Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3, 2249-2267
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i3.5780

Ethnomathematical study of traditional Hole rituals in the Sabu community in Sabu Liae Sub-District Sabu Raijua District

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Abstract: The uniqueness of the culture of a particular region has the potential to contain mathematical concepts, one of which is the culture of the Hole Customary Ritual in the Sabu community of Sabu Liae District, Sabu Raijua Regency. This study aims to describe the ethnomathematics in the culture of the Hole Customary ceremony and related mathematical concepts, as well as to design learning tools for the mathematical concepts found. This research was conducted in Sabu Raijua District, with four research subjects. The type of research is qualitative with an ethnographic approach, where the researcher, as the main instrument, plays a role in collecting data through interviews, observation, and documentation. Data validity uses source triangulation techniques. Data analysis uses ethnomathematics characteristics based on the Miles and Huberman model. The results showed that there is ethnomathematics in the culture of the Hole ceremony, including the activities of counting, measuring, localizing, designing, playing, and explaining. From these activities, mathematical concepts are identified, which include drawing patterns, addition, one-on-one pairing, relations and functions, comparison, and geometry. Thus, these various mathematical concepts can be developed by designing learning tools.

Keywords: *Culture, Ethnomathematics, Hole traditional ceremony, Math concepts, Math learning.*

1. Introduction

Culture is a way of life that develops and is owned by a group of people and is passed down by ancestors from generation to generation [1]. Culture itself consists of several very complicated elements, including religious systems, political systems, customs, languages used, tools, clothing worn, buildings and works of art. Culture is a unity that cannot be separated between culture and humans because culture is essentially human [2]. We can understand an individual outside the culture that has been lived by the individual himself, therefore culture should be seen in a position between humans, but it can also be used as a movement of the human being himself.

Culture is knowledge possessed by humans so that it can be used to interpret the experiences of humans themselves, and can give birth to behaviour in accordance with existing culture [3]. He emphasized that the concept of a culture focuses on the cultural knowledge possessed by a person from the learning process used in interpreting the environment so that it can give birth to an adaptation strategy [4, 5]. As a system of meaning, the shared cultural knowledge is learned, improved, maintained, and applied in the context of daily interaction [6, 7]. Furthermore, for humans, they need something that is a system of knowledge to interpret their world, which causes social behaviour as a result of understanding and interpretation which is also called "culture". A person will always use the cultural knowledge he has as a reference, and that is in the culture of his own people.

Knowledge of culture or cultural values is then realized by someone to be used as symbols and cultural attributes that can characterize a community culture [8, 9]. The results of understanding of the environment are used by individuals (as members of society) in certain cultures to realize their behaviour in accordance with the environment they live in. In relation to the daily environment, cultural

History: Received: 20 January 2025; Revised: 14 March 2025; Accepted: 19 March 2025; Published: 26 March 2025
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results in the form of knowledge, values, norms and rules will be realized in certain objects as cultural objects. Culture is the overall knowledge possessed by humans as social creatures that contain sets of knowledge models that can be selectively used to understand and interpret the environment they need. Education and culture are two elements that complement and support each other [10, 11]. Culture, which has many aspects, will support educational programs and implementation. Therefore, efforts to advance culture also mean efforts to advance education, and the existence of ethnomathematics is indirectly a way to maintain and preserve existing culture.

Education is a goal-conscious process. Purpose means as an effort to provide the formulation of the final results expected by students after carrying out learning experiences. This shows that education is an effort made consciously and systematically to achieve a better standard of living or for progress. One of them is education that supports students to think critically, namely mathematics education, because mathematics is a human activity related to patterns, problem solving, logical thinking with the aim of increasing critical thinking in understanding the world.

Mathematics is a universal subject in every culture that has concepts of numbers and ideas, no matter how sophisticated the culture and technology [12]. The universal notion of mathematics is further reinforced by the fact that it is created all over the world. "Mathematics as human activities", so mathematics and education can be combined, and this combination is called ethnomathematics. Ethnomathematics studies the way other cultures understand, articulate the use of concepts and practices originating from within the culture, when we study ethnomathematics, it does not mean that we only study mathematical phenomena and translate them into formal mathematical concepts (mathematical models) [13, 14]. But more than that the way of thinking and values that can underlie why individuals or even certain groups can have such an understanding are also interesting to study. Another word for the study of ethnomathematics is studying cultural anthropology (ethnography), mathematical modelling and mathematics itself as for other words from the study of ethnomathematics, namely studying cultural anthropology (ethnography), mathematical modelling and mathematics itself [15, 16]. The existence of a learning process using ethnomathematics, is a new bridge for an educator or teacher so that it will increase student learning motivation and be more interested in learning mathematics because it is in direct contact with nature or the environment outside the classroom. Of course, by linking the material to be taught with real examples in everyday life. Education must have something new so that it can make students' curiosity high and make education and culture always develop with the existence of education that collaborates with culture (ethnomathematics).

Ethnomathematics is one of the new and very coherent studies. As one of the new and coherent studies, ethnomathematics plays an important role in exploring the noble values of culture in society. Ethnomathematics is mathematics that grows and develops in a particular community culture. While culture is a habit that contains important and fundamental elements of value that are passed down by ancestors from generation to generation. The *Hole* Customary Ceremony will be held in accordance with the calculation of the customary calendar of the people on the island of Sabu or nicknamed the city of the gods, which has been determined from generation to generation by the ancestors of the Sabu people since time immemorial. The *Hole* ceremony is held on *war'ru bangaliwu* in the traditional calendar or around May or June in the Gregorian calendar.

The traditional ceremony activities carried out by the Sabu community, especially the *Hole Liae* traditional ceremony, are very interesting for researchers to study, because in this traditional ceremony there are symbols contained therein. One of the media they use during the ceremony is offerings, before they perform the ceremony, they first perform the traditional ceremonies of *"Liba Doka"*, *"Bui Ihi"*, *"Gau Dere Hole"*, *"Pe Addo Dere Hole"*, *"Nga'a Hole"*, *"Lingo Dere Hole"*, *"Anynyu Kedu'e Hole"*, *"Baja Nga'a Hole"*, and worship to the ancestral spirits. In addition, the author's interest in this study is that in this modern era there are still people who maintain their ancestral culture, one of which is the community on the island of Sabu.

The purpose of the *Hole* traditional ceremony is as a form of gratitude to God Almighty for his participation and protection for one year and as a thank you or fulfilment of the conditions given by

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

Mone Weo and *Banni Baku* who have given permission to *Kika Ga* to be able to take the land under the traditional house of *Mone Weo* and *Banni Baku*.

