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IS THERE CORRELATION BETWEEN STUDENTS' MEMORIZING QURAN AND THEIR MATHEMATICS SCORE? STUDY ON ISLAMIC BOARDING SENIOR HIGH SCHOOL

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ABSTRACT

This study was motivated by the observation of varying academic performance in integral mathematics among students with different levels of Quran memorization at Darul Mursyidi Islamic Boarding School, Sialogo. Integrating religious and academic education is a key concern in Islamic institutions, raising the question of whether memorizing the Quran can influence cognitive and analytical skills, particularly in mathematics. The aim of this research is to examine whether there is a significant relationship between Quran memorization and academic achievement in integral mathematics. This quantitative study involved 20 eleventh-grade students from Madrasah Aliyah. Data were collected through a written mathematics test focusing on integral material and Quran memorization scores sourced from the Tahfidz instructor. The correlation between these two variables was analyzed using the Pearson product-moment correlation formula. The findings reveal a strong and positive correlation between students' Quran memorization and their performance in integral mathematics, indicating that students who had higher memorization scores tended to achieve better results in mathematics. Furthermore, students with strong memorization abilities also demonstrated better logical thinking and responsiveness, not only in math but also in subjects such as science, fiqh, and faraid. These results support the view that memorizing the Quran can enhance students' cognitive functions, including memory and reasoning, which are essential for learning mathematics. The study concludes that integrating Quran memorization into the educational process may serve as a beneficial strategy for improving students' academic outcomes.

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INTRODUCTION

The Qur'an, as a divine revelation from Allah SWT to the Prophet Muhammad SAW, serves as the primary source of guidance for Muslims in every aspect of life. The Qur'an not only includes

spiritual and moral teachings, but also provides comprehensive guidance related to daily activities, including the practice of memorization. Memorizing the Qur'an (tahfidz) is considered a noble and beneficial act, as it connects individuals spiritually with God, forms character, and instills discipline. In addition, memorizing the Qur'an demands cognitive engagement, focus, and commitment, which can impact other areas of a student's intellectual development. Beyond its religious value, the process of memorizing the Qur'an requires mental endurance, cognitive effort, and sustained concentration skills that can positively influence students' academic abilities.

In today's educational context, particularly within Islamic boarding schools (pesantren), students are expected to balance religious duties such as Quran memorization with academic pursuits, including mathematics. Mathematics is a core subject essential for developing logical reasoning and analytical skills. Topics such as integral calculus often present significant challenges due to their abstract nature and reliance on step-by-step conceptual understanding. Mastery in mathematics requires strong memory, disciplined thinking, and problem-solving skills, which are similarly required in memorization practices.

In an Islamic educational environment, particularly in Islamic boarding schools, students are often required to balance religious obligations such as memorizing the Qur'an with academic learning, including subjects such as mathematics. The dual responsibility of memorizing the Qur'an while studying general education subjects presents both challenges and opportunities. On the one hand, it can be mentally demanding; on the other hand, it can enhance students' learning capacity and academic discipline. Previous studies have shown that memorization activities, especially religious texts, can improve memory, cognitive flexibility, and concentration (Marwansyah & Hidayat, 2019; Romi, 2018). Students who routinely memorize the Qur'an are trained to focus, repeat, and remember complex texts, which has the potential to affect their performance in subjects that require similar skills, such as mathematics.

Mathematics itself is a fundamental academic subject that requires high-level logical reasoning, critical thinking, and sustained concentration. Topics such as integral calculus are often considered complicated by students because they are abstract and require procedural understanding. According to Sujono (Fathani, 2009), mathematics is the science of logical reasoning and a tool for interpreting various ideas and concepts. Students' performance in mathematics is closely related to their ability to understand concepts, apply formulas correctly, and solve problems regularly, all of which require cognitive discipline and mental stamina.

