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ETHNOMATHEMATICS OF SMALL BORDER ISLANDS: LUTUR BATU ON MOA ISLAND

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ABSTRACT

The people of Moa Island have a cultural heritage in the form of Lutur Batu. Lutur Batu is a construction of large stones arranged side by side to form a circular wall. Lutur Batu is used to close village boundaries and as a garden fence which aims to protect plants from wild animals. This research aims to determine ethnomathematics studies on Lutur Batu on Moa Island. The ethnomathematics study of Lutur Batu on Moa Island in this research is expected to provide a deeper understanding of the local wisdom of the people of Moa Island, as well as contribute to the recognition, maintenance, and preservation of cultural heritage with mathematical value in the region. Furthermore, an understanding of the geometric patterns and construction of Lutur Batu can be adopted in mathematics learning at school to increase students' interest in learning and understanding of mathematical concepts. This qualitative research focuses on in-depth understanding of ways of thinking and using mathematics in the traditions and practices of making Lutur Batu in Moa Island. The results of the analysis on Lutur Batu and the manufacturing process showed that there are mathematical concepts such as circles, cylinders, ratios, and statistics. Lutur Batu and the Mathematical concepts contained therein can be used in Mathematics learning at school to enrich learning materials, increase learning motivation and students' understanding of Mathematics concepts. Apart from that, it can increase students' insight and knowledge regarding the cultural heritage of Moa Island

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1. INTRODUCTION

Moa Island is a small island located in the archipelago region of Maluku Province in eastern Indonesia. Moa Island is one of the islands located on the border between Indonesia and East Timor, so it is included in the category of Small Border Islands. The people of Moa Island have a cultural heritage in the form of Lutur Batu. Lutur Batu is a construction of large stones arranged side by side to form a dividing wall between human residential areas and animal areas in the shape of a circle. Lutur Batu is used to close the boundaries of the village. In addition, the people of Moa Island often use Lutur Batu as a garden fence to protect plants from wild animals. Apart from its usefulness in practical aspects, Lutur Batu also reflects the Moa Island people's understanding of traditional mathematics, which they unknowingly apply. The relationship between Lutur Batu culture and people's understanding of traditional mathematics can be studied in a scientific discipline known as ethnomathematics **[1]**.

Ethnomathematics is a scientific discipline that studies the relationship between mathematics and culture **[2][3]**. Research on ethnomathematics has been carried out in Indonesia, including: Ideas, such as traditional Number Systems that are still used by several tribes in Indonesia, for example, the number system in the Sasak tribe community in Lombok **[4]** and mathematical aspects of traditional Indonesian musical instruments, such as the use of musical scales, rhythm, and harmony **[10][11][12]**; Activities, such as counting and time management systems in traditional agricultural practises in several regions of Indonesia **[13][14]** and mathematical aspects of traditional Indonesian games, such as “congklak” or “dakon” **[14][15][16]**; and Artifacts, such as mathematical concepts in traditional Indonesian architecture, for example, the shapes and patterns used in traditional house designs **[5][6][7]**, fine arts, such as batik, weaving, and wood carving, to identify mathematical patterns in these works of art **[8][9]**, and the geometric principles used in the construction of ancient temples in Indonesia **[17][18]**.

However, many researchers have not carried out ethnomathematics studies in the Small Border Islands region. Ethnomathematics in the context of Moa Island can be used to study mathematical concepts contained in the Lutur Batu tradition. Several aspects that can be studied include: Ideas, such as Mathematics of Measurement: Lutur Batu was built using stones of varying sizes. Ethnomathematics can examine how the people of Moa Island measure and estimate the size of the stones needed for the construction of Lutur Batu, and Number Systems and Patterns: The people of Moa Island may use traditional number systems to calculate the number of stones needed, determine stone arrangement patterns, or plan the size of garden fences; Activities, such as Social and Cultural Mathematics: Apart from technical aspects, Ethnomathematics can also research social and cultural factors that influence the development and use of Lutur Batu, such as the mutual cooperation carried out by the community in the process of building Lutur Batu; and Artifacts, such as Geometry and Stone Arrangement: Ethnomathematics can help understand the regularity and geometric patterns in the Lutur Batu arrangement. The measurements and proportions of the stones can also be explained using mathematical concepts.

