EXPLORATION OF ETHNOMATHEMATICS IN BENGKULU
AS A SOURCE OF MATHEMATICS LEARNING
FOR ELEMENTARY SCHOOL STUDENTS

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Abstract
The Merdeka Curriculum implements a multicultural approach in learning. Therefore, ethnomathematics is needed in elementary school mathematics learning. The purpose of this study is to explore the ethnomathematics found in Bengkulu and integrate it into the mathematics curriculum as a learning resource for first-grade elementary school students. This qualitative research with an ethnographic approach was conducted over a period of one year. The research activities include: (1) Identifying the ethnomathematics found in Bengkulu, (2) Mapping the learning achievements and indicators of the mathematics subject in the Merdeka Curriculum for first-grade elementary school, (3) Analyzing the ethnomathematics of Bengkulu City that can be integrated into the learning achievements and indicators of the mathematics subject in the Merdeka Curriculum for first-grade elementary school, and (4) Developing a draft of recommended mathematics teaching materials based on Bengkulu ethnomathematics. The research results obtained are (1) data on Bengkulu ethnomathematics, (2) mapping of learning achievements and indicators of the mathematics subject in the Merdeka Curriculum for first-grade elementary school, and (3) a product of mathematics teaching materials based on the ethnomathematics of Bengkulu City.
Keywords : *Exploration, Ethnomathematics, Elementary School.*

INTRODUCTION

Mathematics and culture are inseparable elements in everyday life. Culture is a unity that is indivisible and comprehensive within the life of society (Pramesti et al., 2021:138). The study of mathematics learning that utilizes a culturally-based approach in conveying mathematical education is known as ethnomathematics. Ethnomathematics is the science that understands how mathematics and culture are interconnected, aiming to express the relationship between the two (Werniarni et al., 2022: 207).

According to D'Ambrosio in Risdiyanti (2020: 29), the perspective of ethnomathematics in mathematics education enables students to understand that the world is rich in diverse cultures. Ethnomathematics serves as a bridge between education and culture, allowing for a more meaningful learning experience for students. This is because

ethnomathematics links mathematical concepts with the norms they encounter in their daily lives (Agusdianita, 2022).

Bengkulu City is one of the cities that serves as the capital of Bengkulu Province on the island of Sumatra. Bengkulu City has a variety of cultures and characteristics that distinguish it from other regions. Examples include Besurek fabric, the Tabut tradition, traditional houses, wedding ceremonies, and traditional clothing, all representing the identity of the Bengkulu community. This local cultural wisdom is an intriguing and potentially valuable component of ethnomathematics that can be integrated into teaching materials or learning resources for elementary school students.

Currently, the textbooks circulating in schools do not incorporate local culture as a context for teaching mathematical concepts. This is unfortunate, as the ethnomathematics present in Bengkulu City is very close to the students and well-known since it is part of their culture. Moreover, the independence curriculum emphasizes a multicultural approach, which means cultures and ethnicities must be integrated into school learning. Therefore, it is essential to conduct research to explore the ethnomathematics present in Bengkulu City that can be integrated into the existing mathematics curriculum in elementary schools.

RESEARCH METHOD

The type of research or method used in this study is qualitative research. This research does not test hypotheses but rather describes information as it is based on the variables studied. According to Agustinova (2015: 10), qualitative research is a research method grounded in post-positivism philosophy, which emphasizes a deep understanding of phenomena. The approach used in this study is ethnography. Ethnography is the analysis, description, or reconstruction of depictions within a culture and group. Ethnographic research focuses on the culture of a specific group of people. Ethnographic research can be regarded as an in-depth study of natural behavior within a culture or group to understand that culture (Agustinova, 2015: 25). In this study, the activities conducted include (1) identifying the culture to be studied; (2) identifying the cultural variables being researched; (3) conducting literature review; (4) obtaining permission to enter the research location; (5) studying and understanding the culture; (6) seeking informants; (7) collecting and analyzing data, describing the culture, and developing theories (Moleong, 2015: 237).

RESULTS AND DISCUSSION

The various forms of ethnomathematics that have been successfully identified by students include traditional houses, historical buildings, tabut structures, and typical foods. The following presents examples of the application of ethnomathematics for the concepts of addition and subtraction, flat shapes, and spatial forms.

