Effects of Memorizing Al-Qur'an On Mathematical Reasoning

Rosdiana IM¹, Ikrimah²

¹Insitut Agama Islam Negeri Ternate, Ternate, Indonesia

Email: rosdianaim@iain-ternate.ac.id

²Insitut Agama Islam Negeri Ternate, Ternate, Indonesia

Email: ikrimahrustam@iain-ternate.ac.id

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Abstract

This study was conducted to investigate the effects of memorizing Al-Qur'an on the ability of mathematical reasoning. The population of this study was all students of grade IX of Al Fityan Gowa Integrated Islamic JunioR High School, Indonesia, totaling 93 people. The sampling technique used is saturated sampling. Data on mathematical reasoning ability was obtained from the results of tests on mathematical reasoning and the ability to memorize Al-Qur'an was taken from the final score of Tahfidz (memorization) Al-Qur'an subjects. Data were analyzed by simple linear regression. The result revealed that there was a significant relationship between memorizing Al-Qur'an and ability of mathematical reasoning. The regression linear model was able to be built. The coefficient of regression is 1.231. The score indicated that every increase of one unit of memorizing Al-Qur'an will increase the ability of mathematical reasoning by 1,232 point. The coefficient of determination is 0.449 that indicated the ability of mathematical reasoning was influenced by the memorization Al-Qur'an by 20.2%.

Keywords: Memorizing Al-Qur'an; Mathematics, Reasoning ability

INTRODUCTION

Reasoning ability is one element that students must possess in learning mathematics (NCTM, 2000), one of the basics of competence and proficiency in mathematics (Battista, 2017). According to Lamon reasoning is the basis for mathematics and science (cited in Dole, Clarke, Wright, & Hilton, 2012). Ball and Bass state reasoning as a mathematical ability needed by every student to understand mathematics (cited in Johansson, 2015). Mathematical reasoning plays an important role, both in problem-solving and in conveying ideas while learning (Ayal, Kusuma, Sabandar, & Dahlan, 2016). Mathematics and reasoning are two inseparable things, mathematics is understood through reasoning, and reasoning is understood and practiced through learning mathematics (Depdiknas, 2002). So, reasoning ability becomes very important in efforts to improve mathematical ability.

However, current investigation indicates that the ability of student reasoning in Indonesia has not been developed optimally and is still relatively low. Head of the Center for Educational Assessment of Balitbang from the Ministry of Education and Culture (Kemdikbud) Nizam said that Indonesian children excel in memorization but are weak in reasoning (Putra, 2019). The evaluation results from the 2011 Trend in International Mathematics and Science Studies (TIMSS) on questions that measure reasoning, Indonesia only answered 10.1 percent correctly while Singapore was able to answer 44.6 percent correctly (Rosnawati, 2013).

The reasoning is a thought process that seeks to link known facts or evidence with conclusions (Keraf, 1982), thought processes or activities to draw conclusions or make new statements based on several statements that are known to be true or considered true (Sadiq, 2007). The activity of thinking in the process of reasoning occurs in the brain, one of which involves the ability of memory. Memory is a mental system that functions to store and process information for a series of complex cognitive tasks

such as understanding, computational thinking, reasoning, and learning (Baddeley, 2010). Memory has a role in reasoning (Baddley, 1974), the best single predictor of reasoning ability (Oberauer, K., Süß, H.-M., Wilhelm, O. & Sander, N., 2007) and there is a correlation between memory capacity and reasoning abilities (Kyllonen, PC & Christal, RE, 1990).

There is evidence to suggest that the activity of memorizing Al-Qur'an can improve the ability of brain memory (Nawaz & Jahangir, 2015) and improve cognitive intelligence in children (Slamet, 2019). Listening to Al-Qur'an for 15 minutes per day without using skills or other training can improve students' memories (Hojjati, Rahimi, Farehani, Gharamaleki & Alian, 2013). Students who can memorize Al-Qur'an improve the ability to think, think critically, creatively, and accurately solve mathematical problems (Jazuli, 2013). Recent studies show that the total gray, white and total brain volume in those who memorize Al-Qur'an is greater than those who only memorize some or those who do not memorize Al-Qur'an because the more brains used, the more high chance to preserve brain tissue (Rahman, Aribisala, Ullah & Omer, 2020).