This research is intended to describe the process of the ceremony and the meanings that exist in the *Hole* Traditional Ceremony in the Sabu Community of Sabu Liae District, Sabu Raijua Regency. The ceremony has meaning as a process of interpreting activities in a community group towards religious activities and also the belief system they adhere to. In the process, there is always the meaning of certain symbols that indicate the process of the traditional ceremony.

2. Literature Review

2.1. Ethnomathematics

Ethnomathematics is mathematics applied by certain cultural groups, such as: certain class groups, labour/farmer groups, children, professional classes, etc [17]. The results of studies from within the culture and then integrated in mathematics learning are systematic efforts through education (mathematics education) in preserving and inheriting culture. In this case, mathematics also has the power that can be used to maintain and promote culture because mathematics itself is contained in culture and integrated with culture.

In culture-based math learning, students are simultaneously introduced to their culture and learn about math. The more students know about their culture, the more they love their culture [18]. By integrating culture in mathematics learning activities at school, it can help efforts to preserve culture and also students will develop and grow on their culture. Ethnomathematics can be interpreted as a model of mathematical approach in a cultural perspective where this model of mathematical approach uses culture as a medium of learning. suggests that ethnomathematics is the study of the relationship between mathematics and related socio-cultural backgrounds and in diverse cultural systems [19]. With the use of ethnomathematics in schools, students are facilitated to understand the mathematics material delivered by the teacher and ultimately use mathematical ideas, mathematical concepts, and practices to solve problems they face in their daily life activities [17, 20].

Ethnomathematics is a new and coherent study and has excellent potential for teachers or instructors to develop mathematics learning into contextual and enjoyable learning while at the same time introducing students to the culture of the Indonesian nation. In addition, ethnomathematics can also be used as a method and approach in learning mathematics even though ethnomathematics is still relatively new in the world of education.

Ethnomathematics contains several activities related to learning mathematics. These activities are characteristic of ethnomathematics, namely Counting, Locating, Measuring, Designing, Playing, and Explaining [6, 21]. **1)** Counting, related to the practice and tools of counting both physically and mentally, has existed for thousands of years in various forms and models. Counting activities are always associated with numbers as seen in the local language expressions used in the cultural group itself. Likewise, the tools used in counting will vary from one cultural group to another. Thus, there will also be different number systems that will be used by each cultural group. **2)** Locating is related to finding or determining a position or location of an object, determining direction, and determining the relationship between one object and another in a certain context. This has to do with spatial ability, how spatial conceptualization and how an object can be positioned in a spatial environment. Navigation mapping, and the organization of spatial objects exist in all cultures and form very important mathematical knowledge. **3)** Measuring, relates to measuring activities in general using a variety of non-standardized measures such as using parts of the body to measure length. As for measuring time, liquids and weight, different cultural groups use different methods and tools. This measuring activity is also related to numbers and therefore includes the activities of comparing, ranking, and quantifying the characteristics of a particular object. **4)** Designing, is concerned with making patterns to create objects or cultural artifacts used in the home for farming, decoration, warfare, games, and religious purposes. Designing is also concerned with large-scale things, such as houses roads, gardens, fields, villages, and cities. All of these become sources and parts in the formation of mathematical knowledge of members of a particular

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

cultural group. **5)** Playing relates to traditional games in society that involve types of mathematical reasoning, probability, and strategic thinking. Games contain game rules, procedures, materials used and standardized criteria. **6)** Explaining refers to various cognitive aspects of conceptualizing the environment and questioning it. To explain various complex and dynamic phenomena such as a life process, the ebb and flow of an event, every culture has stories, in the form of folklore, and storytellers.

Stories are a universal phenomenon, and in relation to mathematical knowledge in culture, what is most important in culture is the ability of the storyteller's language to connect discourse in various ways [22]. In relation to research, attention is drawn to the logicality of connectivity in culture that allows propositions to be combined, contrasted, extended, restricted, elaborated and so on. From all of this, evidence of knowledge has been constructed that meets the criteria of being consistent and convincing.

The characteristics of ethnomathematics are useful for researchers to help and direct so that researchers can identify and describe mathematical knowledge in the culture being studied. The things studied in Ethnomathematics are very diverse, among others [19, 23, 24], 1) Symbols, concepts, principles and skills used mathematically in a community group. 2) Differences or similarities of a mathematical nature found in a community group and the factors of these differences or similarities. 3) The most specific and interesting things that exist in a certain group of people such as: ways of speaking, behaving, thinking, and so on that are related to mathematics. 4) All aspects of community life related to mathematics, for example: social conditions, economic conditions, cultural conditions, and political conditions.

2.2. Culture and Hole Traditional Ceremony

Culture is how members of a group think and how they cope with problems in group life. Culture is all human activity, including beliefs, knowledge, art, morals, laws, customs, and other habits. There are several elements of culture that are better known as universal elements of culture which include language, technology, livelihood systems, arts, and religious systems. The culture of a community is generally described in reference to these universal cultural elements.

Culture on *Sabu* Island is a typical activity that has become a habit that lasts from generation to generation. Aspects of community life on Sabu Island are interrelated with religious life closely related to other aspects of life such as the economic field, social field, and culture or customs. This is based on the view that everything is in harmony or balance and is a gift from God Almighty or in the Sabu language called *"Deo Ama"*, so everything must be done in a religious atmosphere, such as starting activities with ceremonies with the aim of asking for guidance, instructions, guarding, and blessings from God Almighty.

Hole traditional ceremony is a very popular traditional ceremony among the people of Sabu Raijua which is usually performed in mass. The *Hole* Traditional Ceremony becomes very popular because it is only performed once a year, thus attracting many foreign tourists and local tourists including Sabu Raijua people who have been outside the island of Sabu Raijua to participate and take part in the festivity and excitement of the ceremony. In addition, the *Hole* traditional ceremony contains several values that are embedded and always maintained in the social life of the Sabu people. These values include trust value, awareness value, unity value, ethical value, aesthetic value, loyalty value and juridical value. The *Hole* ceremony is carried out in accordance with the calculation of the traditional calendar of the Sabu community which has been determined from generation to generation by the ancestors of the Sabu people since time immemorial. The *Hole* ceremony will be held in May or June in the Gregorian calendar or *War "ru Bangaliwu* in the traditional calendar.

