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EXPLORING ETHNOMATEMATICS IN TRADITIONAL GETUK AND KUE LAPIS FOODS FROM JAVA AS A SOURCE OF MATHEMATICAL LEARNING

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ABSTRACT

Mathematics is often regarded as an abstract and formal discipline, which can create a disconnect between students' understanding and real-world applications. Ethnomathematics offers a culturally responsive approach by uncovering mathematical practices embedded in local traditions, thereby making mathematics learning more contextual and meaningful. This study aims to explore the ethnomathematical elements found in traditional Javanese foods *getuk* and *kue lapis* and analyze their potential as culturally grounded resources for mathematics instruction. Employing a qualitative approach with ethnographic methods, the research was conducted in a Javanese community in North Sumatra, involving traditional food makers as key informants. Data were collected through direct observation, semi-structured interviews, and documentation. The analysis revealed the presence of mathematical concepts such as geometric shapes, proportional reasoning, repeated patterns, and symmetry in food preparation and presentation. These findings suggest that traditional food-making processes can serve as contextual media for teaching geometry and proportional concepts at the primary and secondary school levels. Integrating such ethnomathematical elements into instructional materials not only enhances conceptual understanding but also fosters cultural awareness and appreciation. Therefore, this study highlights the relevance of local cultural practices as an innovative foundation for the development of culturally contextualized mathematics education.

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1. INTRODUCTION

Mathematics is widely regarded as a universal science that supports the development of logical thinking, critical reasoning, and problem-solving abilities. It serves as a fundamental pillar for various disciplines, including technology, economics, science, and education. As a result, mathematics is positioned as a compulsory subject at every level of formal education, as it contributes significantly to the intellectual development of learners (Pathuddin & Raehana, 2019). However, despite its importance, mathematics is often perceived by students as an abstract, difficult, and unapproachable subject. This perception contributes to a lack of interest and even fear, which ultimately affects students' academic performance and engagement in learning mathematics (Jumaisyaroh Siregar, 2021).

Research indicates that many students experience difficulties in understanding mathematical concepts. These difficulties may stem from various internal and external factors. Internal factors include students' cognitive capacity, learning styles, and emotional conditions, while external factors include the quality of instruction, learning materials, and socio-cultural influences (Ilham Raharjo, 2021). Interestingly, some studies also show that people, even without formal mathematical education, can perform calculations or apply mathematical logic in everyday life (Gazali, 2016). This phenomenon suggests that mathematics is not solely confined to classrooms or textbooks; rather, it exists and thrives in daily activities and cultural practices.

The cultural dimension of mathematics is often overlooked in formal education. In reality, traditional societies have long practiced forms of mathematics embedded in their daily activities, ranging from architecture, art, and music, to culinary processes (Dwi et al., 2023). The study of these culturally-rooted mathematical practices is referred to as ethnomathematics. Coined by Ubiratan D'Ambrosio, ethnomathematics refers to the ways in which members of various cultural groups conceptualize, understand, and utilize mathematical ideas in culturally specific contexts (Setiani et al., 2023). Ethnomathematics bridges the gap between abstract mathematical theories and real-world applications, particularly those grounded in culture.

The integration of ethnomathematics into mathematics education offers a contextualized learning experience, allowing students to see the relevance of mathematics in their own culture and environment (Ananda et al., 2018), By connecting learning materials with learners' socio-cultural backgrounds, ethnomathematics fosters deeper understanding, promotes cultural awareness, and enhances motivation. In this context, students do not merely memorize formulas, but instead experience mathematics as a living and meaningful discipline. Moreover, such contextual approaches align with constructivist learning theories that emphasize active, student-centered learning through real-life applications (Zulaekhoh & Rahman Hakim, 2021).

Various studies have explored the application of ethnomathematics in learning. For example, (Malihatus Saniyah et al., 2023) examined the mathematical patterns in traditional foods from Pekalongan and their relevance to geometry topics in school. (Khofifah Amran et al., 2024) analyzed the mathematical concepts involved in the making of *jipang*, a traditional sweet from Indonesia, highlighting its potential for teaching measurement and estimation. Another study by (Nurjannah Siregar E, Asrul 2024) investigated the preparation

of *alame* and *lemang* from Padang Lawas, exploring volume, proportion, and patterns as key mathematical components. These studies illustrate how ethnomathematics can provide rich learning experiences grounded in local culture.

