

(Characteristics of Ethnomathematics in Traditional Games *Mpa'a Gopa* Mbojo tribe)

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Abstract

*The aim of this research is to describe the ethnomathematics of Mpa'a Gopa (a traditional game of the Mbojo Tribe). This research is qualitative research with an ethnographic approach. The data collection methods used were observation, interviews and documentation. The object of this research is the elements of Mpa'a Gopa (a traditional game of the Mbojo tribe) played by students in elementary schools. Based on the research results, it is known that Mpa'a Gopa (a traditional game of the Mbojo Tribe) has mathematical elements or characteristics. The mathematical elements or characteristics found are numbers and geometry, which include fields, numbers, probability, congruence and reflection, as well as mathematical logic. Apart from that, this research in its findings focuses on several objects in the form of plots (of land and tiles) of the players, *Leu/Ince*, and the rules of the game. The field or tile contains planes, reflections, congruence, and numbers/counting. Meanwhile, for players in Mpa'a Gopa it is about numbers/counting and chance. *Leu/Ince* (a traditional game of the Mbojo tribe) contains geometric fields, while the game rules contain mathematics.*

Keywords: Content, Formatting, Article.

INTRODUCTION

Indonesia is a country that is very rich in cultural values and traditions between its regions. The same applies to a culture that was born in the midst of the life of the Mbojo Tribe community. The Mbojo tribe itself is an ethnic group that lives in the eastern tip of Indonesia, specifically on Sumbawa Island, West Nusa Tenggara. In historical records, the Mbojo are known as a tribe that has rich oral traditions, including myths and legends passed down from generation to generation (Budianto, 2020). Based on research conducted by Nuraini (2021), the Mbojo tribe has close cultural relations with other tribes in Nusa Tenggara, including the Sumbawa tribe and the Sasak tribe. This can be seen from the influence in language, customs and religious practices. The Mbojo people generally use the Mbojo language which is included in the Austronesian language group, with a number of different dialects depending on the region. One of the cultures that is still maintained by the Mbojo tribe is traditional games.

Traditional games have been an activity that has provided entertainment value for the Mbojo tribe community for a long time, and are still preserved by children in this environment. Various traditional games have filled children's play activities for a long time, one of which is *Mpa'a Gopa*. According to research conducted by Suharto (2021), traditional games such as Mpa'a

Gopa can help in preserving cultural values which are increasingly threatened by modernization. In this context, it is important to conduct an in-depth study of Mpa'a Gopa, both in terms of history, the rules of the game, and its impact on the Mbojo community. Mpa'a Gopa is played by children and adults, usually in groups. This game involves strategy, speed, and cooperation, which makes it a non-formal educational tool. Statistics from the NTB Provincial Culture and Tourism Office show that around 70% of children in the Mbojo area are still actively playing Mpa'a Gopa, even though the influence of modern games is increasingly dominating. This shows that Mpa'a Gopa is still relevant and has a place in the hearts of the Mbojo people.

As human life develops, traditional games themselves experience a decline in their preservation. For this reason, the role of parents, educators or the cultural community itself should be to pay more attention to the preservation of traditional games. This can be done by using them as media or teaching materials to develop aspects of children's basic development (Citra et al, 2021). Modernization and globalization have changed the way children spend their free time. According to research by Rahman (2022), only 30% of children in urban areas know Mpa'a Gopa, while in rural areas, this figure reaches 60%. This data shows that there are significant differences in the introduction of traditional

games between children in urban and rural areas, which needs to be of concern to policy makers and the community.

One of the benefits of children playing traditional games is that they can develop logical intelligence, support numeracy literacy skills, and overcome children's math anxiety. This is in line with the findings in research by Citra., et al (2021) that traditional games not only contain entertainment elements, but also contain cultural values and are able to train students' thinking and numeracy skills. Traditional games contain values from mathematical concepts, so that if a child plays them, they are indirectly involved in learning activities and understanding mathematics by playing.

On the other hand, mathematics anxiety itself means a feeling of discomfort experienced by students as a result of unstable emotions, this is characterized by feelings of worry, anxiety, fear, tension, fear, impaired concentration and memory, and causing somatic disorders during learning. mathematics or anything related to calculating numbers (Juliyanti & Heni, 2020). Mathematics anxiety often occurs in students because mathematics is considered a complicated, difficult, scary and boring subject because mathematics lessons are considered an activity that consists of just counting, never far from the formulas and numbers that make up the results. they get dizzy (Febriyanti et al, 2019) (Safitri, 2019). Mathematics is also considered only a subject that is limited to being studied in school classes (Safitri, 2019). This is also in line with Zahron (1985) who said that most people think that mathematics is a subject studied at school, but people often do not realize that they apply mathematics in their daily activities. Therefore, many students are unhappy, afraid, and even avoid mathematics subjects.

