Internalization of Islamic Moderation Value in Mathematics Problem Solving

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Abstract. Several studies have discussed the internalization of Islamic values in mathematics, including Islam and mathematics, internalization of Islamic values in mathematics learning with analogy strategies, mathematical analysis of the philosophy of the Quran, the secret of numbers in the Qur'an. However it has never been discused abaout the internalization of Islamic moderation values in mathematical problem solving. So this research is needed. Moreover, the phenomenon of Islam in Indonesia is currently shifting away from the image of moderate Islam and into a harsher conservative ideology. This is more worrying because it has entered the realm of education. For that it is necessary to internalize the value of Ilamic moderation in mathematical problem solving. One of the strategies that can be done to instill religious moderation values in mathematical problem solving is the analogy strategy. Facts, concepts, and principles in mathematics can be used a analogy to instill religious moderation values. In this study, describe some examples of the application of analogy strategies for internalizing Islamic value. This study uses the library method. The data obtained were publications of research artcles in scientific journals. The analyed articles include three stages, organizing, synthesizing and identifying. The results of data analysis show that the value of tasamuh in mathematics learning can be done through open ended problem solving. The characteristics of open ended problem is problem that have more than one solution and answer tolerance, so each student may have different and equally correct solutions and answers. This is in accordance with the principle of tasamuh value in Islamic moderation. Therefore, on classroom learning, the values of tasamuh can be implemented through open ended problem.

Keywords: Islamic, Mathematics, Moderation

1 Introduction

Internalizing the value of mathematics and moderate Islam needs to be done so that learning is more meaningful, beside the objective of national education emphasize tha affective/attitude domain in learning mathematics so that character education can be formed. There have been many studies on mathematics and the Qut'an, including Rashad Khalifa (1974), Ahmad Deedat (1979), Fahmi Basya (2003), Abdurrazzaq Naufal (2005), Abu Zahra an-Najdi (2006), Abah Salma Alif Sampayya (2007), Caner Taslaman (2010), Abdussakir (2017) on the Internalization of mathematics and the Qur'an. However, it has never been discussed about the Internalization of mathematics value in moderate Islam even though this is very important, because in recent years, there is a growing concern that Islam in Indonesia is shifting from the image of moderate Islam and becoming a harser conservative ideology. This can be seen from the number of persecution and act of violence against religious minorities such as Ahmadiyah, Shia, and Christians [1]. As the same time, there is a growing perception that mainstream Islamic organization such as Nahdlatul Ulama (NU) and Muhammadiyah, which have long advocated moderation and tolerance in Indonesia, are losing influence to newer and more conservative Islamic organizations such as Hizbut Tahrir Indonesia (HTI), and the Islamic Defenders Front

(FPI) [2]. Therefore, the internalization of moderate Islamic values must be given since school age through various lessons that allow it to appear in the affective domain, especially mathematics.

Curriculum facts show that mathematics learning is given in schools from elementary school to university level. However, the school curriculum has not found any internalization of moderate Islam in mathematics learning. On the other hand, this internalization is very important because the Internalization of moderate Islamic values can educate the nation accompanied by good morality, this is in accordance with the objectives of national education, namely increasing intelligence, knowledge, personality and noble morals [3]. Mathematics is very likely to be integrated with religious moderation because mathematics is a science of thinking, art, tools and language, which can be combined with other values [4]. When the moral values internalized in mathematics learning have been achieved, it will produce satisfaction from students and make them aware of the beauty of the mathematics they learn.

Some studies on the internalization of mathematics include La Jaama (2015) conducted a study on the internalization of the value of the truth of intentions and ways and sincerity through analogy, then. and Nihayati (2017) integrated Islamic values through set learning. Abdussakir (2017) conducted a study on the Internalization of mathematics and the Qur'an, in this paper it is explained about the Internalization of mathematics and the Qur'an into 6 aspects, namely (1) Developing Mathematics from the Qur'an, (2) Using Mathematics to Implement the Qur'an, (3) Using Mathematics to Reveal the Mathematical Wonders of the Qur'an, (4) Using Mathematics to Explain the Qur'an, (5) Using Mathematics to Convey the Qur'an, and (6) Teaching Mathematics with Qur'anic Values.

