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ETHNOMATHEMATICS EXPLORATION OF MAKING TRADITIONAL OMBUS-OMBUS CAKE TYPICAL OF NORTH TAPANULI AS A SOURCE OF MATHEMATICS LEARNING

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ABSTRACT

There has been a lot of research on ethnomathematics regarding ombusombus cake, but no one has studied their mathematical value from all aspects of the material other than 2D shapes or 3D shapes. This research aims o look for mathematical activities in North Tapanuli culture and focused on developing the ethnomathematics value of the traditional ombusombus food cake typical of North Tapanuli as a source of mathematics learning. The basic ingredient for making ombus-ombus is rice flour. This research is descriptive qualitative research with an ethnographic approach. Data collection techniques were carried out using observation, documentation, and literature review. Data analysis techniques using Spradley design: domain analysis, taxonomy, compatibility, and cultural themes. Based on the results of data collection, there were several mathematical elements in the traditional ombus-ombus cake typical of North Tapanuli. The mathematical elements contained include the concept of comparison, flat shapes (triangles and squares), space shapes (quadrangular pyramids), social arithmetic concepts, measurement concepts, and counting concepts. In this way, Ombus-ombus can be used as a medium for teaching mathematics in the classroom.

Keywords: ethnomathematics, ombus-ombus, elements of mathematics.

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PRELIMINARY

Mathematics is a science that is closely related to people's activities in everyday life (Nsengimana et al., 2020) However, many people think that mathematics is a subject that is very difficult to understand and has little relevance in daily activities (Monteiro et al., 2021). Apart from that, the mathematics learning taught in schools is too formal, the practice rarely involves the surrounding environment, and sometimes the problems taught are very different from those of others so students find it difficult to understand, appreciate, and describe mathematics learning itself in their minds (Setyawardani & Edy, 2024). Students need to understand that mathematics is closely related to life, cultural diversity, and human daily life (Prastika, 2021). Utilizing cultural diversity activities, especially

those closest to students, can facilitate the process of understanding mathematics itself (Armadiyanti, 2023).

Ombuombus is a traditional food typical of the North Tapanuli Batak tribe which was first coined by Musik Boru Sihombing in the Siborongborong area of North Tapanuli in 1904 (Pangaribuan, 2021). This food became familiar to the children of North Tapanuli, which in turn became the starting point for researchers' interest in studying its ethnomathematics value. so that mathematics learning becomes more contextual and meaningful in the minds of students, especially in the North Tapanuli area. Ombus-ombus are currently marketed at *Lopo-Lopo*, *Tugu* intersection, and even marketed throughout Siborongborong sub-district using bicycles from morning to evening. The marketing of Ombus-ombus which is sold in many places makes Ombus-ombus a home snack and one of the important menus served every time there is a celebration in the Batak tribe (Fitriani et al., 2017). So, the ombus-ombus snack itself has become familiar and familiar to both children and adults (Sitepu, 2023).

Ethnomathematics is a mathematics learning with an ethnographic approach, where elements of community culture are utilized in mathematics learning (Mardhotillah & Yazidah, 2023). Apart from that, ethnomathematics is a science that is used to find out how mathematics is adapted from a culture (Puspita & Sari, 2022). Thus it can be concluded that ethnomathematics is mathematics practiced by communities, tribes, nations, labor groups, children of a certain age, and so on (Choeriyah & Nusantara, 2020).

There has been research on the ethnomathematics of ombus-ombus as a source of learning mathematics (Syahputri & Reflina, 2023) ethnomathematics on the traditional food of the Batak tribe (Simanjuntak & Sihombing, 2020), (Naibaho et al., 2022) However, it is unfortunate that the three studies above are only limited to the field of geometry. Therefore, the researcher intends to explore more about the potential of traditional food from the researcher's own homeland for teaching mathematics in fields other than geometry. The familiarity of Ombus-ombus among the community and students in the Batak tribal community is an opportunity for teachers to explore and use Ombus-ombus itself as a contextual learning resource to make mathematics learning at school more meaningful. In connection with the above, the author investigates the activities in making Ombus-ombus which contain mathematical concepts that can later be used as a mathematics learning design.

