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PROFILE OF MATHEMATICS ACHIEVEMENT OF EIGHTH-GRADE STUDENTS BASED ON ISLAMIC SPIRITUAL INTELLIGENCE

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Abstract

This study describes the profile of students mathematics achievement based on Islamic Spiritual Intelligence (ISI) to be coherent with the characteristic of *Siddiq* (truthfulness), *Amanah* (responsiblility), *Tabligh* (delivery), and *Fathanah* (wisdom). To achieve the study objectives, the researcher conducted mathematics test, ISI test, and interview to six students of the 8th grade of the Al Falah Junior High School Surabaya in the first semester 2016-2017. The six students are categorized into high, middle and low in the level of ISI. Furthermore, the data obtained are analyzed using IBM SPSS Statistics 22 Software and are compiled as the profile of mathematics achievement of the 8th grade students based on Islamic Spiritual Intelligence.

The result shows that the high ISI students get a high mathematics achievement. In the knowing, reasoning, and applying cognitive domains, the high ISI students get comparatively higher mathematics achievement than students in the low and middle ISI. Only a high ISI students who can solve the reasoning problem.

Keywords: mathematics achievement, Islamic Spiritual Intelligence.

BACKGROUND

Students' achievement in different fields and levels are influenced by several personal and educational factors. One of the potential research areas is to determine appropriate criterion and educational factors. There are two measures have been used as indicators for predicting students' future conditions, that are scores of intelligence and achievement (Gagne and Pere, 2002).

Teachers generally evaluate for achievement using subjective criterion such as grade point averages or objective scores from tests for verbal or mathematical domains (Guay et al., 2010). In Indonesia, the government has been utilized the National Examination (NE) as a standard form of assessment in order to control the quality of education. This standard regulates achievement assessment held by teachers, school, and government. In the quality of junior high school, there are four proposed subjects, namely Mathematics, English, Indonesian, and Science.

Based on the mathematics achievement of NE, period 2014 to 2015, there was a decreasing trend in average mathematics score. The average mathematics score decreased by 7%, from 56.40 to 49.84.

Table 1. Average score at national examination for junior high school

	2014			2015		
	$\bar{x}$	Sd	Category	$\bar{x}$	Sd	Category
Mathematics	56.40	1.28	C	49.84	21.13	D
Science	60.16	1.17	C	56.22	17.77	C
Indonesian	71.66	1.08	B	71.12	13.97	B
English	760.51	1.25	C	57.08	19.04	C

The results of the NE are not enough for properly understanding the education system and student achievement in Indonesia in order to prepare students for surviving and competing with other countries. It is necessary for benchmarking it with the results of the International study. International comparative studies can strengthen the national picture of the Indonesian national education to interpret the results of the educational system.

One international study followed by Indonesia is the Trends in International Mathematics and Science Study (TIMSS). It evaluates the existing education, especially the study of students aged 14 years at junior high school or eighth grader. The TIMSS has been continuously conducted every four years and is a long series of studies by the International Association for the Evaluation of Educational Achievement (IEA) and Progress in Internasional Reading Literacy Study (PIRLS)

at Boston College. Indonesia has been joined this survey since 1995.

Mastering algebra is a vital step to providing students power to succeed in math. But many students are unprepared to succeed in algebra, and they fail the course the first time they take it (Balfanz et al., 2002; Finkelstein et al., 2012; Huang et al., 2014).

Several issues such as interested students, teachers experienced, economical support, and school-related factors (Santoso & Siregar, 2007) have been presented as solutions. There is a develop proof that motivation, values, study ethics, and work of students have a bigger impact on achievement expressing the answers may lie inside the students themselves (Ornstein, 2010).

A relatively new concept called spiritual intelligence which supporta problem-solving and critical thinking has recently lately under serious contemplation (Smartt, 2014).

Mahasneh et al. (2015) stated that the spiritual intelligence (SI) has the most remarkable type of intelligence because of its ability to influence change in people, societies, and cultures. Improving SI level may help students toward selecting a positive outlook and control as well as reducing the high-stress level caused by the hectic pace of modern life.