3. Research Methods

This research is qualitative research with ethnographic approach. The research uses ethnographic approach because the researcher has to explore the cultural phenomenon in the community by revealing

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

the description of *Hole Liae* Traditional Ceremony in Sabu Raijua Regency. The description is revealed by the way the researcher observes the *Hole Liae* Traditional Ceremony event seen from the activities observed and researched and then explored.

This research was conducted in Hallapaji Village, Sabu Liae District, Sabu Raijua Regency, East Nusa Tenggara Province, Indonesia. The subjects in this study were the Sabu community of Sabu Raijua Regency as performers of the ceremony and traditional leaders. The selection of subjects is based on the following provisions: (1) The subject is a native of Sabu Liae and intensively integrated with the culture of *Hole* Traditional Ceremony in Sabu Island; (2) The subject has a broad understanding of *Hole* Traditional Ceremony in Sabu Island; (3) The subject is fully involved in the culture of *Hole* Traditional Ceremony in Sabu Island; (4) The subject has the ability to explain *Hole* Traditional Ceremony in Sabu Island; (5) The subject has sufficient time to be asked for information about *Hole* Traditional Ceremony for research purposes.

This research instrument is divided into two, namely **(1)** Main Instrument. In this research, the main instrument is the researcher (human instrument), the researcher plays a role in determining the focus and boundaries of the research, selecting informants as data sources, collecting data through observation, interviews and documentation, then qualitatively analysed by the researcher to produce descriptive data in the form of written or spoken words from the objects that have been observed related to the culture of the *Hole* Traditional Ceremony on Sabu Island; **(2)** Supporting Instruments. Supporting instruments in this research are interview, observation, and documentation. To achieve the research objectives, in this research, the researcher uses research procedures, namely **(a)** Determining the area, the object to be studied. In this research, the target is the Sabu Liae Community of Hallapaji Village, Sabu Liae District, Sabu Raijua Regency regarding the *Hole* Traditional Ceremony; **(b)** Determining Informants. A good informant is an informant who is directly involved and knows well about the matter to be studied. The informants chosen in this research are informants who are considered to be able to provide a good explanation, and understand the information needed by the researcher regarding the *Hole* Traditional Ceremony activities in Hallapaji Village; **(c)** Collecting Data. At the stage of collecting data, interviews and observation methods were used. In the observation technique, it is done by observing during the research process and the interview used in this research is a semi structured interview where the researcher uses an interview guide, but there is a possibility that the questions in the interview will develop as needed. In doing so, the researcher used a camera to take pictures related to the culture of the *Hole* Traditional Ceremony on Sabu Island

Furthermore, researchers made notes from the results of interviews and observations; **(3)** Testing Data Validity. The data validity checking technique chosen is triangulation. In testing the validity of the data in this study, it is carried out by triangulating sources, namely where the researcher tries to check the validity of the data that has been obtained by comparing the information obtained between existing informants, observation results, and documentation of data related to culture in the *Hole* Customary ceremony activity on Sabu Island from different sources, after the researcher gets the data needed, the researcher will validate the data obtained to several validators to get accurate data so as to produce conclusions from the data that has been analysed by researchers agreed upon by the data source and also agreed upon by the validator. If the data obtained from informants is different, the researcher will increase the number of informants to get accurate data. The steps that can be taken by researchers, namely Data Validation, Additional Interviews, Further Analysis, Conducting Data Analysis.

In this study, data analysis was carried out using the Miles and Huberman data analysis model, namely data reduction, data presentation, and making conclusions based on data obtained during research activities. Furthermore, this research seeks to obtain ethnomathematics findings, identify mathematical concepts that correspond to ethnomathematics, design learning tools, and develop learning strategies.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

4. Results and Discussion

4.1. Results

4.1.1. Numbers in the Culture of Sabu Liae Subdistrict

Sabu Liae is a sub-district in Sabu Raijua Regency, East Nusa Tenggara, with an area of approximately 57.62 Km^2. The language spoken by the people of Sabu Liae is Sabu language (Li Hawu). *Hole* culture in Sabu Liae sub-district involves counting activity. In calculating, the people of Sabu Liae certainly relate to numbers that appear in the expression of the local language and are used in daily life in Sabu Liae, namely the Sabu language. Some numbers in the culture are described in table 1.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

Table 1.
Numbers in Sabu Liae Sub-district Culture.

Numbers	Numbers in Sabu Language	Numbers	Numbers in Sabu Language
0	Koho	56	Lam'mi Nguru An'na
1	Ahhi	57	Lam'mi Nguru Pid'du
2	D'ue	58	Lam'mi Nguru Aru
3	Tal'lu	59	Lam'mi Nguru Heo
4	Ap'pa	60	An'na Nguru
5	Lam'mi	61	An'na Nguru Ahhi
6	An'na	62	An'na Nguru D'ue
7	Pid'du	63	An'na Nguru Tal'lu
8	Aru	64	An'na Nguru Ap'pa
9	Heo	65	An'na Nguru Lam'mi
10	Henguru	66	An'na Nguru An'na
11	Henguru Ahhi	67	An'na Nguru Pid'du
12	Henguru D'ue	68	An'na Nguru Aru
13	Henguru Tal'lu	69	An'na Nguru Heo
14	Henguru Ap'pa	70	Pid'du Nguru
15	Henguru Lam'mi	71	Pid'du Nguru Ahhi
16	Henguru An'na	72	Pid'du Nguru D'ue
17	Henguru Pid'du	73	Pid'du Nguru Tal'lu
18	Henguru Aru	74	Pid'du Nguru Ap'pa
19	Henguru Heo	75	Pid'du Nguru Lam'mi
20	D'ue Nguru	76	Pid'du Nguru An'na
21	D'ue Nguru Ahhi	77	Pid'du Nguru Pid'du
22	D'ue Nguru D'ue	78	Pid'du Nguru Aru
23	D'ue Nguru Tal'lu	79	Pid'du Nguru Heo
24	D'ue Nguru Ap'pa	80	Aru Nguru
25	D'ue Nguru Lam'mi	81	Aru Nguru Ahhi
26	D'ue Nguru An'na	82	Aru Nguru D'ue
27	D'ue Nguru Pid'du	83	Aru Nguru Tal'lu
28	D'ue Nguru Aru	84	Aru Nguru Ap'pa
29	D'ue Nguru Heo	85	Aru Nguru Lam'mi
30	Tal'lu Nguru	86	Aru Nguru An'na
31	Tal'lu Nguru Ahhi	87	Aru Nguru Pid'du
32	Tal'lu Nguru D'ue	88	Aru Nguru Aru
33	Tal'lu Nguru Tal'lu	89	Aru Nguru Heo
34	Tal'lu Nguru Ap'pa	90	Heo Nguru
35	Tal'lu Nguru Lam'mi	91	Heo Nguru Ahhi
36	Tal'lu Nguru An'na	92	Heo Nguru D'ue
37	Tal'lu Nguru Pid'du	93	Heo Nguru Tal'lu
38	Tal'lu Nguru Aru	94	Heo Nguru Ap'pa
39	Tal'lu Nguru Heo	95	Heo Nguru Lam'mi
40	Ap'pa Nguru	96	Heo Nguru An'na
41	Ap'pa Nguru Ahhi	97	Heo Nguru Pid'du
42	Ap'pa Nguru D'ue	98	Heo Nguru Aru
43	Ap'pa Nguru Tal'lu	99	Heo Nguru Heo
44	Ap'pa Nguru Ap'pa	100	Hengahu
45	Ap'pa Nguru Lam'mi	1.000	Hetab'ba
46	Ap'pa Nguru An'na	10.000	Henguru Tab'ba
47	Ap'pa Nguru Pid'du	100.000	Hengahu Tab'ba
48	Ap'pa Nguru Aru	1.000.000	Hejuta
49	Ap'pa Nguru Heo	10.000.000	Henguru Juta