However, despite the growing body of ethnomathematics research, there remains a lack of focus on certain traditional foods that are deeply embedded in Indonesian culture, particularly in the context of Java (Guntoro et al., 2022). Two such foods are *getuk* and *layer cake* (*kue lapis*), both of which are iconic Javanese delicacies. These cakes are not only widely consumed across Indonesia, but they also carry cultural significance, especially in the regions of Central Java, such as Magelang. *Getuk* is typically made from boiled cassava, mashed and mixed with sugar and coconut, while *layer cake* is characterized by its colorful, structured layers created from rice flour and coconut milk. The preparation of these foods involves various mathematical concepts, such as measurement, proportion, symmetry, sequencing, and spatial reasoning (Nasution & Hasanah, 2023).

Unfortunately, the potential of these traditional foods as learning resources has not been fully explored in the literature. This represents a gap in the current research landscape. While there is substantial evidence supporting the integration of ethnomathematics into learning, most studies have yet to examine *getuk* and *layer cake* in this context. Therefore, it is important to investigate how these foods can be used to teach mathematical concepts meaningfully and culturally (Utami, 2018).

This study aims to explore the ethnomathematical elements found in the making and structure of traditional Javanese *getuk* and *layer cake*, and to examine how these elements can serve as effective resources for mathematics learning. The research seeks to describe the mathematical ideas inherent in these cultural practices and to demonstrate how they can be aligned with the mathematics curriculum taught in schools. The novelty of this study lies in its specific focus on underrepresented traditional foods and their application in the context of mathematics education. By doing so, the study contributes not only to the enrichment of teaching strategies but also to the preservation and appreciation of local cultural heritage (Azurah & Maysarah, 2024).

In conclusion, the integration of local culture such as food into mathematics learning through the lens of ethnomathematics can make abstract concepts more tangible and engaging for students. It also encourages learners to appreciate their cultural identity while developing critical mathematical skills. This study hopes to inspire further research and application of ethnomathematics in various educational contexts across Indonesia and beyond. Therefore, with the existence of ethnomathematics that can be understood by students in schools, the author is interested in conducting research with the title: “Exploring Ethnomathematics in Traditional Javanese Getuk and Kue Lapis Foods as Sources of Mathematics Learning.”

2. METHOD

This study employed a qualitative exploratory approach to investigate the mathematical concepts embedded in traditional Javanese food preparation, particularly in the making of *getuk* and *layer cake* (*kue lapis*). The qualitative method was chosen because it allows the researcher to understand cultural practices in their natural setting and interpret

the meanings constructed by cultural actors (Creswell, 2022). This is aligned with the aim of ethnomathematics to uncover informal mathematical knowledge rooted in daily life and local traditions.

The research was conducted at a traditional cake business in Rebah Village, Dolok Merawan District, Serdang Bedagai Regency, North Sumatra Province. The location was selected purposively because it is inhabited by Javanese descendants who still preserve traditional methods of producing *getuk* and *layer cake*. These foods not only represent culinary heritage but also contain mathematical structures that can be explored and potentially integrated into mathematics learning.

The research subjects were selected purposively and consisted of traditional food makers who have long experience and are actively involved in the production process. These participants were considered cultural actors who hold valuable knowledge related to traditional practices and the implicit mathematics involved.

Data collection involved three primary techniques: observation, interview, and documentation.

1. Observations were conducted directly at the production site to examine patterns, proportions, measurements, and geometric shapes used in food preparation.
2. Semi-structured interviews were conducted to explore the philosophy, reasoning, and perceptions of the food makers regarding the structure and arrangement of the food.
3. Documentation included photographs, and field notes that provided visual data to support the identification of mathematical concepts such as symmetry, repetition, and classification of shapes.