SI defined as the mental abbility used by human beings to address and find solutions to problems of meaning and value, and to place their lives and actions into a wider, richer, and meaning giving context (Zohar and Marshall, 2001). A set of mental capacities which contribute to the awareness, integration, and adaptive application of the nonmaterial and transcendent aspects of one's existence, leading to such outcomes as deep existential reflection, enhancement of meaning, recognition of a transcendent self, and mastery of spiritual states also defined by King & DeCicco. Four core components are proposed to comprise spiritual intelligence: critical existential thinking, personal meaning production, transcendental awareness, and conscious state expansion (King & DeCicco, 2009).

A core spiritual intelligence's, nevertheless, does not represent the Islamic orientation in general (Rahman & Shah, 2015). In Islam, spiritual intelligence is coherent with the individual's internal strength of having an honest heart. A person with an honest heart has the strong aspiration to act in such a way that it will be beneficial for them now and future. The importance of the honest heart has been stated by the great Rasullullah, Peace Be Upon Him (PBUH):

"Whereby in Adam's body contained a piece of meat in the physical form that in fact refers to the pure heart. If the heart is good, the whole body will be good and if the heart is bad, the whole body will be bad as well".

Allah Subhanahu Wa Ta'ala (SWT) has created us and therefore it is reasonable for us to approach Him and put our utmost devotion to Him.This means that by having a high spiritual intelligence, one could control his or her emotions well and later influence good thinking towards certain individuals, works, and situations. Therefore, this study will modify versions of those used in other scales, Spiritual Intelligence Self-Report Inventory (SISRI-24) which was developed by King (2008), to be coherent with the concept of Islam include the characteristic of *Siddiq* (truthfulness), *Amanah* (responsible), *Tabligh* (deliver), and *Fathanah* (wisdom) to shape the Islamic Spiritual Intelligence (ISI).

Several studies that involve ISI have occurred in other countries (Bensaid et al., 2014; Baharuddin and Ismail, 2015; Rahman and Shah, 2015). However, there has been no research conducted to find a profile of mathematics achievement based on ISI. Therefore, this study is conducted to describe if a student's ISI influences as an internal motivator encourage or predicts their mathematics achievement.

METHOD

A descriptive qualitative research design is used in this study. A structured depth interview applied to examine the ISI level of students and their mathematics achievement. The definition of mathematics achievement is adapted from the TIMSS Advanced 2015 Mathematics Framework. The first domain or the low mathematics achievements, i.e. knowing, addresses to students who are able to recall and recognize facts, procedures, and concepts necessary for a solid foundation in mathematics.

Knowing

Recall	Recall definitions, terminology, notation, number properties and geometric properties
Recognize	Be fully aware of entities that mathematically equivalent (e.g., different representations of the same function).
Compute	Carry out algorithmic procedures (e.g., determining derivatives of polynomial functions).

The second domain or the middle mathematics achievements, **applying**, not only mastering the knowing dimension but students also focuses on using this knowledge to model and implement strategies to solve problems.

Applying

Determine	Decide upon efficient and appropriate methods, strategies or tools for solving problems for which there are commonly used methods of solution.
Represent	Generate an equation or diagram that models problem situations and generate equivalent representations for a given mathematical entity or set of information.

Implement	Apply in a manner consistent with its strategies and operations to solve problems in familiar mathematical concepts and procedures.

The third domain or the high mathematics achievements, **reasoning**, students already able to analyzing, synthesizing, generalizing, and justifying through mathematical arguments or proofs. The situations requiring reasoning often are unfamiliar or complex.

Reasoning

Analyze	Consider in detail the elements of a problem and determine the information, procedures, and strategies necessary to solve the problem
Integrate	Link different elements of knowledge, related representations, and procedures to solve problems.
Draw Conclusions	Make valid inferences on the fundament information and evidence.

Research Subject

Population of this study is all students of the 8th grade of Al Falah Junior High School. The six selected subjects of the 8th grade students consist of 3 boys and 3 girls. The research subjects were determined by choosing two students of high ISI, two students of middle ISI, and two students of low ISI. The selected subjects are presented in **Table 2** as follows.