The ethnomathematics study of Lutur Batu on Moa Island in this research is expected to provide a deeper understanding of the local wisdom of the people of Moa Island, as well as contribute to the recognition, maintenance, and preservation of cultural heritage with mathematical value in the region. This research can also be an inspiration for other communities to understand and preserve their cultural practices related to traditional mathematics. Furthermore, an understanding of the geometric patterns and construction of Lutur Batu can be adopted in mathematics learning at school to increase students' interest in learning and understanding of mathematical concepts.

The aim of this research is to determine ethnomathematics studies on Lutur Batu on Moa Island. Research on ethnomathematics in Lutur Batu has several urgencies that need to be acknowledged and considered, including: Understanding local culture: Ethnomathematics studies in Lutur Batu help in understanding more deeply the local wisdom and culture of the people of Moa Island. This research opens a window into understanding how mathematics is closely linked to the daily practices and culture of these communities, helping to value and preserve valuable cultural heritage; Increased appreciation for local mathematics: Ethnomathematics research in Lutur Batu can increase respect for local and traditional mathematics. This can change people's perception of mathematics, from just numbers and abstract formulas to something that is relevant and useful in their daily lives; The contribution to the field of ethnomathematics as a whole: This research can be an important contribution to the development of the discipline of ethnomathematics. The results of research on Lutur Batu can be a reference for ethnomathematics research in other regions, helping to understand the variation and complexity of mathematics in various cultures; and

Potential practical applications: Apart from its academic value, this research also has potential practical applications. For example, an understanding of geometric patterns and the construction of Lutur Batu can be adopted in mathematics learning at school to enrich learning. Thus, research on ethnomathematics in Lutur Batu has a very important urgency for understanding and preserving cultural heritage, respect for local mathematics, and a contribution to the discipline of ethnomathematics.

2. RESEARCH METHODS

This ethnomathematics research uses qualitative approach in understanding the relationship between mathematics and culture in the context of a particular community or cultural group [19]. This research focuses on the in-depth understanding of ways of thinking and using mathematics in daily life, traditions, and cultural practices of a particular group.

The data in this research was collected in several ways as follows:

1) Observation: Observations are carried out by directly observing activities and practices related to mathematics in a particular culture. In the context of ethnomathematics research on Lutur Batu, researchers observed the finished construction of Lutur Batu, the shape of Lutur Batu, and the arrangement of the stones on Lutur Batu;
2) Interview: Interviews were used to gain an in-depth understanding of the communities involved in the use of Lutur Batu. In this research, researchers interviewed a local experts to understand how Lutur Batu was made, associated mathematical patterns, and the values of traditions inherent in its use; and
3) Documentation: Documentation involves collecting data such as photos and videos, and other relevant documents. In ethnomathematics research on Lutur Batu, documentation included photos and videos of the Lutur Batu fence that had been built previously.

The combination of data collection techniques can provide a comprehensive and in-depth perspective on ethnomathematics practices at Lutur Batu in Moa Island. The combination of observation, interviews and documentation helped researchers better understand mathematical patterns, cultural aspects, as well as the value and function of Lutur Batu in the local community daily lives.

The data analysis techniques in this research are:

1) Content Analysis: This technique is used to analyze text content from interview data or documentation that has been collected. Researchers identify key words, themes, or mathematical patterns that appear in interview transcripts or document texts related to Lutur Batu;
2) Thematic Analysis: This technique is used to identify important themes and motifs that emerge from interview and observation data. These themes include the mathematical concepts involved in making Lutur Batu, related cultural values, as well as people's understanding of existing mathematical patterns; and
3) Pattern Recognition: This technique is used to identify mathematical patterns in the construction of Lutur Batu. Geometric patterns, symmetry and proportions contained in the arrangement of stones can be identified and analyzed.

