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Ethnomathematics Study on The Mantaa Duku' Tradition of The Toraja Traditional Community As A Context For Learning Mathematics

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Abstract

Ethnomathematics is an approach that examines the relationship between mathematics and a community's culture. One local cultural practice with potential as a resource for mathematics learning is the mantaa duku' tradition of the indigenous Toraja people. This tradition involves the distribution of meat—derived from buffalo or pigs slaughtered during customary ceremonies—to eligible recipients based on traditional rules passed down through generations. This study aims to describe the ethnomathematical concepts found within the mantaa duku' tradition and to explain its potential as a context for learning mathematics, particularly regarding the topic of fractions. A qualitative approach utilizing ethnographic methods was employed. Data were gathered through observation, interviews with traditional leaders (Toparengge' and Tominaa), and documentation of the mantaa duku' ceremony. Data analysis followed the Miles, Huberman, and Saldaña model, comprising data condensation, data display, and conclusion drawing.

The results indicate that the mantaa duku' tradition embodies various mathematical concepts applied in real-life community settings, including fractions, division, arithmetic operations, ratios, grouping (sets), measurement, and logical reasoning. The concept of fractions is evident in the process of dividing a single buffalo into multiple parts, which are then distributed to recipients according to customary regulations. Beyond its mathematical elements, the tradition reflects cultural values such as fairness, mutual cooperation, responsibility, respect for ancestors, and social solidarity. The findings suggest that the mantaa duku' tradition holds potential as a contextual mathematics learning resource, as it bridges abstract concepts with students' real-world experiences. Instruction that incorporates local culture is expected to enhance the understanding of mathematical concepts while simultaneously fostering students' awareness of the importance of preserving regional culture.*

Keywords: ethnomathematics, mantaa duku', Toraja indigenous community, mathematics learning, fraction concepts.

INTRODUCTION

Mathematics is a discipline that plays a vital role in the advancement of science, technology, and daily life. The logical, systematic, critical, and creative thinking skills fostered through mathematics education equip students to navigate various life challenges. Nevertheless, mathematics instruction in schools faces significant hurdles. Many students perceive mathematics as an abstract, difficult subject with little connection to real life, resulting in poor conceptual understanding and low learning motivation.

A primary reason for this lack of conceptual understanding is that instruction remains dominated by procedural, teacher-centered approaches. Teachers often present formulas directly without linking the material to students' concrete experiences. Consequently, students merely memorize problem-solving procedures without grasping the underlying concepts. This situation highlights the need for instructional innovations that connect mathematical concepts to everyday life, thereby making learning more meaningful.

One approach gaining traction in mathematics education is ethnomathematics. The term was introduced by Ubiratan D'Ambrosio in 1985 to describe the study of how cultural groups understand, utilize, and develop mathematical ideas within their daily activities. This approach recognizes that mathematics does not evolve solely within academic settings but is also embedded in cultural practices—manifesting in activities such as counting, measuring, comparing, classifying, designing patterns, and solving real-life problems.

In an educational context, ethnomathematics aligns well with the Kurikulum Merdeka (Independent Curriculum) because it positions local culture as a source of contextual learning. Culture-based instruction enables students to construct mathematical concepts through experiences that resonate with their own lives. Beyond enhancing conceptual understanding, this approach contributes to the preservation of local culture as an integral part of national identity. Indonesia possesses immense cultural diversity, with each region harboring cultural practices that embody mathematical concepts. North Toraja Regency and Tana Toraja Regency in South Sulawesi are among the regions rich in such culture. The Toraja people are known as an indigenous community that steadfastly upholds various ancestral traditions—ranging from Rambu Solo' and Rambu Tuka' ceremonies, the construction of Tongkonan houses, and Toraja woodcarving, to the meat-sharing tradition known as mantaa duku'.

The mantaa duku' tradition involves the distribution of buffalo or pork—following the ritual slaughter during a customary ceremony—to parties entitled to receive a share under customary law (aluk). Interviews with traditional leaders known as Toparengge' and Tominaa reveal that this meat distribution is carried out systematically, taking into account kinship ties, social status, contributions to the ceremony's execution, and customary regulations passed down through generations. Beyond serving as a gesture of respect toward family and the community, the distribution reflects values of fairness, responsibility, togetherness, and social solidarity.

Observations further indicate that the mantaa duku' process follows an organized sequence of stages: slaughtering the animal, categorizing meat cuts, identifying recipients, and distributing shares to each group in accordance with custom. This process

demonstrates mathematical activities such as division, counting, grouping, measurement, and the determination of proportions aligned with each recipient's entitlements. These activities reveal that the Toraja people implicitly apply mathematical concepts within their cultural life.