Table 2. Research Subject

No.	Category of ISI	Name	Subject Initials	Class
1	High (H)	BSA	RS 1	VIII A
2		MAA	RS 2	VIII B
3	Middle (M)	SA	RS 3	VIII A
4		AZA	RS 4	VIII B
5	Low (L)	KSW	RS 5	VIII A
6		LPP	RS 6	VIII B

Instruments to Assess Achievement and ISI

The five essay problems are implemented for the test and were chosen from 2003 TIMSS problem, which translated from TIMSS 2007 International Mathematics Reports (Mullis et al., 2008). The scores are ranged from 0 to 53.

The ISI instrument was firstly developed by Rahman and Shah (2015). The questionnaire consists of 24-items and assesses various behaviors, through processes, and mental characteristics. It has four characteristics which are *Siddiq* items number 1-6; *Amanah* items number 7-12; *Tabligh* items number 13-18 and *Fathanah* items number 19-24.Scores can range from 0 to 96. It ranges from 9.96& below that correspond to low; 9.96–36.89middle; and 36.89 & above as high. The instrument used had translated, from English language to Bahasa Indonesia. The ISI instrument is presented in **Table 3**.

Table 3. Islamic Spiritual Intelligence (ISI) instrument used

No.	Pernyataan	Nilai			
		1	2	3	4
1.	Saya sering merenungkan hubungan antara saya dan Allah SWT.				
2.	Saya percaya bahwa belajar adalah suatu kewajiban.				
3.	Saya selalu menghadiri kelas agama atau pengajian untuk meningkatkan pengetahuan saya tentang Islam.				
4.	Saya dapat mengaplikasikan nilai-nilai dan etika Islam dalam rutinitas sehari-hari.				
5.	Saya percaya bahwa memenuhi kewajiban sebagai muslim merupakan prioritas.				
6.	Saya selalu mengajak teman-teman untuk mematuhi nilai-nilai Islam dalam kehidupan mereka.				
7.	Saya bertanggung jawab terhadap setiap keputusan yang saya ambil.				
8.	Saya selalu menyelesaikan masalah teman dengan bijak.				
9.	Saya selalu menyimpan masalah teman dengan rapat.				
10.	Saya berusaha adil ketika memberikan penilaian.				
11.	Saya jujur mengakui kualitas teman saya.				
12.	Saya menyimpan masalah pribadi untuk diri sendiri.				
13.	Saya memberikan waktu untuk teman agar dapat berkonsultasi dengan saya setiap saat.				
14.	Saya mendorong teman untuk menyuarakan pendapat mereka kepada saya.				
15.	Saya berani untuk memberitahu teman saya apa yang benar dan salah menurut Islam.				
16	Saya menganggap diri saya sebagai seseorang yang sabar.				
17.	Saya percaya bahwa saya merupakan orang jujur dalam mengerjakan tugas.				
18.	Saya berterus terang dalam menyampaikan pesan kepada teman saya untuk mematuhi nilai-nilai Islam.				
19	Saya menganggap diri saya sebagai seseorang yang profesional ketika membuat keputusan.				
20.	Saya dapat mengantisipasi masalah sebelum masalah itu muncul.				

21.	Saya berserah kepada Allah SWT ketika tidak bisa memecahkan masalah				
22.	Saya akan tetap sabar ketika menghadapi situasi apapun.				
23.	Saya selalu mencoba untuk menemukan cara-cara atau metode baru untuk mengatur waktu lebih baik lagi.				
24.	Saya menganggap diri saya sebagai seseorang yang dinamis dalam berpikir dan membuat keputusan.				

Assessment Administration Schedule

Data collection was conducted on April 17th - May 5th, 2017 at Al Falah Junior High School, Surabaya. The administration schedule for the mathematics achievement and ISI tests is given in **Table 4**.

Table 4. Data Collection Activities

Day/Date	Time	Description
Monday/ April 17th 2017	03.00 – 05.00 PM	ISI test at the boy class.
Wednesday/ April19th 2017	07.00 – 09.00 AM	ISI test at the girl class.
Thursday/ April20th 2017	02.30 – 04.30 PM	Achievement test and interview at the girl class.
Friday/ May 5th 2017	11.00 AM – 01.00 PM	Achievement test and interview at the boy class.

