

Etnomathematics On Equipment Of Kebo-Keboan Alasmalang Traditional Ceremony

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Abstract—Ethnomatematics is a habit and customs in a community group and there is a mathematical concept without being realized by the community. This research was conducted in Alasmalang village, especially Krajan Singojuruh Banyuwangi hamlet. The purpose of this study was described about ethnomatematics of the Traditional Ceremony of Kebo-Keboan Alasmalang with the subject matter of congruence and similarity. This research was belonging of qualitative research with an ethnographic approach. The object of this research is all the equipment that must be available for the implementation of the ceremony. Data sources in this research are the head of Kebo-Keboan Traditional Institue and buldrah. There are 3 methods were used to collecting data, observation, documentation and interviews. The results of data's collection will be analyzed and presented descriptively. The results of this study showed that there are mathematical concepts in the form of point and line, angle, two dimentional figure, congruence and similarity, three dimentional figure, and reflection.

Index Terms— Ethnomatematics, Kebo-Keboan Traditional Ceremony, Traditional Ceremony, Alasmalang

1 INTRODUCTION

MATHEMATICS is considered as difficult subject and unusual. Neither geometry is one of the topics on learning mathematics which is considered difficult by most of students [1]–[5]. This unchanging assumption encourages educators to work harder to finding some interesting ways in learning mathematics specifically geometry[6]–[9]. One of the newest recently used is related with the culture. Learning mathematics with the culture will definitely increase interest and changing the way of students to learn about mathematics has nothing connection with day life and culture. Mathematical elements in a culture are called ethnomatematics. Ethnomatematics are formed because of the relationship between types of socio-cultural groups with mathematics or mathematical expressions in socio-cultural groups [2]–[4], [10]. Ethnomatematics is practiced by certain cultural groups, workers, children from certain classes of society, professional classes, and others [11]–[15]. Ethnomatematics based on learning is considered more effective and makes mathematics more real than school mathematics learning [13][11]. Learning mathematics must have an open mind and not be closed to concepts found in school academic mathematics. freedom of thought from students is needed to see mathematics from all sides and help them in the process of understanding mathematics [16]. The culture that can be used is very diverse, one of which is the Traditional Ceremony of Kebo-Keboan Alasmalang, Banyuwangi.

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The Traditional Ceremony of Kebo-Keboan Alasmalang aims to clean the village and give thanks for the harvest and safety of the village to avoid all evil and be given peace, comfort in life [8][9]. Based on what has been described, the research on ethnomatematics in the traditional ceremony of kebo-keboan in the problem of geometry.

2 METHOD

The purpose of this study is to describe ethnomemematics in traditional kebo-keboan ceremonies and their manufacturing activities. This research is a qualitative research with ethnographic approach. The ethnographic research approach is an activity that describes a culture, whose main purpose is to understand life view from the perspective of the native population [19]. The research area is Krajan Hamlet, Alasmalang Village, Singojuruh District, Banyuwangi Regency. Data collection will be done by 3 methods, namely observation, interviews and documentation. Observations are made by 3 observers and interviews will be conducted on 2 speakers. The guest speaker was the Chairperson of the Kebo-Keboan Customary Institute Alasmalang and Buldrah (leader of the Kebo-keboan traditional ceremony). The research instrument used consisted of observation guidelines and interview guidelines which were validated by 2 validators, namely 2 Mathematics Education lecturers, Faculty of Teacher Training and Education, University of Jember. The guidelines are declared valid if $1,5 \leq V_a \leq 2$ is obtained, and based on the validation conducted, the guidelines for observation and interviews are used valid with the results of $V_a = 2$ on a scale of $1 \leq V_a \leq 2$.

3 RESULTS AND DISCUSSION

The study was conducted on 10 objects which are the main devices of the Kebo-Kebo Alasmalang Traditional Ceremony. These 10 objects include: palawija gates, puddles, plants mountain, cones, Dewi Sri chariots, singkal, teter, keboan horns, keboan necklaces (kluthuk), and farmer's hats. This is an explanation of ethnomatematics available in the Alasmalang traditional ceremony

1. Palawija Gate



Fig. 1. Example of Palawija Gate

Palawija Gate is built on four corners of the road or intersection in the hamlet of Krajan. 11 palawija gates are made by each RT. Because RT is only 11 and if 11 gates are built in four corners of the hamlet, they will have different amounts, so the committee adds 1 gate to be built. 12 gates were built each of 3 for each direction.