METHODS

This research is descriptive qualitative research with an ethnographic approach. Qualitative research is research conducted to understand ongoing phenomena (Risku et al., 2022), while descriptive is expressed with words, images, and not numbers (Hafsi & Hasanah, 2018). Ethnographic methods are used to describe, explain and analyze the cultural elements of a society or nation (Yanti & Haji, 2019). The instrument in this research is a human instrument where the researcher plays an important role as the main instrument whose role cannot be replaced (Wardani & Budiarto, 2022).

This research conducted on March 10, 2024. The object of this research was the typical food of North Tapanuli, namely ombus-ombus. The observation guide begins by explaining the materials for making Ombus-ombus, then the steps in making them so that later it can be concluded that the mathematical elements contained during the manufacturing stage. The researcher knew how to make ombus-ombus directly from Ama Ni Friska Siregar who was an employee of Lopo ombus-ombus number 1 siborong-borong from 1994. The primary data collection techniques were observation and documentation. Observations were made to look for mathematical aspects in the activity of making ombus-ombus.

The results of the observations were then documented in the form of photos and field notes. Secondary data collection techniques use literature studies from seminar proceedings, articles, scientific journals, theses, theses and dissertations. The data analysis technique used in this research is the Spradley design: domain analysis, taxonomy, compatibility, and cultural themes (Putri et al., 2023). The conclusion drawn is regarding the existence of a mathematical learning concept in making Ombus-ombus.

RESULT AND DISCUSSION

Result

Ombus-ombus which is basically a home-cooked food or snack has become a favorite food among people because it has a delicious taste, sweet, soft texture, and also with a fragrant aroma from the banana leaves that wrap it. With a manufacturing process that is not haphazard, there is a special mixture in the processing and it is not steamed repeatedly, making ombus-ombus a food that has its own charm for people who consume it. In 1904, making ombus-ombus still used traditional equipment such as *losung aek* or windmills and pestles or wood to grind brown rice into flour. However, as time goes by,

the process of making ombus-ombus can be done with household kitchen equipment which is easier to obtain.

The process for making ombus-ombus is as follows:

1. Make rice flour: (1) Rice is soaked in a container for 5 hours, (2) drained rice, (3) pounded rice in a mortar, and (4) Once smooth, the rice is filtered.
2. Make dough :
   a. The ingredients needed are
      i. Rice flour 250 g
      ii. granulated sugar 100 g
      iii. salt 10 g
      iv. grated coconut 250 g
      v. brown sugar 100 g
   b. The making process.
      i. Put the rice flour, sugar, and salt into a container, and stir until smooth.
      ii. Add grated coconut to the mixture, and stir until crumbly.
3. Make a package with banana leaves that have been cut into a rectangular shape,
4. Then the banana leaf pieces are shaped into cones,
5. Put the dough into a small packet, then add the brown sugar with a ratio of the whole mixture to brown sugar is 2: 1,
6. Once full, the ends of the package are folded to form a square,
7. Prepare enough water in a steamer basin, then steam the Ombus-ombus,
8. Ombus-ombus is ready to be served.

Table 1: Geometric Concepts in Making Ombus-ombus

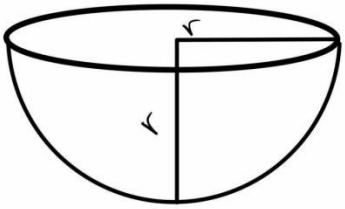
Stages of making Ombus-ombus	Mathematical Concepts	Geometry Model
 **Figure 1. Soaked rice**	Half ball	 **Figure 2. Half Ball**