RESULT AND DISCUSSION

The ISI results of the 8th grade class can be seen in table 5:

Table 5. Students' ISI Results

No.	Class	Name	S	A	T	F	ISI (x)	Category
1	VIIIA	AFAR	19	18	16	17	70	Middle
2		ALNA	17	21	17	16	71	Middle
3		AJA	18	21	18	22	79	Middle
4		BSA	19	21	22	21	83	High
5		FN	19	16	17	19	71	Middle
6		IAD	18	17	21	18	74	Middle
7		JR	21	18	18	16	73	Middle
8		KSW	18	17	16	14	65	Low
9		KAB	19	20	20	19	78	Middle
10		NA	16	21	19	19	75	Middle
11		RNR	20	23	20	20	83	High
12		RM	17	18	16	20	71	Middle
13		RWKS	17	20	16	18	71	Middle
14		RA	17	17	19	18	71	Middle
15		SA	12	21	21	22	76	Middle
16		SU	17	19	16	15	67	Middle
17		SKPD	15	13	10	14	52	Low
18		TKS	18	16	15	19	68	Middle
19		UT	21	21	19	18	79	Middle
20		AHAW	20	18	19	16	73	Middle
21	VIIIB	ANA	18	19	20	18	75	Middle
22		AZA	20	19	16	16	71	Middle
23		DRA	19	19	20	18	76	Middle
24		DSAH	18	18	17	19	72	Middle
25		HMA	21	18	18	16	73	Middle
26		IP	22	18	21	20	81	High
27		LPP	17	14	16	17	64	Low
28		MRA	19	18	16	19	72	Middle
29		MAM	18	15	17	19	69	Middle
30		MAA	19	20	21	20	80	High
31		MRA	19	17	18	15	69	Middle
32		MSHH	19	16	15	12	62	Low
33		MKH	16	16	15	17	64	Low
34		NAW	21	21	18	16	76	Middle
35		RHD	19	15	15	14	63	Low
Total			643	639	618	617	2517	

Information:

S = Siddiq; A = Amanah; T = Tabligh; F = Fathanah

$$\text{Mean } (\bar{x}) = \frac{\sum x}{n} = \frac{2508}{35} = 71{,}91$$

$$\text{Standard Deviation}(SD) = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

$$= \sqrt{\frac{182429}{35} - \left(\frac{2517}{35}\right)^2}$$

$$= 6{,}37$$

Based on the calculation of the mean and standard deviation above, the ISI category was obtained as follows.

Table 6. Criteria for Categorizing Students ISI

Category for Islamic Spiritual Intelligence	Criteria	Frequency	Precentage
High ($x \geq \bar{x} + SD$)	$x \geq 77{,}82$	4	11 %
Middle ($\bar{x} - SD < x < \bar{x} + SD$)	$65{,}48 < x < 77{,}82$	26	76 %
Low ($x \leq \bar{x} - SD$)	$x \leq 65{,}48$	5	13 %

Table 7. Students' ISI Frequency

ISI criteria	Students Average Score	Category
Siddiq	75,83	Middle
Amanah	76,07	Middle
Tabligh	73,33	Middle
Fathanah	73,33	Middle

The **Table 5, Table 6,** and **Table 7** indicate the level of the students' ISI. It is underlined that 13% is low achievement; 76% is middle and 11% students are high achievement. The students are majority belongs to middle achievement.

After finishing the ISI's test, students were given an mathematics achievement test. The students are asked to answer the test. The results are arranged in the form of table 8 as follows.