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

50	Lam'mi Nguru	100.000.000	Hengahu Juta
51	Lam'mi Nguru Ahhi	…..	…..
52	Lam'mi Nguru D'ue	…..	…..
53	Lam'mi Nguru Tal'lu	…..	…..
54	Lam'mi Nguru Ap'pa	…..	…..
55	Lam'mi Nguru Lam'mi	…..	…..

Based on table 1, we can see the difference in number names from 0 to 10, while the mention of numbers 11 to 99 is formed from a combination of numbers 1 to 9. For numbers 100 to infinity, it is also formed from a combination of numbers 1 to 9. In the Sabu language, tens are called *nguru*, hundreds are called *ngahu*, thousands are called *tab'a*, for millions and so on there is no special designation. For explanation, numbers greater than 10 will be constructed in table 2.

Table 2.
Construction of Numbers in the Culture of Sabu Liae Sub-district.

Numbers	Numbers in Sabu Language	Number Construction
10	Henguru	10
11	Henguru Ahhi	10+1
12	Henguru D'ue	10+2
13	Henguru Tal'lu	10+3
14	Henguru Ap'pa	10+4
15	Henguru Lam'mi	10+5
16	Henguru An'na	10+6
17	Henguru Pid'du	10+7
18	Henguru Aru	10+8
19	Henguru Heo	10+9
20	D'ue Nguru	10+10
30	Tal'lu Nguru	10+10+10
40	Ap'pa Nguru	10+10+10+10
50	Lam'mi Nguru	10+10+10+10+10
60	An'na Nguru	10+10+10+10+10+10
70	Pid'duNguru	10+10+10+10+10+10+10
80	Aru Nguru	10+10+10+10+10+10+10+10
90	Heo Nguru	90+10+10+10+10+10+10+10+10
91	Heo Nguru Ahhi	90+1
92	Heo Nguru D'ue	90+2
93	Heo Nguru Tal'lu	90+3
94	Heo Nguru Ap'pa	90+4
95	Heo Nguru Lam'mi	90+5
96	Heo Nguru An'na	90+6
97	Heo Nguru Pid'du	90+7
98	Heo Nguru Aru	90+8
99	Heo Nguru Heo	90+9

Based on table 2, it can be seen that the number 11 is called henguru ahhi which means ten plus one and is constructed as 10 + 1. For the number 99, it is called heo nguru heo which means, ninety plus nine and is constructed as 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 9 or written 90 + 9. Based on tables 1 and 2, it can be seen that the people of Sabu Liae, calculate using base 10 (decimal system). This number in Sabu language is also used by the people of Sabu Liae Sub-district in *Hole* cultural activities.

4.1.2. Hole Traditional Ceremony Activities of the Sabu Liae Community

The *Hole* Ceremony was born from the oral narration about the formation of Sabu Island, which was originally only an ocean without land. The land of Sabu Island was only formed due to the struggle of *Kika Ga* who took land from Raijua Island and then formed Sabu Island. This narrative then forms an

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780

understanding of the ceremony that the *Hole* Ceremony is performed as a form of gratitude for the land given by the creator, as well as the responsibility to protect Sabu Island as an ancestral land.

The *Hole* Ceremony is held in the month of *Banga Liwu* (May-June) according to the traditional calendar of the *Jingitiu* people. In its implementation, the *Hole* Ceremony has several functions, namely (1) Ceremony Function. In this case, the *Hole* Ceremony is a means to achieve safety and blessings for agricultural products, to build good relations between humans and ancestors, and as an effort to reject bad luck and ask for blessings. (2) Social Function. In this case, *Hole* Ceremony becomes a means of education, strengthening family relations, as well as a means of social control and social solidarity. (3) Economic Function. In this case, *Hole* Ceremony also increases people's income during the activity. (4) Ecological Function. In this case, the *Hole* Ceremony opens space for the creation of a sustainable environmental balance.

The *Hole* Traditional Ceremony is one of the traditions in a traditional society that is still considered to contain values and norms that are still quite relevant to the lives of its supporters. The *Hole* Traditional Ceremony is a traditional ceremonial activity which is a worship to the spirits of the ancestors and payment of tribute to *Mone Weo* and *Banni Baku* and also as a form of gratitude to God Almighty for his participation and protection for one year and as a thank you or fulfilment of the conditions given by Mone Woe and *Banni Baku* who have allowed *Kika Ga* to take the land under the traditional house of *Mone Weo* and *Banni Baku*. From this, the *Hole* Traditional Ceremony was created.

Clothing and Equipment for *Hole Liae* Traditional Ceremony. The clothing used in the *Hole Liae* Traditional Ceremony is Sabu traditional clothing. Men wear blankets *(hij'ji huri* and *hij'ji pudi*) and women wear sarongs *(ai)*.

Figure 1.
hij'ji huri, hij'ji pudi, Ai (sarung).

The *Hole Liae* Traditional Ceremony equipment for men and women consists of (1) *Lehua* or sling which is a rectangular cloth shaped in such a way as to form a circle to be worn on the head as a head crown. *Lehu* is usually only worn by men, (2) *Wai Wake* is clothing or equipment used by men to tie *hij'ji pudi* or *hij'ji huri* (blanket) on the waist, (3) *Heleda* or shawl. Sabu traditional clothing in the form of rectangles and tassels that are worn on the chest.