3. RESULTS AND DISCUSSION

The research results showed that in Lutur Batu and its manufacturing process there are the following mathematical concepts:

3.1 Circle

The results of observations and documentation show that the interior of Lutur Batu, which is used as a village boundary and garden fence by the people of Moa Island, is in the shape of a circle as in Figure 1. This is in line with the results of the interview that Lutur Batu is basically a circle, although some parts are not

perfect circles. This is influenced by the structure of the soil or the location of the land being used as a garden and is also influenced by the ability of the community or farmers to create a circle shape. Furthermore, if studied from a mathematical perspective, indirectly the people of Moa Island have used the mathematical concept of optimizing the area of the area bounded by Lutur Batu. A circle shape is a shape that has the maximum area when compared to other shapes, such as triangles, quadrangles, or other shapes with the same circumference.

Knowledge about optimizing the area of gardens bounded by Lutur Batu is crucial for the community of Moa Island to maximize agricultural production. The people of Moa Island, who work as farmers, face several challenges in farming, including: rocky soil conditions that make it impossible to plant crops on all land, and the need for a significant amount of time and effort to gather the stones required to create Lutur Batu. Thus, by creating Lutur Batu in a circular shape, it has helped the Moa Island community optimize the land area to be used for gardening.

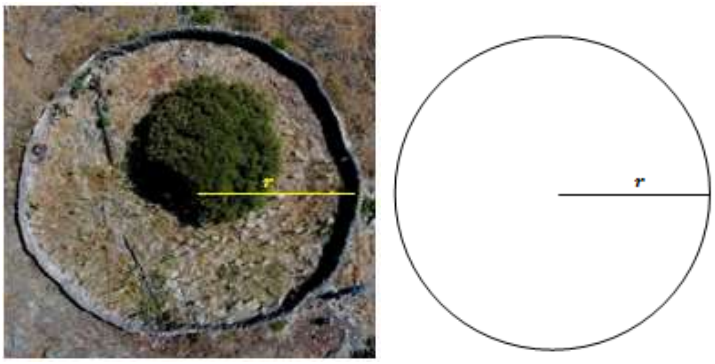

Figure 1. Interior Part of Lutur Batu

Furthermore, to find out the circumference of Lutur Batu and the area bounded by Lutur Batu as in **Figure 1**, the formula for the circumference and area of a circle can be used **Equation (1)** as follow:

$$C = 2\pi r \text{ and } A = \pi r^2 \tag{1}$$

where
C = circumference,
A = area, and
r = radius.

Apart from being viewed from the perspective of optimizing garden land for farmers, Lutur Batu in circular form can be used in the context of classroom learning, especially in the topic of Circles. Utilizing the context of Lutur Batu in the subject of circles for secondary education can help enhance motivation and interest in learning because students can relate mathematical concepts to something real and relevant in their daily lives. Furthermore, the use of the Lutur Batu context in education can improve academic achievements, high-order thinking skills (HOTS) of students, and mathematical literacy skills as it can make it easier for them to grasp the underlying mathematical concepts related to the creation and use of Lutur Batu, such as diameter, radius, circumference, and the area of a circle.

3.2 Hollow Cylinder

The results of observations and documentation show that the shape of the stone arrangement on Lutur Batu which is used as a village boundary and a garden fence by the people of Moa Island is in the form of a hollow cylinder as in **Figure 2**. To make Lutur Batu, the people of Moa Island need a few stones with a certain volume. Knowledge of the volume of stones needed to make a Lutur Batu is important for the community or farmers on Moa Island to estimate the size of the Lutur Batu's radius to be constructed based on the availability of stones. Next, to find out the volume of stone needed to make a Lutur Batu, can use the formula for the volume of a hollow cylinder as **Equation (2)** below:

$$V = \pi(R^2 - r^2)\overline{h} \tag{2}$$

where
V = volume of Lutur Batu,

R = outer radius,
r = inner radius, and
$\overline{h}$ = average height of Lutur Batu.