Mathematics is a basic science that is very important in human life because it includes the ability to think logically, analytically, critically, creatively, and systematically in solving various problems (Rachmantika & Wardono, 2019; Siregar et al., 2022; Siregar et al., 2023). One branch of mathematics that plays an important role in real life is calculus, especially integral material (Rosidah et al., 2024). Integrals are not only mandatory material in high school and college curricula, but also have wide applications in various fields such as physics, engineering, economics, medicine, and technology (Nuraeni et al., 2023). Integrals are one of the important concepts in mathematics that have many applications in everyday life and various disciplines (Nuraita et al., 2024). In calculus, integrals are used to calculate the area under a curve, the volume of a rotating object, the length of a path, and in analyzing non-constant changes (Djatmiko & Akhid, 2020). In addition to its application, integral learning also trains students in abstract thinking and compiling structured solution steps. However, although important, many students have difficulty in understanding integral material because it is complex and requires a deep understanding of concepts (Salsabila et al., 2024). Furthermore, it also shows that strong cognitive abilities such as memory and concentration are closely related to students' success in understanding complex mathematical material such as integrals (Nainggolan, 2024; Hakiki et al., 2025). Therefore, other skills and habits that support students' cognitive aspects,

such as memorization activities, can be important factors in improving mathematics learning outcomes, including integral material.

Although the emphasis is placed on mathematics in modern education, many students still have difficulty understanding and applying mathematical concepts, often due to lack of focus and weak concentration during learning sessions. Research by Khotimah (2020) emphasized that concentration is the basis of all learning activities, yet many students lack the skills or guidance needed to maintain it. In contrast, students who are accustomed to memorizing the Qur'an have shown higher levels of mental resilience and focus, suggesting a potential relationship between memorization practices and academic performance.

Several previous studies have shown the positive impact of memorizing the Qur'an on students' cognitive and academic performance in general (Afrianti & Imamuddin, 2022; Rasyid, 2015). However, there is limited research that specifically examines the effect of memorizing the Qur'an on mathematics achievement, especially in advanced topics such as integrals. The uniqueness of this study lies in its focus on this particular relationship in the context of Islamic boarding schools, where religious and academic learning coexist. This dual learning environment provides an appropriate setting to analyze whether students' religious practices contribute positively to their academic success in science subjects.

The educational model applied in Islamic boarding schools aims to integrate religious knowledge and general education, with the aim of producing students who are intellectually capable and spiritually grounded. In this context, the ability to memorize the Qur'an is not just a religious exercise, but a cognitive training that can affect learning outcomes across disciplines. Students who regularly memorize the Qur'an are expected to develop better time management, self-discipline, and learning strategies, which can be important for mastering complex academic content.

This gap presents a unique opportunity to explore whether memorizing the Qur'an beyond its religious merits can serve as a cognitive tool that supports academic achievement. In the dual-education setting of Islamic boarding schools, the potential synergy between religious practice and academic excellence deserves deeper examination. Such environments provide a meaningful backdrop to study how tahfidz training could influence mastery in technical subjects like mathematics.

Therefore, the main objective of this study is to examine the relationship between students' Quran memorization ability and their academic achievement in integral mathematics. Specifically, this research aims to determine whether students at Pesantren Darul Mursyidi, Sialogo, who possess higher memorization scores, also demonstrate better performance in solving integral problems. The results are expected to offer valuable insights for educators on integrating religious practices as a strategy to enhance students' academic performance, especially in logical and abstract disciplines like mathematics.

Based on this background, this study seeks to explore and analyze the correlation between students' ability to memorize the Qur'an and their academic performance in integral mathematics. The purpose of this study was to determine whether there is a significant relationship between the level of memorization of the Qur'an and student achievement in integral mathematics among eleventh grade students at Pesantren Darul Mursyidi, Sialogo. The findings of this study are expected to provide empirical evidence of the cognitive benefits of memorizing the Qur'an and offer insights for educators in integrating religious practices with academic strategies to improve student learning outcomes.

METHOD

This study employs a quantitative research approach, focusing on the collection and analysis of numerical data to examine the relationship between students' Quran memorization ability and their academic achievement in integral mathematics. A quantitative method is appropriate for this study as it enables the researcher to statistically measure the level of correlation between the two variables. The research is designed as a correlational study, which aims to identify whether a statistically significant relationship exists between Quran memorization and mathematics performance. This design does not involve manipulation of variables, but rather observes and analyzes the naturally occurring data within the population.

