



## Learning mathematics through Islamic Nusantara culture: An ethnomathematics study in Indonesia

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### ARTICLE INFO

#### Article History

*Received:*

23 October 2019;

*Revised:*

4 May 2020;

*Accepted:*

4 February 2020

#### Keywords

Islamic Nusantara;

Ethnomathematics;

Mathematics

### ABSTRACT

This study discusses the study of Islam Nusantara culture in mathematics learning. This research uses library method. The data obtained is a publication of research articles in a scientific journal. The article analyzed includes three stages, namely organize, synthesize, and identify. The results of data analysis show that: 1.) Culture of Islam Nusantara can be used to teach a concept in learning mathematics; 2.) This culture can be used as material in strengthening character education; and 3.) This culture can develop the ability of cultural literacy.



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### INTRODUCTION

One of the skills of the 21st century is literacy (Nopilda & Kristiawan, 2018). This ability is very important for students to have in the future. In response to the Government of the Republic of Indonesia, "Gerakan Literasi Nasional" program was launched. There are 6 basic literacies, one of which is cultural literacy. Cultural literacy is the ability to understand Indonesian culture as a national identity. Understanding means knowing and being able to make culture as a context in learning. Culture is used as a material instrument in learning, so there are efforts to give and strengthen character values to students. One of the characters that can be given is the character of love for the nation. This effort supports the government's program to strengthen character education in schools. Then it can be said that culture-based learning is very important towards strengthening school character education for students. this is one of the reasons for ethnomatematics. It is hoped that mathematics learning will be joyfull. Some research related to ethnomatematics, many related to general and universal culture. Through this paper, the author will study and discuss ethnomatematics through religious culture, namely Nusantara Islam. The aim is that this paper can be used as a reference for developing cultural and religious-based mathematics learning.

### METHOD

The method used in this study is a research library. The study conducted a study of knowledge, ideas, or findings contained in the literature related to ethnomathematics (culture of Islam

Nusantara) in mathematics learning. Furthermore, data analysis techniques consist 3 stages, namely organize, synthesize, and identify (Richardo, 2017). organize is collecting literature that will be used to be relevant to the problem. At this stage, the authors search for ideas, goals, and conclusions from some literature. synthesize is summarizing the results of the interrelationship between literature into a summary. Identify interesting issues in the literature. interesting means the issue that is considered very important to be analyzed, so as to get interesting writing to read.

## FINDINGS AND DISCUSSION

### Learning Through Ethnomathematics

Ethnomathematics is the science of studying community culture, historical relics related to mathematics and mathematics learning (Richardo, 2017). Ethnomathematics is the science of studying community culture, historical relics related to mathematics and mathematics learning (Richardo, 2017). Another definition, ethnomathematics is mathematics practiced by cultural groups, indigenous peoples and others (Richardo & Martyanti, 2019). Thus, ethnomathematics is the study of knowledge about cultural groups, historical relics, indigenous peoples, and others related to mathematics and mathematics learning. In terms of learning, ethnomathematics is an approach to learning mathematics with cultural content (Martyanti & Suhartini, 2018). this approach, directing students to concrete situations (Nadlir, 2014). so, learning mathematics is not just remembering a formula of a concept, but rather to construct a concept through a real context. This is in accordance with the innovative learning model of Indonesian realistic mathematics learning (PMRI). its characteristics use contextual problems to build students' mathematical understanding (Misdalina, Zulkardi, & Purwoko, 2009). So that PMRI learning through culture can develop creative thinking abilities, innovative students in learning mathematics (Irawan & Kencanawaty, 2017). Through this learning, they will have skills in understanding, analyzing, and solving problems (Cahdriyana, Richardo, Fahmi, & Setyawan, 2019).

In terms of character values, ethnomathematics provides learning for students to have the character to respect and love the nation by knowing its culture and history. this is because there is a cultural literacy activity in learning activities. So culture-based learning can be used as a reinforcement of character education. Another literacy ability, namely mathematical literacy. Mathematical literacy is the ability to use mathematical knowledge to solve everyday problems better and more effectively. Mathematical literacy can help individuals to recognize the role of mathematics in the real world and as a basis for consideration and determination of decisions needed by the community (Sari, 2015; Abdullah & Richardo, 2017).

### Islam Nusantara

Islam Nusantara is a religion contained in the Al-Qur'an and Hadist that is practiced by the Prophet Muhammad, followed by the people of Indonesia (Luthfi, 2016). Another definition, Islam Nusantara is Indonesian Islam, a combination of theological values with the values of cultural traditions. The character of Islam Nusantara shows local wisdom that does not contradict Islam, but synergizes the teachings of Islam with local culture that is widely spread throughout Indonesian territory (Astuti, 2018). The cultural context of Islam Nusantara can be found through the practice of worship, social relations between humans and so on. For example, a santri respect to the kyai when shaking hands. The santri walked by bowing while kissing his hand. This is a culture in Islam that is practiced by the people even without written roles (Astuti, 2018). But this is an implementation of Islam in the context of respecting religious teachers. So that the values of the archipelago is a culture not in contradiction with Islam.

