C23_Sudi Prayitno

by Sudi Prayitno Sudi Prayitno

PAPER · OPEN ACCESS

Geometry From Lambitu tribe Etnomatematics

To cite this article: Mariamah *et al* 2021 *J. Phys.: Conf. Ser.* **1778** 012015

View the article online for updates and enhancements.

Geometry From Lambitu tribe Etnomatematics

[1]**Mariamah**, [1]**Muslim**, [2]**Amrullah**,[2]**Sudi Prayitno** and [3]**Anggun Badu Kusuma**

[1] Sekolah Tinggi Keguruan dan Ilmu Pendidikan Taman Siswa Bima, Indonesia
[2] Universitas Mataram, Indonesia
[3] Muhammadiyah Purwokerto, Banyumas, Indonesia

E-mail: mariamah@tsb.ac.id

Abstract. The Lambitu tribe has a traditional house as a cultural heritage of ancestors since 1620 M. The traditional house is uma lengge and uma jompa. The existence of this traditional house is very important for the Lambitu tribe community, which functions as a residence as well as a granary. This traditional house is already very well known among the wider community as well as being a tourist destination. The community do not realize that this traditional form of home has mathematical values, which should be used as a source of learning mathematics for students in the learning process at school. Therefore, the purpose of this study was to identify the ethnomatematics form of lengge and jompa traditional houses. The results showed that uma lengge and uma jompa had geometric shapes such as two-dimensional and three-dimensional shapes. The two-dimensional shapes like square, trapezium, isosceles triangle, right triangle, and rectangles, while the three-dimensional shapes consisted of isosceles trapezium, cubes and rectangular prism. Based on the results of this study, it is important to be used as a reference for teachers and students as well as teaching materials that are contextual and contain local wisdom local culture.

1. Introduction

Uma lengge and uma jompa are two traditional buildings owned by the Lambitu tribe. This traditional house is a cultural heritage and has already been grounded in local and international tourism circles. This cultural heritage is important to be introduced to individuals from an early age starting from the family environment and in the formal education environment. In addition to introducing cultural heritage to the children, it is also hoped that children will easily understand the material through contextual learning. Various problems found as in the results of research by Dafid Slamet Setiana and Annis Deshinta Ayuningtyas that the learning delivered by the teacher in learning mathematics has not touched all aspects, one of which is the cultural aspect [1]. Other problems were also conveyed by Zulkifli M. Nuh and that mathematics learning carried out in class tends to be linear and rigid due to lack of integrating culture [2]. The problem facing Sylviyani Hardiarti is that the assumption that emerges that culture and mathematics as something that is not related and separate [3]. Azamul Fadhly Noor Muhammad, NoerIntan Novitasari state that students experience difficulties in the process of learning mathematicsdue to the lack of teachers in presenting real and contextual examples [4]. Another problem found by Tandiling is that learning carried out in the elementary schools classes is still different from the daily activities of students [5]. Learning conditions that occur in the Lambitu community are not far from the problems found from a variety of previous studies, so this research was needed to be done so that it can be used as material and reference for teachers and students in learning related to Ethnomathematics.

Ethnomathematics are derived from three words, ethno, which means something that is very universal related to social and cultural contexts such as jargon, language, codes of behavior, myths and symbols. The second word is the word mathema, which means to explain, understand, know and do activities such as coding, measuring, classifying, simplifying and modeling activities. The last word "tics" is derived from techne, containing the same meaning as technique. [6]. According to AstriWahyuni, et al that ethnomatematics comes from two words namely ethno which means ethni or culture and the word mathematics. Overall, ethnomatematics is mathematics in culture [7]. Ethnomatematics is the daily activities of the community, which contain mathematical values. According to D'Ambrosio that ethnomatematicsis seen as a way to understand the mathematics of cultural outcomes [8]. According to Sylviyani Hardiarti that ethno-mathematical objects are mathematical concepts that are contained in the cultural objects of certain societies [3]. According to Tandiling that ethnomatematics is a mathematics application of the activities of community groups [5]. Theresia Lauren states that ethnomatematics is a mathematics concept that is associated with culture [9]. Inda Rachmawati states that Ethnomatematics is the daily culture of the people related to mathematics [10]. From the various definitions above, it can be concluded that ethnomatematics is the daily activities of the community as a culture related to mathematics.