One of the most prominent mathematical concepts in the mantaa duku' tradition is that of fractions. A buffalo is viewed as a single, whole unit that is subsequently divided into several parts in accordance with customary rules. Each portion received by a specific recipient represents a fraction of the whole, thereby establishing a strong connection to the concept of fractions taught in schools. Beyond fractions, the process of determining each recipient's entitlement also involves concepts such as arithmetic operations, ratios, sets, measurement, and logical reasoning.

Previous studies have examined ethnomathematics within Torajan culture—covering areas such as Tongkonan architecture, carving motifs, geometric patterns in traditional houses, and traditional measurement systems. However, research on the mantaa duku' tradition remains very limited, despite the fact that this tradition encompasses rich mathematical activities deeply integrated into the lives of the Torajan people. Consequently, this study offers a novel contribution by exploring the ethnomathematical concepts inherent in the mantaa duku' tradition and assessing its potential as a context for mathematics learning, particularly regarding fractions.

Based on this background, the study aims to: (1) describe the implementation of the mantaa duku' tradition among the Torajan indigenous community; (2) identify the ethnomathematical concepts present in the tradition; and (3) analyze the potential of the mantaa duku' tradition as a context for mathematics learning in schools. The findings are expected to contribute to the development of local culture-based mathematics education while simultaneously supporting efforts to preserve the cultural heritage of the Torajan people.

METHOD

This study uses a qualitative approach with ethnographic methods to explore ethnomathematic concepts within the mantaa duku' tradition of the Toraja indigenous people. A qualitative approach was chosen because this study aims to deeply understand the cultural meanings and mathematical activities that emerge in community life. Ethnographic methods are used to examine the relationship between culture and mathematics through direct observation of community activities and interpretations of the meanings given by cultural actors.

The study was conducted in North Toraja Regency, South Sulawesi Province, at a traditional ceremony location that still practices the Mantaa Duku' tradition. The location was selected purposively, considering that the community in the region still maintains the tradition of distributing meat according to customary rules (aluk) passed down through generations. Data collection took place in June 2026, coinciding with the traditional ceremony, allowing for direct observation of the entire tradition. The research subjects consisted of two traditional leaders, Toparengge' and Tominaa, who were selected using purposive sampling because they possess knowledge and authority in implementing the Mantaa Duku' tradition. Both informants were deemed capable of providing comprehensive information regarding the procedures for carrying out the tradition, the basis for dividing the meat, cultural values, and the mathematical concepts involved. Based on interviews, both

traditional leaders explained that the distribution of meat is carried out according to customary rules, taking into account kinship relationships, social status, and the contribution of each party to the ceremony. Furthermore, the meat-sharing process is seen as a representation of the concept of parts within a whole, which can be linked to fractions in mathematics.

The object of this research is the ethnomathematical concepts found in the mantaa duku' tradition. The research focused on the implementation of the tradition, the meat-sharing process, the mathematical concepts that emerge during the process, the cultural values contained within it, and its potential as a context for mathematics learning.

Data collection was conducted through observation, interviews, and documentation. Observations were conducted directly during the Mantaa Duku' tradition using observation sheets compiled based on research indicators. Aspects observed included the implementation of the tradition, the concept of fractions in the meat-sharing process, and the ethnomathematical values that emerged during the activity. Observations indicate that the meat distribution is carried out systematically according to customary law, involving grouping portions of meat, determining recipients based on customary rights, and a calculation process that reflects mathematical concepts, particularly fractions.

Semi-structured interviews were conducted using a validated interview guide. Questions focused on the meaning of the mantaa duku' tradition, its purpose, the meat distribution mechanism, the recipients, the cultural values inherent in the tradition, and the relationship between the distribution process and mathematical concepts. Interviews indicate that the mantaa duku' tradition not only serves social and cultural functions but also involves counting, dividing, grouping, and determining proportions in accordance with customary law.

Documentation was used as supporting data to strengthen the results of observations and interviews. The documentation included photographs of traditional practices, the meat distribution process, conditions at the research location, and field notes. This documentation provided a visual depiction of the meat distribution activities carried out by traditional leaders and the community, thus strengthening the research findings regarding the existence of mathematical practices in the mantaa duku' tradition.

In qualitative research, the researcher acted as the primary instrument (human instrument) responsible for collecting, analyzing, and interpreting data. To support the data collection process, instruments included observation sheets, interview guides, documentation, field notes, a voice recorder, and a camera. The observation instruments and interview guides were developed based on research indicators and underwent a validation process before being used in the field.