### Learning Mathematics Through Islam Nusantara

This article discusses the values of Islam Nusantara that can be used as content in mathematics learning. These values are: 1.) Mathematics learning with Musofahah (shaking hands) cultural content between Santri and Kyai; 2.) Mathematics learning with Tahlilan cultural content.

*Mathematics Learning with Musofahah Content Between Santri and Kyai*

Mushofahah between santri and kyai is done by shaking hands and kissing the hands of a kyai (Hasanah & Rivaie, 2015). Not only that, even sometimes, santri walked to Kyai in a squatting position and kissed his back and palms back and forth. How to shake hands this is a culture of students who apply the concept of Islam Nusantara. Kyai is someone who has expertise in religious knowledge and services in fostering people to become role models in society (Kosim, 2012). While the santri are students.



Figure 1. *Mushofahah* between Santri and Kyai

The picture is a *mushofahah* culture between santri and kyai. The *mushofahah* is a form of respect, appreciation from the santri for the kyai. If it is associated with learning, especially mathematics, then this can be used as a context in factorial concepts. This concept can be used to determine the number of sequences related to shaking hands, with the following problem. Three santri visited the pesantren (a place where a santri studied) to meet his kyai. When they arrived at the kyai's house, they said their greetings and shook their hands by kissing them back and forth on their backs and palms. Determine:

1. How many sequences of mushofahah are there between santri and kyai
2. How many mushofahah?
3. And show what is the character value in the context of the problem?

To solve these problems, a strategy can be used:

Strategi Penyelesaian			Banyak Cara	Jumlah Mushofahah	
Kyai ←	Santri A	Santri B	Santri C	Cara Pertama	3
Kyai ←	Santri A	Santri C	Santri B	Cara Kedua	3
Kyai ←	Santri B	Santri A	Santri C	Cara Ketiga	3
Kyai ←	Santri B	Santri C	Santri A	Cara Ke Empat	3
Kyai ←	Santri C	Santri A	Santri B	Cara Kelima	3
Kyai ←	Santri C	Santri B	Santri A	Cara Ke Enam	3

Figure 2. Answer Strategy

Based on the strategy, then we can answer that question

1. There are 6 ways to order mushofahah between santri and kyai. The problem can be solved by using a factorial concept :  $3! = 3 \times 2 \times 1 = 6$
2. The number of Mushofahah is 18
3. The character value contained in the context of the problem is Religious Value.

Determination of the character value is based on Permendikbud Number 20 of 2018. The religious value is the students kissing the hands of the clerics. the aim of respecting, appreciating the goodness and knowledge is a virtue in Islam.

### Mathematics Learning with *Tahlilan* Culture

*Tahlilan* is a ritual performed by most muslims in Indonesia to commemorate and pray for people who have died. *Tahlilan* is usually done on the first day of death of a person until the seventh day. Then proceed to the 40<sup>th</sup> day, 100<sup>th</sup> day and so on, even to the 1000<sup>th</sup> day of his death. *Tahlilan* ritual is done by reading the words of praise to God, reading the verses of the Holy Qur'an and certain prayers together (Warisno, 2017).



Figure 3. Ritual of *Tahlilan*

This ritual is also in order to give alms to others. Alms is usually a basic human need. The goal, so that people who die get the good from alms. Here, there is the concept of alms to humans. This concept has value as a reinforcement of character in learning, and has contextual value in learning mathematics. The concept of alms is related to the concept of arithmetic operation, with the following problems. A few hours ago, Mrs. Tuti had a disaster that her husband had died. Mrs. Tuti planned to hold a *tahlilan* event at her home. He has invited 40 of his neighbors to attend the event. Most of the neighbors are poor people. He has also prepared 40 food packages to give to his neighbor. The price of 1 meal package is Rp. 50,000, if every alms is multiplied to 10 times, determine:

1. What is the value received?
2. And show what is the character value in the context of the problem?

Solving the problem using the concept of arithmetic operations.

1. We can write  
 1 package for Rp. 50,000 and the number of packages = 40  
 So the value of alms is  $40 \times \text{Rp. } 50,000 = \text{Rp. } 2,000,000$   
 The value of alms is multiplied 10 times,  
 then  $\text{Rp. } 2,000,000 \times 10 = \text{Rp. } 20,000,000$

2. Character values contained in the context of the problem are: 1.) Religious value, this value is seen from the belief in God, that a good will get a multiple reward; and 2.) Value of concern, this value is seen from the behavior of giving to fellow human beings.

### CONCLUSION

Based on these descriptions, the authors conclude: 1.) The culture of Islam Nusantara can be used as a context to teach a concept in mathematics learning; 2.) This culture can be used as material in strengthening character education; and 3.) This culture can develop abilities cultural literacy. Suggestions for readers and researchers, to conduct further related studies, so as to produce mathematics learning materials on the basis of Islam Nusantara.

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