The first ethnomathematics example is Lepek Binti, which is a traditional food unique to the Rejang tribe in Bengkulu, including the Curup region. This food has a history closely tied to the traditions and culture of the Rejang community. Lepek Binti is a traditional cake made from glutinous rice, coconut, and brown sugar. This cake is wrapped in banana leaves and steamed until cooked. The name "Lepek Binti" comes from the Rejang language, where "lepek" means flat or level, while "binti" refers to the filling or core of the cake, which is a mixture of coconut and brown sugar. This cake is often served at various traditional ceremonies, including weddings, thanksgiving events, and commemorations of significant days within the Rejang community. Lepek Binti is not only an everyday food but also a symbol of togetherness and respect for ancestral traditions. To this day, Lepek Binti is still made and enjoyed by the Rejang community and remains one of the culinary heritages that continues to be preserved.

Figure 1. Lepek Binti

Ethnomathematics can be used for the concept of counting whole numbers. This is because mathematics is a part of human activity, and thus the concept of mathematics can also be observed from counting the number of lepek binti cakes. Below is the ethnomathematics image.

Figure 2. Lepek Binti as Ethnomathematics

Another form of ethnomathematics that has been identified by students is a specialty cake from the City of Bengkulu, called "kue bay tat." This cake is shaped in squares, rectangles, and also has circular forms. It is a cake topped with pineapple jam. This cake is often used as a distinctive souvenir from the City of Bengkulu. Below are the shapes of kue bay tat.

Figure 3. Special Cake of Bengkulu City "Bay Tat"

In this ethnomathematics, it can be used as a source for counting and organizing numbers. The following is the explanation.
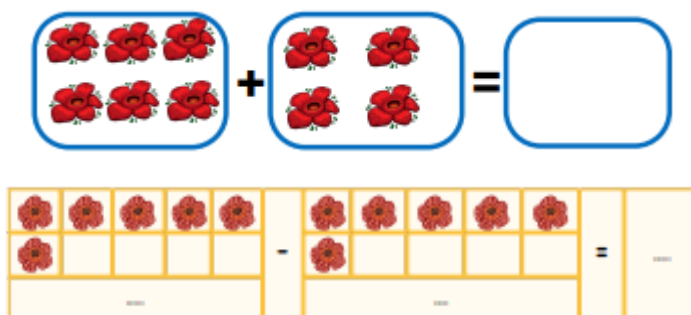

Figure 4. Bay Tat as Ethnomathematics

Another form of ethnomathematics that has been identified by students is the Rafflesia arnoldi flower (Rafflesia). The Rafflesia arnoldii flower (Rafflesia) is distinct from the corpse flower (Amorphophallus). Many people often misunderstand these two endemic flowers found in Bengkulu. They frequently confuse the Rafflesia flower with the corpse flower. One prominent difference, according to information from Mr. Kholidin, an officer at the KPHL Unit III Bukit Daun, which covers protected forest areas in five districts: North Bengkulu, Lebong, Rejang Lebong, Kepahiang, and Central Bengkulu, is that Rafflesia arnoldii belongs to the parasitic plant group of the Rafflesiaceae family. This plant survives by absorbing nutrients from its host plant, namely Tetrastigma, a type of climbing plant from the grapevine family. Meanwhile, Amorphophallus or the corpse flower belongs to the family of aroids. According to him, although both emit a foul odor, the Rafflesia flower is a parasite that can only survive by depending on its host tree. In contrast, the corpse flower has its own tuber, stem, and roots, allowing it to see nourishment independently.

Figure 5. Rafflesia Arnoldi Flower

The Rafflesia Arnoldi flower can be used to teach the concepts of addition and subtraction. Addition and subtraction can be taught by counting the Rafflesia Arnoldi flowers as follows:

Figure 6. The Ethnomathematics Concept of Rafflesia Arnoldi

Ethnomathematics encompasses another aspect, namely the traditional house of Bengkulu known as the Bubungan Lima house. The name "Bubungan Lima" derives from the local language, referring to the roof structure of the house, which consists of five layers or "bubungan." "Bubungan" translates to layers or levels. This design provides a unique visual appearance, distinguishing it from other traditional houses in Indonesia. The Bengkulu community is part of the Malay ethnic group, characterized by a rich tradition and culture. The Bubungan Lima house is an integral part of their cultural heritage. This house reflects the lifestyle, beliefs, and values upheld by the Bengkulu community since ancient times. The Bubungan Lima house serves not only as a residence but also as a center for social and cultural activities.

