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ETHNOMATHEMATICS IN STRUCTURE AND CARVING PATTERNS OF TORAJAN TRADITIONAL HOUSE BUILDING

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Abstract: Toraja is one of the tribes in South Sulawesi, precisely in Tana Toraja. The Tana Toraja people are very famous for their strong cultural customs; there are so many spiritual activities, a series of traditional ceremonies, and cultures that are still very well preserved among the local community. *Tongkonan* is a Torajan traditional house building that is very popular and always attracts attention, including people from outside Tana Toraja, because the shapes and motifs of the carvings are unique; the shapes and motifs of these carvings cannot be separated from mathematical elements. This study is aimed at identifying the ethnomathematics contained in the carving patterns of the Tongkonan traditional house building. The research was qualitative with a descriptive method. The data collection technique used was a literature study. Results indicate that ethnomathematics in the structure of carving patterns on the Torajan traditional houses building can be integrated into various models of mathematics learning.

Keywords: Tongkonan, ethnomathematics, culture, mathematics

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INTRODUCTION

Effective education does not only require intensive experiences in the development of the curriculum; but, more than that, it also needs in-depth investigation and research that can absorb and understand ethnomathematics (Powell & Frankenstein, 1997). Bringing mathematics closer to human life makes it more interesting to be learned as scientific knowledge. Learners will no longer find mathematics as an abstract object and hard to learn if mathematics is integrated into social life and people's cultures.

Indonesia is a country that is rich in cultures; expanding from Sabang to Merauke there are so many tribes with varied cultures. Culture is very close to man's civilization, the two having inter-relation with each other so that it comes to no amazement that each tribe has different characteristics and behaviors and holds fast to their distinct values. One of the minority tribes that is regarded as unique is the Torajan tribe (Badruzzaman, 2003). Toraja is a region in South Sulawesi with cultures that are massive and well-conserved. Some of the renowned Torajan cultures are the *Rambu Solo'*, *Tinggoro Tedong*, *Ma'Nene*, *Rompo Bobo Bonang*, and, the most iconic, *Tongkonan*, which is the Torajan traditional house building (Pakpahan, 2020).

Tongkonan has a crucial role among the Torajan people. Etymologically, *Tongkonan* is derived from the word root of the Torajan language "*Tongkon*" which means 'seat', and the suffix "*an*" which refers to a place or room function. *Tongkonan* is, simply, a place that has the function of uniting the people of Toraja to conduct various traditional ceremonies and religious rituals; a place for deliberation purposes; a center for family ties; and a palace for traditional leaders (Tangdilintin, 2014). Furthermore, in line with the development of time, the functions of the *Tongkonan* have extended. From research conducted in previous studies, it is known that to improve the welfare of the Torajan people, the *Tongkonan* has been used to support the processes of this purpose. In Palimbong *et al*. (2022), it is mentioned that the *Tongkonan* is used as an educational center for the introduction of financial literacy to build awareness of saving money since early for the people in Lembang Langda.

In another study, it is mentioned that, as an educational function, the *Tongkonan* is used as a center for the digital literature community for the empowerment of the young generation in Lembang Lempo Poton (Wibisono, 2022). The *Tongkonan* does not only have an educational function, but it also has the function of an attractive traditional architectural tourism destination in Tana Toraja, especially in Ke'te Kesu (Sampebua & Unm, 2021). This shift in functions does not automatically annihilate or decrease the cultural impressions of the *Tongkonan*, but it is regarded as a favorable development in alignment with the modern age (Wiyatiningsih & Tumangke, 2019).

This house building is rich with cultural elements. Cultural elements that are most dominant are the carvings that are specific and interesting. The carvings are made by using simple carving tools such as bamboo rulers, nails, knives, and pieces of metal rods with sharp tips. The impressions are carved on a piece of wooden board, walls, pillars, and doors of the traditional *Tongkonan* house and *Alang* (barn) in various motifs. The carvings represent the expressions of the *Aluk Todolo* religion. *Aluk Todolo* itself is a religious law that becomes the source of cultures and life philosophy of the ancestors of the Torajans and that contains religious values and guides the behaviors and relations of man towards Puang Matua (God) (Manurung, 2017).

