



# Indonesian Educational Research Journal

Journal homepage: <https://journal.id-sre.org/index.php/ierj/index>



## Exploration of Ethnomathematics in the Traditional House of Sonaf Maubes-Insana

Maria Fransiska Tas'au<sup>1</sup>, Aloisius Loka Son<sup>2\*</sup>, Talisadika S. Maifa<sup>3</sup>

<sup>1, 2\*, 3</sup> Mathematics Education, Universitas Timor, Indonesia

Email: [aloisiuslokason@unimor.ac.id](mailto:aloisiuslokason@unimor.ac.id)

Received	Revised	Accepted	Published
June 25, 2023	July 25, 2023	July 30, 2023	August 10, 2023

### Abstract

The purpose of this study is (1) to explore the mathematical concepts contained in the sonaf-maubes traditional house, and (2) to find out the symbolic meaning contained in the sonaf maubes traditional house. The type of research used is qualitative research with an ethnographic approach. The subjects in this study were people who could provide explanatory information about something that would be examined, including traditional leaders, guardians of the sonaf maubes traditional house and builders as well as the people of the Usfinit tribe who provided information about the history of the sonaf maubes traditional house. Data collection techniques used are interviews, observation, and documentation. Based on the results of the research, it can be concluded that (1) there are mathematical concepts found in the Sonaf-Maubes traditional house, namely flat shapes, spatial shapes, line concepts, counting concepts, distance concepts, and reflections (reflection), (2) there are symbolic meanings in the Sonaf-Maubes traditional houses on the traditional stone pillar main, roof, attic, doors, stoves and so on.

**Keywords:** Ethnomathematics, Exploration, Sonaf Maubes Traditional House

## 1. INTRODUCTION

Mathematics has an important role in various disciplines and promotes human thought in culture. Where human activity has a mathematical concept, which means that in the development process, humans must use mathematics. Mathematics is realized because of human activities that are inherent in various daily activities. Mathematics is a basic need for every individual in society to develop their potential.

Mathematics and culture are two things that are closely related in everyday life. Mathematics is one of the sciences used by humans in everyday life, while culture is a comprehensive way of life that prevails in society and is passed down from generation to generation. Culture is a creation of work, creativity and human feelings, this can prove that humans can use their minds and minds to carry out their lives according to Nursuprianah (2017).

Mathematics and culture are elements that are related to one another in life. Indirectly, all events in everyday life in society are always related to mathematics. Kiswanto (2015) This linkage of mathematics as a science that underlies all human life is what is termed ethno-mathematics. According to D'Ambrosio

<sup>2\*</sup> Corresponden author, email: [aloisiuslokason@unimor.ac.id](mailto:aloisiuslokason@unimor.ac.id)

(1985) ethnomathematics is the study of mathematics that takes into account cultural considerations in which mathematics emerges by understanding the reasoning and the mathematical systems they use. Ethno-mathematics is often referred to as ethno-mathematics. Ethno refers to cultural context, while Mathema means to explain, know or understand, and tics i.e. to do with Techno are also rooted in art and technique. In other words, Ethno refers to group members in a cultural environment who are identified by their cultural traditions, codes, symbols, myths and certain ways that are used to reason and to conclude. Mathema means to explain, understand, overcome, manage so that members of a cultural group can survive and thrive, and Tics refers to techniques such as calculating, ordering, measuring, weighing, coding, classifying, and modeling. Ethnomatematics is a study that collaborates between mathematics and culture (Indriyani, 2017).

One part of the culture is the traditional house. A traditional house is a building that has special characteristics and is used as a place of residence by a certain ethnic group. The traditional house is also used as a place for traditional ceremonies to be held. North Central Timor Regency is one of the regencies in East Nusa Tenggara Province which has a variety of regional cultures that have distinctive characteristics that make them slightly different from other regions. Apart from that, there is something interesting about the culture in North Central Timor, namely the traditional house in the shape of a circle. One of the traditional houses of Sonaf Maubes in North Central Timor which is located in Letmafo Village, Insana Tengah District. In the construction of the sonaf maubes traditional house it is still traditional where the buildings of the Letmafo people still use materials from nature. The construction process does not use nails but only ropes from gawang trees (tain tune).

