The Correlation between Memorizing the Qur'an Ability and Students' Logical-Mathematical Intelligence

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Abstract

A hypothesis telling that students' mathematics logical ability differences are caused by memorizing the Qur'an, is the focus of this research. The researcher in this research analyzes whether there is correlation between logical-mathematical ability and memorization the Qur'an and the overview. Quantitative and qualitative analysis is used to reveal the correlation between logical-mathematics intelligence and the Qur'an memorization. Logical-Mathematical Intelligence test, Qur'an memorization test, interview, and observation are used as instruments in the research. Twenty-eight students in the mathematics study program are as the subject of research where all students have already joined logical-mathematical subject. Based on the results obtained, overall, logical-mathematical intelligence and Qur'an memorization have a positive linear correlation. The more the students memorize the Qur'an the more the students have logical-mathematical intelligence. It is illustrated in the results, there are 6 different types of numerical indicators when viewed from the level of quantity and quality of memorizing the Qur'an. The same number is also reflected in abstract indicators and spatial relations. Each of them shows 6 different types of logical-mathematical intelligence when viewed from the level of quantity and quality of the Qur'an memorization. The research result also shows the benefits of memorizing the Qur'an which provides positive changes on students learning patterns. The development of the Qur'an memorization method is expected to be able to improve students' Qur'an memorization having an impact on students, intelligence especially logical-mathematical intelligence.

Keywords: Abstract; Logical-Mathematical Intelligence; Memorizing The Qur'an; Numerical; Spatial Relations.

Abstract

Adanya dugaan bahwa perbedaan kemampuan logika matematika dimiliki mahasiswa disebabkan oleh hafalan Al-Qur'an, menjadi dasar dari penelitian ini. Penelitian ini menganalisi apakah ada hubungan antara logika matematika dan hafalan Al-Qur'an, serta gambaran dari hubungan tersebut. Analisis kuantitatif dan kualitatif digunakan untuk mengungkap hubungan antara logika matematika dan

hafalan Al-Qur'an. Tes logika matematika, tes hafalan Al-Qur'an, wawancara, serta observasi digunakan sebagai instrument dalam penelitian. Dua puluh delapan mahasiswa tadris matematika menjadi subjek penelitian di mana seluruh mahasiswa telah mempelajari matakuliah logika matematika. Berdasarkan hasil yang didapat, secara keseluruhan, kecerdasan logika matematika dan hafalan Al-Qur'an memiliki hubungan linier positif. Semakin baik kuantitas dan kualitas hafalan Al-Qur'an yang dimiliki, maka akan semakin baik pula kemampuan logika matematika yang dimiliki mahasiswa. Tergambar pada hasil bahwa, terdapat 6 tipe perbedaan pada indikator numerikal jika dilihat dari tingkat kuantitias dan kualitas hafalan Al-Qur'an. Jumlah yang sama juga tergambar pada indikator abstrak dan relasi ruang. Masing-masing menunjukkan 6 tipe perbedaan kecerdasan logika matematika jika dilihat dari tingkat kuantitas dan kualitas hafalan Al-Qur'an. Hasil penelitian menunjukkan pula kebermanfaatan penghafalan Al-Qur'an yang memberikan perubahan positif dalam pola belajar mahasiswa. Pengembangan metode menghafal al-qur'an diharapkan mampu mengembangkan hafalan al-qur'an mahasiswa yang berdampak pula pada kecerdasannya

Keywords: Abstrak; Hafalan Al-Qur'an; Logika Matematika; Numerikal; Relasi Ruang

Introduction

Individual intelligence is divided into 8 categories namely logical-mathematical intelligence, linguistic intelligence, spatial intelligence, musical intelligence, bodily-kinesthetic intelligence, intrapersonal intelligence, interpersonal intelligence, naturalistic intelligence (Gardner, 2011). One of the intelligence that is important for all individuals, helping them in understanding and solving problems in life is logical-mathematical intelligence (Shadiq, Setiawan, Sasongko, & Windro, 2008). Logical-mathematical intelligence greatly affects a person's ability to make decisions correctly and solve a problem (Mukarromah, 2019). Logical-mathematical intelligence is closely related to the ability to think systematically, to use numbers, to calculate, to find causality, and to make classifications (Hartini, 2012). Logical-mathematical intelligence is the ability to analyze situations or problems logically, and to obtain or identify solutions for conducting scientific research and to solve logical-mathematical operations easily (Gardner, 2011). Without logical-mathematical intelligence, it will be very difficult for individuals to be able to solve the problems at hand. Logical-mathematical intelligence helps individuals to think rationally, critically, systematically, objectively, and carefully. Logical-mathematical intelligence will help individuals to avoid making mistakes when thinking/making decisions, this intelligence makes someone putting forward the truth in making decisions.

Individuals with good logical-mathematical intelligence have sensitivity to logical patterns and relationships, statements and propositions (if-then, cause-

effect), functions, and other related abstractions (Armstrong, 2009). Individuals with developed logical-mathematical intelligence master two core abilities in logical-mathematical skills, namely the ability to use and understand abstract relationships and the ability to use numbers and logical thinking. Another characteristic of logical-mathematical intelligence is the ability to categorize, classify, conclude, generalize, calculate, and test hypotheses(Gardner, 1999). These characteristics are useful for building models and theories in operating system settings. Based on the characteristics and abilities of logical-mathematical intelligence, it can be understood that logical-mathematical intelligence is not limited to mathematical abilities, but it includes scientific abilities in other fields.

Logical-mathematical was born from classical logic developed by Aristotle (384-322 BC). Logical-mathematical has the same basis and roots as existing classical logic, only that logical-mathematical has a neater presentation, allowing one to avoid double meanings (Muttakhidah, 2015). Logical-mathematical has clear and systematic rules, uses symbols, standard operations, and applies to predetermined conditions, so that the conclusions obtained will be valid, not ambiguous or have multiple meanings.