The motifs of the carvings are figures and illustrations inspired by several various sources such as sky objects, plants, animals, and folk stories. Every motif carries a certain meaning and manifests a relation between man and God, man and man, man and nature, and animals and plants. Torajan carvings are rich in mathematical concepts. There are numerous geometrical concepts such as circles, squares, rectangles, triangles, rhombuses, symmetries, parallel lines, right angles, and so on. It can be concluded that the Torajan tribe has unconsciously known and, even applied, mathematics in their daily life although they have not done it formally.

Such ideas can be explored and then integrated into the concepts of mathematics for learning in the classroom; this is what is meant by the term ethnomathematics (Trandililing, 2015). This has condoned the development of mathematics learning, as purported by D'Ambrosio & Rosa (2008) who stated that knowledge is built upon the development of different processes in various sociocultural groups to make possible the elaboration and implementation of mathematics skills of counting, placing, measuring, drawing, representing, playing with, understanding, describing, and showing relations among concepts through cultural contexts to achieve the pre-determined learning objectives. In general, ethnomathematics can be seen as mathematics applied to the life habits of society such as gardening, gaming, dressing, etc. (Muhtadi *et al*., 2017). Meanwhile, in the contexts of local cultures of the communities in certain societies, ethnomathematics can be seen as the implantation of mathematics in cultures of the local societies such as traditional rituals, traditional house building, traditional cloth making, and other cultural activities.

Previous researchers have studied aspects of the *Tongkonan* traditional house, such as Nugraha (2019) who wrote about the reviews of ethnomathematics in the Torajan unique carving design in the learning of geometric transformation. In his study, Nugraha reported that, besides containing philosophical meanings, the unique Torajan carvings are also dense with mathematical elements, especially of geometric transformations such as the concept of reflections used in every design of *Pa'tedong*, *Pa'lamban Lalan*, *Pa'manuk Londong*, *Pa'tanduk Re'pe*, *Pa'barana'i*, *Pa'barre Allo*, and *Pa'kangkung*. This similarly happens in the concept of translations in the carvings of *Pa'dadu*, *Pa'sussu*, *Pa'ara' Dena'i*, *Pa'kangkung,* and *Pa'lamban Lalan*. Meanwhile, the concept of rotations is also used in the designs of *'Baka*, *Pa'kapu*, *Pa'kangkung*, *Ne' Limbongan*, and *Pa'salaqbi Dibungai*, and the concepts of dilations are much found in the designs of *Pa'barana'I, Pa'kangkung,* and *Ne'Limbongan*. In certain cases, it is true that some designs even use more than one concept of geometric transformations. It can, thus far, be concluded that the unique carvings of Tana Toraja can be used as media in the learning of mathematics.

Another researcher who has studied the unique ethnomathematical carvings of Tana Toraja is Trandililing (2015) who shows many basic geometric concepts found in the Torajan carvings such as parallel lines, curves, diagonal lines, right angles, symmetries, monolinearities, circles, squares, rectangles, kites, rhombs, parallelograms, trapeziums, and, being the most, triangles whose elements point to the belief of the Torajans who worship three powers. The existence of the many basic geographical elements that are found in the Torajan carvings confirms the belief in the possibility of integrating this culture into the learning of mathematics.

Similarly, in other previous research studies, some reviews are related to the Torajan traditional house building, either in its carvings or constructions. These are, however, in the forms of analyses and identifications of the physics or mathematics principles of the objects such as the studies by Jefriyanto *et al*., (2022) and Side *et al*., (2021) and some other studies that look at the roles of the *Tongkonan* in the life of the Torajan people by Palimbong *et al*., (2022), Sampebua & Unm (2021), Manurung (2017), and Wibisono (2022). Nevertheless, not many studies have been conducted that involve the Torajan traditional house building in instructional processes, especially mathematics learning. As asserted by Rosida *et al*., (2018), culture-based approaches to learning offer effective learning processes while Budiarto (2016) maintains that ethnomathematics helps students familiarize themselves with their local cultures as an effort to conserve them, which also is a form of character building. It is, therefore, commendable that, in the future, integration of the Torajan *Tongkonan* culture into mathematics learning in the classroom be researched further and in more in-depth.