Research that is relevant to this research is research from Putri (2017) which in her research stated that learning resources do not only come from textbooks, but can be supported from the environment and local culture which are more meaningful for students. Ethnomathematics as a bridge between education and culture is able to provide knowledge with added value to be understood because it is related to habits that are able to blend in with local traditions in learning mathematics. This is because ethnomathematics offers local culture-based learning so that students can simultaneously recognize and explore the culture of their nation. This study presents the results of an exploration of ethnomathematics forms that can be found in art. Study. Bayu (2021) shows that there are geometric shapes in the Langkanae traditional house building in Palopo City. The geometric shapes found are lines, angles, squares, rectangles, triangles, trapezoids, parallelograms, hexagons, beams, circles, tubes and triangular prisms.

Prior to this research, several previous studies on ethnomathematics had been reviewed. In research, Mar & Mamoh (2021) states that building elements such as pillars, walls and roofs from Uem Leu Manunis Ka'um Nais contain mathematical concepts found in geometry such as points, lines, shapes, shapes, congruence, and geometric transformation (reflection). The results of the study, Loviana (2020) stated that tapis cloth and traditional houses in Lampung Province have used mathematical concepts, there is a flat wake concept. Research by Funan & Mamoh (2019), states that the geometric concepts contained in uem le'u include points, lines, angles, flat shapes and geometric shapes.

The differences between previous researchers and this study were seen from the time frame, research location, and research subjects. Researchers will focus more on exploring mathematical concepts in the sonaf maubes traditional house.

## 2. METHODS

This study uses an ethnographic approach that is scientifically describing a phenomenon that exists in the usfinite community. The phenomenon in question is related to ethnomathematics activities to find mathematical elements and symbolic meanings of mathematical folklore contained in the sonaf maubes traditional house carried out in the sonaf maubes traditional house. This research was conducted in Letmafo Village, Insana Tengah District North Central Timor Regency from July 27 2022-06 August 2022. Subjects were taken using interview, observation and documentation techniques including traditional elders (1 person), guardian of the sonaf maubes traditional house (1 person), masons who are from the Usfinit tribe itself (approximately 6 people), as for the people from the Usfinit tribe who can

provide information about the concepts applied in the traditional sonaf maubes house, their role in prolonging the history of sonaf maubesi.


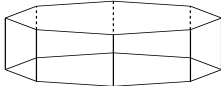





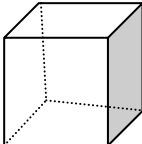
Researchers used three stages in the field process, namely the preparation stage to make research instruments in the form of interview guide sheets based on research planning, then the implementation stage by examining in-depth information about the sonaf maubes traditional house to related parties such as traditional leaders or traditional house keepers, and carpenters. -builders, and finally the data processing stage, namely analyzing and evaluating data that has been collected from observations and interview results by describing it into data that is easy to understand according to the focus of the study.


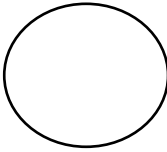

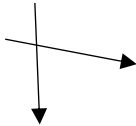

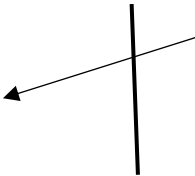

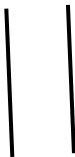



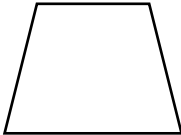
The research technique used is the triangulation technique, namely using several methods to obtain data in research including interviews, observation, and documentation. Data analysis technique is a way to manage data that has been obtained from a study into information so that the characteristics of the data are easy to understand and also useful. The data techniques used in this study are: data reduction, data display (presentation of data) and drawing conclusions.

### 3. RESULTS AND DISCUSSION

Based on the research found in the Sonaf Maubes traditional house, namely mathematical concepts and symbolic meanings contained in the shape of the foundation, walls (nik'a), small pillars (ni ana/ female pole), center pillar (ni atone/ male pillar), place of betel (kaib'a), earthen pot (nainejan), main attic, mezzanine, main pillar, door, and roof can be explained by the researcher as follows:

Table 1. Mathematical concept and symbolic meaning

No	Part of the sonaf maubes traditional house	Picture	Math concept	Symbolic Meaning
1	Foundation		Octagonal prism 	Strengthening in the process of building traditional houses
2	Wall (Nik'a)		Rectangle 	-
3	Small pole (ni ana), female pole (ni bifel) and male pole (ni atoni)		Tube 	Symbolizes a vertical relationship to the ancestors
4	Place of betel (kaib'a)		Cube 	Symbolizes service