Data were analyzed using the interactive model of Miles, Huberman, and Saldana (2014), which involves:

1. Data presentation, by selecting and organizing information based on identified mathematical elements,
2. Data display, presented in the form of descriptive narratives and visual evidence,
3. Conclusion drawing and verification, through continuous comparison and pattern checking.

To ensure data validity, the study applied triangulation techniques:

1. Technique triangulation was used by combining observation, interview, and documentation to cross-verify data.
2. Source triangulation was conducted by comparing information from multiple participants to ensure consistency.

In addition, member checking was carried out by validating the findings with participants to enhance the credibility of the interpretations. Overall, this research method enabled the in-depth exploration of mathematical practices embedded in traditional culinary activities, contributing to the development of contextual and culturally relevant mathematics learning resources based on local wisdom.

3. RESULTS AND DISCUSSION

3.1. RESULTS

Based on the results of research and interviews with the owner of the Dinda cake trading business conducted by the research, a brief history of the Dinda cake trading business was obtained in Kampung Rebah Village, Dolok Merawan District, Serdang Bedagai Regency. The owner of this Dinda cake business is named Parini who has been producing for 5 years. Mrs. Parini has been producing since 2020 but previously this business was sold in front of the house because over time and the age of this trading business only accepted ready-made orders. Mrs. Parini is a native of Central Java who used to live on Jl Tegalrejo-Purwodadi, Purwodadi District, Grobongan Regency, Central Java Province, how long after marrying Mr. Tukimen, the husband of the owner of the Dinda cake trading business was accepted to work in Kampung Rebah Village, Dolok Merawan District, Serdang Bedagai Regency as a rubber latex manager at one of the PTPN III Kebun Gunung Para companies.

Based on interviews with the owner of the Dinda cake business, she discovered that they make a variety of traditional cakes and fried foods, but the researchers focused solely on traditional cakes like getuk and kue lapis. Data collection through interviews was conducted to understand the process of making getuk and kue lapis. Interviews with Mrs. Parini revealed that kue lapis is a favorite in her neighborhood.

During the interview, Mrs. Parini explained the ingredients needed to make getuk, including 1 kilo of sweet potato, 100 grams of brown sugar, and 1 grated coconut. The tools required to make getuk include a baking sheet, a saucepan, a bowl, a pestle, and a gas stove. The researchers observed five stages in the getuk-making process:

1. selecting sweet potatoes (choose sweet potatoes that are of good quality, not too old and not fibrous, cut the sweet potatoes into relatively uniform sizes to ensure ripeness
   which is evenly steamed, 1 or 2 kilos of sweet potatoes),
2. steamed (steamed sweet potatoes for approximately 30-45 minutes until completely soft),
3. pounded (steamed sweet potatoes are pounded using traditional tools),
4. mixed with brown sugar (pounded sweet potatoes are mixed with brown sugar in a ratio of 1 kg of sweet potatoes and 100 grams of brown sugar),
5. formation and presentation (getuk is cut into relatively uniform sizes

Mrs. Parini also explained the ingredients needed to make layer cake, such as 250 grams of rice flour, 500 grams of starch/tapioca flour, 100 grams of wheat flour, 500 grams of sugar, 8 cups of boiled coconut milk , and two green and white food colorings. The tools needed to make layer cake are a baking sheet, pan, bowl, food coloring, measuring cups, scales, and a gas stove. The process of making layer cake that researchers observed includes 5 stages, namely:

1. Preparation of ingredients (250 grams of rice flour, 500 grams of starch/tapioca flour, 100 grams of wheat flour, 500 grams of sugar, 8 glasses of boiled coconut milk, and two food colorings, green and white),

2. Making the dough (mixing flour, sugar and salt and adding coconut milk little by little while stirring until smooth),
3. Color mixing (the dough is divided into 2 parts and mixed with food coloring)
4. Layering and steaming process (pouring the first layer of batter into a greased baking pan, steaming for about 5-7 minutes until the first layer is cooked, pouring the second layer of batter on top of the cooked first layer, steaming again, and this process is repeated until all layers are finished),
5. Cooling and cutting (the cooked layer cake is cooled and the cake is cut into pieces of uniform size, usually square or rectangular.