Logical-mathematical intelligence is important to be developed and mastered by every individual, either at low levels or high levels students. Students with good logical-mathematical intelligence will have good intuition too, so they can solve a problem wisely and be able to prove the truth of the solution he proposes. Students with good logical-mathematical intelligence are able to become a good foundation for the country. The importance of logical-mathematical intelligence presents in students means that logical-mathematical intelligence is important to be possessed by students equally or as a whole. However, based on the facts obtained by researchers regarding to students' logical-mathematical intelligence, it is illustrated that from the process of solving mathematical problems done by Mathematics Study Program students, 30% of students shows good logical-mathematical intelligence and 40% shows quite good logical-mathematical intelligence, the rest shows weak logical-mathematical intelligence. This shows that there are differences on IAIN Curup Mathematics Study Program students' logical-mathematical intelligence.

The differences in logical-mathematical intelligence possessed by students can be affected by many factors, such as motivation, study habits, thinking habits and so on. One of the factors affecting students' logical-mathematical intelligence is the Qur'an memorization. This occurs because the Qur'an affects personal intelligence when it is listened to and memorized. Dr. Nurhayati has revealed that when a baby in the womb listens to the chant of the Qur'an verses , the baby shows

a smiling response and is calmer (Kusrinah, 2013). A positive response shown by the baby because the Qur'an verses are recited correctly and have good pronunciation. The good pronunciation and correct recitation having frequencies and wavelengths positively affect human's brain (Kusrinah, 2013). The positive effects of the Qur'an improve the baby's growth and development in the womb. The effect of the Qur'an on humans' brain is also shown by Abdul DaemAl-Kahel in the book entitled Al-Qur'an the Healing Book. Abdul Daem Al-Kahel has stated that the chant of the Qur'an verses that is heard through the ears, which then enters into the cells in the body, makes the cells relax and fresh. It causes the cells to work very optimally (Al-Kahel, 2010). Optimizing the work of cells in the brain causes good brain performance, so that the brain is able to think maximally, to make decisions correctly, and be able to provide stimulus quickly (Al-Kahel, 2010).

The specialty of memorizing the Qur'an in improving intelligence is also proven on the junior high and senior high school levels students. This is in line with Khotimah's research result. It shows that memorizing the Qur'an affects the level of mathematics learning outcomes on Madrasah Ibtidaiyah students (Khotimah, 2020). This is indicated by the significant difference between the mathematics learning outcomes of students who memorize the Qur'an and the students who do not memorize the Qur'an. The research conducted by Nisa, Mukhlis, and Maswar (2020) also shows a significant correlation between logical-mathematical ability and high school students' communication skills. The result shows that students who have good logical ability will have good communication skills as well (Nisa, Mukhlis, & Maswar, 2020). The students who are able to solve problems, are able to find the reason the problems and will also be able to communicate them (Nisa, Mukhlis, & Maswar, 2020). This is in line with the research conducted by Irawan, Suharta, and Suparta (2016), which presents the higher logical-mathematical intelligence possessed by students. The students have higher ability to understand and solve a problem because the students' steps in solving problems are systematic and logic (Irawan, Suharta, & Suparta, 2016). The other research at high school level also shows that memorizing the Qur'an has a significant correlation to students' learning outcomes as a whole (Mahmudah, 2016). Similar result is shown Ihsan's. The research reveals that memorizing the Qur'an has significant correlation to overall students' learning outcomes. For high school level, memorizing the Qur'an affects the good and bad learning outcomes obtained. In addition, memorizing the Qur'an also affects the formation of a better personality (Ihsan, 2017). The specialty of the Qur'an is also reflected in the Qur'an surah Ar-Rad: 28 meaning:

"(Namely) those who believe and their hearts find peace in the remembrance of Allah. Remember, only by remembering Allah does the heart find peace (The Qur'an, 2019) ".

The Qur'an Surah Ar-Rad: 28 means that the benefits felt by memorizing the Qur'an is a feeling of comfort and peace in heart. The guarantee of peace provided by Allah, provides convenience and relief for every memorizer of the Qur'an in dealing with problems in life. The memorizers of the Qur'an will also get blessings from Allah SWT, where with Allah's blessings, memorizing the Qur'an will be easy to live (Mulyati, 2017). In addition, the memorizers of the Qur'an will be elevated by Allah SWT, both in this world and in the hereafter, in accordance with the Hadith delivered by At-Tirmidhi and At-Tabharani meaning:

"Ali ibn Hujr has narrated to us, has narrated to us Hafsh ibn Sulaiman, from Katsir ibn Zadzan, from 'Ashim ibn Dhamrah, from Ali ibn Abi Talib has said, Rasulullah SAW has said," Whoever reads the Qur'an and memorizes it, then he makes lawful what is lawful and forbids what he forbids, surely Allah will put him in a surge with (because of) the Qur'an, and Allah will accept his intercession to ten people from his family who have all been obliged to go to hell (Muhammad, 1993)".

The Prophet utterances delivered by At-Tabharani, meaning:

"From Annas RA said: The Messenger of Allah said: "Whoever teaches the Qur'an to his child by reading, then his past and future sins will be forgiven. And whoever teaches the Qur'an to his children by memorizing, Allah will raise him in rank when his child reads the Qur'an."

With a high degree, the memorizers of the Qur'an will find it easy to carry out any activities in the world, learning, developing themselves, and solving all forms of problems.

A research conducted by Saleh, Agustina, and Hakim (2018), shows that listening to the Qur'an good recitation reduces the side effects felt by heart disease patients (Saleh, Agustina, & Hakim, 2018). Anxiety, discomfort, fear, and rejection of the disease that were experienced by heart disease patients are significantly reduced during 3 days of after listening to Qur'an good recitation (Saleh, Agustina, & Hakim, 2018). The impact given by the Qur'an is even more powerful than listening to music therapy which is only able to reduce anxiety in patients (Saleh, Agustina, & Hakim, 2018). Based on the research conducted by Aini, Wulandari, and Astuti (2018) verses chant of the Qur'an is able to reduce blood pressure in hypertensive patients. The research shows that from a total of 26 patients, 15 patients with severe hypertension status, 4 moderate hypertension patients, and 7 mild hypertension patients, experience a decrease in status to mild and normal

hypertension after being given listening to the Qur'an therapy (Aini, Wulandari, & Astuti, 2018) . The 26 patients, which were originally divided into three levels of hypertension, namely severe, moderate and mild, underwent changes, namely 12 patients became low hypertension, and 14 patients became normal Aini, Wulandari, & Astuti, 2018). This shows how the Qur'an is able to have a very positive impact, just by listening to the verses chant.