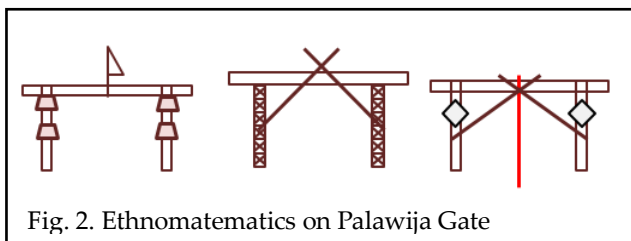


Fig. 2. Ethnomatematics on Palawija Gate

Three examples of palawija arches have ornaments whose shapes are two-dimensional geometric shapes, including trapezoidal, rhombic, square. On the other hand, the Alasmalang village community also emphasized the beauty and neatness in its manufacture so as to produce ornaments that have the same size and shape on each side.

2. Kubangan Puddles

The function of the puddle is as a place to plow the fields which is located in front of the Kebo-keboan cultural home (RBK). Stagnant water is made with the size of rice fields commonly used by the Alasmalang community. A puddle of

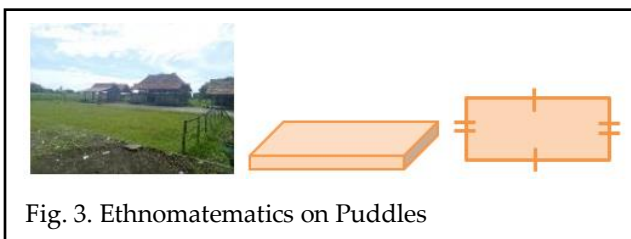


Fig. 3. Ethnomatematics on Puddles

water forms a flat wall with a height of about an adult calf.

3. Plants Mountain

Mountain yields are symbolized by village alms carried out by the Alasmalang Village Community. This will be sent with vegetables harvested by farmers and will be carried around the village. The mountains of agricultural produce form a cone with the center flanked by 2 bamboo poles used to carry the mountains around the village. In this section there are concepts of flattening, circles, and cones. Uniquely, people use poles and form a square in the middle to flank mountains.

The choice of a square shape is believed to be because if the square circle and the middle of the cone will not be shaken when carried around. With this, people have done mathematical thinking in which circles have the same diameter

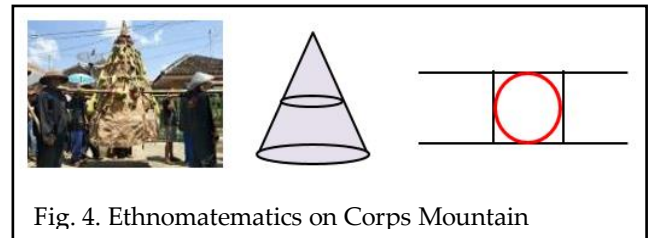


Fig. 4. Ethnomatematics on Corps Mountain

so that the shape that is best suited for flanking a circle is a square.

4. Cones

The traditional Kebo-keboan ceremony is preceded by safety before H. The next day, the activity will be opened at the junction of the hamlet where the opening is done by presenting cone cones that are equipped with pecel pithik with other side dishes. Stumps are made according to guests who come in cone shape. One cone uses 1-1.5 kg of rice with a capacity of 4-7 people.

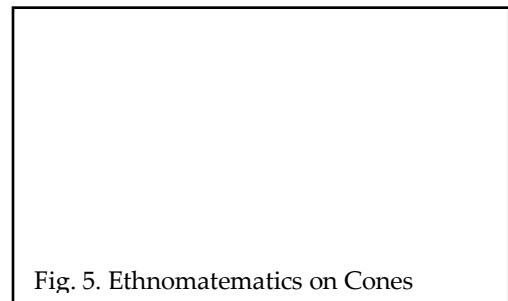


Fig. 5. Ethnomatematics on Cones

5. Chariots of Dewi Sri

Dewi Sri is a symbol of rice planted so that it is fertile and grows well. Dewi Sri will be taken by train around the village and will end up in front of the RBK to carry out the procession of Ngurit. The train is made to have a rectangular frame with a trapezoid-shaped front. Dewi Sri Chariots uses a roof made of woven palm leaves and curved shape. Every shape will be modified by the



Alasmalang community. Aside from using a flat structure as a frame, this kencana train also has a concept of conformity in a rectangular-shaped framework with a wooden divider at the edges.