Unlike getuk, the process of making kue lapis involves more precise measurements. Kue lapis makers use standard measuring tools such as scales, measuring cups, and spoons to ensure precise ingredient quantities and proportions. The thickness of each layer is also kept uniform, usually around 0.5-1 cm, and the steaming time for each layer is carefully measured to ensure proper doneness. To make a good kue lapis, the measurements must be precise. If the batter is too runny, the layers will be too thin. If it's too thick, the layers will be uneven. The steaming time must also be precise, neither too little nor too much.

The dishes may seem simple, but they contain profound philosophies that align with Indonesian customs and values. Therefore, it can be said that introducing or connecting cultural product components can go hand in hand with instilling character education in students. Clearly, what is meant here is character that is aligned with culture. Ethnomathematics focused on making getuk and layer cakes, which are traditional cakes. The ethnomathematics description in this study is illustrated through interviews, then confirmed through direct observation of the getuk and layer cake making process and through documentation as supporting data. Based on the results of observation and analysis, various mathematical concepts were found contained in the process of making and the physical form of getuk and layer cakes. The following is an identification of ethnomathematics in getuk and layer cakes, including:

Ethnomathematics found in traditional getuk food

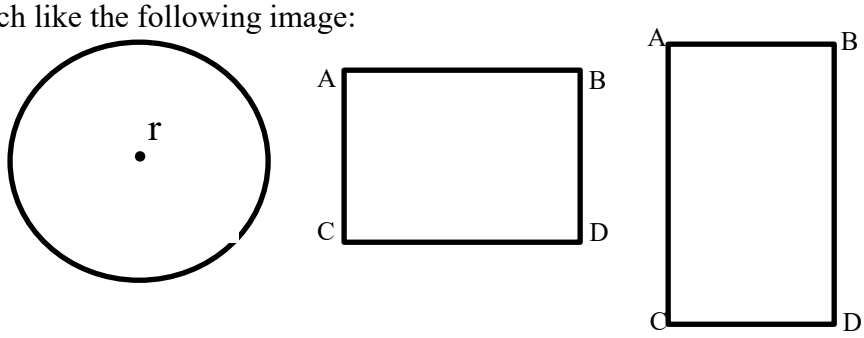
1. Getuk Tools and Shapes

Based on the results of observations, the ethnomathematics found in the tools and shapes of getuk cakes are:

1. an opening for steaming and mashing sweet potatoes that is round or circular in shape
2. the concept of spatial geometry, namely the shape of the surface of the getuk pan and the shape of the getuk that is to be distributed, which is square and rectangular.

Figure 1. Geometry Concept of Getuk Cake Tools and Shapes

If the tools and shapes for making getuk are visualized geometrically, you will get a sketch like the following image:



2. Getuk Ingredients

Based on observations, the ethnomathematics found in the getuk cake-making process is the concept of comparison. Interviews revealed that the getuk cake-making process involves mixing 1 kilo of sweet potato with 100 grams of brown sugar.

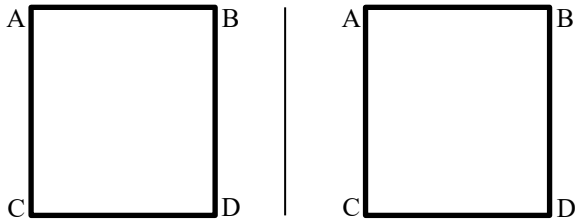
Figure 2. Comparison Concept of Cassava with Brown Sugar

3. Getuk arrangement

Based on the results of the observations, the ethnomathematics found after being cut contained the concept of geometric transformation, namely geometric transformation of the reflection or mirroring type.