5	Earth pot (nainejan)		Circle 	Symbolizes the vessel, blessing to the melting
6	Main loft		Intersecting lines 	Symbolizes the power of nature
7	Mezzanine		Intersecting lines 	Symbolizes unity
8	main mast		Perpendicular lines 	Symbolizes a vertical relationship to the ancestors
9	Male door (eno atone) and female door (eno bifel)		Rectangle 	As a tribute to the ancestors
10	Trapezoidal roof truss		Trapezoid 	Symbolizes harmony and greatness

The results of the study show that the traditional house of Sonaf Maubes contains mathematical concepts, namely: flat shapes, spatial shapes, the concept of counting, the concept of distance, and lines.

### 1. Build Flat

The flat wake concept in the Sonaf Maubes traditional house is as follows:

- a. Square, the square shape is found on the door of the traditional house and the place of siri in the traditional house. Doors and places of siri are called square because they have four equal angles and have the same angles and have the same angles. This is in accordance with the definition of a square according to Viani (2017) a square is a flat shape whose four sides are the same length and the angles are the same size.
- b. Rectangle, the rectangular shape is found in the shape of the walls, doors, bale-bale and so on. If a line is drawn on each of its sides, it will be in the form of a rectangle, it can be said to be a rectangle because the two sides are the same length, parallel and have four right angles. This is in accordance with the definition of a rectangle according to Sujatmiko (2005) a rectangle is a quadrilateral that has two pairs of parallel sides and the same length and has four right angles.
- c. The circle, the shape of the circle is found in the basic form on the foundation of the traditional house, the earthen pot, and on the roof of the traditional house, it is called a circle because it has the center point of the circle on the foundation and the earthen pot, this can be seen from the process of making the foundation and the earthen pot so that it forms a circle. This is in accordance with the definition of a circle according to Khon (Juano and Jediut 2019: 272) a circle is the position of points that are the same distance from a certain point, namely the center point in a flat plane.
- d. Triangle, a triangular shape is found in a triangular betel place. It is said that a triangle has three equal sides and three equal angles. This is in accordance with the definition of a triangle according to Wondo et al (2020) a triangle is a flat figure that has three sides whose three ends meet each other and forms three angles of 180 degrees and has three vertices.
- e. Rhombus, the shape of the rhombus is found in the location of the image on the foundation and the betel leaf which is in the form of a rhombus. The location of the foundation can be seen in the picture on the front door of the traditional house. It has a rhombus shape because it has four sides that are the same length and the angles opposite each other have the same size. This is in accordance with the definition of a rhombus according to Baharin (2007) Saying a rhombus is a 2-dimensional flat shape formed by 4 sides of the same length and having 2 pairs of non-right angles with opposite angles having the same magnitude.

### 2. Build Space

The concept of building space for the Sonaf Maubes traditional house is as follows:

- a. Tubes, tubular shapes on the main pole and support pole. This is based on the formation of two circles that are congruent and parallel and have a rectangle that surrounds the two circles. This is in accordance with the definition of a cylinder according to Djara et al (2021) a tube is a rectangular prism shape with a circular base. The shape of the space bounded by two equal parallel circles is a cylinder.
- b. Cube, where the betel leaves are called cubes because it is a combination of two betel places between the cover and the main betel place, because it has four sides that are the same size. This is in accordance with the definition of a cube according to Bayu (2021) A cube is a geometric shape that has six square sides of the same size.
- c. Trapezoid, the shape of the trapezoid is found in the shape of the roof of a traditional house. The shape is said to be a trapezoid because it is a flat shape that has four parallel sides but not the same length and has sides and angles that face each other. Definition of a trapezoid is a quadrilateral that has exactly one pair of opposite and parallel sides.
- d. The octagonal prism, the octagonal shape is found in the foundation of the Sonaf Maubes traditional house which has 8 corner points and has the same top and base with a foundation height of  $30 \times 30$  above the octagonal ground. This is in accordance with the definition of an octagonal prism according to Suparmin et al (2017) which says that an octagon has the same base and top and is in the form of a right angle to the base and roof so that it can be said that in general the prism space depends on the terms of the base and roof.

