



Exploration of cultural values for learning mathematics in elementary school

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Abstract: Mathematics learning need to be innovated in order the learning objectives of mathematics can be achieved effectively. One of the innovations that can be done is utilize Javanese cultural products which can be in the form of artifacts, building forms, shapes of objects, traditional food, batik motifs, traditional games and others in learning mathematics. Besides being able to learn mathematics well, students can also get to know a culture that is getting forgotten. Lots of Javanese cultural products that can be used in learning. If the Javanese culture product can be utilized properly in mathematics learning, it will create meaningful learning for students.

Keywords: ethnomatematics, mathematics learning, elementary school

Citation: Rudyanto, H.E., Kartikasari, A., & Pratiwi, D. (2019). Exploration of cultural values for learning mathematics in elementary school. *Proceeding Internasional Seminar of Primary Education*, 2, 46 – 51.



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INTRODUCTION

Mathematics is considered a difficult subject for students, including elementary school students (Rudyanto, et al., 2018). Rudyanto's research results (2018) revealed that 27.74% (38 out of 135 respondents) described mathematics as a difficult subject. One contributing factor is the teacher does not associate learning with everyday life so learning seems meaningless. Though mathematics is important for students to solve problems of daily life. For example, to count yields, sell, calculate discounts (Marchis, 2011). So, the teacher's job is to create meaningful learning. That way students will realize that mathematics is important to learn, so students will gradually love mathematics.

Innovative learning needs to be done in learning mathematics (Rudyanto, 2014; Marsigit, et al, 2018), so that mathematics can be learned by students in a fun and not boring way. One strategy that can be applied is to utilize cultural products for learning mathematics. Cultural products can be in the form of artifacts, traditional food, traditional games, batik motifs, buildings, and so on. Mathematics and culture can be linked in a special setting called ethnomatematics (Albanese & Perales, 2015).

The purpose of ethnomatematics is to understand the relationship between mathematics and culture, so students and the general public can understand and mathematics becomes easier to understand (Abdullah, 2017). In other words, ethno-mathematical studies very important in studying anthropological culture (ethnography), mathematical modeling and mathematics itself. In addition, one of the other ways to utilize ethnomatematics knowledge in learning in schools is to make ethnomatematics as reference material in the delivery of material and making contextual problem solving questions that are appropriate to students' cultural backgrounds. Culture-based mathematics learning does not mean making the subjects of society (students) go back to the past, but how culture that has become a national identity can continue to survive adjusting developments (Supriadi, et al. 2016).

Regarding culture, Indonesia has 17,504 islands, 1360 tribes, 726 languages, 250 million inhabitants. Of the many, there is one unique culture and is one of the largest in Indonesia, namely Javanese culture. Javanese culture has cultural values that have a specific characteristic compared to other cultures including customs which are polite, gentle, and polite manners and have many cultural products in the form of artifacts, food, pottery, building forms, traditional games, all of which can be used in learning by utilizing culture, especially in learning mathematics. Ghufon (2018) states cultural values include artifacts (works), habits, and character. By integrating through the exploration of these cultural values into learning, students will learn mathematics while learning about culture, especially Javanese culture, which they may begin to leave behind. The character of loving culture can also be instilled through learning mathematics. Because basically the cultivation of character needs to be instilled since elementary school (Rudyanto & Retnonongtyas, 2018). Mathematical activities that can be carried out for example by observing artifact forms such as traditional food (jadah, mendut, jenang, cone, etc.), shapes of buildings (joglo, temples, other cultural relics), crafts (pottery, caping, tumbu, ebor, etc.) which looks like a flat shape or a geometric shape, the teacher can utilize the product in mathematics learning by identifying the characteristics or characteristics of the shape, circumference, area, or volume. So that students are more enthusiastic in learning mathematics.

DISCUSSION

Learning Mathematics in Elementary School

Mathematics is studied so that students have one ability, namely problem solving (BSNP, 2007). Problem-solving abilities possessed by students must be able to be used to face problems in daily life. Then the teacher must create an atmosphere of learning that supports these goals, where the main concept of learning mathematics RME is human activity

(Shanty, 2016; Prahmana et al., 2012). This is in line with the stage of child development which, according to Piaget, is included in the concrete operational stage. Where elementary school children are still bound in terms of things that are concrete in learning. So learning should associate with real life problems.

Ethnomatematics

The intersection between mathematics, cultural anthropology and mathematical models is called ethnomatematics (Rosa & Orey, 2013). In principle, mathematics and culture are related to one another. The purpose of ethnomatematics according to Abdullah (2017) is to understand the relationship between mathematics and culture so that people and students can understand mathematics more easily. Ghufroon (2018) states cultural values include artifacts or works, customs, and nobility. These three aspects can be a part of mathematics learning so that mathematics learning can be achieved holistically. Examples of Javanese cultural ethno-mathematics are as follows.

Estimation of Measurement

Estimation in measurement of length: *kilan*, *depa*, *siku*, etc. Estimation in height measurement: *sak dengkul*, *sak bangkekan*, *sak ugel-ugel*, etc. Size of rice field: *sebau*, *sak hektar*, *sak wolon*, *sak ru*, etc.