Figure 3. Geometric Transformation Concept in Getuk

If the getuk shape is visualized using a reflection type geometric transformation, you will get a sketch like the following image:



Ethnomathematics found in traditional layer cake food

1. Layer Cake Tools and Shapes

Based on the results of observations, the ethnomathematics found in the tools and forms of these layer cakes are:

1. flat geometric concept, namely the shape of the surface for mixing all the flour ingredients with coconut milk and the shape of the surface for differentiating colors and the place for steaming the circular layer cake.
2. the concept of spatial geometry, namely the shape of the surface where the layer cake pan is placed and the shape of the layer cake that is to be distributed, which is square

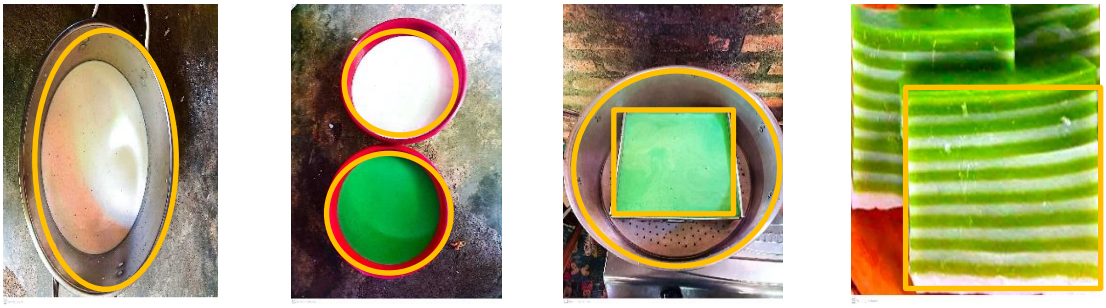
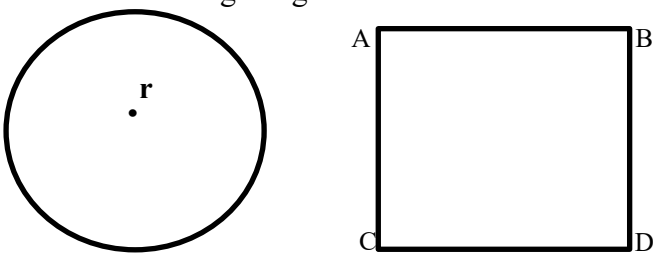


Figure 4. Geometry Concept of Layer Cake Tools and Shapes

If the tools and shapes for making layer cake are visualized geometrically, you will get a sketch like the following image:



2. Layer Cake Ingredients

Based on observations, the ethnomathematics found in the process of making these layer cakes is the concept of comparison. Interviews revealed that the process of making getuk cakes begins with a ratio of 250 grams of rice flour, 500 grams of starch/tapioca

flour, and 100 grams of wheat flour, along with a ratio to distinguish the two colors of the layer cake, green and white.

Figure 5. Comparison Concept Between Rice Flour, Starch/Tapioca Flour, Wheat Flour and Comparison of 2 Colors

3. Layer Cake Arrangement

Based on the results of the observations, the ethnomathematics found after being cut contained the concept of geometric transformation, namely geometric transformation of the reflection or mirroring type.

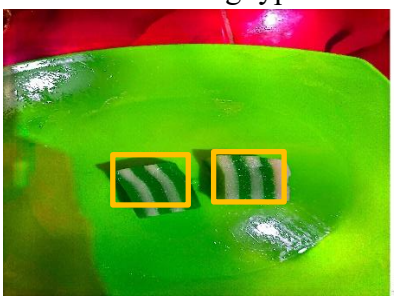
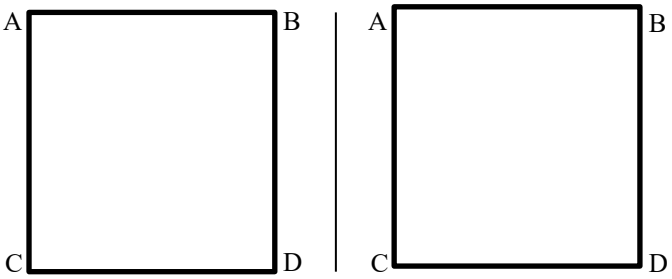


Figure 6. Geometric Transformation Concept in Layer Cake

If the shape of a layer cake is visualized using a geometric transformation of the reflection type, you will get a sketch like the following image:



4. Layer Cake Slices

Based on the results of the observation, the ethnomathematics found after cutting contained the concept of number patterns found in the colors of the layer cake.