Table 8. Students' Achievement Results

No	Class	Name	Problem's number					Total score (X)
			1	2	3	4	5	
1	VIII A	AFAR	15	2	2	16	6	41
2		ALNA	9	0	2	16	0	27
3		SAJA	10	3	2	2	6	23
4		BSA	17	2	2	16	0	37
5		FN	10	0	2	5	0	17
6		IAD	17	7	1	16	4	45
7		JR	14	5	2	2	6	29
8		KSW	10	1	1	2	0	14
9		KAB	17	4	2	10	1	34
10		NA	14	0	2	11	4	31
11		RNR	17	5	2	12	4	40
12		RM	12	0	2	2	0	16
13		RWKS	9	0	2	6	8	25
14		RA	11	7	2	4	6	30
15		SA	17	7	2	20	4	50
16		SU	15	0	2	2	6	25
17		SKPD	17	6	2	7	6	38
18		TKS	17	6	2	6	6	37
19		UT	17	0	2	11	4	34
20	VIII B	AMAW	17	0	0	0	0	17
21		ANA	17	0	0	0	0	17
22		AZA	17	5	1	0	0	23
23		DRA	17	0	1	0	0	18
24		DSAH	17	0	0	0	0	17
25		HMA	5	0	0	0	0	5
26		IP	17	0	1	19	9	46
27		LPP	0	0	1	0	0	1
28		MRA	6	0	1	0	0	7
29		MAM	9	0	0	0	0	9
30		MAA	17	6	1	16	9	49
31		MRA	4	0	0	0	0	4
32		MSHH	16	0	1	0	0	17
33		MKH	8	1	0	6	9	24
34		NAW	9	0	0	0	0	9
35		RHD	8	0	0	0	0	8
Jumlah			449	67	43	207	98	864

The result of the study shows the majority level of the 8th grade students' of Al Falah Junior High School Surabaya belongs to middle level of ISI.

1. **The profile of mathematics achievement of eighth-grade students based on low Islamic Spiritual Intelligence**

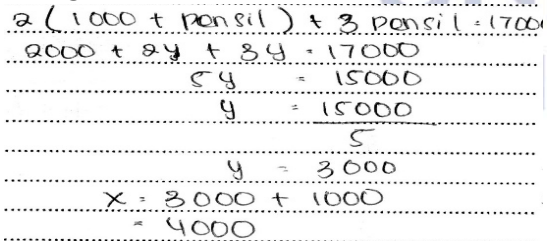

Figure 1. The mathematics achievement of RS5 in applying cognitive domain

RS5 replace the number of pen with x and the number of pencil with y. RS5 also generate an equation that model problem of situation. After that RS5 directly writes the price of two pens and three pencils into equations, then RS5 can find the price of one pencil and one pen. With that information, RS5 can find the price of two pencils and one pen but RS5 hasn't finished solving the problem.

2. **The profile of mathematics achievement of eighth-grade students based on middle Islamic Spiritual Intelligence**

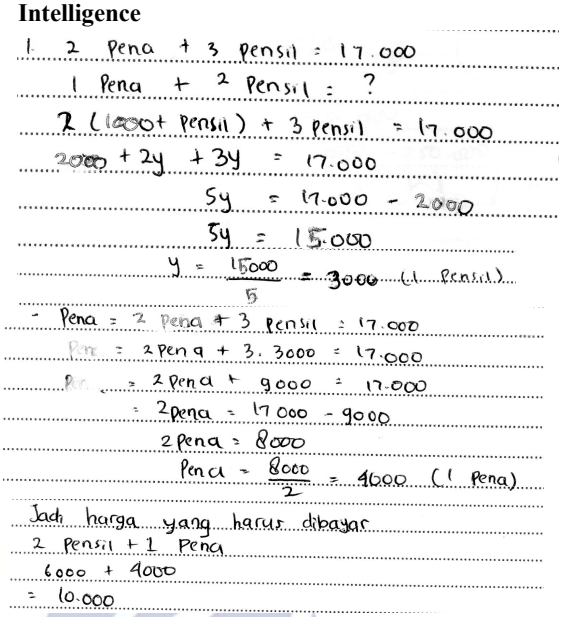

Figure 2. The mathematics achievement of RS3 in applying cognitive domain

RS3 writes mathematics equation of the information given. After that, RS3 writes the price of two pens and three pencils into equations, 2 pena+3 pensil=17.000. Then RS3 writes the price of a pen that is more expensive Rp 1.000,00 of the price of a pencil, pena=1000+pensil. RS3choose substitution method to find the price of a pen and a pencil. By implementing the strategies RS3 can easily find the price of two pencils and one pen which is Rp 10.000,00. At this stage of completion, RS3 completes it properly.