It is often used for traditional ceremonies, family gatherings, and community events, reflecting the importance of the house in the social life of the community.

Figure 7. Traditional House of Bubungan Lima

In traditional houses, there are indeed numerous concepts of two-dimensional shapes, especially rectangles, as well as concepts of three-dimensional shapes and measurement. The following is an example of ethnomathematics in the traditional house of Bubungan Lima.

Figure 8. Ethnomathematics in the Bubungan Lima Traditional House

The ethnomathematics from Bengkulu that follows is Tabut. The Tabut festival is commemorated every year by the local community. The Tabut structure is a multi-tiered building resembling a mosque. The following presents an image of the Tabut structure.

Figure 9: The Tabot as the Culture of Bengkulu

The Tabot, as an ethnomathematical entity, contains numerous mathematical concepts. One of them is the concept of a rectangular plane figure. This is an image of one section of the surface of the Tabot structure.

bangun datar apa saja yang membentuk gambar tabot tersebut?

Figure 10 Ethnomathematics in Tabot

In ethnomathematics, Tabut is indeed rich in mathematical concepts. Students can explore Tabut as a learning resource for geometry, including various two-dimensional and three-dimensional shapes. The concepts of perimeter and area can also be found in the structure of Tabut. Consequently, students will be interested in studying it because they are familiar with this ethnomathematics. Moreover, they find joy in learning not only about culture but also about mathematics.

Mathematics is a science that relates to the examination of abstract shapes or structures, thus requiring mastery of the concepts found within mathematics (Karso et al., 2011:1.40). Mathematics is a field of study that explores how to think rationally and reasonably to acquire concepts that can be learned from various phenomena. Furthermore, according to Tambunan in Karso (2011:1.42), mathematics is knowledge about quantity and space, one branch among many systematic, orderly, and exact sciences. Mathematics involves calculations and numbers that are integral to human life, assisting individuals in accurately estimating various ideas and conclusions.

The Mathematical Science Education Board-National Research Council, as cited in Wijaya (2011:7), articulates that the objectives of mathematics learning consist of: (1) practical goals, which involve using mathematics to solve everyday problems; (2) civic goals, aimed at enhancing students' ability to participate actively in social relationships; (3) professional goals, influenced by society's general view of education as a tool for job acquisition; and (4) cultural goals, placing mathematics as a product of human culture and simultaneously as a process to develop culture.

Mathematics education possesses special characteristics compared to other subjects. According to Hendriana and Soemarmo (2014:12), the characteristics of mathematics include: (1) having abstract subjects of study, encompassing facts, operations (relations),

concepts, and principles; (2) relying on agreements, including symbols, terms, and basic rules (axioms); (3) employing deductive reasoning; (4) maintaining consistency within its system; (5) featuring symbolic representation; (6) considering the domain of discourse. In addition, Karso et al. (2011:1.40) describe the characteristics of mathematics as a science with a deductive thought pattern, a science of patterns and regularities, the art and language of organized structure, and a domain encompassing systematic and exact ideas and abstract concepts.

These characteristics may present challenges in classroom learning, as conveyed by Agusdianita (2020), where common issues include the abstract nature of mathematical concepts, the suitability of mathematical learning strategies, and appropriate teaching aids for mathematics learning. Therefore, there is a need for learning resources that are close to the students' lives to concretize mathematical concepts. One potential learning resource is ethnomathematics.

The term "ethnomathematics," first introduced by D'Ambrosio, a Brazilian mathematician in 1985, originates from the word 'ethno,' referring to cultural groups or tribes within a country (Yusuf et al., in Mayang et al., 2021:2). It is composed of the word 'mathema,' which conveys the meanings of explaining, knowing, understanding, and performing activities such as coding, measuring, classifying, concluding, and modeling (Werniarni, 2022:3). The suffix 'tics' derives from the word 'techne', which means technique. In its early inception, D'Ambrosio used the term ethnomathematics to describe a type of mathematics distinct from school mathematics.