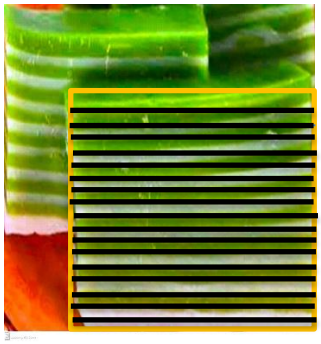


Figure 7. Concept of Number Patterns in Layer Cake

3.1 DISCUSSION

This study aimed to explore the integration of ethnomathematics in traditional Javanese foods into mathematics education, with a focus on getuk and kue lapis. The findings confirm that ethnomathematics is embedded in the preparation and presentation of these foods, directly addressing the research objectives and problem formulation. Such connections reinforce the importance of contextualizing mathematics in local culture to enhance student engagement and understanding. Thus, ethnomathematics is related to mathematics education provided in educational institutions. The relationship between community culture and mathematics education can serve as a focal point for processes, teaching strategies, and learning in the educational realm.

The various elements in making getuk and traditional layered cakes, which have been mathematically represented, can be studied using the principles of geometry, comparison, geometric transformation, and number patterns. The following are the results of a study of the mathematical concepts identified in the making of traditional Javanese getuk and layered cakes:

1. The Concept of Geometry in Getuk and Javanese Layer Cake

These geometric applications illustrate how tangible cultural artifacts, like food, can concretize abstract mathematical concepts such as area, perimeter, and volume. This aligns with constructivist learning theory, which emphasizes learning through meaningful contexts (Rosa & Orey, 2011). This research found that the process of making and serving getuk and kue lapis is closely related to geometric concepts, particularly plane and solid geometry. Getuk, for example, is generally molded in a rectangular or square pan, then cut into equal pieces. Each piece of getuk can serve as a concrete example to introduce students to the concepts of area and perimeter of a rectangle.

For example, if a getuk pan is the same size $20\ cm \times 10\ cm$ and is cut into 10 equal pieces, then the area of one piece of getuk is $20\ cm \times 10\ cm \div 10\ cm = 20\ cm^2$. These calculations illustrate how tangible objects can concretize abstract concepts like area and perimeter, which aligns with constructivist learning theories.

In layered cake, the geometric concept is even richer because this food consists of several layers arranged repeatedly with the same thickness.

For example, if a layer cake pan measures $18\ cm \times 9\ cm \times 6\ cm$, and consists of 6 layers, then the thickness of each layer is $1\ cm$. Students can be asked to calculate

the volume of one layer of cake, which is $18\,cm \times 9\,cm \times 1\,cm = 162\,cm^3$. If the entire cake is cut into 12 equal pieces, then the volume of each piece is $972\,cm^3 \div 12\,cm = 81\,cm^3$.

In addition to area and volume, the concept of perimeter can also be explored. For example, students are asked to calculate the perimeter of a square piece of getuk with sides. $4\,cm$. The answer is: $4\,cm \times 4\,cm = 16\,cm$. This activity helps students understand perimeter calculations and relate them to real objects they encounter every day.

Furthermore, the shape and arrangement of layered cakes can be used to introduce the concept of cuboids and prisms. Students can be asked to imagine how the cake would change its volume and surface area if it were enlarged or reduced. This way, mathematics learning becomes more contextual and easier to understand.

Using traditional foods as a learning tool for geometry also fosters students' creativity in creating models of geometric and geometric shapes from food. This can improve fine motor skills and spatial visualization. By integrating geometric concepts through traditional foods, students not only understand mathematics abstractly but also concretely and apply it to everyday life. Beyond geometric concepts, traditional foods also embody proportional relationships, which are fundamental to mathematical reasoning and real-world problem solving.

