Ethnomathematics on the Tutup Ari of the South Tapanuli Regent's Office Building

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Abstract

This study aimed to discover the shape or mathematical concept of the ornaments found on the Tutup Ari of the South Tapanuli Regent's Office building. The ornaments on the tutup are one of the Mandailing cultural customs which must be preserved because they contain their own meaning and significance in each form. These ornaments can be found in various areas of Southern Tapanuli, one of which is in South Tapanuli, to be precise, in the South Tapanuli Regent's Office building. The ornaments on the tutup ari can be used as a medium for learning mathematics at school so that learning mathematics at school can be started by introducing the surrounding customs and culture. This paper explores the mathematical ideas contained in the ornaments on the tutup ari of the South Tapanuli Regent's Office building. The discussion is descriptive in nature, giving an overview of the ornaments in detail. The results of the exploration and analysis of these ornaments found that there are mathematical concepts in the form of flat geometric shapes such as triangles, trapezoids, parallelograms, rhombuses, squares, and rectangles.

Keywords: *Ornament; Tutup Ari; Ethnomathematics; Culture; Philosophy.*

Abstrak

Tujuan penelitian ini adalah untuk mengetahui bentuk atau konsep matematika pada ornamen ornamen yang terdapat pada tutup ari bangunan Kantor Bupati Tapanuli Selatan. Ornamen-ornamen pada tutup ari tersebut adalah salah satu adat budaya mandailing yang tetap harus dijaga kelestariannya karena mengandung arti dan makna tersendiri pada setiap bentuknya. Ornamen-ornamen tersebut banyak ditemui di berbagai daerah Tapanuli Bagian Selatan, salah satunya di Tapanuli Selatan tepatnya pada bangunan Kantor Bupati Tapanuli Selatan. Ornamen-ornamen pada tutup ari tersebut dapat dijadikan sebagai media pembelajaran matematika di sekolah agar pembelajaran matematika di sekolah dapat dimulai dari memperkenalkan adat dan budaya di sekitarnya. Tulisan ini menggali tentang ide-ide matematika yang terdapat pada ornamen-ornamen pada tutup ari bangunan Kantor Bupati Tapanuli Selatan. Pembahasan bersifat deskriptif memberi gambaran tentang ornamen-ornamen secara terperinci. Hasil eksplorasi dan analisis ornamen-ornamen tersebut ditemuka adanya konsep matematika berupa bentuk konsep geometri bangun

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datar seperti segitiga, trapesium, jajar genjang, belah ketupat, persegi dan persegi panjang.

Kata Kunci: Ornamen; Tutup Ari; Etnomatematika; Budaya; Filosofi.

INTRODUCTION

A learning must innovate in developing the potential of students. Education and culture are two elements that cannot be separated from everyday life. One of the education that must be related to culture is mathematics education. Mathematics education with cultural potential is assumed to make education more meaningful and contextual (Freddy, 2020). Mathematics has actually been widely used by every community in everyday life. Mathematics is part of the culture and part of everyday (Pane & Sihotang, 2022). Therefore, it can be concluded that the process of learning mathematics in senior high schools must be related to the context of students' daily lives (Afriansyah, 2018), with the provision of a learning model that continues to innovate in everyday life.

Therefore, in conveying mathematics, the teacher should dig deeper into the knowledge of mathematics obtained from the lives of the people around where they live (Effendi, 2019). Real things related to students' experiences in everyday life can be used as exciting learning resources. Teachers can associate math material with student activities in everyday life and then slowly look for mathematical forms (Dewita et al., 2019).

Culture is a habit of the people that occurs from generation to generation and becomes the identity of an area (Sulistyani et al., 2019). When a custom and culture are associated with mathematics, it is called Ethnomathematics. Ethnomathematics is something that has been widely discussed in previous studies. Through Ethnomathematics, learning will be more memorable because it also introduces local traditions and cultures that are still recognized and carried out by certain groups of people (Loviana et al., 2020). Hasanuddin stated that Ethnomathematics is a new awareness about recognizing society's potential in the field of mathematics. Namely, mathematics is designed for cultural groups from indigenous tribes and people interested in the field of mathematics (Hasanuddin, 2017).