Several studies have studied the effect of memorizing the Al-Qur'an on mathematics learning outcomes (Khotimah, 2020), differences in mathematical achievement of students who take and do not take the Qur'an memorization program (Romi, Arief & Siregar, 2018) and the relationship between the ability to memorize Al-Qur'an with mathematics learning achievement concluded that there was a positive and significant relationship between the two. Students who memorize high (long verses of the) Al-Qur'an have high learning achievements because memorizing Al-Qur'an and learning mathematics both require high concentration (Cahayono & Agus, 2007). However, most researchers have limited their study on the effects of memorizing the Qur'an on general mathematical abilities. Therefore, this study will investigate the effects of memorizing Al-Qur'an on a specific mathematical ability, namely reasoning ability.

RESEARCH METHODS

This research is a correlational study conducted to determine the level of relationship between two or more variables without making additional changes or manipulation of existing data. This study is directed to determine the effect of one independent variable on a dependent variable, which is memorization of Al-Qur'an on the ability of mathematical reasoning. The population of this study was all students of grade IX of Al Fityan Integrated Islamic Junior High School, Gowa, Indonesia, totaling 93 people in the 2018/2019 school year. Because the total population is less than 100, the sampling technique used is saturated sampling, where the entire population is sampled. So, the number of samples consisted of 93 people.

Research instruments in the form of reasoning ability tests are used to measure mathematical reasoning abilities. Before being used, the reasoning test instrument was first validated by two experts in the field of mathematics education. The Al-Qur'an memorization data is obtained from semester scores of Tahfidz subjects while data on mathematical reasoning abilities is obtained from the results of the reasoning test. This study uses the association test to find out whether between the two variables there is a significant relationship/influence, measuring the strength of its influence, and making predictions based on the strength of the relationship. The association test used is a simple regression between one independent variable to one dependent variable to test the truth of a predetermined hypothesis. Before testing the linear regression model, the prerequisite test analysis is performed so that the assumptions underlying the linear regression model can be met so that the estimators used are not biased. The prerequisite tests include the normality test and the linearity test. Simple regression analysis is used to test the hypotheses raised in the study, namely:

H_0 : There is no effect of memorizing Al-Qur'an to the ability of mathematical reasoning

H_1 : There is effect of memorizing Al-Qur'an to the ability of mathematical reasoning

To test this hypothesis, the data obtained were analyzed using the F test formula and t -test using the IBM SPSS 20.0 program for Windows.

RESULT AND DISCUSSION

Data Description

Before conducting a regression analysis, the normality and linearity tests are first performed. To test the normality of data distribution the Kolmogorov-Smirnov test was used. From the results of the normality test, it was concluded that both the Al-Qur'an memorization data and both mathematical reasoning data are normally distributed with a significance probability value greater than $\alpha = 0.05$, ie 0.087 for the Al-Qur'an memorization variable and 0.084 for the mathematical reasoning variable. Data normality test results can be seen in Table 1 below.

Table 1. Tests of Normality

	Statistic	Kolmogorov-Smirnov ^a	
		D	Sig.
Memorizing Al-Qur'an	.086	93	.087
Mathematical Reasoning	.086	93	.084

a. Lilliefors Significance Correction

In the linearity test, the calculated F value is 0.459 with a significance probability value (sig.) of 0.923. So, for $\alpha = 0.05$, it is known that the significance probability value is greater than α . Thus, it can be said that the equation of the Al-Qur'an memorization variable regression over mathematical reasoning ability is linear. The linearity test results are presented in Table 2 below.

Table 2. Output SPSS Anova Uji Linearitas

			F	Sig.
Mathematical Reasoning * Memorizing Al-Qur'an	Between Groups	(Combined)	2.214	.018
		Linearity	21.520	.000
		Deviation from Linearity	.459	.923

The results of the regression test analysis showed an R-value of 0.449 which is a correlation coefficient between memorizing the Al-Qur'an and the ability of mathematical reasoning. From these figures, it can be explained that the closeness of the relationship between memorizing the Al-Qur'an and mathematical reasoning is 0.449. For the value of R Square obtained by 0.202 which is the coefficient of determination between the memorization of the Al-Qur'an over mathematical reasoning. Based on these figures it can be concluded that 20.2% of the variation in mathematical reasoning can be explained by the Al-Qur'an memorization variable. The results of the summary regression model can be seen in Table 3 below.

Table 3. Output SPSS Model Summary Regresi

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.449 ^a	.202	.193	7.58418

From table 4, value of F for the regression model is 23.027 with degrees of freedom $df1 = 1$ and $df2 = 91$. While for the probability of significance (Sig.) was obtained by 0,000. So that for $\alpha = 0.05$, it is known that the significance probability value (Sig.) greater than α , which is $0,000 < 0.05$. This means that the regression model was obtained can be used to predict mathematical reasoning with the Al-Qur'an memorization variable as an independent variable.