2. The Concept of Comparison in the Process of Making Getuk and Layer Cake

The concept of ratio is a crucial element in mathematics and is frequently encountered in everyday life, including in the preparation of traditional foods like getuk (getuk) and kue lapis (layered cake). In this context, ratio can be applied to various aspects, from the ratio of ingredients to the size of slices, to the number of layers in a kue lapis (layered cake).

For example, in making getuk, the ratio of cassava to sugar determines the final taste. If the original recipe calls for 1 kg of cassava and 200 grams of sugar, then the ratio of cassava to sugar is $1000:200$or $5:1$. Students can be asked to solve the problem.

In layer cakes, the ratio of the number of layers is also an interesting aspect to explore. For example, one layer cake consists of 9 layers: 3 red, 3 green, and 3 yellow. The ratio of the red, green, and yellow layers is $1:1:1$. Students can be given the following problem:

Through comparative learning based on traditional foods, students not only understand abstract mathematical concepts but also see real-life applications in everyday life. This can increase their motivation to learn, conceptual understanding, and logical and critical thinking skills. Recognizing patterns in cultural products like kue lapis not only teaches mathematical sequences but also fosters students' ability to predict, generalize, and model real phenomena, which is a critical skill in STEM education.

3. The Concept of Number Patterns in Layer Cake

Javanese layered cakes feature a regular, repeating pattern of colorful layers. Each layer is typically the same thickness and color, forming a sequential pattern that can be

used to introduce the concepts of sequences, series, and mathematical patterns. For example, if a layered cake consists of 8 layers in the repeating order of red, green, and yellow, students could be asked to identify the color of the 7th layer. The answer would be: red, green, yellow, red, green, yellow, red.

Layer cake patterns can also be used to introduce the concept of arithmetic sequences. If each layer is given 60 grams of dough and there are 7 layers, then the total dough needed is $7 \times 60 = 420\ grams$. Students can be invited to calculate the total amount of dough for various numbers of layers. In addition to color patterns, the order of adding layers can also be used to introduce the concept of sequence and multilevel addition. If the thickness of each layer is $0.7\ cm$ and there are 10 layers, then the total height of the cake is $0.7\ cm \times 10\ cm = 7\ cm$.

The concepts of patterns and sequences are crucial in mathematics because they form the basis for understanding sequences, series, and functions. Using layered cakes as a medium, students can learn to recognize patterns, make predictions, and solve problems involving sequences and series. This activity can also be developed into creative projects, such as designing their own color patterns and layer thicknesses, allowing students to apply mathematical concepts in real-world projects.

Geometric transformations found in traditional food arrangements provide a culturally relevant entry point for exploring symmetry, congruence, and spatial reasoning. This contextual approach can make abstract transformations more accessible to learners (Rosa & Orey, 2011).

4. The Concept of Geometric Transformation of Getuk and Layer Cake

Geometric transformation is an important concept in mathematics, encompassing translation (shift), reflection (reflection), rotation (rotation), and dilation (enlargement/reduction). This concept can be found in the process of making, arranging, and serving traditional foods such as getuk (rice cake) and kue lapis (layer cake). Through this activity, students can understand geometric transformations concretely and apply them to everyday life.

Reflection can be observed when pieces of getuk or layered cake are arranged symmetrically on a serving plate. For example, two pieces of getuk are placed facing each other to form a line of symmetry. Students can be encouraged to determine the axis of symmetry and prove that the two pieces are congruent. For example , If a square piece of getuk is placed at position $(2,3)$ and reflected over the y-axis, where is the position of its image? So the answer is $(-2,3)$

Through this exploration of geometric transformations, students can understand that mathematical concepts exist not only in the classroom but also in everyday cultural activities. This strengthens students' understanding of geometric transformations while fostering an appreciation for local culture. Learning about geometric transformations based on traditional foods can also be developed into creative projects, such as designing presentation patterns for layered cakes or getuk (rice cakes) with various transformations. This activity not only fosters mathematical skills but also fosters students' creativity and collaboration.

Based on the research results and discussions conducted, it is shown that ethnomathematical exploration of traditional Javanese foods like getuk and layered cake makes a significant contribution to the development of contextual, meaningful, and culturally-rooted mathematics learning. This research proves that these two traditional foods are not merely cultural products but are also rich in mathematical concepts that can be effectively integrated into the learning process in schools.