The Qur'an and logical-mathematical ability have a common thread that complements each other. The Qur'an which has been compiled by scholars and companions, with directions from the Ottomans has several rules or patterns in. The rules and patterns in question are pattern rules in the distribution of letters in the Qur'an. As stated by Ansaruddin, there are four kinds of divisions in the Qur'an, namely: Al-Sab'ul al-thiwal, Al-miun, Al-Matsami, Al-Mufhashshal (Ansharuddin, 2016). Al-Sab'ul al-thiwal is seven long surah (Ansharuddin, 2016). Al-miun is the surah consisting of 100 verses or more (Ansharuddin, 2016). Al-Matsami is the surah having verses is less than 100 verses, and Al-Mufhashshal is short surah (Ansharuddin, 2016). Ansaruddin also has revealed that, if the Qur'an is examined further, between one surah to others there are some interrelated surah, related to arguments, related to stories, and the surah translate each other (Ansharuddin, 2016). Understanding the patterns existing in the Qur'an, is closely related to the logical-mathematical ability. The logical-mathematical ability is closely related to the ability to think systematically, to find cause and effect, and to classify (Ansharuddin, 2016). When someone is able to understand the relationship between the surahs in the Qur'an, it means that someone has honed the logical-mathematical ability, the ability to find cause and effect and classification, and to be sensitive to logical relationships. This is in accordance with Armstrong's opinion, saying that individuals with good logical-mathematical ability will be sensitive in seeing logical patterns and relationships (Mufarizuddin, 2017). When someone is able to understand the systematic compiling, to understand the pattern of relationships in the Qur'an, it shows that the individual has logical-mathematical ability. This is directly proportional to the opinion from Baum, Viens, and Slatin (2015) stating that individuals with developed logical-mathematical ability will be able to use and understand abstract relationships in an event (Baum et al., 2005)

The existence of memorizing the Qur'an privilege, the effect of memorizing the Qur'an on intelligence, and the correlation between patterns in the Qur'an and logical-mathematical intelligence raises a new question of whether the different levels of students' logical-mathematical intelligence is affected by the amount and quality of students' the Qur'an memorization or not. Bearing in mind that memorizing the Qur'an increases individual intelligence and one of the main goals

of Islamic universities under the Ministry of Religion is to create individual having Islamic values and male and female the Qur'an memorizers. This is the main basis for the researcher to examine whether memorizing the Qur'an has significant correlation on students' logical-mathematical intelligence or not. Besides there are many researches discuss the correlation of memorizing the Qur'an and students' achievement or intelligence. However, there is no research examining the correlation of memorizing the Qur'an and logical-mathematical ability which is one of the foundations of this research. This research examines the correlation of memorizing the Qur'an and students' logical-mathematical intelligence at mathematics education study program of IAIN Curup. The research proves whether the varying levels of students' logical-mathematical intelligence at mathematics education study program of IAIN Curup has correlation to students' the Qur'an memorization or not.

Method

The mixed-method approach is used in this research implementing concurrent embedded model. Concurrent embedded model is chosen because this model allows researchers to explore data qualitatively when quantitative approach is implemented or vice-versa. Quantitative and qualitative data collection is conducted in the first step of this research. After the two types of data are obtained, all data are analyzed and presented in research result. Based on the result, conclusions and suggestions are compiled and developed.

Logical-mathematical tests, the Qur'an memorization tests, interviews, and documentation are used as instruments. 28 students of mathematics study program of IAIN Curup are the subjects in this research. The 28 students have joined logical-mathematical subject, basic mathematics, and statistics. The consideration is the research subjects must have relatively mathematics same input. The indicators of logical-mathematical intelligence used are numerical ability, spatial logic ability, and abstract ability. The Qur'an memorization test is implemented orally to measure the quality of students' the Qur'an memorization consisting (Mabruri, 2017):

1. Fluency in memorizing the Qur'an;

2. Conformity of recitation with the recitation rules;

3. Ahkamal mad wa Qasr (The laws of recitation);

4. *Fashahah (the accuracy) namely: Al-wafu wa al-ibtida* " (to stop and start reciting the Qur'an verses), *Mura' atul huruf wa al-harakat* (maintaining the existence of letters and reciting symbols), *Mur 'aatul kalimah wa al-ayat* (understanding the existence of words and verses).

Logical-mathematical test used in this research consists of 100 questions in three different test categories about numerical test, spatial relations test, and abstract test. Logical-mathematical test used in this research is conducted by partner institutions engaged in measuring individual intelligence, namely the guidance and counseling unit of IAIN Curup. Logical-mathematical test used in this research is standardized national test instrument developed by guidance and counseling unit.

The number of the Qur'an memorization is traced by direct tracking to students. The interview aims to explore further information about students' opinions on memorizing the Qur'an, motivation in memorizing the Qur'an, what methods or techniques are used by students in memorizing the Qur'an, and how often students use their time to memorize the Qur'an and whether the process of memorizing the Qur'an is guided by other people or not, as well as to further explore the intensity of students' mathematics learning. Interviews are also used to explore external factors affecting the data and to dig deeper into the students' logical-mathematical intelligence. Interview guidelines for logical-mathematical intelligence data are based on indicators of logical-mathematical intelligence attached in Table 1. Students' logical-mathematical intelligence interview is conducted in relaxed conditions without any students' preparation. Interview is conducted on the sidelines of lectures and activities after lectures.

Table 1. Logical-Mathematical Intelligence Ability Interview Guide

Indicator	Statement
Numerical	1. Given a problem of counting integer operations, students are able to work on and explain; 2. Given a fractional arithmetic operation problem, students are able to work on and explain; 3. Given a problem with series of numbers and letters, students are able to work on and explain.
Abstract	Given a picture series problem, students are able to solve and explain.
Space Relations	1. Given a simple spatial relation problem, students are able to solve and explain the pattern of the relationship; 2. Given a complex spatial relation problem, students are able to solve and explain the pattern of the relationship.