2. Method
This research was a qualitative descriptive study with the aim to describe the geometric shape of the umalengge and umajompatraditional buildings in the Lambitu tribe. Data was obtained from informants consisting of lambitu community, traditional leaders and community leaders. The instrument used was interview and observation techniques. Data analysis of interviews results used qualitative techniques that was started from data reduction, data display, and conclusions. Meanwhile, the data analysis of the observation resultswere analyzed descriptively.

3. Result
The results of direct identification of the uma jompa and uma lengge, as well as the results of interviews with traditional leaders and the Lambitu community, obtained data on the form of ethnomatics from the jompa and lengge traditional houses. Table 1 will describe the geomtery shape of uma jompa and about the geometry of uma lengge

<div align="center">

Table 1. Geometric shape of uma jompa

Uma jompa

</div>

House cubicle
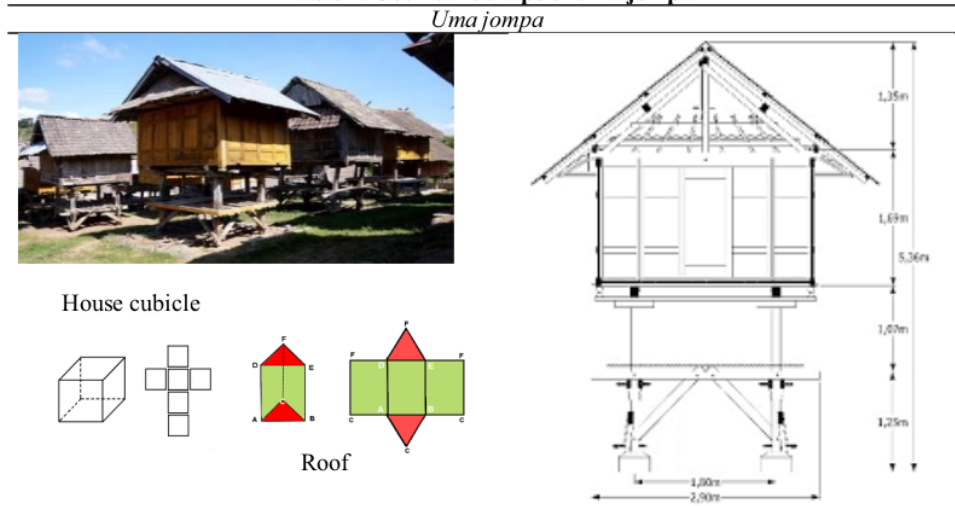
Roof

From the shape of the traditional uma jompa houses, various forms of geomtheria can be identified. Starting from the shape of the roof, doors, poles to the shape of the house. The geometric shapes can be seen in below:

Table 2. Geometric shapes

Geometric shapes	
The *uma jumpo* roof from the front forms a triangle	
The *Uma jumpo* roof from the left and right form a rectangle	
Uma jumpo walls form a square	
Right-angled triangular house pole	

In the following section, we will identify the forms of traditional Lengge houses, starting from the form of poles, roofs, floors and doors. The geometric forms can be seen in below.

Table 3. Geometry shapes of uma lengge

Uma lengge	Geometric shapes	
		The shape of the left and right sides of the roof is the Trapezoid
		The floor of the house forms a square
		The front and back sides of the roof
		Rectangular door
		Right-angled triangle-shaped house pole

Based on the identification of the parts of the uma jompa and uma lenge, geometric shapes were found in the shape of two-dimensional and three-dimensional. The geometric shape of uma jompa consisted of square, rectangle, triangle, right triangle, and cube. The geometrical shape of uma lengge consists of isosceles trapezium, isosceles triangle, right triangle, square, and rectangle. The following will explain the side and angle of the geometrical shape of two-dimensional shape.
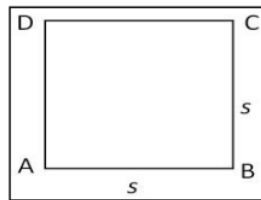
Figure 1. Square

The square is formed from the uma lengge floor and the main wall uma see (Figure 1). There are four equal sides, namely sides AB=BC=CD=DA, DAB=ABC=BCD=CDA =90º
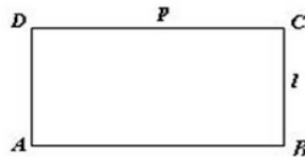
Figure 2. Rectangle

Two sides are parallel and the same length is AB = CD dan AD = BC. Right angle and equal angles A= B = C = D = 90⁰
AD // BC dan AB//DC
The rectangle is formed from the roof of the left and right *uma jompa*. While the uma lengge is formed from the front door
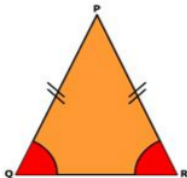
Figure 3. Isosceles Triangle

Isosceles triangle has the same side length: PQ = PR and has the same angle that is the angle of Q and R

Figure 4. Trapezium

The isosceles trapezium is formed from the roof of the left and right sides of the uma lengge. Trapsium isosceles has parallel sides are AB //DC, then AD =BC, DAB=CBA, side AC=BD

Figure 5. Trapezium

A right triangle is a triangle whose one angle is 90º, where the side in front of the right angle (90º angle) is the hypotenuse.