Tabel 4. Output SPSS Model Anova (F-Test)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1324.497	1	1324.497	23.027	.000 ^b
	Residual	5234.299	91	57.520		
	Total	6558.796	92			

The results in table 4 show that Al-Qur'an memorization variable over the mathematical reasoning variable is significant. The regression model in question is explained in table 5.

Tabel 5. Output SPSS Coefficientt

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-29.130	22.666		-1.285	.202
	Hafalan Al-Qur'an	1.231	.256	.449	4.799	.000

The Al-Qur'an memorization regression equation for mathematical reasoning is $Y = -29,130 + 1,231X$. The regression coefficient of 1.231 states that each increase of one unit of the ability to memorize the Al-Qur'an will increase the ability of mathematical reasoning by 1,231. From the same table, it is obtained that the calculated t value for the Al-Qur'an memorization variable is 4,799 with a significance probability (Sig.) is 0,000, then using $\alpha = 0.05$ shows that the probability value of significance (Sig.) greater than α , which is $0,000 < 0,05$ which resulted in H_0 rejected. Thus, it can be concluded that there is a significant effect of memorizing the Al-Qur'an on the ability of mathematical reasoning.

Discussion

The result of this study, namely that the ability to memorize the Al-Qur'an has a positive influence on the achievement and learning outcomes of mathematics, is inline with the findings of previous studies conducted by other researches such as Nugthy Faiziyah (2018), Romi, Yanwar, Arief and Juliarni Siregar (2018) and Sita Husnul Khotimah (2020). Although the focus of some of these studies is to measure mathematical abilities in general, they are still in the same scope because reasoning ability is one of the basics of competence and proficiency in mathematics (Battista, 2017). Besides, according to Ball and Bass to be able to understand mathematics reasoning is needed (cited in Johansson, 2015). Reasoning ability also plays a role in the problem-solving process and in conveying ideas when learning mathematics (Ayal, Kusuma, Sabandar, & Dahlan, 2016).

The activity of memorizing the Qur'an always involves four activities at the same time namely reading verses, re-reading the verses, storing the verses into memory and reciting the memorized verses from memory. The series of activities continue to be carried out continuously almost every. This will certainly make the memory of a memorizer of the Al-Qur'an more often used. Dr. Abdullah Subaih, professor of Psychology at the University of Imam Muhammad bin Su'ud al-Islamiyah, stressed that "For people who are accustomed to memorizing the Qur'an, they will be trained with high concentration. According to him, brain cells are like the case with other limbs, which must continue to function. People who are used to memorizing, then the brain cells and body are active and become stronger than people who ignore it (cited in Romi, Arief & Siregar, 2018). Furthermore, one of the benefits obtained by memorizing the Al-Qur'an is a gift from God in the form of sharp memories and brilliant thoughts (Sa'dulloh, 2008).

The ability of a memorizer of the Al-Qur'an to process information faster directly affects his reasoning ability. This is supported by a study conducted by Klaus Oberauer, Heinz-Martin Süß, Oliver Wilhelm, and Nicolas Sander (2007) which indicates that memory is the single best predictor of reasoning ability. Moreover, according to Mukaila Alade Rahman, Benjamin Segun Aribisala, Irfan Ullah, and Hammad Ome (2020), the total gray, white, and total brain volume of Al-Qur'an memorizer are greater than that

of non-memorizer. The capacity of some parts of the larger Al-Qur'an recitation brain has an impact on its reasoning ability in line with the results of the research of Patrick C. Kyllonen and Raymond E. Crystal (1990) which states that there is a correlation between memory capacity and reasoning ability.

CONCLUSION AND SUGGESTION

The results of data analysis and discussion show that memorizing the Al-Qur'an has a positive and significant effect on the ability of mathematical reasoning. Al-Qur'an memorization variable gives an effect of 20.2% on the variable of mathematical reasoning. The recitation of the Qur'an which is carried out repeatedly enhances memory performance which greatly supports the thought process in compiling interrelated facts and relevant sources to draw a new conclusion

The results of this study can be used as evidence that memorization of the Al-Qur'an contributes to the process of learning mathematics so that students are expected to further improve their enthusiasm and improve the quality of memorization of the Al-Qur'an as a way to hone the ability of mathematical reasoning as an important foundation in mastering mathematics.