Traditional games

Mathematical concepts as a result of play activities are related to grouping, counting or numerating activities, and others can be revealed from each of these games having mathematical concepts. In Javanese society there are various traditional games that are often played by children and even adults. In the game has mathematical concepts for example as follows: 1) *Engkleng*: square and rectangular models; 2) *Bekelan*: numerating, adding, and subtracting numbers from 1 to 5; 3) *Lompat Tali*: the concept of straight lines and curved lines; 4) *Berman Pasir*: the concept of building space; 5) *Pasaran*: social arithmetic concepts, including currency values and integer operations; 6) *Delikan*: the concept of counting numbers from 1 to 10; 7) *Dakon*: the concept of addition, subtraction, multiplication and division of integers.

Traditional games

The mathematical concept as a result of the activities of designing tools and making patterns contained in pottery and traditional equipment is an example of the ethnomatematics of Javanese society, including the shape of a half-ball ebor with a circular patterned edge, a round shaped circle, a ellipse-shaped entong, cone shaped capil, and kelasa shaped rectangular, and other cultural relics that have geometric shapes.



Figure 1. Layah



Figure 2. Ebor

Mathematics learning based on ethnomatemics

Ethnomatemics which have been studied previously are then implemented in mathematics learning. Marsigit (2015) at the preparation stage the teacher must prepare a learning environment and plan mathematical activities. So, the math product must first be prepared by the teacher. Can be in the form of observing product images or direct observation of the product. For example, we take the example of material to build space. Then the teacher can take advantage of cultural products in the form of crafts such as *caping* that resembles the cone shape.



Figure 3. *Caping*

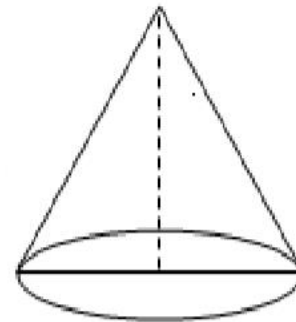
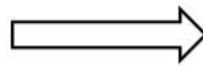


Figure 4. cone

Through observation in the form of visual (visual) media or direct observation, students can carry out activities identifying the characteristics of *caping* that resemble conical shapes. In addition students can also determine the volume of *caping* by determining the area of the base and height first. And there are still many cultural products that can be utilized in the learning process. For example, traditional foods (*jadah*, *mendut*, *jenang*, etc.), building forms (*joglo*, temples, other cultural relics), handicrafts (pottery, *caping*, *tumbu*, *ebor*, etc.) in the form of resembling a flat shape or a space build, the teacher can utilize the product in mathematics learning by identifying the characteristics or characteristics of the shape, circumference, area, or volume. As identified by Rudyanto, et al. (2019) follows

Table 1. Examples of ethnomatematics in the context of traditional foods and their learning

Food Names	Information	Mathematics Learning
 Source: google	Jadah The name of the food is <i>Jadah Ketan</i>. <i>Jadah</i> is a traditional food derived from glutinous rice that is cooked with shredded coconut after it is cooked set / pounded until smooth after it is cut. The shape resembles that of a cube chamber	Through observing the traditional food forms of <i>Jadah</i>, students can identify the characteristics or characteristics of the <i>Jadah</i> shape and the volume of the <i>jadah</i> that resembles the cube shape.
 Source: Google	Getuk Lindri <i>Getuk Lindri</i> (gethuk lindri) is a food in the form of market snacks made from the main ingredient of cassava and refined sugar and colored and usually served with grated coconut. <i>Getuk lindri</i> is a modification of <i>getuk</i> or <i>gethuk</i> cake which is only made from cassava with finely ground brown sugar and then it is sliced. <i>Gethuk lindri</i> is a traditional Javanese cake and is widely available in traditional markets.traditional.	Through food observation activities <i>Getuk lindri</i> which looks like a square and rectangle students can identify the characteristics of the building, measuring the circumference of the building, and area of the building.

The ethnomathematics-based mathematical activities enable students to learn mathematics while learning about culture. In addition students can easily understand mathematical concepts so that mathematics is meaningful to students. Therefore the teacher must always innovate so that mathematics learning is more enjoyable (Marsigit et al, 2018). Culture-based learning aims so that students can understand mathematics easily (Abdullah, 2017). What happens now is that mathematics is not liked by students because of the mathematics material itself. Material that is difficult to understand certainly has many factors. It could be due to lack of innovative learning methods, inappropriate delivery of material, no use of instructional media, no mathematical activities in learning, learning does not consider student characteristics. Then the teacher factor becomes important. Teacher factors influence students' attitudes towards mathematics. Certainly need to get attention for mathematics teachers at this time is a paradigm shift from the teaching paradigm to the learning paradigm (Marpaung, 2003)

CONCLUSION

Ethnomathematics-based mathematics learning can create meaningful learning because it is associated with life contexts. Utilizing existing cultural products enables students to learn mathematics more easily and naturally students will get to know their culture which is getting forgotten due to the rapid development of technology. Learning must facilitate students to provide the broadest possible space so that learning objectives can be achieved (Rudyanto, 2013).

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