METHOD

The present study was qualitative research using the descriptive method. Qualitative research is aimed at understanding the phenomena experienced by the research subject including behaviors, perceptions, motivations, actions, habits, and other traits holistically through descriptions in the forms of words and language in a specific natural context (Creswell & Creswell, 2018). Data were collected by way of literature studies. The focus of the study was identifying the mathematical principles and models found in the *Tongkonan* Torajan traditional house building. The study aimed to describe the mathematical concepts found in the parts of the *Tongkonan* building. Findings showed that ethnomathematical elements are found in the *tongkonan* such as monolinearities, symmetries, circles, rhombs, squares, lines forming vertical rectangles, triangles, trapeziums, balos, and principle uses of straight lines, curves, parallel lines and angles, including also geometric transformation principles of reflections, translations, rotations, and dilations that are numerously found in the exterior carvings of the *Tongkonan* building.

RESULTS AND DISCUSSION

Parts of the *Tongkonan*

The Torajan traditional house building is unique because of its construction and carvings on the exterior side. There is implicit meaning in every shape, interior room division, structure of the building, and pattern of the carvings. Seen from the orientation of the building, the *Tongkonan* always faces the north direction and is located across the rice barn. This orientational direction is influenced by the belief that in *Aluk Todolo*, God the Almighty resides in the North (Manurung, 2017).

Figure 1. *Tongkonan*
Source: *Abd. Muthalib*

In Figure 1, the specific and unique shape and structure of the *Tongkonan* can be seen. In line with the development over time, the shape and structure of the *Tongkonan* can be distinguished into five types by the social status of the owner; this is because the Torajan people still honor social hierarchy as a tribute to the society. However, in general, the shapes and structures of the five types of *Tongkonan* are not far different because they must still conform to the basic spiritual values that are enfolded from generation to generation. The structure of the *Tongkonan* building and its functions can be seen in Figure 2.

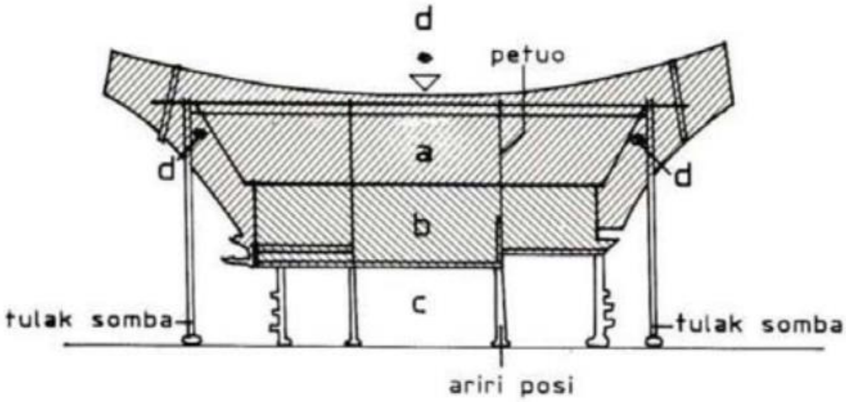


Figure 2. Ilustration of the structure of the *Tongkonan*
Source: *Kis-Jovak* (1988)

In Figure 2, the structure of the *Tongkonan* building can be seen which is full of meanings. There are three vertical hierarchies; in “a”, it is believed that the section is sacred because this is where the god or God resides; “b” is a middle world inhabited by man, and part “c” is believed to be where the evil spirit ramble. In the illustration, “d” is also seen which is the roof part, and is left open for ritual purposes (Manurung, 2017).

Figure 3. Carving patterns on the exterior wall of the *Tongkonan*
Source: *Trandililing* (2015)

Patterns or motifs of carvings on the exterior walls of the *Tongkonan* are widely varied in forms, but scrutinized, every motif is dominated by the colors yellow, black, and brownish red (Figure 3). This pattern tends to be analogous to various patterns of the Torajan cloths that are used as traditional costumes. Although there are many shapes of the carving patterns, triangles are always dominating. According to Trandililing (2015) and Budiarto (2016), this is related to the belief of the *Aluk Todolo* that man is obliged to worship three entities, namely: (1) *Puang Matua* (God), the highest god, creator of the universe, who is believed to reside in the north sky; (2) *Deatas*, creatures of *Puang Matua*, created to take care of man’s life and become rulers of man, and are believed to reside in the east sky; and (3) *Tomembali Puangs*, souls of the ancestors who are believed to reside in the west sky. In other reviews, it is stated that the carving patterns of the *Tongkonan* symbolize the social status of the Torajan people, feature symbols of objects and creatures in the life of the Torajan people, and contain implicit messages of the philosophy of the people of Tana Toraja (Lebang, 2017).