Figure 2.
Lehua (Sling), *Wai Wake* (Blanket binder), *Heleda* (Shawl).

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
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There are 6 stages in performing the *Hole Liae* Traditional Ceremony, namely (1) Traditional Ceremony Activity *"Liba Doka"* It means scattering fragrant aromas on fields, gardens and all land on the island of Sabu, so that food crops, animals and living trees can provide fragrant results. (2) The traditional ceremony *"Bui Ihi"* means cleaning yourself, counting the number of members of each family, from men, women to babies born that year and family members who have died. (3) Ceremonial activities "*Gau Dere*, *Pe Addo Dere* and *Lingo Dere Holè*". *Dere* is the drum of *Hole*. (4) Ceremonial activity "*Nga'a Hole"*, means *Hole* traditional dinner. (5) Ceremonial activity "*Anynyu Kedua Holè*", means weaving the *Hole* Trinity Parallelogram. (6) Ceremonial Activity "*Ba'ja Nga'a Holè*", means giving offerings stored in a *kab'ba nga'a* (eating place made of coconut fruit) and placed on the *kelaga duru* (floor of the stilt house on the left) for the ancestors, God the guardian and God the giver of life, The *Wie Nga'a Hole* ceremony is the culmination of all the *Hole* traditional ceremonial activities in *"Warru Bangaliwu"* (traditional calendar) which is between the end of April and the beginning of May (traditional calendar).

4.1.3. Tools Used in Hole Liae Traditional Ceremony

The tools used can be seen in the following table 3.

Table 3.
Tools Used in *Hole Liae* Traditional Ceremony.

No	Figure	Description
1		*Kerij'ji Dai. Kerij'ji Dai* is made of woven palm leaves. *Kerij'ji Dai* is used to store the offerings and to screen the rice or sorghum that will be used during the *Hole Liae* Traditional Ceremony.
2		*Kerij'ji Wore. Kerij'ji Wore* is made of woven palm leaves and is smaller than *kerij'ji dai. Kerij'ji Wore* is used to store rice or sorghum and also as a place to eat.
3		*Kab'ba Nga'a. Kab'ba Nga'a* is made from coconut and cut off the head to form a container. *Kab'ba Nga'a* is used to store food for the ancestors and also as a place to drink.

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4		*Ar'ru Rai*. *Ar'ru Rai* is made of clay through several stages such as sculpture. *Ar'ru Rai* is used to cook food both for the ancestors as offerings and also to cook food to eat during the *Hole Liae* Traditional Ceremony.
5		Mat *(Dap,pi)*. *Dap,pi* is a tool used as a base when riding a horse in the *Hole Liae* traditional ceremony.
		Chicken Knife (*Dara Manu*). *Dara* is a tool used on chickens during the *Hole Liae* chicken spur event which is tied to the chicken's leg.

4.1.4. Ethnomathematics in the Hole Liae Traditional Ceremony Activity of the Sabu Liae Community

Ethnomathematics in the *Hole Liae* Traditional Ceremony of the Sabu Community in Sabu Liae District, Sabu Raijua Regency is described based on six characteristics of ethnomathematics which include Counting, Locating, Measuring, Designing, Playing, and Explaining.

The results show that ethnomathematics is found in the culture of the *Hole Liae* Traditional Ceremony of the Sabu community in Sabu Liae District which can be seen from the clothing, equipment and tools used. Ethnomathematics found in the culture of the *Hole Liae* Traditional Ceremony of the Sabu community include **(1)** Counting. Counting activities that can be found in the *Hole Liae* Traditional Ceremony are when counting the number of people in a family, counting the number of *Paralelogram* that will be woven, counting the number of lumps of rice that will be prepared for the Giver of life and ancestors and counting the number of borders of Sabu Liae land *(Keb'bihu Rai Hawu*); **(2)** Measuring. The measuring activity of the Sabu community in *Hole Liae* Traditional Ceremony can be found when cooking rice and peanuts that will be eaten together during Nga'a *Hole*, the measurement used is if one *Keri'ji Wore* of rice then the peanut is half of the same Kerij'ji Wore; **(3)** Designing. The designing activity of the Sabu community in the *Hole Liae* Traditional Ceremony can be found in the tools used; (4) Playing. Playing activity among the Sabu community in *Hole Liae* Traditional Ceremony can be found in chicken belt game and *Hole* horse race; (5) Explaining. Explaining activity of the Sabu community in *Hole Liae* traditional ceremony can be found when explaining the history of *Hole Liae* traditional ceremony and how to do *Baj'ja Nga'a Hole* process (giving offerings to the ancestors). When doing *Baj'ja Nga'a Hole*, the customary leader must know very well where the rice lumps are located for each *Deo Rai* (God), the customary leader must not keep the offerings in any place because it will get disaster in life.

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ISSN: 2576-8484
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4.1.5. Mathematical Concepts Related to Ethnomathematics in Hole Liae Traditional Ceremony Culture

Based on the results of the research on the *Hole Liae* Traditional Ceremony activities in the Sabu Community of Sabu Liae District, several mathematical concepts related to ethnomathematics in the *Hole Liae* Traditional Ceremony culture were found which have been described previously, which include counting or calculating, locating or determining, measuring or measuring, designing or designing, playing or games and explaining or explaining. The math concepts include.

(1) The concept of one-on-one pairing. The concept of one-on-one pairing in counting activities is found when pairing *Paralelogram* to each person, where one person only gets one Paralelogram. The calculation can be constructed in table 3.

Table 3.
Counting the number of people with the number of Paralelogram.

Persons	Paralelogram	Total
1	1	1:1=1
2	2	2:2=1
3	3	3:3=1
4	4	4:4=1
5	5	5:5=1

It can be seen that in calculating the number of people with the number of *Paralelogram*, the concept of one-on-one pairing is found, where each person only gets one diamond. If there is only one person in a family then there is only one *Paralelogram*, which can be written 1:1=1, if there are two people in a family then each person only gets one *Paralelogram* or can be written 2:2=1, so if there are three, four or five people in a family then each member only gets one *Paralelogram* or can be written 5:5=1. Thus, in calculating the number of people with the number of *Paralelogram*, the concept of one-on-one pairing is found.

(2) Relation and function. Then in giving lumps of rice *(Baj'ja Nga'a)* to *Deo* (God), mathematical concepts can be found, namely the form of relations and functions, where one lump of rice is intended for only one Deo (God) and cannot be divided. The first position at the top will be given to God the Giver of Life, the second for God the preserver of life will be kept under the right, the third for God the guardian of life will be kept under the center and the last for God the giver of fertility on earth will be kept under the leftmost. The "number representation" relation from set A to set B can be expressed by an arrow diagram, and the set of ordered pairs.

