and comprehend. According to Istarani, the learning model includes a sequence of materials presented by the teacher, covering the phases before, during, and after the lesson, as well as providing direct or indirect learning facilities. (Supriani et al., 2020) state that the function of the learning model is to guide teachers in conducting lessons. Including designing lesson plans and selecting appropriate strategies and methods for the learning process (Mayasari & Arifudin, 2023).

Thus, the findings of this study have important implications for teachers and education practitioners, particularly in developing teaching approaches that integrate religious values with the development of students' logical thinking skills. Islamic Religious Education can be designed more creatively and innovatively to not only provide religious understanding but also support the development of students' analytical and logical abilities.

CONCLUSION

Based on the research findings, it can be concluded that Islamic Religious Education (PAI) significantly influences students' logical mathematical thinking skills. This is evidenced by the statistical analysis, where the correlation significance value of 0.000 indicates a significant relationship between the two variables. With a correlation coefficient of 0.817, the relationship between PAI learning and students' logical mathematical thinking skills falls into the very strong category. This result suggests that the more optimal the PAI learning, the higher the students' ability to think logically in mathematics. Additionally, the regression analysis shows that PAI learning



contributes 71.4% to students' logical mathematical thinking skills. This coefficient of determination indicates that PAI learning plays a dominant role in influencing students' logical mathematical thinking skills, while the remaining 28.6% is influenced by other factors not examined in this study. The obtained linear regression equation $Y = 0.473 + 0.816X$ further strengthens the finding that for every one-unit increase in PAI learning, students' logical mathematical thinking skills will increase by 0.816.

The practical implications of this finding suggest that religious education, especially PAI, should be viewed as a means to support the development of students' critical and logical thinking skills. Therefore, when designing curricula and learning strategies, it is essential to integrate logical principles into the PAI subject matter. One way to implement this is by using a problem-based learning approach, which requires students to connect religious concepts with practical applications in daily life, including mathematics. This approach will not only enhance students' logical thinking abilities but also strengthen their character in alignment with religious values.

Educational policy should also focus on developing teacher training that emphasizes teaching techniques capable of integrating cognitive and spiritual aspects in a balanced way. This will help teachers support both the intellectual and moral development of students simultaneously. Furthermore, this research contributes to educational policy-making, particularly in formulating a more holistic curriculum. By integrating religious education with the development of logical thinking skills, it is expected that students will grow holistically, encompassing moral, spiritual, and intellectual aspects. However, this study has limitations in identifying other factors that may affect students' mathematical logical thinking abilities, such as the role of family, learning styles, or other teaching approaches. Future researchers may explore these variables to gain a more comprehensive understanding of the factors contributing to the development of students' mathematical logical thinking skills.

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