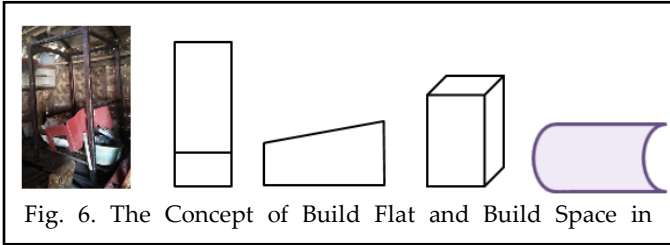


Fig. 6. The Concept of Build Flat and Build Space in

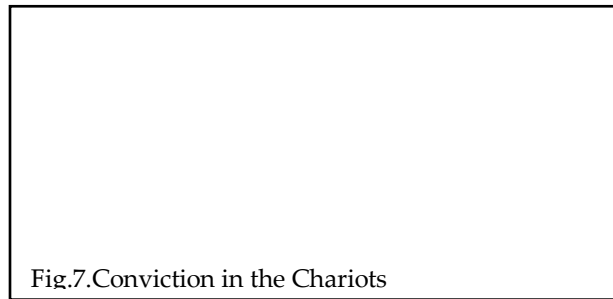


Fig.7.Conviction in the Chariots

6. Singkal

Singkal is a tool used to plow a field and is usually used with a partner who is used to pull singkal in the process of plowing. Singkal has a chart called simpe. Simpe functions as a soil penetrator during the process of plowing and the Alasmalang community makes its shape have a sharp angle. This is because the simpe function itself is used through the ground so sharp objects are needed to penetrate it. In addition, Singkal has a pair whose ornaments use flat shapes such as polygons and trapezoid. This ornament has the same size and shape with each other and on the left and right side has an arrangement such as reflection from each part.

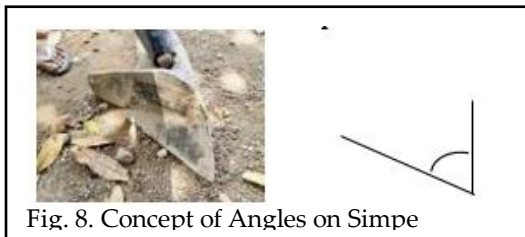


Fig. 8. Concept of Angles on Simpe

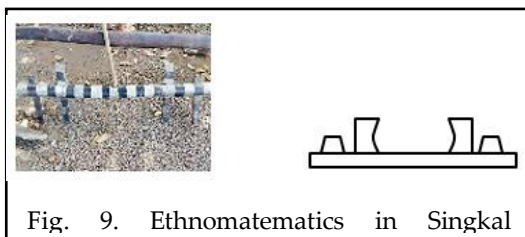


Fig. 9. Ethnomatematics in Singkal

7. Teter

Teter becomes an inseparable tool from singkal. Teter is useful for leveling land that has been plowed using singkal. Teter has an elongated hexagon shape which makes it easy to equalize

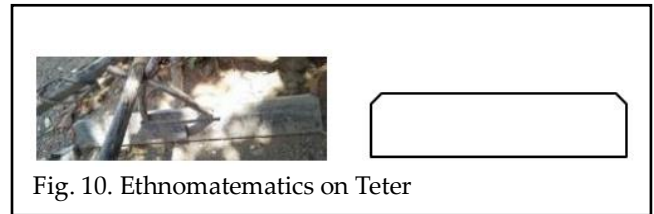
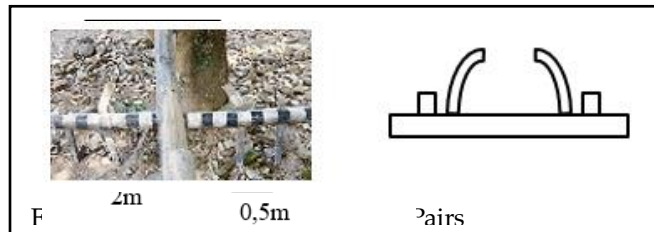


Fig. 10. Ethnomatematics on Teter



due to a wider surface so that the time used is also more efficient. In addition, the teter also has a pair whose ornament is a quadrilateral and a curved plane. The addition of this ornament is to show the value of art with a beauty and neatness so that people make it with the same shape and size between the two and arranged like a reflection on the left and right.

8. Horn of Keboan

The keboan horn can be said to be the main device in the traditional kebo-keboan ceremony. The keboan horn is used to indicate that it is the keboan that characterizes the agricultural process in the village of Alasmalang. Keboan horns are made by the perpetrators using roots, rattan, and wood which are shaped to resemble horns with the same size between the left and

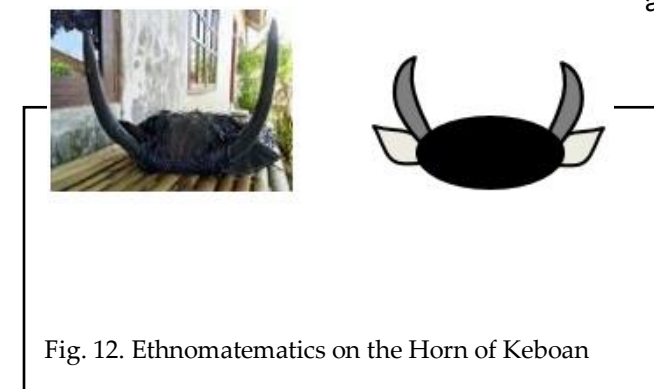


Fig. 12. Ethnomatematics on the Horn of Keboan

right. This keboan horn is equipped with ears made from rubber slipper and carpet made by piling up materials and cutting them all at once to produce ears of the same size.