The Qur'an memorization test used is continuing the Qur'an verses. Students are given a verses fragment, then the students are asked to continue the verse and mention the name of surah. The Qur'an memorization focuses on juz 30. It is chosen based on the common students' the Qur'an memorization. The test is attached in Table 2.

Table 2. The Qur'an Memorization Test

No	Problems
1	Write Hijaiyah letter
2	What letter come out of the throat?
3	What Tafkhim and Tarqiq mean?
4	Explain the various laws of reading ra (ر)!
5	Explain what makharijul huruf is!
6	Explain the differences of qolqolah shugra and kubra!
7	Mention various of mad!
8	Give an example of mad wajib muttashil and mad jaiz munfashil, 2 each!
9	Explain the various laws of reading mim mati (م)
10	Explain the various laws of reading nun mati (ن) and tanwin (ـًـٍـٌ)

The results of tests, interviews and documentation are analyzed quantitatively and qualitatively. Quantitative analysis is conducted by using statistical calculation (hypothesis test) while qualitative analysis is conducted by using descriptive analysis techniques. Quantitative analysis is intended to describe whether memorizing the Qur'an has correlation to students' logical-mathematical intelligence or not. The hypothesis in the quantitative test is there a positive correlation between students' logical-mathematical intelligence and the quantity and quality of students' the Qur'an memorization. Qualitative analysis aims to describe students' logical-mathematical intelligence for those who have already memorized the Qur'an in quantity and quality.

Hypotheses for this research are:

1. H_0 : There is no correlation between logical-mathematical intelligence and the Qur'an memorization in quantity.

   H_1 : There is positive correlation between logical-mathematical intelligence and the Qur'an memorization in quantity.

2. H_0 : There is no correlation between logical-mathematical intelligence and the Qur'an memorization in quality.

   H_2 : There is positive correlation between logical-mathematical intelligence and the Qur'an memorization in quality.

3. H_0 : There is no correlation between logical-mathematical intelligence with the Qur'an memorization in quality and quantity.

   H_3 : There is positive correlation between logical-mathematical intelligence and the Qur'an memorization in quality and quantity.

Results

There are several processes for analyzing the data found. First, the data normality test is conducted from three different data obtained; second, if the data are normally distributed, then the linearity test is performed using linearity test formulation; third, if the data are linear, the next test is a multiple correlation test (parametric statistics); fourth, if the three different data are not normally distributed, then the correlation test used is non-parametric statistics, Rank Spearman and Kendall Tau correlation test. The correlation analysis in this research is conducted using SPSS application version 24.

Normality test

Normality test is needed to see if the data distribution is normally distributed or not. The normality test used is the Shapiro-Wilk test integrated to SPSS. The hypotheses test used is as follows:

H_0 : The data of students' logical-mathematical, students' Qur'an memorization in quantity and students' Qur'an memorization in quality are normally distributed.

H_1 : The data of students' logical-mathematical logic ability, students' Qur'an memorization in quantity and students' Qur'an memorization in quality are not normally distributed.

The test is conducted using significant level of =0.05, if the value of sig>α, then H_0 is accepted, if the significant level is =0.05 and the value of sig <α, then H_0 is rejected. Table 3 presents the result of normality test.

Table 3. The Normality Test Result of the Qur'an Memorization in Quantity, the Qur'an Memorization in Quality, and Logical-Mathematical Ability

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.209	28	.003	.877	28	.003

Based on Table 3, the value of sig = 0.003, meaning sig < α, it illustrates that the three data, namely the Qur'an memorization in quantity, the Qur'an memorization in quality and logical-mathematical ability are not normally distributed, then the hypothesis test is conducted by using non-parametric statistics, rank spearman and kendall tau correlation test.

Hypotheses Test

Hypotheses Test 1

The correlation test is conducted using the Rank Spearmen Correlation test. The non-parametric test is implemented because the data are not normally distributed. The first hypotheses in this research are:

H_0 : There is no correlation between logical-mathematical intelligence and the Qur'an memorization in quantity.

H_1 : There is positive correlation between logical-mathematical intelligence and the Qur'an memorization in quantity.

The correlation test results using the Rank Spearman are presented in Table 4 below.

Table 4. The Correlation of Students' Logical-Mathematical Ability Test and the Qur'an Memorization in Quantity

			Memorization in Quantity Rank	Logical Mathematical Rank
Spearman's rho	Memorization in Quantity Rank	Correlation Coefficient	1.000	.699**
		Sig. (2-tailed)	.	.000
		N	28	28
	Logical Mathematical Rank	Correlation Coefficient	.699**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

Based on Table 4, the significant value of the two data is 0.00 meaning that sig < α and H_0 is rejected. This means that the Qur'an memorization in quantity and students' logical-mathematical ability have positive correlation. Based on correlation coefficient value of 0.699, it illustrates that the more students memorize the Qur'an surah, the more students have logical-mathematical ability.

Hypothesis Test 2

The second test is conducted to see whether students' Qur'an memorization in quality the level of students' logical-mathematical ability. The correlation test of students' Qur'an memorization and logical-mathematical ability is implemented by using Rank Spearman formulation integrated to SPSS. It is non-parametric statistics calculation because the data obtained in this research are not normally distributed. The results of Rank Spearman Rank Test are presented in Table 5.

Table 5. Correlation Test of Students' Logical-Mathematical Ability the Qur'an Memorization in Quality

			Logical Mathematical Rank	Memorization quality Rank
Spearman's rho	Logical Mathematical Rank	Correlation Coefficient	1.000	.778**
		Sig. (2-tailed)	.	.000
		N	28	28
	Memorization Quality Rank	Correlation Coefficient	.778**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

From the significance value in table 5, it is illustrated that students' Qur'an memorization in quality and students logical-mathematics ability have positive correlation. The more students memorizing the Qur'an in quality, the more students have logical-mathematical ability level. This is in line with the correlation coefficient 0.778 shown in Table 4.3. This is a positive number having value in the range of 0.60-0.799. The meaning is the level of positivity of the correlation between students' Qur'an memorization and logical-mathematical ability is very strong.