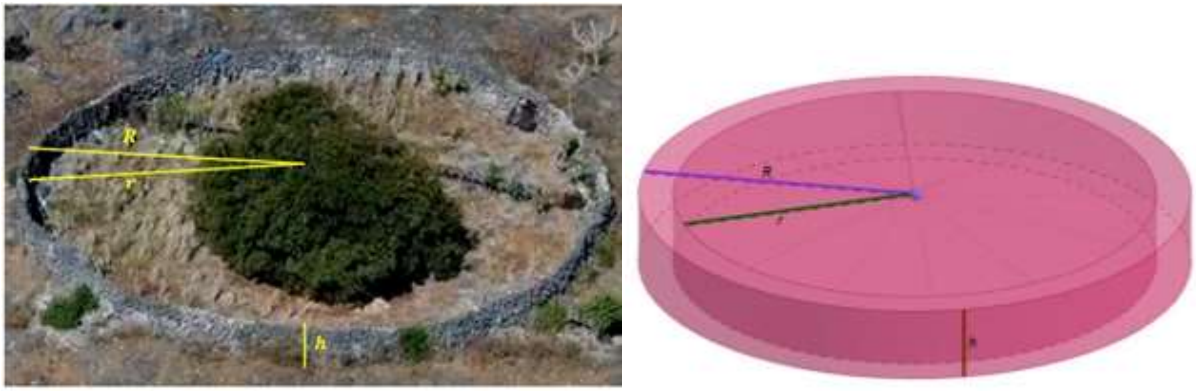

Figure 2. Lutur Batu in the Form of Hollow Cylinder

Knowledge about the volume of stones required to create a Lutur Batu is essential for the people of Moa Island to estimate the size of Lutur Batu that can be constructed based on the available stone supply. Additionally, the community of Moa Island can calculate the volume of stones needed to construct a Lutur Batu with specific radii and heights. This understanding allows them to plan their stone collection and construction activities more effectively, ensuring that they have enough materials to build the Lutur Batu as per their requirements.

3.3 Ratio

Based on the results of the interview it was found that the process of making Lutur Batu as a garden border is sometimes carried out by the people of Moa Island in a cooperative manner. This cooperation aims to speed up the process of making Lutur Batu so that it can be completed before the planting season. The number of people who play a role in the process of making Lutur Batu will of course affect the time it takes to make Lutur Batu. The more people involved in the process of making Lutur Batu, the less time it takes to complete making a Lutur Batu, and vice versa. To find out the ratio between the number of workers and the time required, the ratio formula in **Equation (3)** can be used:

$$x_1 \cdot t_1 = x_2 \cdot t_2 \tag{3}$$

where
x_1 = number of first-time workers,
t_1 = the time required if the work is carried out by x_1 workers,
x_2 = number of second workers, and
t_2 = the time required if the work is carried out byx_2 workers.

Figure 3. Lutur Batu in Various Sizes

Each Lutur Batu with a different size as shown in the **Figure 3** requires different processing time if done with the same number of workers. The longer the Lutur Batu is made, the longer it will take to complete

the process of making the Lutur Batu. The people of Moa Island must of course know the time needed to make Lutur Batu of a certain length so that it can be completed before the planting season or a certain time. To find out the ratio between the length of the Lutur Batu made and the completion time, we can use the ratio formula in **Equation (4)** below:

$$\frac{x_1}{t_1} = \frac{x_2}{t_2} \tag{4}$$

where
x_1 = the length of the first Lutur Batu,
t_1 = the time required to complete the first Lutur Batu,
x_2 = the length of the second Lutur Batu, and
t_2 = the time required to complete the second Lutur Batu.

Furthermore, each person has a different speed in the process of making Lutur Batu. If the speed of each person in completing making Lutur Batu with a certain size is known, then the time required to complete making Lutur Batu collaboratively can be determined using the formula in **Equation (5)** below:

$$\frac{1}{t} = \frac{1}{t_1} + \frac{1}{t_2} + \cdots + \frac{1}{t_n} \tag{5}$$

where
t = collaborative working time,
t_1 = processing time by the first worker/group of workers,
t_2 = processing time by the second worker/group of workers, and
t_n = processing time by the *n*-th worker/group of workers.

3.4 Statistics

The results of observations and documentation show that the stone arrangement used in Lutur Batu has varying sizes both in terms of the width of the stone, which is the width of the stone lutur, and the height of the Lutur Batu, as can be seen in **Figure 4**. To make a Lutur Batu, people must make a Lutur Batu with a certain width and height so that it is not damaged or passed over by wild animals, which can damage the plants in the garden. To find out the average size, median, and mode of the width and height of Lutur Batu, can use the data centralization size formula (average, median, and mode). Furthermore, if seen from a mathematics learning point of view, the varying width and height of Lutur Batu can be used in learning statistics material, such as measures of data concentration (average, median, and mode) for both single data and group data and measures of data distribution. Single and group data, and presenting data in both table and diagram form.