The formation of the term ethnomathematics certainly has a clear purpose. According to Barton, ethnomathematics aims to learn how students can understand, articulate, process, and finally use mathematical ideas, concepts and practices that can solve problems related to their daily activities (Fajriyah, 2018). Ethnomatematics studies are still minimally discussed by most people, especially math teachers. Indonesia is a country that has many ethnic groups, where each tribe has its own culture or customs, has a lot of potential that can be explored to maximize studies in the field of culture, one of which is in the field of ethnomathematics. With the development of mathematics based on different needs of life, each culture and sub-culture is expected to be able to develop mathematics by collaborating with various related parties so that local culture can be passed on to the next generation (Kholilah, n.d,-a).

One of the cultures that is still very clear and that we often encounter in the southern part of Tapanuli is the Bagas Godang Traditional House. Many of the buildings inspired by the Bagas Godang traditional house are found in various areas in the southern part of Tapanuli, for example in the Office of the South Tapanuli Regent in the Situmba area, at the Tor Sibohi tourist spot in the Sipirok area, at the Baharuddin Islamic Boarding School in the Batang Angkola area, in the Huta tourist area Siantar Panyabungan, Pidoli village Panyabungan area, in the center of Sipirok Market and many other places.

Indirectly, it turns out that the Tutup Ari Bagas Godang Traditional House, whose application is in the South Tapanuli Regent's Office, contains Mandailing ornaments which are very closely related to mathematics. Each of these ornaments has its own meaning and significance. This is also in line with Pane, Martina's statement which states that the forms of each part of the traditional house consist of forms that have indirectly practiced mathematical concepts. Mathematics and culture are something that cannot be avoided in everyday life (Pane & Sihotang, 2022).

Building at the South Tapanuli Regent's Officeis a building that combines elements of regional culture in its construction with a distinctive construction. Tutup Ari used is almost the same as tutup ari in the Bagas Godang traditional

house. Although not all tutup ari ornaments in the Bagas Godang are in the Tutup Ari of South Tapanuli Regent's office building. Tutup Ari itself is the roof used for the houses of kings in ancient times in southern Tapanuli.

In Mandailing, various forms of traditional ornamentation can be found on the Tutup Ari sections of the Sopo Godang (Customary Assembly Hall) and Bagas Godang (King's Big House). In the Mandailing language, these ornaments are called bolang which also functions as symbols or emblem that have deep meanings for the Mandailing people.(Hendri, 2020). The roof of the king's house has Tutup Ari (triangular area on the roof) on each side, namely 4 (four) Tutup Ari equipped with ornaments and there is one more on the roof of the stairs. At the top of Tutup Ari there are three branches which are named marsalapsap pandenggani which means to describe three noble qualities, namely: parbinegean, marparnidaan, and marpangarohai, which means 1) good in sight means always looking positively because someone who has a positive outlook, whatever the phenomena of this life then it will always look for what meaning is in it, 2) Good in hearing means sensitive in news that comes, when is news of joy when news of sorrow and every listening to anything must be filtered or selected which one must be listened to or must be ignored, 3) Clean his heart, meaning that people who are clean in heart will be far from the nature of heart disease, which is only sincere in doing and working selflessly. The Tutup Ari field is divided into nine parts and is decorated and has its own meaning. The ornaments described in Tutup Ari Bagas Godang are in the form of geometric lines (straight lines) except for those depicting natural objects, such as the sun, moon and stars, as well as flowers. Ornaments (bolang) which have a function as a symbol or emblem. The symbol or emblem has very deep meanings for the Mandailing people The ornaments described in Tutup Ari Bagas Godang are in the form of geometric lines (straight lines) except for those depicting natural objects, such as the sun, moon and stars, as well as flowers. Ornaments (bolang) which have a function as a symbol or emblem. The symbol or emblem has very deep meanings for the Mandailing people (Dewita et al., 2019).