3. **The profile of mathematics achievement of eighth-grade students based on high Islamic Spiritual Intelligence**

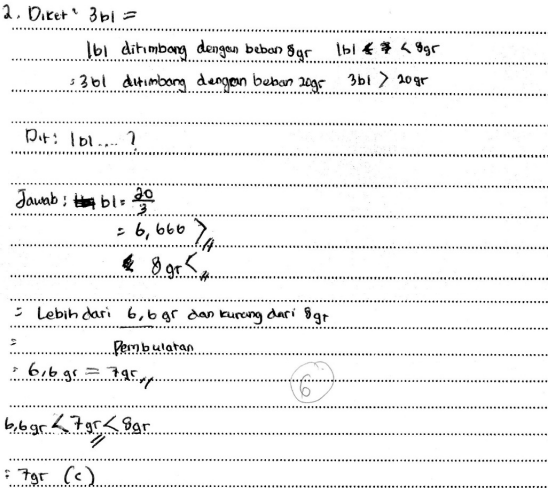

Figure 3. The mathematics achievement of RS2 in reasoning cognitive domain

RS2 changes the number of cube to 'bl' and writes some information needed for answering the question. After that RS2 tries to make some equation which is 1bl < 8gr and 3bl >20gr. With that information, RS2 link the information to solve the problems. RS2 tries to find the minimum mass of one cube by divide 20 with 3 which equal to 6,666gr. At the final step, RS2 combines the information which the mass of one cube is greater than 6,67 gr and less than 8 gr, and finally RS2 can find the mass of one cube which is 7 gr. At this stage of completion, RS2 completes it properly and covers the reasoning cognitive domain.

Based on analysis of the research results, it can be inferred that:

At low ISI students, the mathematics achievement at a level significantly different from the average in knowing, applying and reasoning cognitive domain.

In applying cognitive domain, the low ISI students can select or determine an efficient strategy, substitution method, for solving system of linear equation problems. They also can generate equivalent representations. Not only select or generate equations, but the students also can implement the mathematical operations. In knowing cognitive domain, the low ISI students can recall number properties and notation.

The middle ISI students achieved a mathematics achievement higher than the low ISI students in knowing and applying cognitive domains. No middle ISI students achieve a high achievement in the reasoning cognitive domain.

The middle ISI students perform a high mathematics achievement in applying and knowing cognitive domains. They can recognize mathematical expressions and numbers.

The middle ISI students also can determine an appropriate operation for solving problems, generate equivalent representations for a given mathematical entity or relationship and execute a set of mathematical instructions.

The high ISI students get a high mathematics achievement. In the reasoning, knowing and applying cognitive domains, the high ISI students achievement comparatively higher than students in the low and middle Islamic Spiritual Intelligence. Only a high ISI students who can solve the reasoning problem. The high ISI students solve equations with the variable on each side of the equation, demonstrating an increased grasp of solving for unknown values. They can recall the terminology of mathematical notation by gather like terms and solve for an unknown.

Not only showing good achievement in knowing cognitive domain, but the high ISI students also have a good achievement in reasoning cognitive domain. They can determine and describe or use relationships between variables or objects in mathematical situations; make valid inferences from given information. They also can typically work with linear equalities and expressions.

CONCLUSION

The study result is in agreement with the previous studies which revealed that spiritual intelligence skills had a positive influence on students' academic achievement (e.g. Azizi and Zamaniyan, 2013; Azizollah, et al., 2013). Its mean that the spiritual intelligence affect academic achievement. In the knowing, reasoning, and applying cognitive domains, the high ISI students get comparatively higher mathematics achievement than students in the low and middle ISI. Only a high ISI students who can solve the reasoning problem.

SUGGESTION

Describing the profile of students mathematics achievement of eighth grade students based on high, middle and low ISI has supplied new insight into influential factors on achievement. In a current effort to further enhance student mathematics achievement both locally and globally, certain recommendations are provided. One recommendations would be to add other measures of achievement such as class ranking, grade point average (GPA), students attendance, or a combination of factors that would give a clearer measure of achievement, rather than what one standardized test provides..

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