Based on the identification of the parts of the uma lengge and uma jompa, various geometric forms were found in the traditional buildings of the lambitu tribe. G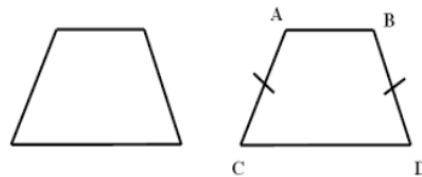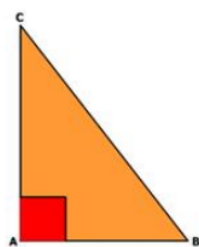eometry is material that has been taught in elementary school mathematics learning. Therefore, uma lengge and uma jompa is very suitable to be used as a learning medium, because students are very familiar with this umatraditional and the materials are close to the daily environment of students.

Various research results have contributed significantly to mathematics learning that apply ethnomatematics in learning such as the results of Ojose's research which provide suggestions for learning mathematics that is not only in aspects of academic knowledge but also apply mathematics used in everyday life in school learning [11]. Euis Fajriyah's research results states that it is very necessary to involve culture in the learning process so that students can preserve the nation's culture and students are motivated in their learning [12]. Meier argues that the age of students is at a concrete preoperational stage in primary schools so that the mathematics object delivered in learning must be concrete[13]. According to Marsigit the environment around students can be used as mathematical objects [14]. Suprana states learning mathematics can be explored in the cultural values [15]. Ethnomatematics data is used as a bridge for students to construct their knowledge with daily activities [12]. Windria states that local culture can be involved in learning mathematics as a mathematics activity [16]. Arwanto points out about ethnomatematics on batik Trusmi Cirebon [17] while Abi regarding ethnomatematics exploration from the Amanuban tribe [18]. Haryono about ethnomatematics from the activities of the Dayak [19]. Nuh and Dardiri people about the spelling activities in the Riau Malay community [20]. Ubayanti, Lumbantobing and Manurung by applying ethno-mathematics in learning to motivate students to learn. Ubayanti, S. U., Lumbantobing, H., & Manurung [22]; Apino & Retnawati [23]; Jailani, Sugiman, Apino [24] state the results of their research that the application of real context can increase the ability to share high order thinking skills of students. Siti Jamilatus Juhria, Hobri, Ervin Oktavianingtyas about ethnomatematics in the activities of Madurese farmers, the results of this study were then explored into learning mathematics in schools [25].

Based on the results of this study, itcan be used as material or reference for mathematics teachers, especially at the elementary school level in the Lambitu tribe. Uma jompa and uma lengge are typical buildings of the Lambitu tribal people who are very close to people's lives. By applying culture-based learning in mathematics learning, it can make easier for students to combine existing knowledge with new knowledge that they get, besides that students will feel motivated by seeing mathematics material that is associated with their real life. In addition to mathematics material become easier to understand, students get to know and love their culture. Therefore, the ethnomathematics of uma jompa and uma lengge are very appropriate to be applied in mathematics learning in Lambitu tribal elementary school. This research was a preliminary research as a basis for further research, namely research that will develop Ethnomatematics teaching materials to develop the mathematics problem solving ability of Lambitu students.

4. Conclusion

Based on the results of the study, it can be concluded that the uma lengge structure has a geometric shape in the form of two-dimensional shape such as trapezium, square, triangle, right triangle and rectangle, while the geometry shape of the uma Jompastructure includes rectangle, square, isosceles triangle and right triangle. The three-dimensionalshapes of uma lengge and uma jompaare an isosceles trapezium, cubes and rectangular prisma.

Acknowledgment

References

[1] Ayuningtyas A.D and Setiana D.S 2019 Development Of Math Material Based Materials Etnomatematika Kraton Yogyakarta. Actionoma: *Journal of Mathematics Education Study Program* **8** p 11-19

[2] Zulkifli M. and Dardiri N 2016 Ethnomatematics in the Numbering System of Riau Malay Communities. Kutubkhanah: *Journal of Religious Social Research* **19** p 220

[3] Hardiarti, S. (2017). Etnomatematika: Aplikasi Bangun Datar Segiempat pada Candi Muaro Jambi. *Aksioma* **8** p 99-110.