Hypotheses Test 3

The third hypotheses analysis test is conducted by using Multiple Linear Regression test. Multiple Linear Regression is used to see whether students' Qur'an memorization in quality and quantity and students' logical-mathematical ability simultaneously have positive correlation or not. The results can be seen in Table 6.

Table 6. Correlation of Logical-Mathematical Intelligence and the Qur'an Memorization in Quality and Quantity.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13013,724	2	6506,862	34,174	.000 b
	Residual	4760.133	25	190,405		
	Total	17773.857	27			

Table 6 shows that simultaneously the Qur'an memorization in quantity and quality and students' logical-mathematical ability have a positive correlation. The Qur'an memorization in quantity quality and students' logical-mathematical ability collectively have positive correlation. Students having high levels on memorizing

the Qur'an have high level of logical-mathematical ability as well. Based on the research results presented in Table 6, it is found that students' logical-mathematical intelligence has positive correlation to the Qur'an memorization both in quantity and quality. It can be seen that the Qur'an memorization both in quality and quantity positively have correlation to level of students' logical-mathematical intelligence. Students who have the Qur'an memorization in high quantity and good quality have also high logical-mathematical intelligence (see Table 7).

Table 7. Logical-mathematical Score Data and Al-Qur'an Memorizing

Student Code	Numerical		Abstract		Space Relations		Logical-Math		Quan. Memorizing the Qur'an	Qur'an Memorization Qualification
	PP	Classification	PP	Classification	PP	Classification	PP	Classification		
PS	85	BT	65	BS	90	BT	80	High	39	82
TMN	70	BS	80	BT	90	BT	80	High	28	76
SDA	85	BT	60	BS	90	BT	78	High	20	71.5
MAP	70	BS	60	BS	90	BT	73	High	18	70.5
AUH	70	BS	80	BT	70	BS	73	High	18	70.5
MR	45	BR	65	BS	97	BT	69	Medium	16	67
IF	80	BT	50	BS	70	BS	67	Medium	16	61.5
ALC	70	BS	45	BR	80	BT	65	Medium	16	58
TMN	30	BR	65	BS	75	BT	57	Medium	15	56
NH	60	BS	40	BR	65	BS	55	Medium	15	56
YS	25	BR	55	BS	70	BS	50	Medium	14	44.5
TS	10	BR	50	BS	80	BT	47	Medium	13	42.5
IN	45	BR	60	BS	30	BR	45	Medium	13	42
SP	25	BR	60	BS	50	BS	45	Medium	13	40
TP	15	BR	25	BR	90	BT	43	Medium	13	36
SMS	10	BR	35	BR	65	BS	37	Low	13	32.5
TD	45	BR	50	BS	3	BR	33	Low	13	30.5
SO	45	BR	1	BR	30	BR	25	Low	12	29.5
SELF	20	BR	15	BR	40	BR	25	Low	14	28
FT	5	BR	30	BR	35	BR	23	Low	12	25
AL	15	BR	20	BR	25	BR	20	Low	12	30
UK	10	BR	15	BR	10	BR	12	Low	16	50
RC	10	BR	10	BR	15	BR	12	Low	12	24
ZH	15	BR	15	BR	1	BR	10	Low	12	24
SK	5	BR	15	BR	10	BR	10	Low	12	23
Y Y	5	BR	5	BR	10	BR	7	Low	12	22
PU	1	BR	5	BR	10	BR	5	Low	12	20
RA	5	BR	3	BR	1	BR	3	Low	38	75.5

Note:

PP= Point of test BT = High Talent BS= Medium Talent BR= Low Talent

In Table 7, in general, it can be seen that students have good quality and quantity on the Qur'an memorization have also good logical-mathematical intelligence reflected in all indicators of logical-mathematical intelligence. Table 7 shows that when students have good the Qur'an memorization both in quantity and quality, then at least two of the three logical-mathematical intelligence indicators, namely, numerical ability, abstract ability, and spatial relation ability are in the high category. Although in Table 4, it can be seen that two data on students who have high logical-mathematical intelligence and good Qur'an memorization are in high category on one indicator of abstract ability. The students get scores close to high category but they are in middle category on other indicators. Table 7 describes some data shown by the students having codes AL, UK and RN, it does not show correlation between logical-mathematical intelligence and the Qur'an memorization, and it does not conclude that the Qur'an memorization has no positive correlation to logical-mathematical intelligence. Three students are in low classification.

Based on each indicator for logical-mathematical intelligence, there are several different types of abilities when they are viewed from the quality and quantity of the Qur'an memorization. The description of logical-mathematical intelligence ability on each indicator is provided in the review below.

An Overview of Logical-Mathematical Intelligence on Numeric Indicators Based on the Quantity and Quality of the Qur'an Memorization.

Based on Table 8, it is illustrated particularly for the first indicator, numerical ability or students' ability to count, not all students have a positive correlation to the Qur'an memorization. For example, the students having code IF. The student has good talent at numeric but the student has low ability at the Qur'an memorization compared to the student having code MR. However, generally the data show that most students having high and middle quantity and quality on the Qur'an memorization have high and middle numerical ability. This correlation also applies to students having low numerical abilities as well (see Table 8).

Based on Table 8 and Table 9, there are 6 types of students based on the level of quantity and quality of the Qur'an. The first type, students having high quantity and quality of the Qur'an memorization, high intelligence at logical-mathematical, and high numerical ability. The second type is the students having high quantity and quality of the Qur'an memorization, high logical-mathematical intelligence, and middle numerical ability. The third type is the students having middle quantity and

quality of the Qur'an memorization, middle logical-mathematical intelligence, and high numerical ability (see Table 8 and Table 9).