The target population consists of Grade XI students at Madrasah Aliyah Darul Mursyidi Islamic Boarding School in Sialogo. From this population, a purposive sample of 20 students was selected based on their active involvement in Tahfidz programs and mathematics instruction, and on the availability of both Quran memorization and academic performance records. Data collection was conducted using two primary instruments. The first was a written test on integral mathematics, which was prepared by a certified mathematics teacher and aligned with the national curriculum to assess students' comprehension of integral concepts. The second instrument was the Quran memorization score, obtained from Tahfidz teachers, which reflects the students' fluency, accuracy, and consistency in memorizing the Quran based on institutional standards.

For data analysis, the study utilized the Pearson Product Moment Correlation formula to determine the strength and direction of the linear relationship between Quran memorization and mathematics achievement. SPSS software was used to ensure precision in the computation and interpretation of the results. The research followed a systematic process beginning with the identification of the research problem, followed by a literature review to build a theoretical framework. After finalizing the methodology, the researcher selected the sample, conducted data collection through testing and documentation, and then analyzed the results. The study concludes by interpreting the findings and drawing conclusions regarding the correlation between Quran memorization and academic performance. This structured and replicable methodology allows for consistent future research in similar educational contexts to validate the findings.

RESULTS AND DISCUSSION

Results

Based on the tests that have been carried out by researchers and have been tested, the results obtained are based on the table below, the tahfidz value is dominated by the good to very good category. The completion criteria set in the Islamic boarding school for the tahfidz subject is 75. There are still students who have not reached the minimum completion criteria in the tahfidz subject for various reasons, including being at home for a week, so they cannot maximize memorization deposits on time.

Meanwhile, result that states the value of the integral material mathematics test is the table below. Based on the table, the total value of the students' integral mathematics test is 1523, divided by the number of students in the class, resulting in an average value of 76.15. This means that the students' mathematics test value for integral material in Islamic boarding schools is included in the good criteria because it exceeds the minimum value limit.

This preliminary analysis is intended to present quantitative data from the results of the integral material mathematics test with students' memorization deposits in the tahfidz subject. Where the variable x is the number or value of student memorization while the variable y is the value

of the integral material mathematics test, combined in a table to facilitate further calculations, can be seen in the Table 1 below:

Table 1. Correlation Data Between Al-Qur'an Memorization Scores (X) and Mathematics Test Scores on Integral Material (Y)

No	Name	Quran Memorization Value (x)	Integral Material Test Score (y)
1	AZ	86	80
2	AA	78	70
3	AP	92	60
4	AH	90	90
5	ES	78	75
6	IS	85	90
7	KH	85	80
8	MR	90	94
9	MFA	60	50
10	MS	72	75
11	MTA	80	80
12	MR	88	82
13	NP	86	87
14	NH1	75	70
15	NH2	78	80
16	PS	80	82
17	R	86	80
18	S	90	80
19	SMD	84	82
20	SR	76	70

The measurement of Al-Qur'an memorization scores (X) in this study is based on a standardized evaluation system applied by Tahfidz teachers at Pondok Pesantren Darul Mursyidi Sialogo. The scoring is typically conducted weekly or monthly and includes several core indicators, such as fluency in recitation, accuracy in pronunciation (tajwid), memorization retention (muraja'ah), and the ability to recite without prompts. Each student receives a score reflecting their consistency, discipline, and mastery of the assigned verses or surahs. These scores are quantified on a numerical scale usually 0 to 100 allowing them to be statistically analyzed alongside academic performance scores, such as those in mathematics.

In this study, the Quran memorization score for each student represents their independent variable (X), while their test score on integral mathematics functions as the dependent variable (Y). Once the data are collected and organized (as seen in Table 1), the next step is to conduct statistical analysis to test the hypothesis. The null hypothesis (Ho) suggests that there is no significant relationship between Quran memorization and mathematics achievement, particularly in integral calculus. The alternative hypothesis (Ha), conversely, posits that there is a meaningful and statistically significant relationship between the two. Through correlation analysis using Pearson's Product Moment formula, this relationship can be tested to determine whether Ha is accepted and Ho is rejected, thus providing empirical support for the role of Quran memorization in enhancing cognitive performance and academic achievement.