Ethnomathematics of Parts of the *Tongkonan*

Ethnomathematics is a program that studies the history, anthropology, linguistics, and philosophy of mathematics together with pedagogical implications the focus of which includes the techniques of describing, understanding, and solving discrepancies in social and cultural environments. Ethnomathematics helps build learners' awareness of the importance of the roles of mathematical knowledge in society and the contexts of mathematical cultures. An essential aspect of ethnomathematics is the interactions between the mathematics learning process academically and its roles in the local cultures of the community. Ethnomathematics gives fresh air in positively rebuilding cultural identities, i.e. representing cultures with students on a large scale in the learning processes (Rosa *et al*., 2017).

Mathematics is a manifestation of social changes; this is supported by the ideas that: 1) mathematics is a social and cultural product, 2) Mathematics contribution comes from Western civilization and non-west, 3) Mathematical knowledge can be found in different forms, and 4) mathematics has a political aspect (Rosa *et al*., 2016). It is therefore understandable that mathematics is very close to the life of people so ethnomathematics programs are applied to learning processes. However, in the implementation of ethnomathematics in learning, in-depth investigation must be conducted concerning the topic of the cultures that are involved. According to Rosa *et al*. (2017), the reasons for the necessity of applying ethnomathematics in the classroom include the facts that it can become: 1) an effective solution to traditional mathematics, 2) one of the approaches to developing inter-cultural classes, and 3) a way to change the nature of the interrelation between mathematics and the society. In other words, ethnomathematics mediates between mathematics and society, two entities that are, principally, tightly bound.

It needs to be taken into account, however, that every decision entails consequences, including the decision to implement ethnomathematics in the instructional process. One consequence is that such is a high-level pedagogical action because integrating ethnomathematics in the class is not simply by listing phenomena of cultures and then inserting mathematics into it. On the contrary, such action needs a large perspective of wide cultural backgrounds, a complete understanding of the cultures, and advanced pedagogical expertise. It is therefore true that using an ethnomathematics mode in instruction is a complex undertaking, needs time, and has difficulties that are hard to access (Rosa *et al*., 2016). It is therefore useful to point out that implementing ethnomathematics in class needs to take into consideration all the consequences that come with it.

Ethnomathematics that can be identified from the Torajan *Tongkonan* traditional house building includes, among others (Sources: KI Komunal) : (Figure 4) monolinearity in the motifs of *Pa'ulu Karua* and *Pa'Suletang*; (Figure 5) symmetries in many motifs such as *Pa'Salabbi* and *Pa'Dadu*; (Figure 6) circles in the motif of *Pa'limbongan*; (Figure 7) rhombs in the carvings *Pa'lamban*; (Figure 8) squares such as the motifs in *Pa'dadu*; (Figure 9) lines that form vertical rectangles in the carvings of *Pa'Susuk*; (Figure 10) triangles as can be found in the carving motifs of *Pa'dadu*, *Pa'bere Allo*, and *Pa'Salabbi*, and the roof part of the *Tongkonan*; (Figure 11) trapeziums in the building structure of the *Tongkonan*; (Figure 12) balos in the building structure of the *Tongkonan*; and (Figure 13) straight lines, curves, parallel lines, and angles that are found in every carving pattern and in the shape of the *Tongkonan* itself.

The principle of line singleness that is most famously developed on *Chokwe* has already been practiced in the Torajan exterior carvings as well

Figure 4. Monolinearity

The symmetry principle is the match of the shape and measurement of a space divided by an axis. This principle is used for several carving motifs in the *Tongkonan*.

In mathematics the following formula of the symmetrical axis is known: $x = \frac{-b}{2a}$.