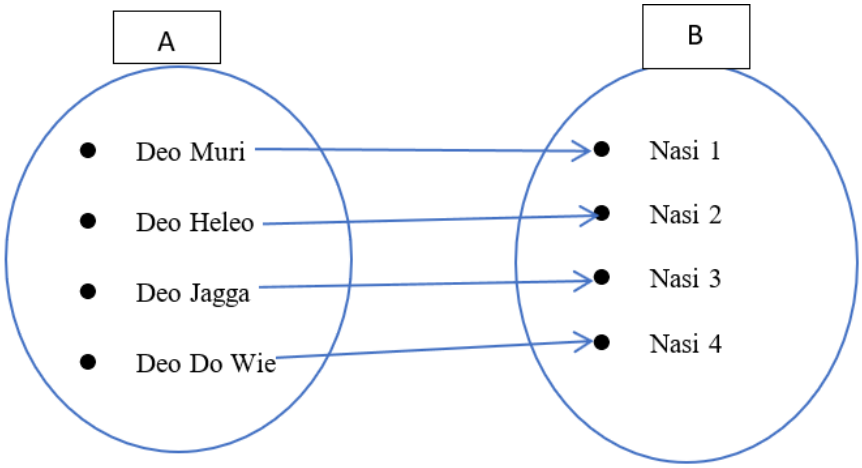

Figure 3.
Arrow Diagram.

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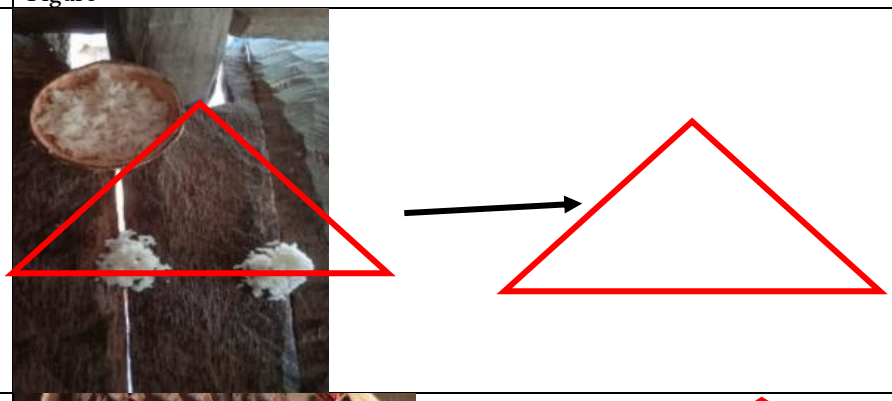
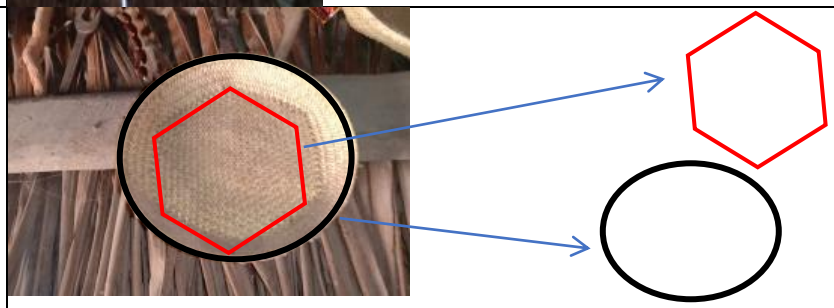
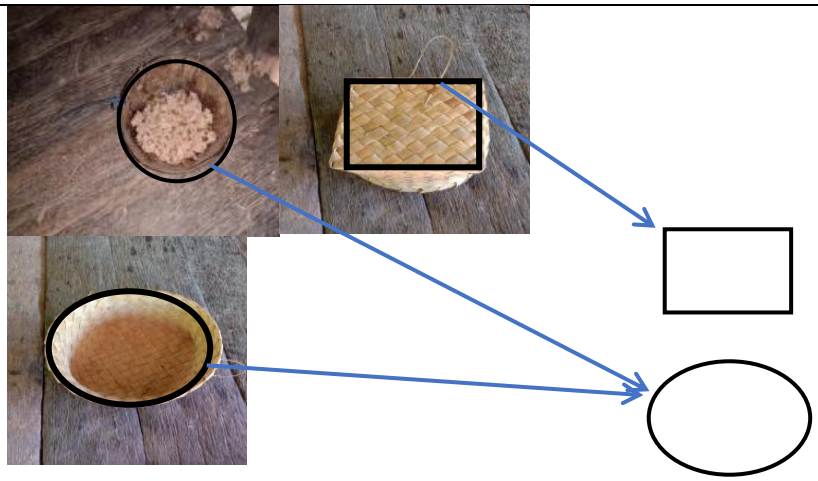
The arrow diagram in figure 12 can be made into a set of consecutive pairs A = {(Deo Muri, Nasi 1), (Deo Heleo, Nasi 2), (Deo Jag'ga, Nasi 3), (Deo Do Wie, Nasi 4).

(3) The concept of geometry.

Geometry concepts can be seen in Table 4 Below.

Table 4.
The concept of geometry in *Hole*.

No	Figure	Description
1		Concept of equilateral triangle geometry. This can be seen from the placement of the Nasi blob in the ceremony to honour the ancestors
2		The concept of geometry in *Kerij'ji Dai* or a place to clean rice, sorghum and beans. The *Kerij'ji Dai* forms a circle and the bottom or base forms a regular hexagon
3		The concept of geometry in *Kerij'ji Wore* or a container used to store rice or sorghum and also as a place to eat and *kab'ba Nga'a* (a place to store food for ancestors) which forms a circle and its base forms a rectangle