9. Necklace of Keboan

Another device that is characteristic of keboan is the keboan

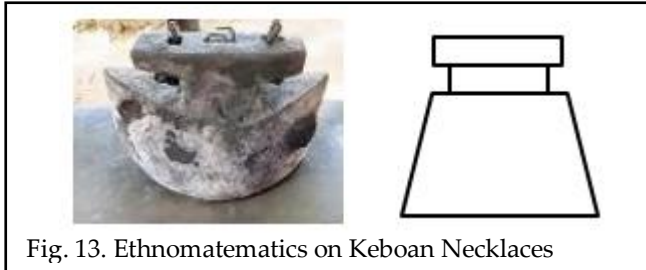


Fig. 13. Ethnomatematis on Keboan Necklaces

necklace. This necklace will sound when shaken by the perpetrators and is considered as a way of communication between buffalo with their children and buffalo with farmers. Keboan necklaces made of jackfruit wood carved to form a cavity like the leaves at the bottom. Then in the middle a hole is made to attach two small logs that function to make the sound of a keboan necklace. In this sculpting process, the community prioritizes the appearance of the left and right of the same shape and size that are sought when directed into mathematics there will be a concept of reflection on the keboan necklace.

10. Farmer's Hat

Farmers as perpetrators who control keboan when doing piracy sawh. Farmers wear conical hats or caping with their respective sizes. Inside the caping are half the balls used for use by farmers.

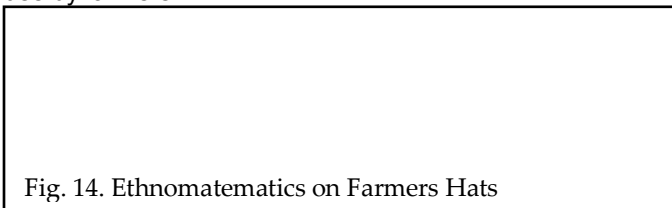
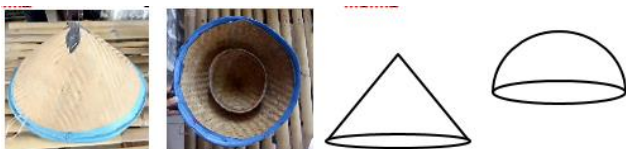


Fig. 14. Ethnomatematis on Farmers Hats



Ethnomatematis is mathematics that arises and develops in a group of people and is in accordance with the local culture which functions as a center of learning and teaching [20]. According to Orey and Rosa the process of learning mathematics will run well when a teacher can link the learning process with social and cultural interaction through dialogue, language, symbolic meaning in mathematics [20]. Based on the results above, in accordance with relevant research related to ethnomatematis, the results of research conducted by [21] said that the shape and engraving of the Mandara Giri Semeru Agung Temple have a mathematical element. Based on another research by [22], it can be found that ethnomatematis can also be found in Islamic nuances of art, namely in the form of tambourines. Other research on ethnomatematis is by [23] which states that the mathematics can be used as an interesting learning material. Not only introducing mathematical concepts but also by introducing culture to students. This research produces mathematical concepts of geometry in the form of points and lines, angles,

flat shapes, concordance and congruence, space constructions, and reflections on 10 devices used in the implementation of the Alasmalang kebo-keboan traditional ceremony.

4 CONCLUSION

Based on the results of research that has been carried out an analysis and discussion of it, it can be concluded that there is a geometrical concept in the equipment used by the Alasmalang village community in carrying out the traditional kebo-keboan ceremony in Alasmalang village. Ethnomatematis obtained are located in the activity of designing and measuring ceremonial equipment including: palawija gate, wallow, mountains of crops, cone, Dewi Sri chariot, singkal, teter, keboan horn, keboan necklace and farmers hat. The palawija gate, the mountain of produce, Dewi Sri's chariot and the cone are symbolic of gratitude for the harvest that God has given to the people of Alasmalang village. Puddles, singkal, teter, horns and keboan necklaces, as well as farmers' hats are equipment that can never be separated from the lives of farmers in the village of Alasmalang. Based on the form, the making and determination of the place in a series of events also the equipment used has various geometrical concepts including: points and lines, angles, flat shapes, space constructions, congruence and harmony, and geometric transformations.

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