Mandailing is one of the tribes in North Sumatra. Mandailing is an area located in the middle of the northern part of the island of Sumatra (Matondang, 2020). The Mandailing area is inhabited by the Mandailing ethnic group which is one of the original ethnic groups of North Sumatra. The Angkola-Mandailing regional ornament art is one of the traditional arts that has long developed and is known by the public as a decorative pattern that is widely applied to traditional houses and traditional ulos fabrics (Herlina & Toyba Lubis, 2022).

Then according (Saragi, 2017, p. 105) in his book entitled Types of Motifs and Philosophical Values of Traditional Ornaments of North Sumatra states that from the results of the research conducted, 36 types of Mandailing Ornament motifs were successfully inventoried which can be grouped into 5 patterns, namely: 1) Geometric patterns; 2) Pattern of plants (flora); 3) animal (fauna) patterns; 4) Cosmos pattern; and 5) Technical Patterns. Each motif has a meaning and some only function as decoration or emphasize its aesthetic value. The nature of the ornament is divided into two, namely the main ornament and the ornament as an edge decoration that frames the main ornament. Ornamental motifs that are lifted from natural forms experience stylization and shape changes so that animal and plant forms are depicted with geometric shapes.

Based on the explanation above, the researcher concludes that the Mandailing Ornament is a type of ornament originating from one of the areas in North Sumatra Province. Mandailing ornaments are generally scattered in the Tabagsel area (South Tapanuli) which includes four districts and one city, namely South Tapanuli Regency, Mandailing Natal Regency, Padang Lawas Regency, North Padang Lawas Regency, and Padang Sidimpuan City. These five areas are dominated by residents with the Angkola tribe and the Mandailing tribe.

Based on the explanations above, the researcher is interested and seeks to study more about Ethnomatics on the Tutup Ari of the South Tapanuli Regent's Office Building. Researchers hope that the Ethnomatics on the Tutup Ari Building of the South Tapanuli Regent's Office can be preserved and maintained because there are so many philosophical foundations contained therein that can become the basis of life for future generations and can be integrated into the school

curriculum so that the learning process in class is more real so that it can be more understood by participants. because it is more adapted to the regional context. In this case, namely Tutup Ari, the South Tapanuli Regent's Office Building. This can encourage students to improve their mathematical skills in various contexts.

RESEARCH METHODS

The approach in this study uses an ethnographic approach that aims to get an overviewabout ethnomatics on the Tutup Ari of the South Tapanuli Regent's Office Building. The research time was planned for four months, starting from October to January 2022. The subject of this research was ethnomathematics on the Tutup Ari, the South Tapanuli Regent's Office Building.

The descriptive survey method applied in this study aims to describe the ethnomathematics search results on the Tutup Ari of the South Tapanuli Regent's Office Building. Data collection techniques using triangulation techniques which means combining several data collection techniques, namely participatory observation, in-depth interviews, documentation. Participatory observation, in which the researcher directly observes the observed object (Sugiyono, 2016, p. 95) namely ethnomathematics on the Tutup Ari of the South Tapanuli Regent's Office Building. In-depth interviews, in which the researcher conducted in-depth and structured interviews according to the interview guidelines that had been made to find ethnomathematics on the Tutup Ari, the South Tapanuli Regent's Office Building. Next is documentation, where the researcher documents activities in the form of taking pictures, video and audio to be observed or heard again. Documentation was also carried out by collecting literature such as books, scientific articles, reports and newspapers related to ethnomathematics on the Tutup Ari of the South Tapanuli Regent's Office Building.