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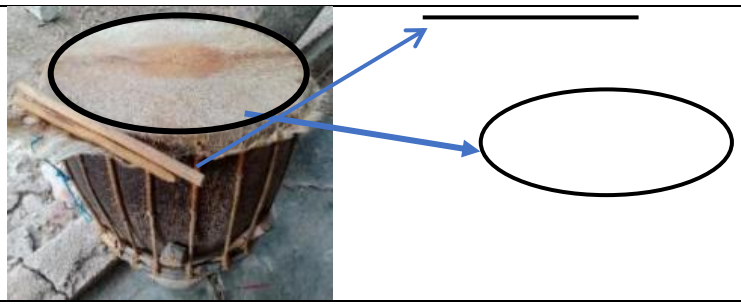
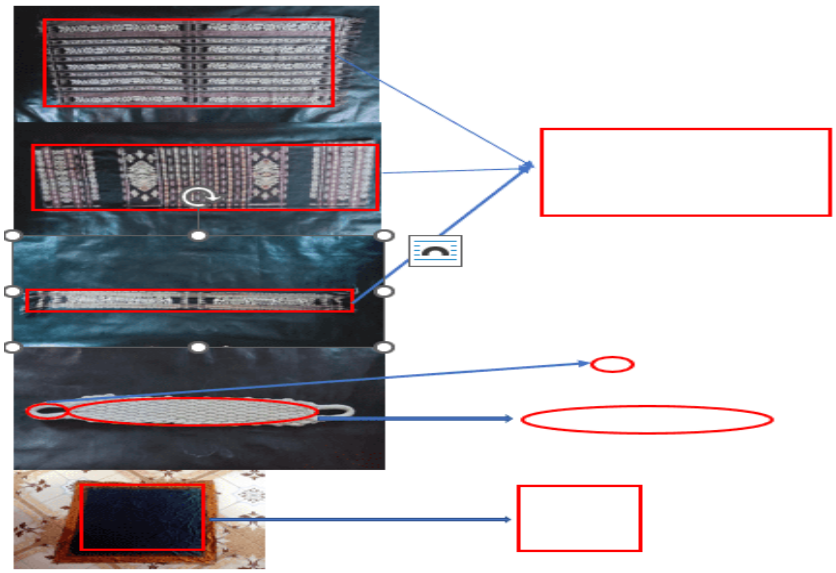
4		The geometric shape of the *Dere* or drum used to accompany the *Hole* horse race is made from palm tree trunks and buffalo skin (the part that is beaten). The *Dere* is played by beating it using wood made from the *memo* tree.
5		Men's equipment such as blankets *(Hij'ji Huri)*, sarongs *(Ai)*, men's headbands (lehu), shawls *(heleda)* in the form of rectangular geometric shapes, *Wai Wake* (circular and elliptical shapes), sling *(Lehu)* in the form of a square

(4). The concept of number pattern in the fabric picture. The concept of number pattern and its relation to number pattern found on sarong and blanket used during *Hole Liae* traditional ceremony can be related to the concept of number pattern, namely picture 1, 3, 5, 7 (odd number) will be the same and picture 2, 4, 6 (even number) will be the same repeatedly.

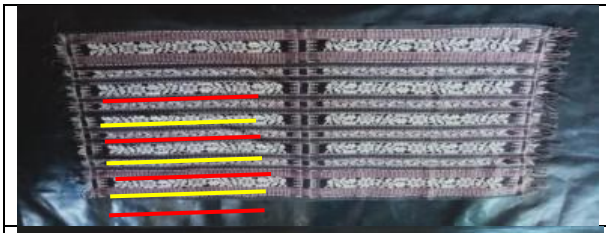
	Picture pattern of sarong 2, 4, 6, 8 (even number pattern)
	Blanket drawing pattern 1,3,5,7 (Odd number pattern)

Figure 4.
Number pattern on blanket and sarong pictures.

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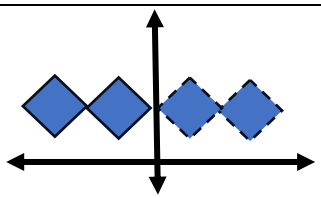
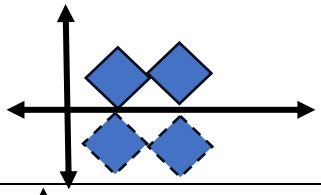
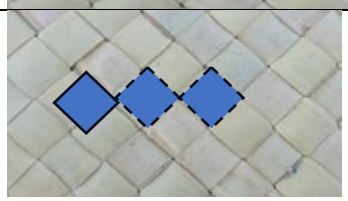
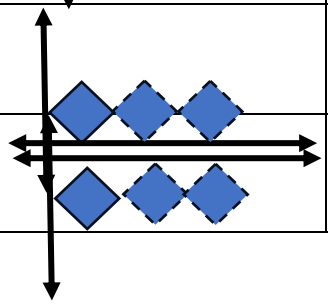
The concept of number patterns that is also found in the plait made of palm leaves, namely *dap'pi* (mat) used as a base in horse racing can be related to the concept of number patterns. The *dap'pi* contains the number patterns 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

(5) The concept of geometry transformation. The woven *dap'pi* (mat) made from palm leaves used as a base for horse racing can be related to the concept of geometry transformation, which includes reflection and translation. Reflection is the shape of the d*ap'pi* woven hemisphere facing each other will have the same shape and size. Translation is the shifting shape and size that does not change shape and size, only its location changes. In other words, the coordinates of the woven *dap'pi* after experiencing a shift will change from the original coordinates.

Table 5.
Types of Geometric Transformations on *Dap'pi* or Carpet.

Figure Dap'pi or Carpet	Ilustration	Types of Geometric Transformations
		Reflection about the y-axis
		Reflection about x-axis
		Translations about the y-axis Translations about the x-axis

(6) The concept of measuring. The concept of measuring is found when measuring rice and beans used for cooking. This concept of measuring can be seen in table 5.

Table 6.
Math concepts found in *Hole Liae* traditional ceremony.

Keri'ji Wore (rice storage)	Rice / Sorghum	Groundnut	Numbers Construction
1	1	1/2	1+1/2=1,5
2	2	1	2+1=3
3	3	1.5	3+1,5=4,5

If the rice to be cooked is one Keri'ji Wore then the beans to be cooked together are 1/2 of the rice to be cooked, so the amount of rice and beans to be cooked is 1.5 *Keri'ji Wore*, if the rice to be cooked is 2 *Keri'ji Wore* then the beans to be cooked together is 1 *Keri'ji Wore* so the amount of rice and beans to be cooked is 3 *Keri'ji Wore* while if the rice to be cooked is 3 *Keri'ji Wore* then the beans to be cooked together is 1.5 *Keri'ji Wore* so the amount of rice and beans to be cooked is 4.5 *Keri'ji Wore*.

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4.1.6. Integration of Ethnomathematics of Hole Liae Traditional Ceremony in Sabu Community, Sabu Liae Sub-district, Sabu Raijua Regency in Mathematics Teaching and Learning

The results of the study of ethnomathematics in the culture of *Hole Liae* Traditional Ceremony show that there are mathematical activities related to the concept of school mathematics. This connection is an opportunity for learning mathematics at school with the concept of ethnomathematics and at the same time can preserve the culture. Based on the description of the research results on the integration of ethnomathematics in traditional musical instruments in mathematics learning, the corresponding mathematical concepts can be presented in table 7.