### 3. Line Concept

The line concept in the Sonaf Maubes traditional house, namely, at the stage of the main pillar to the attic (tetu) for making the building design seen at the angles of the attic in making a straight line up (vertical), the main pillar has one dimension and the same length. This is in accordance with the definition of the concept of a line according to Drs. I Wayan Gulendra M. Sn (2010) A line is a geometric shape that is depicted by a moving point, a line has only one dimension, namely the length of the line also has three types, namely a straight line, the shortest connecting line between two points that do not coincide.

#### 4. The concept of distance and the concept of quantifier

The concept of counting is seen in the sonaf maubes traditional house building in the arrangement of the wood on the roof of the house. While the concept of distance is seen in the way of placing or arranging for each wood or pillar in a traditional house building because to place one object with another object, of course, the concept of distance is used by measuring. This is consistent with the definition of the concept of distance and the concept of quantifier. According to Indriyani (2018), counting is an activity related to the question "how many" of an object or tool that is often used by mentioning natural numbers starting from one until all objects are counted.

#### 5. Concept of Reflection (Reflection)

The place of siri has an element of reflection (reflection) which is shown from its shape, if the axis of symmetry is made it will cut the axis at the place of siri into two parts right and left, it will be seen that the right side is symmetrical with the left part (Tahu, et al, 2023). Definition of the concept of reflection is the concept of reflection is where left and right movements are the same.

Many symbolic meanings imply human respect for ancestors and human relations with humans (balance, equality and harmony).

#### 1. Foundation

The community uses an 8 angled foundation, which means that 8 major tribes are in Insana or in other words, 4 large tribes guard the inside of the traditional house and 4 other large tribes guard the outside of the Sonaf Maubes traditional house. The foundation has the meaning of a major source of strength in the Sonaf Maubes traditional house. The foundation has a building structure that is directly connected to the ground and supports the weight of the traditional house building. This is stated by Das (2015) the foundation is the lower part of the building structure that is directly connected to the ground which is useful for supporting the weight of the building on the top of the building structure.

#### 2. Main Pole

The main pillar symbolizes a position, strength and vertical relationship with the biggest ancestor in the Sonaf Maubes traditional house. The main pillar serves as a place to convey requests or highest manifestations through the ancestors and is usually carried out by usif (raja insana). This is in accordance with the definition of the main pillar according to Fouk et al (2019) the great pillar symbolizes the link between humans and the highest party

#### 3. Attic

There are three bale bales in the Sonaf Maubes traditional house, namely the main bale or central bale, middle bale and bottom bale. The main bales are located higher than the middle bales and the bottom bales. Bale bale has its own symbol, upper bale bale (central attic) which is a place to store valuables, sacred items, and natural forces or forces in the sonaf maubes traditional house and not everyone can occupy the attic. The middle bale, which is a place to store food for the emperor and a place to store kitchen utensils, has a symbol of the unity of human society. The lower bale-bale is the resting place for the king, where the usif amaf sits, and the place for storing food dishes, the meaning of the lower bale-bale symbolizes togetherness in carrying out traditional activities in the sonaf maubes traditional house. This is in accordance with the definition of an attic according to Lede & Dapa (2021) an attic is a place for storing sacred objects that provide help. In other words, the attic symbolizes respect for the ancestors.

#### 4. Place Siring Pinang

The place for betel nut (kaib'a) in the Sonaf Maubes traditional house resembles flat shapes and geometric shapes such as squares, rectangles and cubes. Kaib'a is a container for placing betel nut

which functions as a dish for the ancestors (be'e nai) during traditional ceremonies, such as the Sek Pena ceremony (corn harvest) and so on. This is in accordance with the definition according to Tualaka (2019) where betel nut is meaningful as a means of social interaction, social approach, kinship and social intimacy (relationships between humans and their environment). In other words, it symbolizes service and appreciation.

5. Earth Pot (Nai nejan)

The clay pot in the Sonaf Maubes traditional house is usually made of clay and sand and is used at certain times, for example during traditional events and so on. Nai nejan is a container for filling water. The water in the nai jejan is called by the Usfinit tribe as oe manikin (water of blessing). This is in accordance with the definition of water according to Sianipar et al (2015) Water is found in jars which are a type of water that contains supernatural powers. Sacred water has a symbolic meaning of having a sacred power, which can protect humans from all dangers. Nai nejan served with offerings to the ancestors symbolizes sincerity in surrendering to the ancestors in the form of offerings to the ancestors/ancestors. This is in accordance with the definition according to Umaroh (2018) that the giving of offerings symbolizes a sincere request realized with a sense of sincerity without feeling the least bit heavy or burdened.