The data validation technique uses triangulation techniques. The researcher acts as an instrument (human instrument). This research consists of three stages of activity, namely, the planning stage, the researcher conducts a literature study, arranges research permits, determines informants, compiles and validates research instruments. In the implementation stage, the researcher collected data which included observation or direct observation of ethnomathematics on the Tutup Ari of the South Tapanuli Regent’s Office Building, interviews with respondents, and documentation in the form of photos, videos and audio. The last stage is data

analysis and reporting. Researchers conducted data analysis using techniques that included data reduction, presentation and drawing conclusions. Furthermore, the researchers compiled research reports and scientific articles that were published in accredited national journals.

RESULTS AND DISCUSSION

Various forms of motifs or carvings that can be found on Bagas Godang in Mandailing are motifs of plants, animals, and so on. In addition, each form of carving motif contains its own meaning and significance (Puspitasari, 2021). An example of the shape of the Godang Bagas carving motif is the bamboo shoots which symbolize the Dalihan Natolu custom, the shape of the buffalo head motif (ulu nihorbo) which symbolizes responsibility for the owner of Bagas Godang. In addition, the forms of carved motifs can be found on the pillars of Bagas Godang, the walls of the terraces of Bagas Godang, on the windows, the forms of carvings are also found on weapons, swords, tombstones and musical instruments.(Pasaribu & Jekmen Sinulingga, 2022). The Names, Patterns and Basic Mandailing Ornament Ideas, can be seen in Table 1.

The following is the result of documentation in the form of pictures of each Mandailing orname, especially in the South Tapanuli Regent's Office which was taken (photos) using the Samsung A52S camera at every corner of the side of the South Tapanuli Regent's Office in Pertapakan, Situmba, Sipirok District.

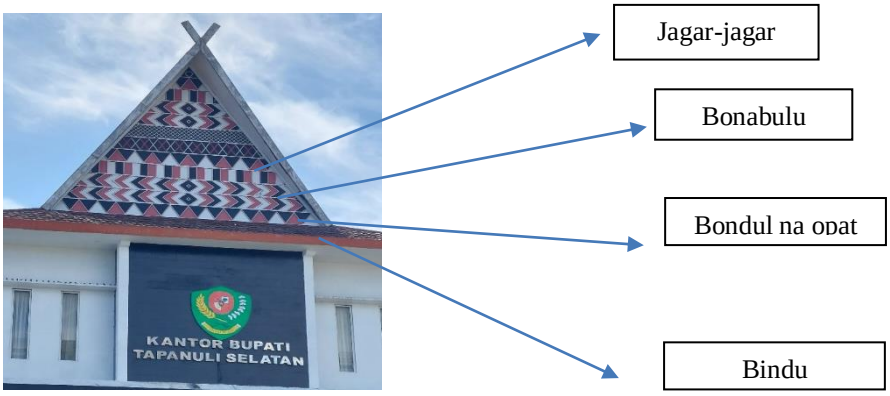

Figure 1. Tutup Ari South Tapanuli Regent's Office

Table 1. Names, Patterns and Basic Mandailing Ornament Ideas

No.	Motive Name	Ornament Pattern	Basic Ornament Ideas
1	*Bonabulu*	Geometric	Bamboo tree
2	*Bondulna opat*	Geometric	House floor
3	*Panji-panji*	Geometric	Flag
4	*Raga-raga*	Geometric	Basket
5	*Suncang duri*	Geometric	Fish bone
6	*Jagar-jagar*	Geometric	Coconut white
7	*Sipatomu-tomu*	Geometric	face to face
8	*Bindu*	Geometric	Bamboo (bamboo shoots)
9	*Bintang na toras*	Geometric	Flower petals
10	*Burangir(aropik)*	Geometric	Betel leaf
11	*Rudang*	Geometric	Coconut flower
12	*Bindumatogu*	Geometric	Triangle
13	*Timbangan*	Technical	Scales
14	*Podang*	Technical	Sword
15	*Gancip*	Technical	Pliers (clamp tool)
16	*Tagan*	Technical	Mashed betel
17	*Takar*	Technical	Coconut shell
18	*Pinggan*	Technical	Ceramic plate
19	*Loting pakpak*	Technical	Lighter
20	*Horis*	Technical	Kris
21	*Lading(upak)*	Technical	Machete
22	*Mata ni ari*	Cosmos	Sun
23	*Gimbang*	Technical	Points of the compass
24	*Gunung*	Technical	Mountain
25	*Bulan*	Technical	Moon
26	*Bintang*	Technical	Star
27	*Alaman Bolak*	Technical	Yard of the house
28	*Parbincar mata ni ari*	Technical	Sunrise
29	*Ulok sibaganding tua*	Animal	Snake
30	*Manuk na bontar*	Animal	White cock
31	*Barapati*	Animal	Pigeons
32	*Hala*	Animal	Scorpion
33	*Lipan*	Animal	Centipede
34	*Tanduk ni horbo*	Animal	Buffalo horn
35	*Bunga Teratai*	Plant	Lotus flower
36	*Gombut*	Plant	Leaves and fruit gamang