Hasim's research (2015) [5], in the study explained that moral values in elementary school PAI books issued by publishers have been guided by the content standards of the Ministry of Education and Culture, including aspects of aqidah, sharia and morals. However, the material in general still builds personal piety and has not built the social piety needed in order to build religious harmony and tolerance. Then Suharto's research (2017) [6] states that the role that Islamic educational institutions can play in the realm of religious moderation is the installation of moderate Islamic ideology to students in the learning process. There are three aspects that need to be considered in this installation, namely the emphasis on moderate Islam in formulating educational goals, internalizing moderate values in designing the curriculum, and filtering teaching materials so that moderate Islamic ideology can be instilled in students. Study that has integrated the value of religious moderation in learning includes Harto and Tastin (2019) [7], discuss the scientific approach in PAI learning where Islamic moderation is part of the learning. Some of these study have attempted to integrate the values of religious moderation in education and learning, but there is no study that specifically discusses the internalization of moderate Islamic values in mathematics learning, so this study is important to carry out.

Islamic moderation according to NU is supported by the following doctrinal trilogy; al-tawwassut (moderate or middle way), i'tidal (straight path, not leaning to the left or right), and al-tawazun (balance, justice in treating worldly affairs and the hereafter). The concept of al-tawassut comes from the Qur'an verse (2:143), i'tidal comes from the Qur'an verse (5:8), and al-tawazun comes from QS al Hadid: 25. The manifestation of the principles and characteristics mentioned above, according to several NU kiyai, must be explicitly exposed in all key aspects of Islam such as aqidah, Islamic law, tasawwuf, akhlaq, social ethics, muamalah, culture and civilization and Islamic da'wah (education). This opinion is complemented by Ali who defines moderate Islam as "those who do not share the hard-line visions and actions" [8]. He states that moderate Islam in Indonesia refers to Islamic communities that emphasize normal behavior (tawassut) in implementing the religious teachings they uphold; they are tolerant of differences of opinion, avoid violence, and prioritize thinking and dialogue as a strategy. Meanwhile, Afrizal Nur and Mukhlis put forward a more detailed concept of moderation, namely [9]:

a. Tawassuth (taking the middle path), which is an understanding and practice that is not ifrath (excessive in religion) and tafrith (reducing religious teachings).
b. Tawazun (balance), namely understanding and practicing religion in a balanced manner that covers all aspects of life, both worldly and ukhrawi, firm in stating principles that can distinguish between inhira, (deviation,) and ikhtilaf (difference).
c. I'tidâl (straight and firm), namely putting things in their place and exercising rights and fulfilling obligations proportionally.
d. Tasamuh (tolerance), which recognizes and respects differences, both in religious aspects and various other aspects of life.
e. Musawah (egalitarian), which is not discriminating against others due to differences in beliefs, traditions and origins.
f. Shura (deliberation), namely every problem is resolved by deliberation to reach consensus with the principle of putting the benefit above all.
g. Ishlah (reform), which prioritizes the reformative principle to achieve a better situation that accommodates the changes and progress of the times based on the public good (mashlahah 'ammah)

while adhering to the principle of al-muhafazhah 'ala al-qadimi al-shalih wa al-akhdzu bi al-jadidi al-ashlah (preserving old traditions that are still relevant, and applying new things that are more relevant).

h. Aulawiyah (prioritizing the priority), namely the ability to identify matters that are more important to be prioritized for implementation compared to those of lesser importance.

i. Tathawwur wa Ibtikar (dynamic and innovative), which is always open to making changes for the better.

Based on the views on moderation above, this study takes one aspect of the discussion, namely tasamuh / tolerance, which means mutual respect for others who are different culturally, linguistically, ethnically, politically and religiously [10].   In addition, tasamuh is often paired with the term tolerance, which has become the latest term for the relationship between two parties that are different in idiology and concept. The terms tasamuh and tolerance are substantively and terminologically different, but they are still used in religious, socio-cultural and political contexts as an implication of cultural mixing.

The author interprets tasamuh/tolerance as an attitude of mutual respect for others despite different religions, ethnicities and cultures, so that everyone can have different views on one issue, in learning mathematics the concept of tolerance is similar (analog) to the principle of open ended problem solving. The type of problem used in open ended learning is open on the basis that the process is open, end products are open and ways to develop are open. The process is open, meaning that the type of problem given has many correct ways of solving. So it allows the answers between one student and another student to be different. The end result is open, meaning that the type of problem given has many correct answers (multiple), so that the truth of the answer is not single, in this case students who answer differently are still given tolerance as an equally correct answer. while the way of further development is open, namely when students have finished solving the problem, they can develop new problems by changing the conditions of the first (original) problem [11].