Figure 3. Rice drained

Tube without cap

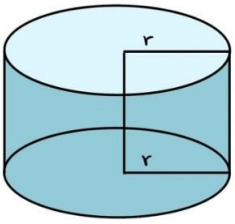


Figure 4. Tube Without Cap

Figure 4. Rice is pounded in a mortar

Pacung Cone

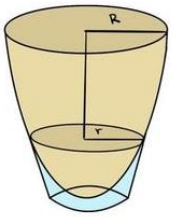


Figure 5. Hemispherical basic spike cone

Figure 6. Once smooth, the ground rice is filtered

Block without cover

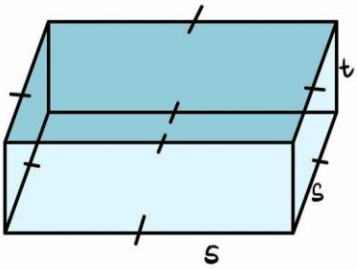


Figure 7. Block without cover

Figure 8. Dough-making process

Half ball

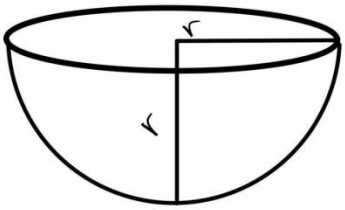


Figure 10. Half Ball

Figure 11. Banana leaves that have been cut into four squares

Rectangle

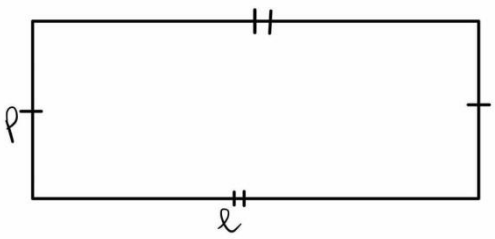
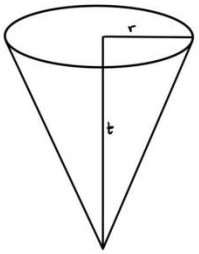
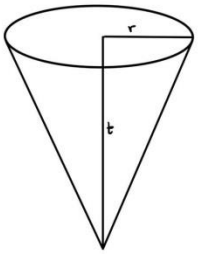
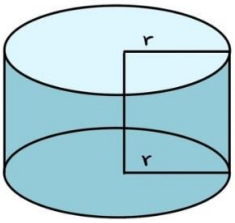


Figure 12. Rectangle

 **Figure 13. Forming a package**	Cone	 **Figure 14. Cone**
 **Figure 15. Enter the dough**	Cone	 **Figure 16. Cone**
 **Figure 97. Fold the base of the package**	Rectangular pyramid	 **Figure 108. Pyramid**
 **Figure 119. steamed for 45minutes**	Tube, rectangular pyramid	 **Figure 20. Tube Without Cap**
 **Figure 21. Ready-made ombus-ombus**	Rectangular pyramid	 **Figure 22. Pyramid**

Discussion

1. Identify mathematics learning in Ombus-ombus

1.1. Comparison concept

From the description of making Ombus-ombus above, you can find the concept of comparison in the materials used to make it. The concept of this comparison lies in how many measurements of food ingredients are used to make Ombus-ombus dough. The ingredients needed to make 13 Ombus-ombus or equal to 720 grams of ombus-ombus are 1000 grams of water, 250 grams of rice flour that has been steamed and filtered, 100 grams of granulated sugar, 10 grams of salt, 250 grams of grated young coconut, and 100 grams of brown sugar. Because the units for these materials are weight units (gr), the comparison can be written as follows:

$$1000gr\ water : 250gr\ rice\ flour : 100gr\ sugar : 10gr\ salt : 250gr\ grated\ coconut : 100gr\ brown\ sugar.$$

So the ratio of the number of ingredients needed to make 720 grams of ombus-ombus is $10 : 2.5 : 1 : 0.1 : 2.5 : 1$. This comparison is an equal comparison, where when one ingredient increases, the other ingredients will also increase.

1.2. Two-dimensional geometry concept

In the process of making Ombus-ombus wrappers, banana leaves are used which are cut into rectangular shapes to later be shaped into Ombus-ombus wrappers.

1.3. Three-dimensional geometry concept

In the process of making ombus-ombus, several tools are also used, such as a mortar, a block-shaped sieve to sift flour until smooth, and a half-spherical bowl to make the dough, The package is made from banana leaves to form a cone and then folded to form a rectangular pyramid.

1.4. Counting concept

In the process of making Ombusombus, in measuring the ingredients we have to calculate the amount of ingredients that must be poured. Therefore, the author discovered the concept of counting in the process of making Ombus-ombus.