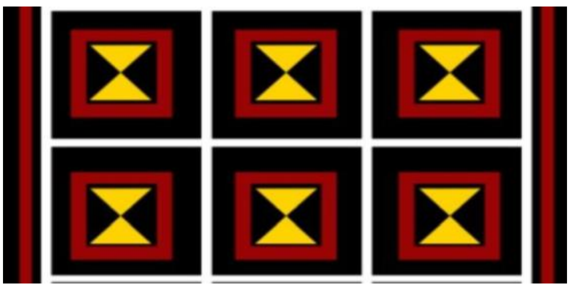


Figure 5. Symmetry

The circle is a flat shape that is bordered by one side only. The formulas for the area and circumference of a circle:
Area: $\pi \times r^2$
Circumference: $2 \times \pi \times r$

Figure 6. Symmetrical circles

The rhombus is a flat shape with four sides of the same length, and each side is parallel face to face, but not straight. The formulas for the area and circumference of the rhombus:
Area: $\frac{1}{2} \times d_1 \times d_2$
Circumference: $4s$

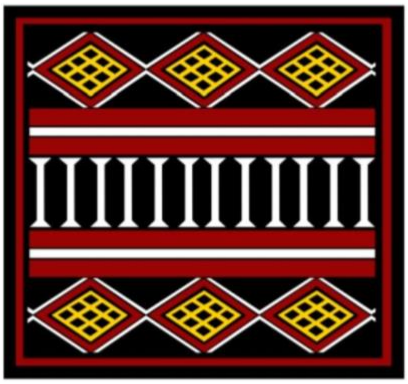


Figure 7. Rhombus

A square is a flat shape with four sides of the same length and four straight angles. The formulas for the area and circumference of the square:
Area: $s \times s$
Circumference: $4s$

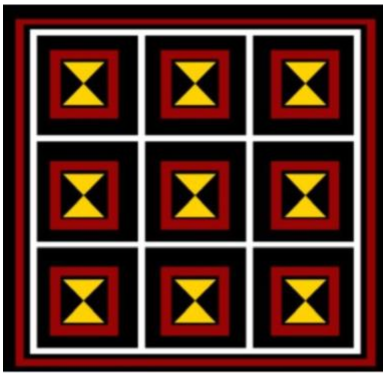


Figure 8. Squares

A rectangle is a flat shape with four sides, each facing side has the same length, and each angle is straight. The formulas for the area and circumference of a rectangle:
Area: $p \times l$
Circumference: $2\,(p + l)$

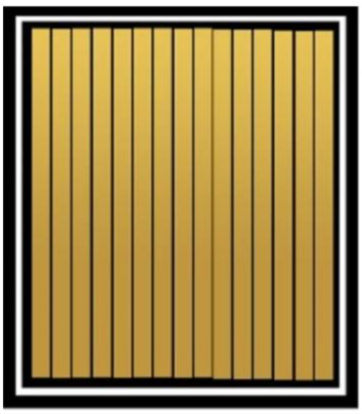


Figure 9. Rectangles

A triangle is a flat shape with three sides and three angles. The formulas for the area and circumference of the triangle:
Area: $\frac{1}{2} \times a \times t$
Circumference: $a + b + c$

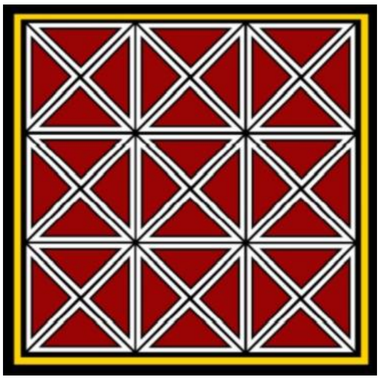


Figure 10. Triangles

A trapezium is a flat shape with four sides and has at least one facing side. The formulas for the area and circumference of a trapezium:
Area: $\frac{1}{2} \times (a + b) \times t$
Circumference: $AB + BC + CD + AD$

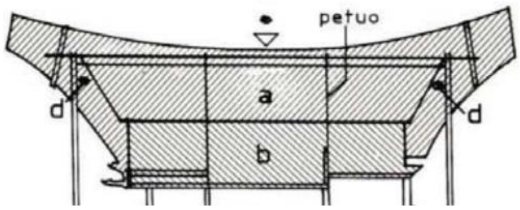


Figure 11. Trapezium

A cuboid is a space shape formed by three pairs of rectangles, and at least one pair has a different size. The formulas for the area and volume of a cuboid:
Area: $2(pl + pt + lt)$
Volume: $p \times l \times t$