Based on the above background, this study aims to explore more deeply the Internalization of mathematics values in moderate Islam with the concept of tasamuh (tolerance), the value of mathematics in this case is in the context of open ended problem solving in schools. By knowing the Internalization of tasamuh and math values, it will be easier to practice in learning at school.

2   Method

The method used in this study is library research. Researchers conducted a study of knowledge, ideas, or findings contained in the literature related to the value of mathematics and moderate Islam. The study data is secondary data in the form of research results in the form of scientific journals. Furthermore, data analysis techniques include 3 stages, namely, organize, syntesize, and identify [11]. The first step, organize, is to organize the literature that will be used. The literature was reviewed to make it relevant to the problem. At this stage, the author searches for ideas, goals, and conclusions from several literatures. Second, synthesize, which is uniting the results of the literature organization into an orderly summary, and looking for connections between the literature. Third, identify the issues of controversy or substance from the literature. The point is the issues that are considered very important to analyze, summarize the substance of the literature and can be drawn an important and new conclusion so as to get an interesting writing to read. Then to bring up the internalization of mathematics and the value of tolerance using analogy strategies by connecting facts, concepts, and principles in mathematics. Polya (1954) stated that the word analogy comes from the Greek "analogia" which means proportion. According to Polya (1954), analogy is related to similarity. In the Big Indonesian Dictionary, analogy is defined as a similarity or correspondence between two different objects or things. Cambaridge Advanced Learner's Dictionary & Thesaurus defines analogy as a comparison between objects that have similar features, and is often used to help explain a principle or idea. To say that two things are analogous is because they can be compared in their corresponding aspects. Analogy has been widely used by Christian mathematicians to explain religious concepts, especially those related to transcendent aspects (Williams and Dickerson, 2004) and has become one of the strategies to explain the values of faith in Christianity (Taylor, et al. 2001). For example, Taylor et al (2001) use the analogy of an angle to explain the relationship between people. In an angle, the closer two points are to the corner point, the closer the distance between the two points. The analogy is that the closer two people are to God, the closer the relationship between the two people. In this study, some examples of the application of analogy strategies for internalizing moderation values are described.

3 Discussion

Polya (1954) stated that the word analogy comes from the Greek "analogia" which means proportion. According to Polya (1954), analogy is related to similarity. In the Big Indonesian Dictionary, analogy is defined as a similarity or correspondence between two different objects or things. In this case, it is the correspondence between the concept of tolerance and an example of internalizing the value of Tasamuh (Tolerance) in solving mathematical problems of linear equations of two variables.

Table 1. Examples of internalizing the value of Tasamuh (Tolerance) in solving mathematical problems of linear equations of two variables.

Problem	Alternative Solution	Description
A cow for Qurban weighs 360 kilograms, if someone wants to Qurban with goats that equal the weight of the cow, how many goats are needed so that the total body weight is equal to the weight of the cow?	**Answer 1** Students can suppose that the weight of the goat is equal to 30 kg and perform trial and error with repeated addition as follows: $30 + 30 + 30 + \ldots + 30 = 360$ (12 goats required) **Answer 2** Students who are quite familiar and skillful with the concept of division, can directly use division ie: $360 : 30 = 12$ so 12 goats with a body weight of 30 kg each are required.	The problem is a math problem, which has many alternative answers. in this case it can use the concept of repeated addition. The problem is a math problem, which has many alternative answers. In this case, it uses the concept of division.
Make different representations of $1 + 1$ and 8: 2!	$\triangleright \quad 1 + 1 = 2$ $\qquad\qquad\qquad\qquad =$ 1×2 $\qquad\qquad\qquad\qquad =$ $11 - 9$ $\triangleright \quad 8 : 2 = 4$ $\qquad\quad = 2 \times 2$ $\qquad\quad = 9 - 5$	Alternative solutions are two or more fractions that have the same value even though the numbers of the fractions are different Like $2 + 2$ has the same value as $3 + 1$, both produce the same number.
Find the equations $x + 3y = 7$ and $2x + 2y = 6$. Find the sum of their solutions!	a. Substitution Method Solution: $x + 3y = 7$ $<=> x = -3y + 7$ ….(1) Then, plug equation (1) into equation (2) to find the value of y $2x + 2y = 6$ $<=> 2 (-3y + 7) + 2y = 6$ $<=> -6y + 14 + 2y = 6$ $<=> -6y + 2y = 6 - 14$ $<=> -4y = -8$ $<=> y = 2$ Use either equation (1) or (2) to find the value of x $x + 3y = 7$ $<=> x + 3 (2) = 7$ $<=> x + 6 = 7$ $<=> x = 1$ So, HP = { 1 , 2 } b. Elimination Method Given two equations $x + 3y = 7$ and $2x + 2y = 6$, determine the HP of these equations! The first step is to do elimination by subtracting to eliminate the variable or coefficient x to find out the value of y $\underline{2x + 2y = 6}$: 2 $<=> x + y = 3$ Then, do $x + 3y = 7$ $\underline{x + y = 3}$ _ $2y = 4$ $y = 2$ The next step is to do elimination by subtracting to eliminate the variable or coefficient y to find out	There are several methods that can be used in solving problems in addition to the methods of substitution, elimination, mixture and graphics.