Data validity was ensured through source and technical triangulation. Source triangulation was conducted by comparing information obtained from Toparengge', Tominaa, observations, and documentation. Meanwhile, technical triangulation was conducted by matching data from observations, interviews, and documentation to obtain consistent and reliable data. Data analysis used the interactive model of Miles, Huberman, and Saldaña, which includes three stages: data condensation, data display, and conclusion drawing and verification. In the data condensation stage, all results of observations, interviews, and documentation were selected and grouped based on the research focus. Next, the

data were presented in narrative form, tables, and documentation to facilitate interpretation. The final stage was carried out by drawing conclusions regarding the ethnomathematics concepts contained in the mantaa duku' tradition and its potential as a context for mathematics learning. The conclusions obtained were continuously verified through a triangulation process to have a high level of credibility.

RESULTS AND DISCUSSION

A. Research Result

1. Implementation of the Mantaa Duku' Tradition in the Toraja Traditional Community

The mantaa duku' tradition is an important part of Torajan traditional ceremonies, both Rambu Solo' and Rambu Tuka'. This tradition is performed after the slaughter of a buffalo or pig as a sacrificial animal. The meat is then cut into portions and distributed to those entitled to receive it, based on customary law (aluk). The distribution process is not random, but follows customary rules that have been passed down through generations.

According to an interview with Toparengge', the mantaa duku' tradition is a form of respect for family, relatives, traditional leaders, and community members who have traditional ties to the ceremony organizer. The meat is distributed fairly according to the rights of each recipient, thus strengthening social ties within Torajan society. This opinion is supported by Tominaa, who explained that the distribution of meat not only serves as a form of respect for the recipient but also as a symbol of brotherhood, solidarity, and respect for customary law. According to him, each portion of meat has a designated recipient based on kinship, social standing, and contribution to the ceremony.

Observations show that the tradition is carried out systematically through several stages: slaughtering the animal, separating the animal parts, grouping the meat, determining recipients according to customary rules, and distributing the meat to the community. The entire process takes place in an orderly manner under the supervision of traditional leaders, ensuring that each recipient receives their rightful share.

2. Observation Results of the Mantaa Duku' Tradition

Direct observations were conducted during the Mantaa Duku' tradition using an observation sheet compiled based on three main aspects: the implementation of the tradition, the concept of fractions in meat distribution, and ethnomathematics values.

In general, all observation indicators indicate that the mantaa duku' tradition was carried out in accordance with customary rules. The meat distribution was carried out in an orderly manner through the process of identifying animal parts, grouping recipients, and determining the number of portions to be given to each group.

Observation results table of the mantaa duku' tradition:

Observed Aspects	Observation result
Implementation of traditions according to customary rules	Well implemented
Meat distribution is carried out systematically	Implemented
Determination of recipients is based on customary rules	Implemented

The concept of a portion of a whole is visible	Very visible
Differences in the number of portions for each recipient	Very visible
There is an activity of counting portions of meat	Very visible
Contains elements of ethnomathematics	Very visible
Can be used as a learning context	Very feasible

Observations show that mathematical concepts emerge naturally during the meat-sharing process. A buffalo is viewed as a single unit, then divided into several parts according to customary rules. This process illustrates the concept of fractions, which is closely related to mathematics taught in schools.

3. Results of Interviews with Traditional Leaders

Interviews were conducted with two traditional figures, namely Toparengge' and Tominaa.

Interview with Toparengge'

Toparengge' explained that Mantaa Duku' is a tradition of sharing meat that has been practiced since ancestral times. The main purpose of this tradition is to maintain kinship ties, respect the community participating in the ceremony, and adhere to applicable customary rules. The informant also stated that the distribution is based on social standing and family relationships, so that each recipient receives a different portion according to their rights. He also explained that the distribution process involves counting the portions of meat, which can be related to the concept of fractions in mathematics.

Interview with Tominaa

Tominaa explained that the distribution of meat is an important part of Torajan customs. The distribution is carried out carefully to ensure that all recipients receive their fair share according to customary law. He also explained that a single buffalo is seen as a single unit, divided into several parts according to the needs and rights of each recipient. He believes this process is highly suitable for use as an example of learning about fractions, as students can understand the concept of parts within a whole through their familiar culture

4. Research Documentation

Images of the manta duku' tradition



Documentation shows the meat distribution process during the mantaa duku' tradition, which takes place in the courtyard of the Tongkonan. Traditional leaders and community members are seen grouping the meat portions from the slaughtered buffalo before distributing them to the recipients. This activity demonstrates the process of grouping, counting, and dividing the meat portions

according to customary law, providing concrete evidence of ethnomathematics in Torajan society.

5. Identification of Ethnomathematics Concepts in the Mantaa Duku' Tradition

Analysis of the results of observations and interviews shows that the mantaa duku' tradition contains several mathematical concepts that developed naturally in the lives of the Torajan people.