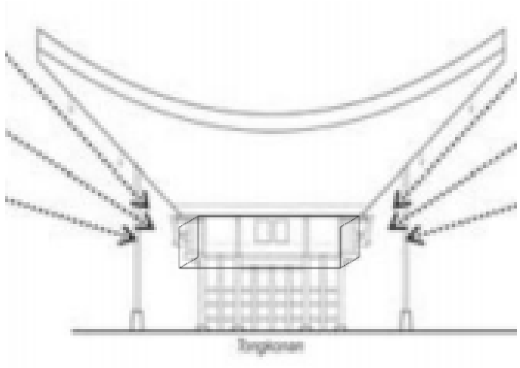


Figure 12. Cuboid

A line is a geometric shape with a single dimension, i.e. length. A line can be straight or curved. Two lines can be parallel, intersecting, or coincident.

Figure 13. Line and Curve

From its structure and carvings on the exterior walls, the Torajan *Tongkonan* traditional house building contains numerous mathematical elements, especially geometric. From the figures presented above, it can be seen that, although the Torajan people did not understand mathematics at that time, various cultures have grown that are tightly bound with mathematics. For example, they can make a pattern consisting of more than one shape; and then maintain the symmetry of the shapes and carvings so that the shapes and carvings are precisely done and interesting.

Tongkonan for Contextual Mathematics Learning

Tongkonan is a culture that is close to the life of the Torajan people, not only the elders and adults but also the youth and children. This is because, not only of its functions as a facility for traditional rituals and ceremonies but also as a center for the development of community members in various sectors. Therefore, making the *Tongkonan* culture a medium for mathematics learning is an option that is worth considering. Learning mathematics through an approach of culture that has become part of the learners' lives will certainly have a positive effect on the learners' interest and motivation (Lembang & Ba'ru, 2021). Learning mathematical concepts and developing them locally by making use of the realities of cultural divergences can help the learning processes become realistic and meaningful; such an integration process is what is called ethnomathematics (Orey & Rosa, 2021).

Tana Toraja is one tourist destination that is the most visited especially in South Sulawesi. Because of this, the majority of the people have traded as a major occupation. Many produce their ornaments or artwork specific to Toraja to be sold. The Torajan people have, since early times, devised themselves with the skills of making and marketing local products. Although they are practically able to produce merchandise articles in their daily-life skills, it is possible that by understanding the basic concepts of mathematics and geometry, they will be more skillful in producing the articles and, even, make improvements and innovations in the production processes. It is here that it will be useful for them to know the basic principles for designing and making the patterns and carvings.

Naturally, not many know or are aware of the relations between Torajan cultures and mathematics. It is the role of the school to give advocation of such usefulness of relating cultures to learning so that people will be attracted by ethnomathematics programs at schools. For example, particular patterns of carvings are given and learners are guided to identify them and, later, produce them such as by learning how to design the patterns, and what basic elements are used such as straight lines, curves, geometric shapes, etc. This does not stop here; further designs can even use geometric transformations in the carving processes.

The following patterns of carvings can be used as examples. Figures 14-16 show the concepts of geometric transformations in the making of *Tongkonan* carvings (Sources: KI Komunal and *Deviant Art*).

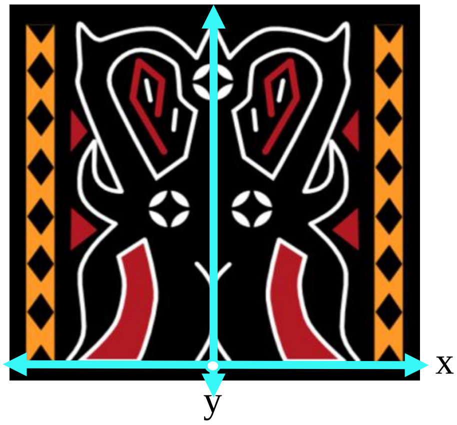


Figure 14. Reflection concept in *Pa'tedong* patterns

The *Pa'tedong* motif uses the concept of reflection (Figure 14). The image beside shows reflection on the y-axis, so that the reflection produces an image as per the characteristics of the mirroring concept, $P(x, y) \rightarrow P(-x, y)$.