1.5. Measurement concept

Apart from that, students can also measure length and width. The basic ingredient for making ombus-ombus is rice flour. the height of the ombus cake is an idea to realize students' understanding of the use of rulers in measurement material.

1.6. Social Arithmetic Concepts

Production costs in the process of making Ombus-ombus are:

Table 2: Ingredients in the making 130 packs of Ombus-ombus

No	Ingredients	Amount	Cost (Rupiah)
1	Rice flour	2500 gr	Rp15.500
2	Sugar	1000 gr	Rp13.000
3	Salt	100 gr	Rp2.500
4	Grated coconut	2500 gr	Rp130.000
5	Brown sugar	1000 gr	Rp13.000
6	Young banana leaves	1 tie	Rp7.000
Total			**Rp181.000**

The Ombus-ombus produced 130 packs with a selling price of Rp. 3,000 per pack. You can find out the profit and profit percentage. Is:

Profit = Selling price – buying price = Rp. 240.000 – Rp. 181.000 = 59.000

Profit percentage = (profit/purchase price) * 100%

= (59.000/181.000) * 100% = 32.5%

Based on the findings in this research, the author can present the mathematical concepts found in Table 3

Table 3: The results of the mathematical concept map contained in Ombus-ombus

No	Mathematical Concepts Found in learning	
1	Social arithmetic	Grade VII
2	Two-dimensional figure	Grade III
3	Geometry	Grade IX
4	Counting	Grade I
5	Measurement	Grade IV
6	Comparison	Grade VII

Thus, this is in line with research conducted (Naibaho et al., 2022), (Syahputri & Reflina, 2023), (Simanjuntak & Sihombing, 2020) in their research which said that there are mathematical elements in the traditional cake of Ombus-ombus. Some research proves that traditional food can be used as a preference or source for mathematic learning (Saniyah & Ardiansyah, 2023).

2. The role of Ombus-ombus as a Mathematics learning medium

We can use the process of making Ombus-ombus as teaching material in mathematics learning. Remembering that problems are contextual can help students to understand mathematics in everyday life (I. Muhammad, 2023)

. Examples of mathematics learning from making Ombus-ombus are as follows:

The educator explained about ombus-ombus and the materials needed to make 13 packs of ombus-ombus along with the capital required for their production. Educators can ask questions as follows:

a. How much brown sugar is required in order to make 10 packs of ombus-ombus? How much does it cost for the brown sugar?
b. If Budi sells one pack of ombus-ombus for Rp. 5,000, what percentage of profit does Budi get from the production costs for 130 packs as above?
c. Find the volume of 50 grams of ombus-ombus if it is known that the base area is 3cm2 and the height is 5cm!

Students can answer that a lot of brown sugar is needed $\frac{13}{10} = \frac{100gr}{x}. then, x = \frac{1000gr}{13} = 76.92gr$ and the percentage of profit obtained by Budi is as much as $((650.000 - 181.000) : 181.000) * 100\% = 259\%$. The volume of 50gr Ombus-ombus is volume = Base area * height= $3cm^2 * 5cm = 15cm^3$. The research results showed that there are mathematical concepts in the form of comparison, social arithmetic in making Ombus-ombus, and space geometry. This research can also be used as material for developing mathematics learning. The impact resulted from the research above shows that students' own love for their culture grew and their motivation to learn mathematics itself increased because the way of carrying out the learning itself became more real and easier to describe. This is in line with the aim of ethnomathematics as the development of mathematics teaching materials to improve students' understanding of mathematics (A. F. N. Muhammad & Novitasari, 2020).

CONCLUSION

Based on the results of the exploration and discussion above, we can draw the conclusion that there are elements of mathematics learning such as social arithmetic, geometry, and the concept of comparison in the process of making Ombus-ombus. This explains that cultural elements can be used in mathematics learning. This research is still within the limits of identification, Therefore, the researcher hopes that the results of this study can be further developed. The results of this research indicate that the process of making Ombus-ombus can be used as material for developing student worksheets or ethnomathematics-based textbooks.

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