These geometric applications illustrate how tangible cultural artifacts, like food, can concretize abstract mathematical concepts such as area, perimeter, and volume. This aligns with constructivist learning theory, which emphasizes learning through meaningful contexts (Rosa & Orey, 2011). In terms of geometry, both getuk and kue lapis provide concrete media for learning about plane and solid shapes, measuring area, volume, and perimeter. Students can directly observe, measure, and calculate the shape and size of food pieces, making mathematical concepts previously considered abstract easier to understand and more relevant to everyday life.

In the aspect of comparison, students can learn to compare quantities, sizes, weights, and ratios of ingredients used in making food. Comparing the amount of cassava to sugar, the size of large and small pieces, and the number of layers of a layer cake are all real-life examples of the application of the concepts of comparison and proportion in mathematics.

In terms of patterns and sequences, layer cakes with their repeating colorful layers are an effective medium for introducing the concepts of patterns, sequences, and series. Students can learn to recognize and predict patterns, count the number of layers, and understand the concepts of repetition and sequence visually and practically.

In the aspect of geometric transformation, the processes of cutting, arranging, and serving getuk and kue lapis involve elements of translation, reflection, rotation, and dilation. Students can practice how the shape and position of food pieces change through shifting, mirroring, rotating, and changing scales, thereby strengthening their understanding of the concept of geometric transformation.

This finding highlights a novel application of ethnomathematics in the Indonesian context, integrating culinary heritage into STEM education and demonstrating its potential to bridge cultural preservation with academic achievement. In addition to mathematical aspects, this study also confirms that ethnomathematics-based learning instills cultural, social, and character values in students. Through hands-on activities involving traditional foods, students not only learn mathematics but also appreciate cultural heritage, practice collaboration, and develop creativity and critical thinking skills. The integration of ethnomathematics into mathematics learning encourages teachers to be more creative in linking subject matter to local culture and involving the community as a learning resource. Collaboration between schools, families, and the community is key to the successful development of contextual and relevant mathematics learning (Saniyah & Ardiansyah, 2023).

Thus, ethnomathematics exploration of traditional Javanese foods like getuk and layered cake has been shown to enrich mathematics learning, improve conceptual understanding, and contribute to cultural preservation and character building. The

results of this study can serve as a reference for developing culture-based mathematics learning models in various regions in Indonesia, so that mathematics is no longer considered difficult and abstract, but rather becomes a living, intimate, and meaningful science for students.

This study was limited to two types of traditional food from Java, namely getuk and kue lapis, which may limit the generalizability of findings to other cultural contexts. Data collection relied on qualitative methods without quantitative measurement of learning outcomes. Future studies could include experimental designs to assess the effectiveness of ethnomathematics-based instruction. Further research could examine the integration of ethnomathematics into the national curriculum, explore its application to a wider variety of cultural artifacts, and investigate its long-term impact on students' problem-solving skills, cultural identity, and interest in STEM fields.

CONCLUSION

Based on the results of research conducted through a qualitative approach with ethnographic methods, this study concludes that traditional Javanese foods such as *getuk* and *kue lapis* contain diverse mathematical concepts that represent applications of ethnomathematics in daily life. The identified concepts include: (1) geometric shapes (squares and rectangles) in the food's basic forms, (2) ratio and proportion in ingredient measurements, (3) number patterns in the layered colors of *kue lapis*, and (4) geometric transformations during the preparation process.

These findings demonstrate that traditional foods have strong potential as contextual and culturally meaningful resources for mathematics learning. Integrating such materials into culture-based pedagogy can make mathematics more engaging, relevant to students' experiences, and foster cultural pride. This aligns with the study's objective to highlight ethnomathematics as an approach that connects local culture with mathematical understanding.

However, this study is limited to two types of traditional food and a small number of informants, which may affect the generalizability of the results. Future research could expand the scope by exploring a wider variety of traditional foods or applying similar approaches in other cultural contexts.

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