6. Doors

There are two doors to the Sonaf Maubes traditional house, namely the male door (eno atoni) and the female door (eno bifel). This is based on customary prohibitions which state that men and women cannot enter through the same door. The door symbolizes respect for the ancestors by bowing their heads when entering the traditional house (Kehi, et al., 2022). This is in accordance with the definition of doors according to Hermansyah (2016) that the entry/up point with a slightly lowered body position is a form of respect for the sultan.

7. Roof

The people of Letmafo village use one type of the roof of the Sonaf Maubes traditional house, which is a trapezoidal shape. This is based on the material and the manufacturing process, such as the trapezoidal shape using hun/humusu, the shape is still traditional because it still uses natural materials for roofing and keeps rainwater from entering the sonag maubes traditional house. Definition of a rectangular trapezoidal roof has exactly a pair of parallel sides so that rainwater does not enter the traditional house and the wind does not easily knock down the roof of the traditional house.

#### 4. CONCLUSION

Based on the results and discussion, it can be concluded that mathematical concepts found in the Sonaf Maubes traditional house are; flat shape, geometric shape, line concept, counting concept, distance concept and reflection concept. Flat shape in the form of a square found on the carved door of a traditional house, rectangles found on the walls, attic and door of a traditional house, triangles on the crossbar, circles on the foundations and on the roof of traditional houses (ntakni), rhombuses on the foundations and a series of motifs. Build space in the form of octagonal prisms on the foundation, cubes on the series, tubes on the support pillars, main pillars, and a rectangular pyramid that resembles a trapezoid on the roof of the house. The concept of the line is in the first loft, mezzanine, main pillar and suaf. The concept of counting and the concept of distance on how to arrange the roof of the sonaf maubes house. The concept of reflection is in the place of siri-pinang. In this case it shows that there is a relationship between mathematics and culture.

The symbolic meanings found in faut leu, main pillars, roofs, attics, doors, stoves and so on. Faut leu symbolizes strengthening in the process of building traditional houses, while the main pole symbolizes the vertical relationship with the ancestors, the bale-bale symbolizes the unity between the various tribes that exist in there, through the place of the banana series and the earthen pot symbolizes a vessel for blessings to the ancestors, the main attic symbolizes strength nature, the mezzanine symbolizes unity, the doors symbolize as a bow of respect for the ancestors and the roof symbolizes harmony and greatness.