The form of the motif and the philosophical value of each ornament found on the tutup ari of the South Tapanuli Regent's Office building will be discussed in the table below.

Table 2. Motives and Philosophical Values of the Mandailing Ornament on the Tutup Ari of the South Tapanuli Regent's Office building

Math Concept	Ornament Shape Ornament name	Meaning of Ornament
Straight lines, geometry and symmetry	 ***Bona Bulu* (Bamboo tree)**	*Bona Bulu is* a designation or notification to everyone from other villages or migrants that the village is independent or standing on its own.
Geometry and Symmetry	 ***Bondul na Opat***	*Bondul na Opat* It is also called a floor that has four corners (bondul = floor, opat = four), the middle room of the sopo godang which is used as a place for hearings or deciding a case or the fairest decision according to custom by traditional leaders.
Geometry, symmetrical left and right	 ***Jagar-Jagar***	*Jagar-jagar is* the name for the pistil of a coconut that is still small. The shape of this ornament is like the shape of the letter x which is arranged repeatedly. The meaning contained in this ornament is a symbol indicating that a village already has strong customary institutions.
Geometry, triangle and symmetrical	 ***Bindu***	*Bindu* or shoots of bamboo shoots or young bamboo shoots. Especially the godang (large) bamboo shoots can be used as food (vegetables). Shoots of bamboo shoots are a symbol of growth, as well as the Dalihan Na Tolu custom as a customary basis that can bring society to progress and benefit others.

The mathematical concepts contained in each ornament on the tutup ari of the South Tapanuli Regent's Office building will be discussed one by one in this section:

1. Bindu / Pusuk ni Robung (rebung)

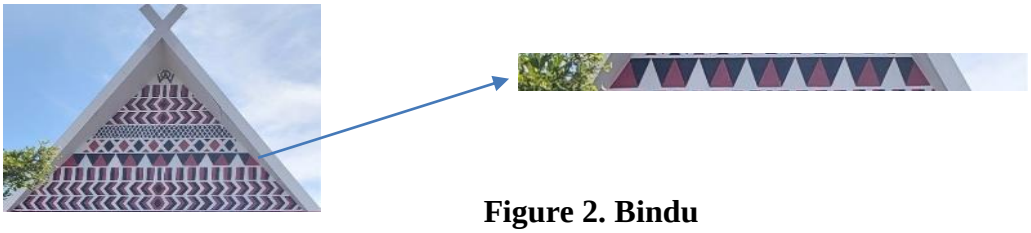

Figure 2. Bindu

Bindu/Pusuk ni Robung symbolizes the system of social organization. The meaning of this motif is the socio-cultural life order of the Angkola Mandailing people which is based on Dalian Na Tolu Adat (Three Tungku Sejarangan) or Markoum Sisolkot Adat (relative-clan custom) which consists of Mora, Kahanggi, (family relatives), anak boru (son-in-law/in-law). Shoots of bamboo are a symbol of growth, as well as the Dalian Na Tolu custom as a customary basis that is able to bring the Angkola Mandailing community to progress and benefit others(Lubis, n.d.).