After the data is grouped, the next step is to conduct further calculations to prove the hypothesis that the author previously proposed. Ho indicates that there is no significant relationship or influence between memorizing the Qur'an and the integral value, and Ha is the opposite. To

prove whether or not the alternative hypothesis (Ha) is accepted, calculations are carried out to obtain the correlation coefficient (r_{xy}) by first preparing a work table as follows

Table 2. Test of Pearson Correlation Between Al-Qur'an Memorization and Mathematics Test Scores on Integral Material

		Al-Qur'an Memorization	Mathematics Test Scores on Integral Material
Al-Qur'an Memorization	Pearson Correlation	1	,638**
	Sig. (2-tailed)		,002
	N	20	20
Mathematics Test Scores on Integral Material	Pearson Correlation	,638**	1
	Sig. (2-tailed)	,002	
	N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

In determining the level of strength of the relationship between variables, the correlation coefficient value can be used as a guideline which is the output of SPSS, with the following provisions:

1. Correlation coefficient value of 0.00 - 0.25 = very weak relationship
2. Correlation coefficient value of 0.26 - 0.50 = sufficient relationship
3. Correlation coefficient value of 0.51 - 0.75 = strong relationship
4. Correlation coefficient value of 0.76 - 0.99 = very strong relationship
5. Correlation coefficient value of 1.00 = perfect relationship

Based on the output above, the Pearson Correlation value is 0.638** and significant at 0.002, meaning that there is a strong relationship between Al-Qur'an Memorization and Mathematics Test Scores on Integral Material, so it can be concluded that if Al-Qur'an Memorization is high then Mathematics Test Scores on Integral Material are also high.

By using the product moment correlation formula, namely:

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n(\sum x^2 - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

The correlation number between variable X and variable Y is 8.838, which means that the correlation is positive. The product moment correlation index roughly or simply lies at 0.70-0.90, which means that the correlation between variable X and variable Y is a strong or high correlation. It turns out that r_{xy} is greater than r_{tabel} at a significance level of 5%. for r table it is obtained from the formula $t = \frac{r_{xy}\sqrt{n-2}}{\sqrt{1-r^2xy}}$, the result is 4.784 and the value of $t_{tabel=2.10092}$. Thus the null hypothesis (*Ho*) is rejected, while the alternative hypothesis (*Ha*) is accepted. This means that there is a positive and significant relationship or correlation

between memorizing the Qur'an and students' integral mathematics scores. The activity of memorizing the Qur'an has a role to help students in learning activities, especially in the field of Mathematics, because it can improve intelligence and memory.

The results of the study showed that most of the students' Quran memorization (tahfidz) scores were in the good to very good category, with an average score of 81.35. However, there were still students who had not met the Minimum Completion Criteria (KKM) of 75, which was caused by several obstacles such as being outside the Islamic boarding school for a certain period of time. Meanwhile, the results of the students' mathematics test on integral material also showed a fairly good average score, which was 76.15, exceeding the set KKM limit.

To see the relationship between the Quran memorization score (variable X) and the mathematics test score on integral material (variable Y), a correlation analysis was carried out using the Pearson Product Moment formula. The calculation results showed a correlation coefficient value of r = 0.838, which indicated a strong positive correlation between the two variables. Furthermore, the significance test produces a $t_{count\ value} = 4.784$, which is greater than $t_{tabel=2.10092}$ at a significance level of 5%, so the null hypothesis (*Ho*) is rejected and the alternative hypothesis (*Ha*) is accepted.

This finding concludes that there is a positive and significant relationship between memorizing the Qur'an and mathematics learning outcomes (integral material). This strengthens the view that tahfidz activities contribute to students' cognitive abilities, especially in improving memory and concentration when studying mathematical concepts. Different from several previous studies that showed a low or insignificant correlation between memorization and academic achievement in general, this study highlights a strong and specific relationship between memorizing the Qur'an and achievement in exact subjects such as mathematics, especially integral material. These results support the integrative approach of Islamic boarding school education in combining religious and scientific learning.