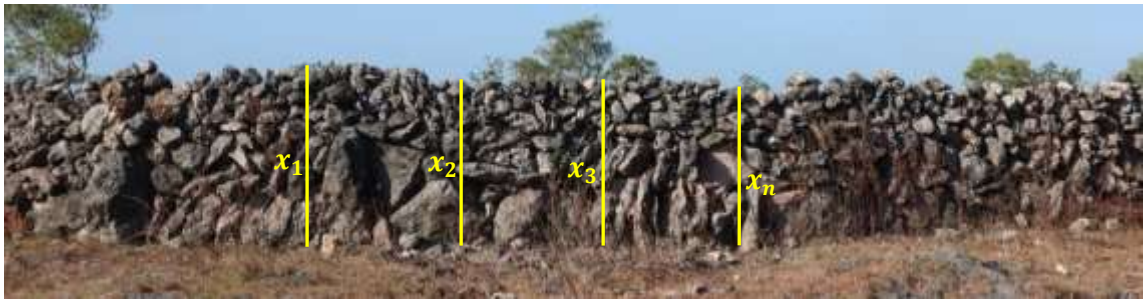

Figure 4. Height Variations of Lutur Batu

For example, to determine the average height of Lutur Batu for a single data, we can use the formula in **Equation (6)** below:

$$\bar{x} = \frac{\sum x_i}{n} \tag{6}$$

where
$\bar{x}$ = average,
$\sum x_i$ = sum of all data, and
n = number of data.

In the results of the analysis of Lutur Batu and its manufacturing process, it was found that in Lutur Batu and its manufacturing process there are mathematical concepts such as circles, cylinders, ratios, and statistics, as previously described. In the process of making Lutur Batu, the community has indirectly used mathematical concepts such as optimizing the area bounded by Lutur Batu, the volume of hollow cylinders to estimate the number of stones needed to make a fence in the form of Lutur Batu, and the concept of ratio to estimate the completion time for Lutur Batu so the planting process is on time. Lutur Batu and the mathematical concepts contained therein can be used in mathematics learning at school to enrich learning materials, increase learning motivation **[20]**, and improve students' understanding of mathematics concepts **[21]**. Apart from that, this can increase students' insight and knowledge regarding cultural heritage **[3]** on Moa Island.

The use of Lutur Batu in mathematics education can also help develop Higher Order Thinking Skills (HOTS) among students **[22]**. Students need to engage in analysis, problem-solving, and critical thinking to connect mathematical concepts with real-life situations involving Lutur Batu. Additionally, this learning approach can strengthen students' mathematical literacy skills **[23][24]**. Students learn how to apply mathematical concepts in different contexts, collect data, and interpret relevant information. The improvement of students' mathematical literacy skills, especially at the elementary school and junior high school level, is a priority program in the field of education in Indonesia, considering the relatively low mathematical literacy skills of junior high school students in the country **[25]**. The utilization of Lutur Batu as a learning resource in topics such as Circles, cylinders, ratios, and statistics at the junior high school level has the potential to create more engaging, profound, and beneficial learning experiences for students. It assists students in developing a strong understanding of mathematics and the high-level thinking skills required in their daily lives.

4. CONCLUSIONS

Based on the results of the analysis of Lutur Batu and its manufacturing process, it can be concluded that in Lutur Batu and its manufacturing process there are mathematical concepts such as Ideas, in the form of concepts and ideas for making Lutur Batu in a circular shape to optimize the area in Lutur Batu; Activities, in the process of making Lutur Batu, there is a mathematical concept, namely the ratio between the number of workers and the time needed to build Lutur Batu; and Artifacts, in Lutur Batu that has been built there are mathematical concepts such as circles, cylinders and statistics. The mathematical concepts contained in Lutur Batu and the manufacturing process can be used in mathematics learning at school to enrich learning materials, increase students' learning motivation, understanding, and knowledge regarding mathematical concepts, and also reflect the cultural heritage of Moa Island.