In Bindu or Pusuk Robung there is a mathematical concept in the form of a triangular shape in each Bindu color with the same size. Then if two Bindu or multiples are combined it will form a parallelogram. And if the triangles are combined it will form a trapezoid. Can be seen in the image below

Figure 3. A Mathematical Concept in the form of a Triangular Shape in Each Color of Bindu

2. Bondul Na Opat

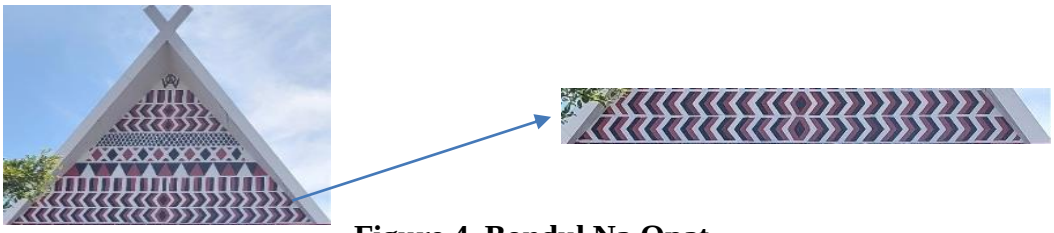

Figure 4. Bondul Na Opat

Bondul Na Opat or Four Banduls symbolizes the provisions in litigation Meaning: Every customary case will be resolved at Sopo Godang (Customary

Assembly Hall) by Namora Natoras, and decisions taken must be fair so as not to harm the parties to the litigation(Kholilah, nd-b).

Whereas in Bondul Na Opat there is a geometric concept of a rhombus shape in the center of the ornament, symmetry and reflection. As shown in the image below

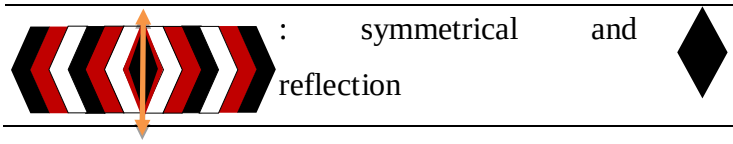

Figure 5. Bondul Na Opat there is a Geometric Concept of a Rhombus

3. Bona Bulu

Figure 6. Bona Bulu

This ornament is also called the Bona Bulu ornament, which has vertical lines resembling the shape of bamboo sticks lined up neatly. The color of the ornaments applied to the ornaments in the Bagas Godang traditional house are white motifs and red backgrounds. This ornament is located in the Tutup Ari section or above the house in the first order from the bottom(Hasibuan & Misgiya, 2020). Bona Bulu (bamboo) symbolizes the Huta government system Meaning: A residential area can be categorized as a huta or bona bulu if the facilities and infrastructure are complete, including: elements of Dalian Na Tolu (Mora, Kahanggi and Anak Boru), Raja Pamusuk, Namora Natoras, Ulubalang, Bayo-bayo Nagodang, Datu and Sibaso(Kholilah, nd-b).

Whereas in the Bona Bulu ornament there is a geometric mathematical concept in the form of a rectangular shape and can also form a square if several patterns are combined on the bona bulu, apart from that there is also the concept of straight and symmetrical lines. As shown in the image below

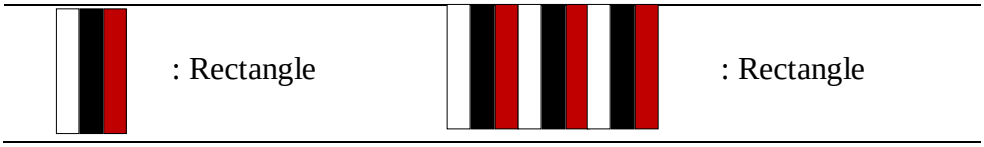

Figure 7. Bona Bulu Ornament there is a Geometric Mathematical Concept

4. Jagar-jagar

Figure 8. Jagar-jagar

Jagar-jagar symbolizes the community's obedience to customs Meaning: In every huta there are provisions regarding Marraja custom, Marmora custom, Markahanggi, Maranak boru, and Naposo Nauli Bulung custom(Kholilah et al., 2019).