Table 8. Measurement Results Data on Logical-Mathematical Intelligence on Numeric Indicator Based on the Qur'an Memorization Data (Quantity and Quality)

Student Code	Numerical		Math logic		Quan. The Qur'an memorization	The Qur'an memorization Qualification
	PP	Classification	PP	Classification		
PS	85	BT	80	High	39	82
TMN	70	BS	80	High	28	76
SDA	85	BT	78	High	20	71.5
MAP	70	BS	73	High	18	70.5
AUH	70	BS	73	High	18	70.5
MR	45	BR	69	Medium	16	67
IF	80	BT	67	Medium	16	61.5
ALC	70	BS	65	Medium	16	58
TMN	30	BR	57	Medium	15	56
NH	60	BS	55	Medium	15	56
YS	25	BR	50	Medium	14	44.5
TS	10	BR	47	Medium	13	42.5
IN	45	BR	45	Medium	13	42
SP	25	BR	45	Medium	13	40
TP	15	BR	43	Medium	13	36
SMS	10	BR	37	Low	13	32.5
TD	45	BR	33	Low	13	30.5
SO	45	BR	25	Low	12	29.5
SELF	20	BR	25	Low	14	28
FT	5	BR	23	Low	12	25
AL	15	BR	20	Low	12	30
UK	10	BR	12	Low	16	50
RC	10	BR	12	Low	12	24
ZH	15	BR	10	Low	12	24
SK	5	BR	10	Low	12	23
Y Y	5	BR	7	Low	12	22
PU	1	BR	5	Low	12	20
RA	5	BR	3	Low	38	75.5

Note:

PP= Point of test   BT = High Talent   BS= Medium Talent   BR= Low Talent

Table 9. Interview Results on Students' Logical-Mathematical Intelligence

Indicator	Results
Numerical	Height: able to reason quickly Medium: able to reason for a long time. Low: no visible reasoning ability. Good in arithmetic operations.
Abstract	High: able to visualize abstract patterns seen in students' ability to distinguish images and find series of images. Medium: able to visualize abstract images, by distinguishing images, but it takes a long time to find patterns in a series of images Low: quite capable of visualizing images in an abstract way
Space Relations	High: has a good ability to visualize and draw an object from a net or vice versa and is able to visualize the rotation of an object Medium: has good ability to visualize and describe an object from a net or vice versa, but cannot visualize the rotation of an object Low: has the ability to visualize and describe an object quite well when the object's net is given.

The fourth type is the students having middle quantity and quality of the Qur'an memorization, middle logical-mathematical intelligence, and middle numerical ability. The fifth type is the students having middle quantity and quality of memorization, middle logical-mathematical intelligence, and low numerical ability. The sixth type is the students having low quantity and quality at the Qur'an memorization, low logical-mathematical intelligence, and low numerical ability.

All types have good abilities in solving simple arithmetic problems (integer arithmetic operations, fraction operations, time, distance, etc.). The difference in each type is the ability to reason to solve mathematical problems. The first type, has excellent reasoning abilities. When the problem presented in Figure 1 is given, the first type of students can easily and quickly find the required pattern. This type of question needs students good understanding. It is pattern of addition and multiplication and it takes less than 90 seconds.

10. 2,4,4,7,8,10,...

   A. 16 and 15   D. 15 and 13
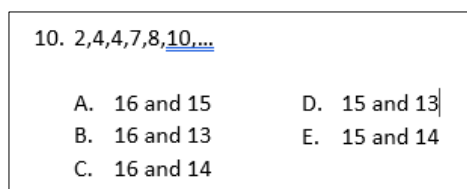   B. 16 and 13   E. 15 and 14
   C. 16 and 14

Figure 1. Number Series Problem.

The second type students have almost as good reasoning as the first type one. However, the second type students take a longer time to find the pattern in solving

problem in Figure 1. The second type students take more than one minute to find the pattern. The same thing occurs to the third type students. This type students have as good reasoning as the first type students, but they require longer time to solve the problem.

The fourth type students have good understanding in finding patterns for the problem in Figure 1. The fourth type students are able to find addition patterns faster but they take more than 3 minutes for finding multiplication pattern in Figure 1. For students having high numerical abilities, they are able to solve easily the problems presented in Figure 1.

Logical Intelligence Description on Abstract indicators the Qur'an Memorization

Table 10 shows that two students having high Qur'an memorization and logical-mathematical intelligence are classified into high level and they have high abstract ability as well. Although one of these students is not in the top three based on the overall logical-mathematical intelligence, this does not give a conclusion that the Qur'an memorization has no correlation to abstract ability as the second indicator of logical-mathematical intelligence (see Table 10).

There are 6 types of students having equality between good quantity and quality of Qur'an memorization and logical-mathematical intelligence in Tables 9 and 10. The first type is students having high quantity and quality of the Qur'an memorization, high logical-mathematical intelligence, and high abstract ability. The second type is students having high quantity and quality of the Qur'an memorization, high logical-mathematical intelligence, and middle abstract ability. The third type is students having middle quantity and quality of the Qur'an memorization, middle logical-mathematical intelligence, and middle abstract ability.

The fourth type is students having middle quantity and quality of the Qur'an memorization, middle logical-mathematical intelligence, and low abstract ability. The fifth type is students having low quantity and quality of the Qur'an memorization, low logical-mathematical intelligence, and middle abstract ability. The sixth type is students having low quantity and quality of the Qur'an memorization, low logical-mathematical intelligence, and low abstract ability.

Table 10. Measurement Results Data of Logical-Mathematical Intelligence
Indicators, Abstracts and the Qur'an Memorization (Quantity and Quality)

Student Code	Abstract		Math logic		Quan. Memorizing the Qur'an	Qur'an Memorization Qualification
	PP	Classification	PP	Classification		
PS	65	BS	80	High	39	82
TMN	80	BT	80	High	28	76
SDA	60	BS	78	High	20	71.5
MAP	60	BS	73	High	18	70.5
AUH	80	BT	73	High	18	70.5
MR	65	BS	69	Medium	16	67
IF	50	BS	67	Medium	16	61.5
ALC	45	BR	65	Medium	16	58
TMN	65	BS	57	Medium	15	56
NH	40	BR	55	Medium	15	56
YS	55	BS	50	Medium	14	44.5
TS	50	BS	47	Medium	13	42.5
IN	60	BS	45	Medium	13	42
SP	60	BS	45	Medium	13	40
TP	25	BR	43	Medium	13	36
SMS	35	BR	37	Low	13	32.5
TD	50	BS	33	Low	13	30.5
SO	1	BR	25	Low	12	29.5
SELF	15	BR	25	Low	14	28
FT	30	BR	23	Low	12	25
AL	20	BR	20	Low	12	30
UK	15	BR	12	Low	16	50
RC	10	BR	12	Low	12	24
ZH	15	BR	10	Low	12	24
SK	15	BR	10	Low	12	23
Y Y	5	BR	7	Low	12	22
PU	5	BR	5	Low	12	20
RA	3	BR	3	Low	38	75.5