Ethnomathematics concept table in the mantaa duku' tradition

Cultural Activities	Mathematical Concepts	Explanation
Dividing a buffalo	Fractions	A buffalo is viewed as a single entity and then divided into several parts.
Determining the number of shares for each recipient	Arithmetic Operations	The number of parts to be given to each recipient is calculated.
Differences in the number of shares	Comparison	The size of the portion varies according to customary status.
Grouping recipients	Sets	Recipients are grouped based on customary status and kinship.
Determining the size of the share	Measurement	The meat pieces are measured to comply with customary provisions.
Determining the recipient's rights	Logical Reasoning	The distribution is carried out according to agreed-upon customary rules.

Of these six concepts, fractions are the most dominant. Each piece of meat represents a part of a whole, making it highly relevant to the fractions students learn at both elementary and secondary school levels.

B. Discussion

There he research findings indicate that the mantaa duku' tradition is not only a cultural activity but also a mathematical practice that developed naturally in the lives of the Torajan people. The concept of fractions is evident when a buffalo is divided into several parts according to customary law. This division reflects the meaning of fractions as parts of a whole. Furthermore, the process of determining the number of parts for each recipient involves arithmetic, while differences in the number of parts between groups indicate the concept of comparison.

This research finding aligns with ethnomathematics theory, which states that cultural activities contain various mathematical concepts that can be used as learning resources. The mantaa duku' tradition demonstrates that the Torajan people have applied mathematical principles for generations in their daily lives, although not expressed in formal formulas. Counting, comparing, grouping, and

measuring are carried out as part of customary practices, making mathematics a living social practice within the community.

Beyond mathematical concepts, the mantaa duku' tradition also embodies cultural values such as justice, mutual cooperation, responsibility, respect for ancestors, solidarity, and togetherness. These values form the basis for determining the distribution of meat, ensuring that each recipient receives their rights according to their status and kinship. Therefore, utilizing the mantaa duku' tradition as a learning context not only helps students understand mathematical concepts but also introduces local cultural values that are important to preserve.

The results of this study demonstrate that integrating local culture into mathematics learning can make the learning process more contextual, meaningful, and relevant to students' experiences. Teachers can use illustrations of meat distribution in the mantaa duku' tradition to explain the concepts of fractions, arithmetic operations, comparison, and grouping, making it easier for students to connect abstract concepts with real-world situations. Thus, mathematics learning is not only oriented toward mastering concepts but also contributes to the preservation of Torajan culture.

CONCLUSION

Here This research shows that the mantaa duku' tradition of the Toraja indigenous people is a cultural practice that embodies various ethnomathematical concepts and has the potential to be used as a context for mathematics learning. This tradition is carried out through the process of distributing meat from the slaughter of a buffalo or pig to those entitled to receive it based on customary rules (aluk), taking into account kinship relationships, social standing, and each individual's contribution to the traditional ceremony. The distribution process is carried out systematically and reflects the values of justice, togetherness, responsibility, solidarity, and respect for ancestors. These findings are supported by field observations and interviews with traditional leaders, who explained that the distribution of meat is carried out according to customary rules that have been passed down through generations.

The research results identified several mathematical concepts contained in the mantaa duku' tradition, namely fractions, arithmetic operations, comparison, sets, measurement, and logistic reasoning. Among these concepts, the concept of fractions is the most dominant because a buffalo is viewed as a single unit that is then divided into several parts according to the rights of each recipient. Furthermore, the process of determining the number of portions, grouping recipients, and selecting the size of the cuts of meat demonstrates that the Torajan people have naturally incorporated mathematical activities into their cultural life.

The findings of this study indicate that the mantaa duku' tradition has great potential for integration into mathematics learning, particularly in fractions. Utilizing local culture as a learning context can help students understand mathematical concepts through experiences close to everyday life, making learning more meaningful. Furthermore, using the mantaa duku' tradition as a learning resource also supports efforts to preserve local culture and strengthen students' cultural identity. Thus, ethnomathematics is an approach capable of connecting mathematical knowledge with the cultural values of the community, so that learning focuses not only on mastering concepts but also on character building and an appreciation of the nation's cultural heritage.

Suggestion

Based on the research findings, several suggestions can be made as follows.

1. For mathematics teachers, the mantaa duku' tradition can be utilized as a learning context for fractions, ratios, arithmetic operations, and measurement, making learning more contextual, engaging, and relevant to students' real-life experiences.
2. For schools, the results of this study can serve as a reference in developing local culture-based learning as an implementation of the Independent Curriculum, which integrates local wisdom into the learning process.
3. For the Torajan indigenous community, the mantaa duku' tradition is expected to be preserved as a cultural heritage that not only holds social and customary value but also contains educational value that can be utilized in the educational world.
4. For future researchers, this research can be developed by examining the application of the mantaa duku' tradition in mathematics classroom learning design, measuring its effectiveness in improving students' understanding of mathematical concepts, or exploring other mathematical concepts inherent in Torajan culture.

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