The mathematical concept contained in the Jagar-jagar is the geometric concept of a rhombus shape, symmetrical, there are straight line intersections and has the concept of reflection and has a repeating pattern.

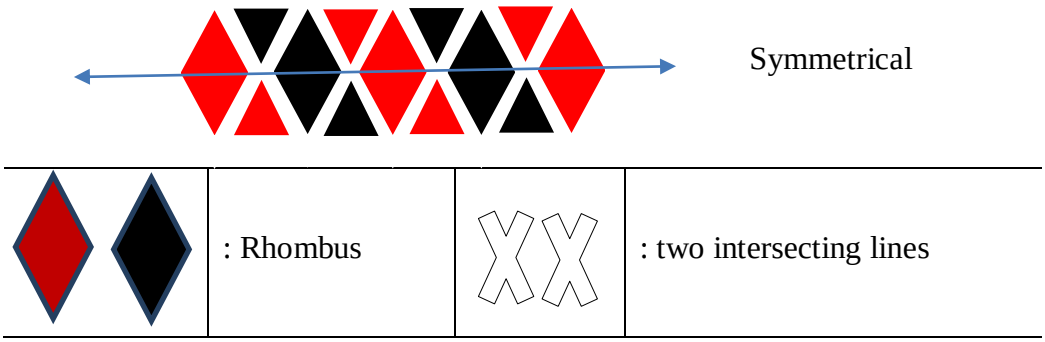

Figure 9. The Mthematical Concept Contained in the Jagar-jagar

CONCLUSION

The ornaments on the lid of the South Tapanuli Regent's Office building mostly use mathematical concepts in the form of geometric lines or flat shapes, these ornaments also have the same color pattern, namely red, white and black.The main function of the ornament is not just as a decoration, but has a

symbolic function to show many things related to cultural values and the way of life of the people of South Tapanuli. although the ornaments used are not too many or only a few because the shape of the ornaments found on Tutup Ari uses repetition of the same shape in different places.

Suggestions that can be conveyed by researchers can be used as guidelines for the community and students etc. To be able to better preserve local cultures that are almost drowning in the current modern situation. It is hoped that not only students and lecturers can get to know our cultures, but also the people themselves. It is hoped that in the future this cultural research will be even better to explore other local cultures.

REFERENCES

Afriansyah, E. A. (2018). DESAIN LINTASAN PEMBELAJARAN PECAHAN MELALUI PENDEKATAN REALISTIC MATHEMATICS EDUCATION. *Mosharafa: Jurnal Pendidikan Matematika*, *6*(3), 463–474. https://doi.org/10.31980/mosharafa.v6i3.334

Dewita, A., Mujib, A., & Siregar, H. (2019). Studi Etnomatematika tentang Bagas Godang sebagai Unsur Budaya Mandailing di Sumatera Utara. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(1), 1–12. https://doi.org/10.31980/mosharafa.v8i1.202

Effendi, H. (2019). Kontekstualisasi Fungsi Bagas Godang dan Sopo Godang Sebagai Sumber Pembelajaran Sejarah Lokal. *Diakronika*, *18*(2), 19. https://doi.org/10.24036/diakronika/vol18-iss2/66

Fajriyah, E. (2018). Fajriyah, E. (2018). Peran etnomatematika terkait konsep matematika dalam mendukung literasi. PRISMA: , 1, 114–119. *PRISMA;Prosiding Seminar Nasional Matematika*, *01*, 114–119.