Note:

PP= Point of test   BT = High Talent   BS= Medium Talent   BR= Low Talent

The first and the second types, have almost same characteristics. Both types have good abstraction abilities, but the second one requires longer time than the first type relatively. The first type is able to solve the problem in Figure 2 in 90 seconds. The second type takes one minute. The third type has equality as the second type and the third type takes one minute to solve the problem given. In this

research when students have abstract ability, it is easier for the students to solve the question in Figure 2.
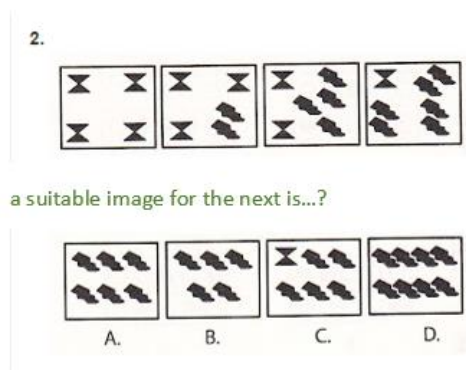

Figure 2. Series Problem Image

The fourth and fifth types describe a fairly good abstraction ability, with a fairly long solving problem time around 2 minutes. The sixth type describes poor abstraction ability. This type of student is unable to provide a solution for the problem in Figure 2. Based on the interview, the sixth type of students use "guessing" technique to answer all questions given during the test.

The Logical-Mathematical Intelligence Description on the Spatial Relation Indicators Based on Quantity and Quality of The Qur'an Memorization

It is seen in Table 11, 29% of students have high spatial relation ability. 50% of the high group are students having good quantity and quality of the Qur'an memorization. Based on Table 9, it is illustrated that there are 6 types of students based on the quantity and quality of the Qur'an memorization. The first type are students having high quantity and quality of the Qur'an memorization, high quality of logical-mathematical intelligence, and high spatial relation ability. The second type is students having high quantity and quality of the Qur'an memorization, high quality of logical-mathematical intelligence, and middle spatial relation ability.

The third type is students having middle quantity and quality of the Qur'an memorization, middle quality of logical-mathematical intelligence, and high spatial relation ability. The fourth type is students having middle quantity and quality of the Qur'an memorization, middle quality of logical-mathematical intelligence, and middle spatial relation ability. The fifth type is students having low quantity and quality of the Qur'an memorization, low quality of logical-mathematical intelligence, and middle spatial relation ability. The sixth type is students having high quantity

and quality of the Qur'an memorization, high quality of logical-mathematical intelligence, and low spatial relation ability.

Table 11. Measurement Results Data of Logical-Mathematical Intelligence Indicators, Spatial Relations and the Qur'an Memorization Data (Quan and Qual)

Student Code	Space Relations		Math logic		Quan The Qur'an Memorization	The Qur'an Memorization Qualification
	PP	Classification	PP	Classification		
PS	90	BT	80	High	39	82
TMN	90	BT	80	High	28	76
SDA	90	BT	78	High	20	71.5
MAP	90	BT	73	High	18	70.5
AUH	70	BS	73	High	18	70.5
MR	97	BT	69	Medium	16	67
IF	70	BS	67	Medium	16	61.5
ALC	80	BT	65	Medium	16	58
TMN	75	BT	57	Medium	15	56
NH	65	BS	55	Medium	15	56
YS	70	BS	50	Medium	14	44.5
TS	80	BT	47	Medium	13	42.5
IN	30	BR	45	Medium	13	42
SP	50	BS	45	Medium	13	40
TP	90	BT	43	Medium	13	36
SMS	65	BS	37	Low	13	32.5
TD	3	BR	33	Low	13	30.5
SO	30	BR	25	Low	12	29.5
SELF	40	BR	25	Low	14	28
FT	35	BR	23	Low	12	25
AL	25	BR	20	Low	12	30
UK	10	BR	12	Low	16	50
RC	15	BR	12	Low	12	24
ZH	1	BR	10	Low	12	24
SK	10	BR	10	Low	12	23
YY	10	BR	7	Low	12	22
PU	10	BR	5	Low	12	20
RA	1	BR	3	Low	38	75.5

Note:

PP= Point of test   BT = High Talent   BS= Medium Talent   BR= Low Talent

The first type Students having high spatial relations ability, as well as high quantity and quality of the Qur'an memorization show the ability, dexterity and

accuracy in finding patterns in Figures 3, 4 and 5 in the short time, less than 1 minute relatively.
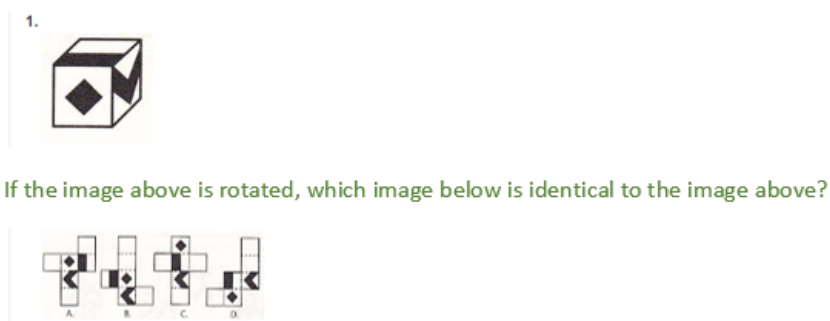