Research on the study of ethnomathematics in small border islands, the development of reference books or teaching materials based on ethnomathematics in small border islands, and the utilization of ethnomathematics in mathematics education in the regions of small border islands are important to undertake. This is partly to narrow the gap in the quality of education and research between urban areas in Indonesia and remote regions like small border islands. Research on the study of ethnomathematics and its application in education can also raise awareness and serve as a consideration for the Indonesian government, especially the Ministry of Education and Culture, in creating teaching materials tailored to the local cultural contexts of each region.

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REFERENCES

[1] I. Risdiyanti and R. C. I. Prahmana, "Ethnomathematics: Exploration in Javanese culture," *J. Phys. Conf. Ser.*, vol. 943, no. 1, pp. 1–6, 2017, doi: 10.1088/1742-6596/943/1/012032.

[2] M. Turmuzi, I. G. P. Suharta, and I. N. Suparta, "Ethnomathematical research in mathematics education journals in Indonesia: A case study of data design and analysis," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 19, no. 1, pp. 1–13, 2023, doi: 10.29333/ejmste/12836.

[3] A. Q. Fouze and M. Amit, "The Importance of Ethnomathematics Education," *Creat. Educ.*, vol. 14, no. 04, pp. 729–740, 2023, doi: 10.4236/ce.2023.144048.

[4] L. M. Fauzi, S. Ahyan, A. Rasidi, Z. Wardi, and M. Gazali, "Ethnomathematic Study : Number System And Cultural Meaning In The Sasak Tribe Community," *J. Pendidik. Mat.*, vol. 6, no. 1, pp. 19–26, 2023.

[5] R. M. Hariastuti, M. T. Budiarto, and M. Manuharawati, "From Culture to Classroom: Study Ethnomathematics in House of Using Banyuwangi," *Int. J. Trends Math. Educ. Res.*, vol. 2, no. 2, pp. 76–80, 2019, doi: 10.33122/ijtmer.v2i2.60.

[6] S. Supiyati, F. Hanum, and Jailani, "Ethnomathematics in sasaknese architecture," *J. Math. Educ.*, vol. 10, no. 1, pp. 47–57, 2019, doi: 10.22342/jme.10.1.5383.47-58.

[7] A. K. Sari, M. T. Budiarto, and R. Ekawati, "Ethnomathematics study: cultural values and geometric concepts in the traditional 'tanean-lanjang' house in Madura – Indonesia," *JRAMathEdu (Journal Res. Adv. Math. Educ.*, vol. 7, no. 1, pp. 46–54, 2022, doi: 10.23917/jramathedu.v7i1.15660.

[8] R. C. I. Prahmana and U. D'Ambrosio, "Learning geometry and values from patterns: Ethnomathematics on the batik patterns of yogyakarta, indonesia," *J. Math. Educ.*, vol. 11, no. 3, pp. 439–456, 2020, doi: 10.22342/jme.11.3.12949.439-456.

[9] N. Faiziyah *et al.*, "Ethnomathematics: Mathematics in Batik Solo," *J. Phys. Conf. Ser.*, vol. 1720, no. 1, pp. 1–6, 2021, doi: 10.1088/1742-6596/1720/1/012013.

[10] F. Fredy, L. Halimah, and Y. Hidayah, "Malind-Papua Ethnomathematics: Kandara Musical Instrument as Learning Media for Geometry Concepts in Elementary School," *J. Iqra' Kaji. Ilmu Pendidik.*, vol. 5, no. 1, pp. 43–57, 2020, doi: 10.25217/ji.v5i1.872.

[11] G. S. Bito and F. Fredy, "Ethnomathematics: Musical Instrumen in Ja'I Dances for Culturally Responsive Teaching in Elementary Schools," *PrimaryEdu - J. Prim. Educ.*, vol. 4, no. 2, p. 183, 2020, doi: 10.22460/pej.v4i2.1853.

[12] Y. S. Kristyasari and H. Sukoco, "Ethnomathematics in ten Indonesian traditional musical instruments," *Ethnomathematics J.*, vol. 3, no. 2, pp. 62–73, 2022, doi: 10.21831/ej.v3i2.53151.