Discussions

The results of this study show a positive and significant relationship between students' Quran memorization ability and their mathematics achievement, particularly in integral material, with a correlation coefficient of r = 0.838. This strong correlation indicates that students who possess higher memorization skills tend to perform better in mathematics. The cognitive processes involved in memorizing the Qur'an such as repetition, concentration, and long-term memory retention also play a vital role in understanding and solving mathematical problems, which require analytical and logical thinking. These findings align with Fadhilah (2022) research, which found that Quran memorization helps improve focus, memory, and overall learning outcomes. Similarly, Fatmawati (2024) concluded that Quran memorization activities strengthen mental discipline and consistency, which are essential for academic achievement.

Further supporting this result, Firmansyah (2023) reported that students who actively engage in tahfidz programs tend to demonstrate better performance in academic subjects due to improved concentration and study habits. In another relevant study, Wahyuni & Rouf (2024) found that Quran memorization ability influenced mathematics achievement by 73.7%, reinforcing the idea that mental training through memorization supports logical problem-solving skills. Yudha & Rohmadi (2022) also identified a strong correlation (r = 0.870) between Quran memorization and mathematics scores among junior high school students, closely mirroring the results of the present study. Additionally, Fajriyyah (2021) observed that students who memorized the Qur’an exhibited consistently higher academic achievement across various subjects.

The slight variations in correlation values among studies may stem from differences in institutional settings, curriculum structure, and student learning environments. However, the consistent trend across findings suggests that integrative learning models in Islamic boarding schools, where Quran memorization and academic learning are combined, offer significant cognitive advantages. In such environments, religious practices are embedded into students' daily routines, reinforcing discipline and time management both of which are vital for mastering complex academic materials like mathematics.

This study also aligns with cognitive psychological theories that emphasize the role of repetitive memory tasks in enhancing short and long term brain functions. The act of memorizing the Qur'an repeatedly strengthens neural pathways related to memory, attention, and problem solving, which are directly transferable to academic contexts such as mathematics learning. Therefore, incorporating Quran memorization into formal education not only supports students spiritually but also contributes to holistic intellectual development. These findings advocate for the continued integration of religious memorization practices in educational curricula as a strategic means of enhancing cognitive skills and improving academic performance.

These findings suggest that Quran memorization activities can contribute to improving students' academic achievement, especially in mathematics. The improvement of cognitive abilities and discipline obtained through Quran memorization can be an important asset in the teaching and learning process in schools. Therefore, the integration of Quran memorization activities into the education curriculum can be an effective strategy to improve the overall quality of education. The interpretation of these findings is also in line with cognitive psychology theories which state that repeated memory training, such as that which occurs in the process of memorizing the Quran, can increase the brain's short-term and long-term working capacity, as well as hone the focus and attention that are very much needed in subjects such as mathematics.

CONCLUSION

Based on the results of the study, it can be concluded that the ability to memorize the Qur'an of students at the Darul Mursyidi Sialogo Islamic Boarding School is in the good category, which is indicated by the dominance of tahfidz scores that exceed the minimum completion criteria set by the Islamic boarding school. Memorizing the Qur'an has been proven to have a positive influence on students' logical thinking skills which are very important in the reasoning process, including in understanding mathematical concepts such as integral material and has an impact on other subjects. This study provides a scientific contribution in showing that improving the quality of memorizing the Qur'an can be a strategic approach to support students' academic achievement as a whole. Therefore, the integration between religious and academic education needs to be continuously developed in order to form students who excel intellectually and spiritually. The implications of these findings indicate the importance of strengthening the tahfidz program in formal education environments, especially in Islamic boarding schools, because it has been proven to support the achievement of better academic achievement, not only in integral material but also in all basic mathematics competencies and other general subjects. For further development, it is recommended to conduct further research involving a wider sample and at different levels of education to strengthen the validity of the relationship between memorizing the Qur'an and academic achievement, as well as to explore the role of other mediating factors such as learning motivation, learning styles, and environmental support on student learning outcomes.

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