Figure 3. Type 1 Spatial Relations Problem
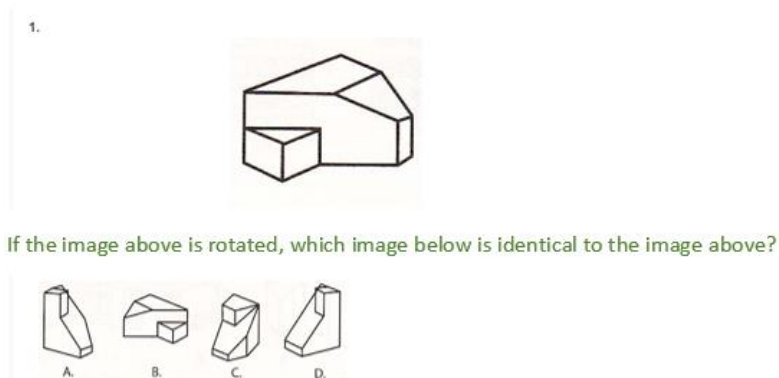

Figure 4. Type 2 Spatial Relation Problem

Figure 5. Space Relations Problem: Object Rotation

Based on Table 9 and 11, students in the second and third types have good spatial relations ability. The two types students are able to solve the problems in Figures 3, 4 and 5. However, the students have differences and they relatively spend long time compared to the students in the first type. The second type students take

more than one minute to solve each problem. The third type students take 1.5 minutes to solve the problem given.

The fourth type students are able to solve only the problems in Figures 3 and 4. The fourth type students are only able to visualize shapes, but they are not able to visualize rotations. The fifth type students are able to quickly solve the problem in Figure 4 in a short time relatively, but they have difficulties in solving the problem in Figure 5. The sixth type students show the low quality of spatial relation ability. The sixth type students are able to solve the problem in Figure 4, concluding that the students are able to simply visualize the relation in the form of space only.

The Qur'an memorization is not only having correlation to students' logical-mathematical intelligence but also has correlation to students learning patterns. The results of the interviews in Table 12 show that students having good quality of Qur'an memorization has good learning patterns as well.

Table 10. Differences in Student Intensity in Learning Mathematics Based on Memorization Quality

Quality of the Qur'an memorization	Memorization Intensity
Tall	1 hour/day
Currently	1-2 hours/week
Low	1-2 hours/month
Low	Uncertain

Discussion

Some data shown by the students having codes AL, UK and RN, it does not show correlation between logical-mathematical intelligence and the Qur'an memorization, and it does not conclude that the Qur'an memorization has no positive correlation to logical-mathematical intelligence. Three students are in low classification. This is because of external inhibiting factor, students' emotional level facing tests. Based on the interview, the students have same condition when facing the test. First condition, the students lack of focus. It is because the students miss the breakfast so it is hard for them to focus in the condition of hunger. Second condition, the delay on the test schedule. Of course, this affects students' mentality especially the test readiness. If the test readiness is not in conducive situation, automatically the students are not able to think. This is in line with Slameto's opinion that learning readiness greatly affects a person's ability to absorb knowledge or to think (Slameto, 2013).

Based on observational data during the lecture, it is known that the three students are students who have a very high level of anxiety, thus affecting the ability

of students when doing the tests. In a research conducted by Ikhsan, for every 1% of addition on anxiety, the learning outcomes achievement will decrease by 1.80 (Ikhsan, 2019). Anxiety greatly affects a person's readiness to solve problems, the more anxious, the more stressed the person will be. The three obstacles mentioned above are the main factors in the occurrence of data outliers in this research, so it can be concluded that in average, the Qur'an positively has correlation to logical-mathematical intelligence.

The fifth type students have fairly good reasoning abilities. The students are able to find addition patterns but unable to find multiplication patterns in problems. The sixth type students are students having low reasoning abilities and more than 50% of students in this type are unable to find patterns in the problem. Students having high numerical abilities are able to solve simple arithmetic problems (integer arithmetic operations, fraction operations, time, distance, etc.) and are able to solve problems that require high reasoning (number series, letter series). Ann has stated that with numerical abilities, someone is able use numbers to solve the problem correctly (Olatoye & Aderogba, 2011).

In this research when students have abstract ability, it is easier for the students to solve the question. It means, the students are able to see the other side of question and able to imagine the problem. The same condition occurs in Jacobsen, Eggen, and Kauchak's research saying that abstraction is an idea that humans use to describe, understand, and simplify the world (Jacobsen, Eggen, & Kauchak, 2009). So, people with good abstract ability can be easier to solve abstract problem in real life.

The Qur'an memorization is not only having correlation to students' logical-mathematical intelligence but also has correlation to students learning patterns. The results of the interviews show that students having good quality of Qur'an memorization has good learning patterns as well. This is because a good Qur'an memorizer will repeat the verses systematically and consistently so that the memorization can be increased and the existing verses memorization is not lost (Ubaid, 2014) . A systematic and consistent pattern of the Qur'an memorization affects other life patterns, one of them is learning. The students will be used to learning consistently because they are used to memorizing consistently (Badwilan, 2009) . The same condition occurs in Nurhayati and Sholeh's research showing that the Qur'an memorization increases students motivation to learn, the more students Qur'an memorization the more students have learning motivation (Nurhayati & Sholeh, 2021).

Conclusion

The research results in this research illustrate that the Qur'an memorization has positive correlation to the level of logical-mathematical intelligence. Someone who has good Qur'an memorization in quantity and quality has good logical-mathematical intelligence as well. Based on each indicator of logical-mathematical intelligence, namely abstract, spatial and numerical relations, there are different types of intelligence when they are viewed from the Qur'an memorization in quantity and quality. There are 6 numerical indicators types when they are viewed from the level of students' Qur'an memorization in quantity and quality. Likewise, abstract indicators and spatial relations, each indicator has 6 different types when it is viewed from the level of students' Qur'an memorization in quantity and quality.

The research results also show the usefulness of the Qur'an memorization which provides changes on students learning patterns. The more often the students memorize the Qur'an, the more they have learning and organized pattern. Based on the research results, all efforts to improve students' Qur'an memorization quality have a positive correlation on students' intelligence, especially on logical-mathematical intelligence. Developing methods on the Qur'an memorization has a positive correlation on students' intelligence development. There are research limitations that have not been able to reveal in detail the factors that can influence the positive relationship between memorizing the Qur'an and logical-mathematical intelligence.

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