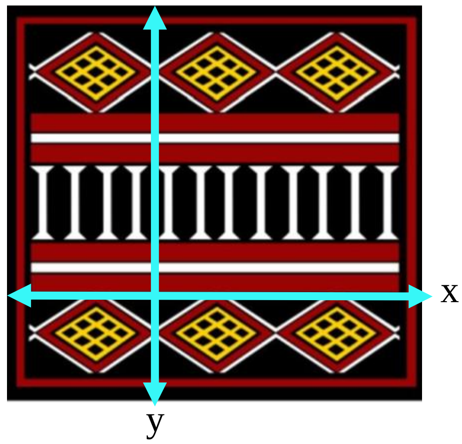


Figure 15. Translation concept in *Pa'dadu* pattern

In *Pa'dadu* motifs, the concept of translation is generally used in each element of the motif (Figure 15). Some elements are shifted left or right (y-axis), up or down (x-axis), or experience shifts on both axes. An example is a rhombus which experiences a shift in the x and y axes.

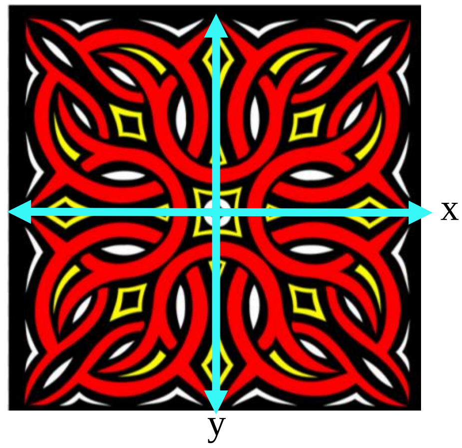


Figure 16. Rotation concept in *Pa'Baka* pattern

The *Pa'baka* motif uses the principle of rotation, almost all components are a form of rotation of other elements (Figure 16). Apart from that, it also uses the concepts of translation and reflection. In the image to the side, you can see a circular object rotating about both axes, in other words, the object is rotating at 90°, 180°, and 270°.

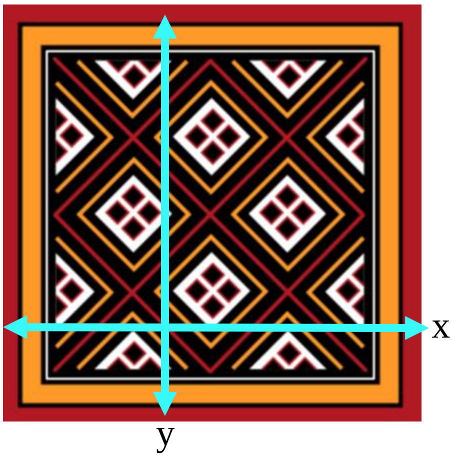


Figure 17. Dilation concept in *Pa'Re'Po Sangbua* pattern

In the image of the *Pa're'po Sangbua* motif on the side, it is dominated by rhombus shapes of various sizes (Figure 17). This shows that this motif in principle uses the concept of dilation. For example, a white rhombus is dilated n times, resulting in larger rhombuses that are orange, black and red.

Knowledge about the concepts of reflection, translation, rotation, and dilation can be easier for the learners to understand if they are presented in the integration with the cultures so that concepts that are formerly abstract can become more realistic and can be directly imagined or observed. Besides, understanding these concepts can help the learners to find ideas to create products in more efficient ways.

Similar treatments can be applied to the basic materials of introductions to flat spaces for elementary school students such as squares, rectangles, circles, triangles, and so on. These materials can be taught through the ethnomathematics approach via various learning models. According to Isrok'atun & Rosmala (2018), a learning model is the component of an instructional system that consists of the steps or phases of the learning process which are known as syntaxes. A learning model can be realized by a variety of strategies, tactics, or techniques in the framework to achieve the learning objectives (Isrok'atun & Rosmala, 2018). In the ethnomathematics approach to the learning of the Torajan cultures, a technique can be devised, for example, to estimate the size of a particular carving pattern for a particular exterior wall in the *Tongkonan*, to make the Torajan cloth by a particular material and determine the precise size for a particular pattern, and so forth.