[4] Fadhly Z, Muhammad N, and Novitasari N.I 2019 Development of Ethnomatematics - Based Mathematics Teaching Materials to Improve Mathematics Understanding of Class Iii Elementary School Students. *Journal of Basic Education* **4** P 80-93

[5] Tandililing, E 2013 Development of School Mathematics Learning With Ethnomatematics Approach Based On Local Culture As An Effort To Improve The Quality Of Mathematics Learning In Schools, *Conf. Proc*. p 180 – 187.

[6] Rosa. M. and Orey, D. C 2011 Ethnomatematics: The cultural aspects of mathematics. *Revistas Latinoamericana de Etnomatematic*a **4** P 32-54.

[7] Wahyuni A and Ayu Aji W T, & Sani B 2013 The Role of Ethnomatematics in Building the Nation's Character, *Conf. Proc* P 115-8

[8] D'Ambrosio, U 2006 Preface. Prosiding, International Congress of Mathematics Education Copenhagen. Pisa: University of Pisa.

[9] Laurens T 2016 Ethnomatematics Analysis and Its Application in Improving Learning Quality *Lemma Journal* **3** p 86-96

[10] Rachmawati. I 2012 Exploration of Ethnomatematics of Sidoarjo People. *E-Jurnal UNESA* **1** P 1-8

[11] Ojose, B 2011 Mathematics Literacy: Are We Able to Put the Mathematics We Learni Into Everyday Use? *Journal of Mathematics Education* **4** p 89-100

[12] Fajriyah E 2018 The Role of Ethnomatematics Related to Mathematical Concepts in Supporting Literacy *Prisma* **1** p 114-9

[13] Meier, L. T 2012 The Effect of School Culture on Science Education at an Ideologically Innovative Elementary Magnet School *Journal Science Teacher Education* **23** p 805-822.

[14] Marsigit 2016 Learning Mathematics in a Present Perspective *Journal of Mathematics Education* **2** p 132-144.

[15] Suprana 2019 Development of Ethnomatematics-Based Mathematics Teaching Materials on Transform Geometry Materials *Journal of Mathematic Education* **1** p 1-7

[16] Windria, H 2016 Rich Batik, Utilizing Batik Motifs in Mathematics Classes. *Conf. Proc.* **1** P 279-291

[17] Arwanto, A 2017 The Trusmi Batik Ethnomatematics Exploration of Cirebon to Reveal the Philosophy and Mathematical Concepts Value. Phenomenon *Journal of Mipa Education* **7** p 40-49

[18] Abi, M. A 201 Exploration of Ethnomatatics in the Amanuban Tribe and its Relationship with Mathematical Concepts (Thesis). Universitas Negeri Semarang. Semarang

[19] Hartoyo 2012 Ethnomathematic exploration on the culture of the Dayak Community at the Indonesian-Malaysian Border, Sanggau Regency, West Kalimantan *Journal of Educational Research* **13** p 14-23.

[20] Nuh, M. Z and Dardiri 2016 Ethnomatematics in the Numbering System of Riau Malay Communities. Kutubkhanah *Journal of religious social research* **19** p 220-238.

[21] Arisetyawan, A., Suryadi, D., Herman, T., and Rahmat, C 2014 Study of ethnomathematics: A lesson from the Baduy Culture *International Journal of Education and Research* **2** p 681-8.

[22] Ubayanti, S. U., Lumbantobing, H., and Manurung, M. M. H 2016 Ethno-mathematical exploration in Sero: Culture of the Kokas Fakfak people of West Papua *Journal of Scientific Mathematics and Learning* **2** p 11-17.

[23] Apino, E., & Retnawati, H 2017 Developing instructional design to improve mathematical higher order thinking skills of students. *J. Phys. Conf. Ser.* **812** p 1-7

[24] Jailani, J., Sugiman, S., & Apino, E 2017 Implementing the problem-based learning in order to improve the students' HOTS and characters *Journal of Mathematics Education Research* **4** p 247-259.

[25] Juhria,S.J, Hobri and Oktavianingtyas E 2015 Ethnomatematics in Madura Farmers Community Activities in Kranjingan Sumbersari Jember as a Teaching Material for Student Project Sheets. *Kadikma,* **6** p 99-111

C23_Sudi Prayitno