[13] R. C. I. Prahmana, W. Yunianto, M. Rosa, and D. C. Orey, "Ethnomathematics: Pranatamangsa system and the birth-death ceremonial in yogyakarta," *J. Math. Educ.*, vol. 12, no. 1, pp. 93–112, 2021, doi: 10.22342/JME.12.1.11745.93-112.

[14] D. S. Padang and M. S. Lubis, "Ethnomathematical Exploration Of Traditional Agricultural Tools In Hutamanik Village, Sumbul Regency," *Indones. J. Sci. Math. Educ.*, vol. 06, no. 2, pp. 137–151, 2023, doi: 10.24042/ijsme.v5i1.17003.

[15] Z. Zuhri, S. V. Dewi, J. W. Kusuma, S. Rafiqoh, I. Mahuda, and H. Hamidah, "Implementation of Ethnomathematics Strategy in Indonesian Traditional Games as Mathematics Learning Media," *J. Innov. Educ. Cult. Res.*, vol. 4, no. 2, pp. 294–302, 2023, doi: 10.46843/jiecr.v4i2.613.

[16] A. Setyawati, J. Soebagyo, and J. F. Sunni, "Eksplorasi Etnomatematika dalam Permainan Tradisional Galasin di Jakarta pada Konsep Matematika," *Union J. Ilm. Pendidik. Mat.*, vol. 11, no. 1, pp. 58–65, 2023, doi: 10.30738/union.v11i1.12661.

[17] J. Munthahana and M. T. Budiarto, "Ethnomathematics Exploration in Panataran Temple and Its Implementation in Learning," *Indones. J. Sci. Math. Educ.*, vol. 3, no. 2, pp. 196–209, 2020, doi: 10.24042/ijsme.v3i2.6718.

[18] W. Kurniawan and T. Hidayati, "Ethnomathematics in Borobudur Temple and Its Relevance in Mathematics Education," *J. Pendidik. Progresif*, vol. 10, no. 1, pp. 91–104, 2020, doi: 10.23960/jpp.v10.i1.202011.

[19] T. Septianawati, Turmudi, and E. Puspita, "Ethnomathematics study: uncovering units of length, area, and volume in Kampung Naga Society," *J. Phys. Conf. Ser.*, vol. 812, no. 1, pp. 1–7, 2017, doi: 10.1088/1742-6596/755/1/011001.

[20] P. E. Yandani and G. N. S. Agustika, "Implementation of Ethnomathematics in Mathematics Learning Videos for First Grade of Elementary School," *Mimb. PGSD Undiksha*, vol. 10, no. 2, pp. 326–336, 2022, doi: 10.23887/jjpgsd.v10i2.47683.

[21] A. Saparuddin Nur, K. Kartono, Z. Zaenuri, S. B. Waluya, and R. Rochmad, "Ethnomathematics Thought and Its Influence in Mathematical Learning," *MaPan J. Mat. dan Pembelajaran*, vol. 8, no. 2, pp. 205–223, 2020, doi: 10.24252/mapan.2020v8n2a3.

[22] H. Heriyanto, Z. Zaenuri, and W. Walid, "Creative Thinking Ability in Habits of Mind-based Ethnomathematics JUCAMA Learning Models," *J. Prim. Educ.*, vol. 10, no. 100, pp. 348–358, 2021, [Online]. Available: https://journal.unnes.ac.id/sju/index.php/jpe/article/view/50421

[23] A. F. N. Muhammad, Marsigit, and Soeharto, "A case study of geometri literacy in elementary school through ethnomathematics at borobudur temple Indonesia," *Int. J. Sci. Technol. Res.*, vol. 8, no. 10, pp. 1041–1045, 2019.

[24] P. V. J. Runtu, R. J. Pulukadang, N. O. Mangelep, M. Sulistyaningsih, and O. T. Sambuaga, "Student's Mathematical Literacy: A Study from The Perspective of Ethnomathematics Context in North Sulawesi Indonesia," *J. High. Educ. Theory Pract.*, vol. 23, no. 3, pp. 57–65, 2023, doi: 10.33423/jhetp.v23i3.5840.

[25] OECD, "Indonesia Student performance (PISA 2018)," 2018.