Fredy, R. P. (2020). Etnomatematika Malind-Papua: Integrasi Budaya dalam Kompetensi Dasar Matematika di Sekolah Dasar. *Journal of Education*, *03*(02). https://doi.org/10.32478/al-mudarris.v%vi%i.521

Hasanuddin, H. (2017). ETNOMATEMATIKA MELAYU: PERTAUTAN ANTARA MATEMATIKA DAN BUDAYA PADA MASYARAKAT MELAYU RIAU. *Sosial Budaya*, *14*(2), 136. https://doi.org/10.24014/sb.v14i2.4429

Hasibuan, A. T., & Misgiya, M. (2020). PENERAPAN ORNAMEN TRADISIONAL PADA RUMAH ADAT MANDAILING. *Gorga : Jurnal Seni Rupa*, *9*(2), 455. https://doi.org/10.24114/gr.v9i2.22119

Hendri, S. (2020). Kearifan Lokal Pada Arsitektur Kantor Bupati Padang Lawas. *juitech*, *04*.

Herlina, H. & Toyba Lubis. (2022). Ornamen pada Bagas Godang Mandailing: Kajian Kearifan Lokal. *Journal of Language Development and Linguistics*, *1*(1), 55–70. https://doi.org/10.55927/jldl.v1i1.993

Kholilah, A. (n.d.-a). *BENTUK DAN FUNGSI RUMAH ADAT RAJA PAMUSUK MANDAILING*.

Kholilah, A. (n.d.-b). *BENTUK DAN FUNGSI SOPO GODANG TAPANULI SELATAN MANDAILING NATAL*.

Kholilah, A., Andeska, N., & Ghifari, M. (2019). KAJIAN ESTETIKA TIMUR PADA RUMAH ADAT SOPO GODANG MANDAILING. *Gorga : Jurnal Seni Rupa*, *8*(2), 308. https://doi.org/10.24114/gr.v8i2.14711

Loviana, S., Merliza, P., Damayanti, A., Mahfud, M. K., & Islamuddin, A. M. (2020). Etnomatematika pada Kain Tapis dan Rumah Adat Lampung. *Tapis : Jurnal Penelitian Ilmiah*, *4*(1), 94. https://doi.org/10.32332/tapis.v4i1.1956

Lubis, Y. E. (n.d.). *STUDI BENTUK DAN MAKNA MOTIF RAGAM HIAS ANGKOLA MANDAILING DI MASJID AGUNG SYAHRUN NUR TAPANULI SELATAN*. *04*.

Matondang, A. R. (2020). PENGEMBANGAN MODUL MATEMATIKA BERBASIS BUDAYA MANDAILING DENGAN PENDEKATAN MATEMATIKA REALISTIK (PMR) UNTUK MENINGKATKAN KEMAMPUAN KOMUNIKASI MATEMATIK. *AXIOM : Jurnal Pendidikan dan Matematika*, *9*(1), 26. https://doi.org/10.30821/axiom.v9i1.7230

Pane, R. N., & Sihotang, M. A. I. (2022). *Etnomatematika Pada Rumah Bolon Batak Toba*. *5*.

Pasaribu, D. & Jekmen Sinulingga. (2022). Nilai-Nilai Kearifan Lokal yang Terdapat pada Bagas Godang di Desa Pidoli Dolok Kecamatan Panyabungan Kota Kabupaten Mandailing Natal. *Journal of Social Interactions and Humanities*, *1*(2), 71–82. https://doi.org/10.55927/jsih.v1i2.855

Puspitasari, D. V. (2021). *ANALISIS GAMBAR RAGAM HIAS PESERTA DIDIK KELAS VII A SMPN 52 SURABAYA*. *9*.

Saragi, D. (2017). *Jenis Motif dan Nilai Filosofis Ornamen Tradisional Sumatera Utara*. Thafamedia.

Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. ALFABETA.

Sulistyani, A. P., Windasari, V., Rodiyah, I. W., & Muliawati, N. E. (2019). EKSPLORASI ETNOMATEMATIKA RUMAH ADAT JOGLO TULUNGAGUNG. *Media Pendidikan Matematika*, *7*(1), 22. https://doi.org/10.33394/mpm.v7i1.1537