According to D'Ambrosio, mathematics taught in schools is categorized as mathematical education. However, ethnomathematics is the mathematics implemented within recognized cultural groups, such as indigenous communities, labor groups, children of certain ages, and more. To this day, ethnomathematics has taken on meaning in every classroom. Since then, the organization of multicultural classrooms has been homogenized worldwide.

Ethnomathematics is understood specifically by certain societies within activities that integrate with mathematics. Ethnomathematics is a mathematical approach utilizing the culture of a region (Shirley in Mayang et al., 2021: 1). According to Zayyadi (2017), ethnomathematics represents culture-based mathematics education. The Great Indonesian Dictionary (KBBI) defines 'ethno' or culture as thoughts, reasoning, and customs, whereas culture is the result of human activity and inner creation. From a research perspective, ethnomathematics signifies the cultural anthropology of mathematics and mathematics education.

Ethnomathematics is interpreted as the unique methods employed by specific cultural groups or communities in activities relating to mathematics. Mathematical activities include tasks where the abstraction process occurs, transforming real-life experiences into mathematics or vice versa. These mathematical activities can involve grouping, counting, measuring, designing constructions or tools, creating patterns, locating, playing, explaining, and so forth (Narsyah and Rahman, 2020: 5).

From various opinions regarding ethnomathematics, it can be understood that ethnomathematics is a way to study mathematics by involving local cultural activities, thereby facilitating an individual's understanding of mathematics. This aligns with Agusdianita (2020), emphasizing that students can learn based on the culture within their immediate context. Mathematics related to the surrounding culture is termed ethnomathematics. Ethnomathematics can be implemented as a teaching method that facilitates better understanding of mathematics. By employing ethnomathematics, it is hoped that students can explore problem-solving skills, critical thinking, and interest in learning mathematics.

The objective of ethnomathematics is to acknowledge that there are different ways of performing mathematics while considering the developed mathematics learning material and the local culture. By integrating elements of ethnomathematics in mathematics education, it is hoped to provide a fresh perspective that learning mathematics is not confined to the classroom. Students can study mathematics by engaging with the outside world and interacting with local cultures that form the foundation of ethnomathematics.

A teacher should be able to develop creative and innovative teaching materials applicable in learning activities. Thus, students become interested and motivated to learn. A good teacher is one who can develop appropriate teaching materials to meet students' needs. In mathematics education, ethnomathematics-based teaching materials can be utilized. With ethnomathematics, learning becomes more comprehensible for students. This finding is supported by Agusdianita (2023), suggesting that the students were able to understand the concepts of perimeter and circumference of squares, rectangles, and triangles through inquiry linked to ethnomathematics in their lives. A similar conclusion was presented by Putri et al. (2024) in their research, noting that the use of ethnomathematics teaching media can enhance students' academic achievement. Therefore, ethnomathematics is critically important for integration into the classroom learning process.

According to Narsyah and Rahman (2020:7), ethnomathematics-based learning undoubtedly involves the integration of cultural values contained in learning materials. The

fusion of cultural elements can take the form of observing selected cultures firsthand, conducting observations through images, or providing brief descriptions of a particular culture to be implemented. Several criteria or considerations for selecting learning resources, according to Jalinus and Ambiyar (2016: 141), include: economic and practical characteristics, ease and simplicity regarding organization or application, flexibility in planning and execution, suitability with the cognitive level and capabilities of the students, relevance to the goals to be achieved and the available time; and the teacher must have the skills and capabilities to utilize learning resources effectively.

CONCLUSION

Ethnomathematics is a cultural approach to mathematics education. The ethnomathematics present in Bengkulu is quite diverse. Bengkulu has traditional foods, musical instruments, historical buildings, Tabut festivals, and more. This ethnomathematics can be utilized as a learning resource for students to understand mathematical concepts. It is hoped that through ethnomathematics, students' interest in learning mathematics can be increased, which in turn will positively impact students' learning outcomes.

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