Table 7.
Integration of Ethnomathematics of *Hole Liae* Traditional Ceremony in School Mathematics.

No	Activities in *Hole Liae* Traditional Ceremony	Ethnomathematics Found	School Mathematics Concepts	Basic Competencies	Education Level
1	Counting the number of people in a family, counting the number of *Paralelogram* to be woven, counting the number of lumps of rice to be prepared for the giver of life and ancestors and counting the number of borders of Sabu Liae land (*keb'bihu Rai Hawu).*	Counting	Addition	3.2 Describe and perform addition and subtraction of numbers involving *Hole* numbers up to 999 in daily life and relate addition and subtraction 4.2 Solve addition and subtraction problems involving numbers up to 999 in everyday life and relate addition and subtraction	Elementary School (Grade 2)
			Division	3.4 Explain multiplication and division involving integers with product up to 100 in daily life and relate multiplication and division to daily life. 4.4 Solve multiplication and division problems involving integers with product up to 100 in daily life and relate multiplication and division	Elementary School (Grade 3)
			Relationships and Functions	3.3 describe and express relations and functions using various representations (words, tables, graphs, diagrams and equations) 4.3 solve problems related to relations and functions using various representations	Junior High School (Grade 8)
2	The position of the lump of rice that will be kept for the *Deo* (God) they believe in.	*Locating*	Geometry	3.12 Analyses various flat shapes based on their properties 4.12 Classify various flat shapes based on their properties	Elementary School (Grade 3)
3	Measuring rice and peanuts that will be eaten together during the *nga'a*	*Measuring*	Comparison	3.1 Understand the concept of comparison using tables graphs and equations	Junior High School (Grade 7)

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ISSN: 2576-8484
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DOI: 10.55214/25768484.v9i3.5780

	Hole and to be offered to the ancestors.			4.1 Apply the concept of equal and opposite value comparisons using tables, graphs and equations in everyday life	
4	Designing the tools used for the *Hole Liae* traditional ceremony.	*Designing*	Geometry	3.12 Analyze various flat shapes based on their properties 4.12 Classify various flat shapes based on their properties	Elementary School (Grade 3)
			Number Pattern	3.1 Make generalizations from patterns in number sequence and object configuration sequence 4.1 Solve problems related to patterns in number sequence and object configuration sequence	Junior High School (Grade 7)

Thus, mathematical knowledge in the *Hole Liae* Traditional Ceremony of the Sabu Community, *Sabu Liae* District, *Sabu Raijua* Regency contains mathematical concepts that can be used in mathematics learning in accordance with the learning outcomes and education level.

5. Discussion

Ethnomathematics is a branch of mathematical studies that examines how mathematical concepts are applied in the daily life of a community, especially in the mathematics concepts are applied in the daily life of a society, especially in the aspect of culture and tradition. The result of this research found ethnomathematical activities contained in the *Hole Liae* Traditional Ritual of the Sabu Community, Sabu Liae District, Sabu Raij Regency. The ethnomathematics is described based on six characteristics of ethnomathematics which include Counting, Locating, Measuring, Designing, Playing, and Explaining. Based on these activities, the *Hole Liae* ritual found several math concepts related to ethnomathematics. related to ethnomathematics that can be identified in the *Hole Liae* Traditional Ritual. in the *Hole Liae* Traditional Ritual include the concept of addition, one-on-one pairing, relation and function, division, geometry, number pattern, drawing pattern, arithmetic sequence and geometric transformation arithmetic and geometric transformation

The results of this study indicate that there is great potential in integrating ethnomathematics concepts into formal education. An understanding of the mathematical concepts contained in local culture can be used as contextual teaching materials, so that mathematics learning becomes more interesting and easily understood by students, especially those from indigenous communities [17, 25]. The results of this research are also in line with those conducted by Dhiya, et al. [26]; Dominikus, et al. [27]; Simbolon [25] and Wulandari, et al. [28] which concluded that ethnomathematics findings can be integrated into formal mathematics learning in schools [25-28].

In addition, this study also has a positive impact on cultural preservation, as documentation of how Savunese people use mathematics in their traditional rituals can help maintain cultural heritage from generation to generation. Recognition of mathematical values in traditional cultures can also increase people's appreciation of their own traditions.

One of the main implications of this research is the potential integration of ethnomathematics concepts in the formal education system. Contextualized mathematics education based on culture can help students understand mathematical concepts more easily because the material studied has relevance to their daily lives [29, 30]. In this context, it is important for educators to develop teaching materials that incorporate elements of local culture, such as geometric patterns in traditional art, calculation systems in customs, and the concept of symmetry in traditional architecture.

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Collaboration between the world of education and culture is the main key in implementing the results of this research or other research related to ethnomathematics [31, 32]. This collaboration can be done by developing a culture-based curriculum where the government and educational institutions can work together with local communities to develop learning materials that reflect local cultural values. In addition, it can be done by training teachers in the ethnomathematics approach, where teachers must be equipped with knowledge of how to apply ethnomathematics concepts in mathematics learning, and strengthening community involvement by involving traditional leaders and cultural leaders in the learning process can increase students' understanding of the relationship between mathematics and their culture.

Ethnomathematics thus has significant implications for education and cultural preservation. By integrating mathematical concepts contained in local culture into education, students can more easily understand mathematics as well as increase appreciation for their own culture.

6. Conclusion

Based on the results of the research, it can be concluded that the *Hole Liae* ritual in the Sabu community contains various aspects of ethnomathematics that reflect the use of the concept of mathematics concept in daily life. The result of this research found ethnomathematical activities contained in the *Hole Liae* Traditional Ritual of the Sabu Community, Sabu Liae District, Sabu Raijua Regency. The ethnomathematics is described based on six characteristics of ethnomathematics which include Counting, Locating, Measuring, Designing, Playing, and Explaining. Based on these activities, the *Hole Liae* ritual found several math concepts related to ethnomathematics.

The implication of this research is that the study of ethnomathematics can be a bridge between modern science and local wisdom, so as to enrich understanding of mathematics and support cultural preservation efforts. Therefore, it is important for academics, educators, and the government to pay more attention to the integration of ethnomathematics in the education curriculum as well as in efforts to document and preserve local culture.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

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Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 2249-2267, 2025
DOI: 10.55214/25768484.v9i3.5780