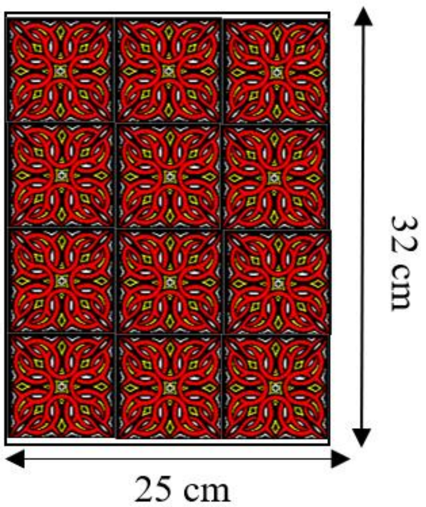
Learning can be designed by giving a problem related to these materials. For example, "Adi receives a project to design the exterior of a new *Tongkonan* recently built in the district of Ke'te Kesu; the size of the wall is 8 × 6 metres. The decoration uses the *Pa'Sala'Bi Biasa* pattern with a basis of squares not more than 190 in number. Help Adi to determine the measurements of the pattern carved on the wall." This example can become a problem in the learning design that will make learners work on the solution by understanding the mathematical concepts and applying them to solve the problem. It is possible that such a problem can be designed in a different learning model by the class conditions and situations of the learners.

The following is an example of integrating the Torajan cultural elements into the mathematical concepts.

"Dori is a Tana Toraja bag craftsman. One of her customers ordered a bag with a rectangular *Pa'baka* motif with a maximum size of 800 cm^2, where the sides were no more than 32 cm. The customer requested that the motifs in the bag be designed in a square shape and nothing was cut off. Help Dori to design the bag that will be made, the shape of the bag, the size of each motif, and how many squares of *Pa'baka* motifs are needed to make the bag!"

In completing the design, the steps that must be taken by Dori are as follows.

1. Determine the length and width of the rectangular bag to be made. This can be done by using the area formula of a rectangle $p \times l = L$. Let's say that one side measures 32 cm (as the desired maximum length). Then we get:
$$32 \times l = 800$$
$$l = \frac{800}{32}$$
$$l = 25$$
2. After knowing the length and width of the rectangular bag you want to make, the next step is to determine how many motifs you want to make the bag look attractive. Dori wanted 12 motifs to decorate her bag design with a pattern more or less like the picture below.



3. The next step is to determine the size of each square of the pa'baka motif. This can be done by dividing the length of the side by the number of squares on that side.
$$Side\ of\ square = \frac{32}{4} = 8$$
$$Side\ of\ square = \frac{25}{3} = 8{,}33$$
Because the width is 25 cm and is not divisible by 3, both the top and bottom sides will be left empty (without motifs), this will not reduce the aesthetic value of the bag.
4. Next, Dori can start making bags ordered by customers based on these provisions, namely rectangular bags with a length of 32 cm and a width of 25 cm decorated with 12 pa'baka motifs measuring 8 cm × 8 cm.

This calculation is not the only solution to the problem. Students can use other calculation techniques so that such assignments can involve students' creativity and skills in problem-solving. This illustration shows that ethnomathematics related to the specific carving pattern of the *Tongkonan* Torajan culture can be integrated into various instructional models as learning material in the teaching-learning process. Studies on the effectiveness of learning using the ethnomathematics approach, particularly in the topic of *Tongkonan* carving patterns, and its impacts on the student's cognitive and affective abilities can become foci for further research.

CONCLUSION

The traditional house building of Toraja, more commonly known as the *Tongkonan*, is a culture of the Torajan people that is still preserved up to the present time. The uniqueness of the *Tongkonan*, either in the structure of the building or the carvings on the exterior walls which are notably specific, is a culture that is preserved from generation to generation and is tightly close to the life of the Torajan people. *Tongkonan* has become a center for rituals, and traditional ceremonies, and a medium for the development of society in the modern time. The structure and carving patterns of the components of the *Tongkonan* carry the inspirations of sky objects, human beings, animals, and plants; but these components are not detached from mathematical values. Mathematical concepts that can be identified from the tongkonan components are, among others: monolinearity, symmetry, circle, rhombus, square, line that forms vertical rectangle, triangle, trapezium, balo, and use of straight line, curve, as well as parallel line and angle. In the motifs of the unique Torajan carvings can be found the principles of geometric transformation such as reflection, translation, rotation, and dilation. It is shown that the contexts of the structures and carvings of the *Tongkonan* can be integrated into various instructional models and contents of mathematics learning in class. The use of local cultures as media in the learning of mathematics can challenge students' curiosities and creativities so that they can gain learning experiences that are meaningful and useful and that can be retained in long-range memories.

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