REFERENCES

- Ayal, C. S., Kusuma, Y. S., Sabandar, J., & Dahlan, J. A. (2016). The Enhancement of Mathematical Reasoning Ability of Junior High School Students by Applying Mind Mapping Strategy. *Journal of Education and Practice*, 7(25), 50-58.
- Baddeley, A. D., & Hitch, G. (1974). Working memory. In *Psychology of learning and motivation* (Vol. 8, pp. 47-89). Academic press.
- Baddeley, A. (2010). Working memory. *Current biology*, 20(4), R136-R140.
- Battista, M. T. (2017). Mathematical reasoning and sense making. *Reasoning and sense making in the mathematics classroom: Grades*, 3-5.
- Cahayono & Agus N, (2007). *Penjelasan-penjelasan Ilmiah tentang Dahsyatnya Manfaat Ibadah-Ibadah Harian untuk Kesehatan Jiwa dan Fisik Kita*. Yogyakarta: DIVA Press
- Depdiknas. (2002). *Kurikulum Berbasis Kompetensi Mata Pelajaran Matematika*. Jakarta: Depdiknas
- Dole, S., Clarke, D., Wright, T., & Hilton, G. (2012). Students' proportional reasoning in mathematics and science.
- Faiziyah, N. (2018). Memorizing Qur'an and Mathematics Achievement. *MEJ (Mathematics Education Journal)*, 2(1), 7-11.
- Hojjati, A., Rahimi, A., Farehani, M. D. A., Sobhi-Gharamaleki, N., & Alian, B. (2014). Effectiveness of Al-Qur'an Tune on memory in children. *Procedia-Social and Behavioral Sciences*, 114, 283-286.
- Johansson, H. (2015). *Mathematical Reasoning-In physics and real-life context*.
- Keraf, Gorys. 1982. *Eksposisi dan deskripsi*. Ende-Flores: Nusa Indah
- Khotimah, S. H. (2020). Pengaruh Kemampuan Menghafal Al-Qur'an dan Sikap Siswa Terhadap Hasil Belajar Matematika. *Hikmah Journal of Islamic Studies*, 15(2), 103-115.
- Kyllonen, P. C., & Christal, R. E. (1990). Reasoning ability is (little more than) working-memory capacity?!. *Intelligence*, 14(4), 389-433.
- Nawaz, N., & Jahangir, S. F. (2015). Effects of memorizing Al-Qur'an by heart (Hifz) on later academic achievement. *Journal of Islamic Studies and Culture*, 3(1), 58-64.
- NCTM. (2000). *Principle and Standars for School Mathematics*. Reston: NCTM.
- Oberauer, K., Süß, H. M., Wilhelm, O., & Sander, N. (2007). Individual differences in working memory capacity and reasoning ability.
- Putra, M. (2016, December 06). Anak Indonesia Disebut Masih Lemah dalam Penalaran. *Republika*. Diakses dari <https://republika.co.id/berita/pendidikan/eduaction/ohrgeg284/anak-indonesia-disebut-masih-lemah-dalam-penalaran>

- Rahman, M. A., Aribisala, B. S., Ullah, I., & Omer, H. (2020). Association between scripture memorization and brain atrophy using magnetic resonance imaging. *Acta Neurobiol Exp*, 80, 90-97.
- Romi, R., Arief, Y., & Siregar, J. (2018). Perbedaan Prestasi Belajar Matematika Antara Siswa Yang Mengikuti Dan Tidak Mengikuti Program Menghafal Al-Al-Qur'an. *AN-NAFS*, 12(1), 1-11.
- Rosnawati, R. (2013). Kemampuan penalaran matematika siswa SMP Indonesia pada TIMSS 2011. In *Prosiding Seminar Nasional Penelitian, Pendidikan dan Penerapan MIPA, Fakultas MIPA, Universitas Negeri Yogyakarta* (Vol. 18).
- Sa'dulloh. (2008). *9 Cara Praktis Hafal Al-Qur'an*. Jakarta: Gema Insani
- Shadiq, F. (2007). Apa dan mengapa matematika begitu penting. *Departemen Pendidikan Nasional Direktorat Jenderal Peningkatan Mutu Pendidik Dan Tenaga Kependidikan Pusat Pengembangan Dan Pemberdayaan Pendidik Dan Tenaga Kependidikan (PPPPTK) Matematika*, 1-10.
- Slamet, S. (2019). The Effect of Memorizing Al-Qur'an On the Children Cognitive Intelligence. *Humanities & Social Sciences Reviews*, 7(3), 571-575.