Problem	Alternative Solution	Description
	the value of x 2x + 2y = 6 | x3 | < = > 6x + 6y = 18 x + 3y = 7 | x 2 | < = > <u>2x + 6 y = 14</u> _ 4x + 0 = 4 x = 1 So, the resulting solution set is the same HP = { 1 , 2 } c. Mixed Method (elimination and substitution) Given two equations x + 3y = 7 and 2x + 2y = 6, determine the HP of the equation! The first step is the elimination method, to find the value of x 2x + 2y = 6 | x3 | < = > 6x + 6y = 18 x + 3y = 7 | x 2 | < = > <u>2x + 6 y = 14</u> _ 4x + 0 = 4 x = 1 Next, substitute the value of x into one of the equations x + 3y = 7 < = > 1 + 3y = 7 < = > 3y = 7 – 1 < = > 3y = 6 < = > y = 2 Then the result is the same HP = { 1 , 2 } d. Graphing method Draw the graphs of the equations x + 3y = 7 and 2x + 2y = 6, and determine their intersection points. From the figure above, we can see that the intersection point is at the point { 1 , 2 } and in other words HP = { 1 , 2 }	

Table 1 above is an example of a math problem that has more than one alternative answer, so the problem is an open ended problem [11]. This is also supported by the opinion that Open ended is Innovative learning, because the learning is carried out by discussing problems or problems openly with various solutions [12].

The results of research on open ended in math problem solving include Al-Absi[13] in his research mentioned that students who use an open-ended approach can be the most successful in all aspects. Murni (2013) explained that open-ended approaches and questions can give students freedom in giving their expressions, utterances, and opinions in order to improve their thinking skills.

The author needs to integrate the open ended nature of math problem solving with the value of tasamuh/tolerance. This is in line with the opinion of Afrizal & Mukhli who stated that tasamuh is an attitude of recognizing and respecting differences, both in religious aspects and various other aspects of life [9]. While open ended is a math problem that is possible with different solutions and answers [11].

The example of table 1 is the internalization of tasamuh in solving open ended math problems. The tasamuh included in the example of mathematical problems in table 1 above is shown from each mathematical problem has an alternative solution and more than one answer, so that in tasamuh it is a difference in view / opinion of an object, in this case the object referred to in mathematical problems.

Furthermore, tamasuh needs to be integrated in every mathematics lesson through the Internalization of the mathematics curriculum, starting from elementary, junior high, high school, to higher education. This is in accordance with the national education aims to develop the potential of students to become human beings who

are faithful and devoted to God Almighty, noble, capable, creative, independent, and become democratic and responsible citizens [14].

In addition, the attitude of tasamuh owned by students can avoid intolerant attitudes, which have been a concern for the Indonesian nation, such as attitudes that consider Pancasila irrelevant to the condition of the nation, intolerant attitudes towards different understandings, instead what is expected from the values of tasamuh is that students have an attitude of mutual respect for other people who are different both culturally, linguistically, ethnically, politically and religiously [10].

4 Conclusion

Based on the discussion, it can be concluded that the internalization of the value of Tasamuh (Tolerance) in solving mathematical problems of linear equations of two variables can be done through open ended problem solving. the characteristics of open ended problems are problems that have more than one solution and answer tolerance, so that each student may have different and equally correct solutions and answers. this is in accordance with the principle of tasamuh value in Islamic moderation. For this reason, in class learning can implement the values of tasamuh through open ended problems

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