## REFERENCES

- Baharin, S. (2007). *Kamus Matematika Bergambar untuk Sekolah Dasar*. Jakarta: PT. Grasindo.
- Bayu, D. Y. (2021). Eksplorasi Etnomatematika Pada Rumah Adat Langkanae Di Kota Palopo (Disertasi Doktor, Institut Agama Islam Negeri Palopo).
- Das, B.M. (2015). *Principle Of Foundation Engineering*, Cengage Learning, USA.
- D'Ambrosio, U. (1985). Ethnomathematic and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*, 1(5), 44–48.
- Djara, E. (2021). Eksplorasi Etnomatematika Ngadhu Dan Bhaga Dalam Kaitannya Dengan Pembelajaran Matematika Pada Masyarakat Desa Ubedolumolo Kabupaten Ngada. *Jupika: Jurnal Pendidikan Matematika*, 4(1), 61–107.
- Farida, F. (2015) Mengembangkan Kemampuan Pemahaman Konsep Peserta Didik Melalui Pembelajaran Berbasis VCD. *Al-jabar: jurnal pendidikan matematika*, 6 (1), 25-32
- Fouk R. F, Kondradus B, & Liliweri Y. K. (2019). Makna Simbol-Simbol Dalam Tradisi Hamis Batar (Syukur Jagung) Pada Suku Tetun Desa Wehali Kecamatan Malaka Tengah Kabupaten Malaka. *Jurnal Communio: Jurnal Jurusan Ilmu Komunikasi*, 8(1), 1245-1251.
- Funan, F. X., & Mamoh, O. (2019). Eksplorasi Etnomatematika Uem Le'U Insana Dalam Kaitannya Dengan Konsep Geometri. *RANGE: Jurnal Pendidikan Matematika*, 1(1), 63–75. <https://doi.org/10.32938/jpm.v1i1.271>
- Hermansyah W. (2016). Terminologi Rumah Adat Dalam Loka Sumbawa: Sebuah Tinjauan Antropolinguistik. *Retorika: Jurnal Ilmu Bahasa*, 2(2), 293-312.
- Indriyani, S. (2017). Eksplorasi Etnomatematika Pada Aksara lampung. *UIN Raden Intan Lampung*.
- Juano A, Jediut M, 2019. Eksplorasi Etnomatematika Dan Hubungannya Dengan Konsep Geometri Pada Matematika Sekolah Dasar Dalam Budaya Masyarakat Manggarai. *Jurnal Pendidikan dan Kebudayaan Missio* 11/2: 270-278
- Kehi, S., Son, A. L., & Simarmata, J. E. (2022). Studi Etnomatematika: Makna Simbolik dan Konsep Matematika Pada Rumah Adat Hamanas Malaka. *PRISMA*, 11(2), 585-594.
- Kiswanto. (2015). Deskripsi Pemahaman Konsep Materi Geometri di Tinjau Dari Kepribadian Sensing dan Intution Pada Siswa Kelas IX SMP Negeri 33 Makasar Doctoral Disertation Universitas Islam Negeri Alauddin Makasar).
- Lede YK, Dapa YJ, 2021. Etnomatematika Berbasis Geometri Pada Rumah Adat Di Desa Reda Mata Kabupaten Sumba Barat Daya. *Asintot: Jurnal Kependidikan Matematika*, 3(1), 67-76.
- Loviana .S. (2020). Etnomatematika pada kain Tapis dan Rumah Adat Lampung. *Jurnal Penelitian Ilmiah*, 1(4), 94–110.
- Mar, A. & Mamoh, O. (2021). Eksplorasi Etnomatematika Pada Rumah Adat Manunis Ka'umnais Suku Uim Bibuika Kecamatan Botil Leobele Kabupaten Malaka. *URNAL MathEdu (Mathematic Education Journal)*, 4(2), 155–162.
- Nursuprianah, I. (2017). Pemodelan Matematika Rentang Waktu yang Dibutuhkan dalam Menghafal Al-Qur'an. *Jurnal THEOREMS (The Original Research of)*, 2(1), 1–10.
- Putri, L. (2017). Eksplorasi Etnomatematika Kesenian Rebana Sebagai Sumber Belajar Matematika Pada Jenjang Mi. *Jurnal Ilmiah Pendidikan Dasar UNISSULA*, 4(1), 136837.
- Suparmin, S., et al. (2017). Pena Emas Olimpiade Sains Matematika untuk SMP. Seri Konomatika 3. Bandung: Yrama Widya. Hal 181.
- Tahu, O. M., Son, A. L., & Deda, Y. N. (2023). Exploration of Geometry Concepts in the Tafatik Maromak Oan Malaka Traditional House. *Brillo Journal*, 2(2), 80-93.
- Tualaka D. (2019). Degradasi Fungsi, Makna dan Nilai Budaya Oko'Mama Pada Komunitas Tutar Uab Meto. *Litera: Jurnal Litera Bahasa Dan Sastra*, 4(1), 51-59.



- Ulum, B., Budiarto, M. T., & Ekawati, R. (2017). Etnomatematika Pasuruan : Eksplorasi Geometri untuk sekolah dasar pada motif batik Pasedahan suropati. *Seminar Nasional Integrasi Matematika dan Nilai Islam*, 1 (1), 70-78.
- Umaroh S, 2018. "Makna Filosofis Tradisi Munggah Kap Dalam Pembangunan Rumah Pada Masyarakat Muslim". Desa Sari; Demak. Diss. IAIN Kudus: Program Studi Aqidah Dan Filsafat Islam.
- Viani RS, 2017. Pengaruh Model Problem Based Learning (PBL) Terhadap Hasil Belajar Matematika Materi Bangun Datar Persegi Panjang dan Persegi Siswa Kelas VII Mtsn Tulungagung.
- Wondo, M. T.S., & Mei, M. F., (2020). Ethnomathematic Exploration Of Lio Traditional House Of Ende District For Geometry Learning. *Pendidkan Dan Kebudayaan Mission*, 1(12), 32-44.