Mathematics anxiety also has an influence on students' low numeracy literacy skills, even though one of the emphases in mathematics subjects is on numeracy literacy skills. Numeracy literacy skills can be understood as students' ability to describe information that discusses numbers or mathematics to be able to formulate a problem, analyze the problem, and determine the solution to the problem (Hartatik, 2019). Then skills in numeracy literacy are very

necessary in learning mathematics, because in practice mathematics is not only always related to formulas, but is still seen from students' reasoning abilities or critical thinking patterns in solving various mathematical problems. Another thing is that numeracy literacy skills can also help students understand the role of mathematics in solving problems related to students' daily lives (Salvia et al, 2022).

The facts in the field are that only a small percentage of students are able to utilize numeracy literacy skills in their daily life practices. The basic concepts of mathematics in the form of the ability to calculate are simply mastered by students, but their skills in using these concepts in real conditions or such as when solving problems do not work in a structured manner and are even ignored. Based on this, it can be seen that the numeracy literacy skills of Indonesian students are still at a low level.

Improving the quality of education in Indonesia is of course a shared responsibility, because education is the main capital in efforts to improve the welfare of a nation. In this case, direct practice is needed in preserving, exploring and developing Indonesian culture. One way is to explore the ethnomathematics of traditional games, as mathematical concepts are also born with the habits and culture of a society. So, in line with ethnomathematics, which is the use of mathematical values in a culture found in a particular society, of course the preservation and exploration of learning resources can be done by exploring ethnomathematics in traditional games. *Mpaa Gopa* Mbojo tribe.

The use of ethnomathematics as in traditional games can be seen from how to play it, the mathematical elements contained in it, as well as the philosophy contained in the traditional game. Ethnomathematics is a study that connects culture and mathematics. This concept was first introduced by Ubiratan D'Ambrosio in 1990, who emphasized the importance of understanding mathematical ways of thinking that emerge from certain cultural contexts (D'Ambrosio, 1990). Ethnomathematics not only includes mathematical techniques and methods used in a particular culture, but also how educational values (Ahyansyah, et al., 2021), norms, and traditions (Meyunda, et al., 2023) can

influence the way people think and interact with mathematics.

Research conducted by Nunes and Bryant (2018), found that children in various cultures have different ways of understanding basic mathematical concepts, such as counting and measurement. For example, in some rural communities in Africa, children learn to count by using objects around them, such as grains or stones, reflecting a way of thinking that is integrated with their environment. This suggests that mathematical understanding can vary greatly depending on cultural context. Dharmamulya (2008) revealed that traditional games contain cultural values which include things like fun or joy, freedom values, democratic values, leadership values, can train skills in counting, train skills in thinking and logic, foster a sense of responsibility and sense of friendship.

Therefore, researchers explore ethnomathematics in traditional games *Mpaa Gopa* the Mbojo tribe as a source of learning. The formulation of the problem that was explored is "How do traditional games of the Mbojo tribe support numeracy literacy and overcome math anxiety?" "And what are the mathematical elements in traditional games *Mpaa Gopa*?" As well as "How to apply Ethnomathematics *Mpaa Gopa* in mathematics learning?"

METHOD

Based on the problems in this research, the appropriate approach to use is qualitative research. This research uses ethnographic methods with ethnomathematics specifications. The ethnographic approach is generally carried out using an observation process. The aim of this research is to explore mathematical elements in traditional games *Mpaa Gopa* the Mbojo tribe that can support numeracy literacy skills and overcome students' math anxiety. As for the data collection used in this research by conducting in-depth interviews, observations or observations, as well as documentation.

This research began in January until June 2024. The research subjects were students at elementary schools in Bima. The research design used by researchers refers to the Spradley Ethnographic Research Cycle, which is as follows:

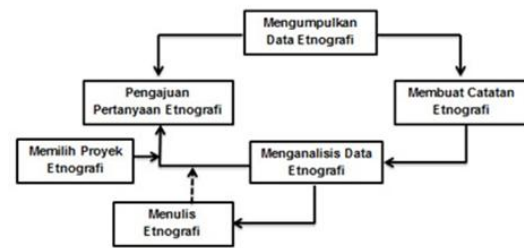


Figure 1: Spradley's Ethnographic Research Cycle

RESULTS AND DISCUSSION

This research focuses on several objects, namely the *Mpaa Gopa* plot, *Leo/Ince*, the rules of the game, as well as the players. The following is an explanation of the objects that are the focus of the research.



Figure 2. Gopa and Player Plots

1. Characteristics of Ethnomathematics *Mpaa Gopa*

Based on the results, researchers obtained findings related to ethnomathematics in the form of tools used in ethnomathematics *Mpaa Gopa*. The tools usually used in traditional *Gopa* games are stone slabs, tile shards, or ceramics for use as *Leo/Ince* in *Mpaa Gopa*. Apart from that, there are wooden twigs, chalk, markers, bricks, or charcoal, depending on the area used to draw/form the *Gopa* plots, making plots on the *Mpaa Gopa*, researcher observations.

■ Petak *Mpaa Gopa*

The shapes of *Gopa* plots are very diverse, but in general the areas used as *Mpaa Gopa* plots always have mathematical elements, namely flat shapes, similarity, reflection, congruence, and contain elements of number. The *Mpaa Gopa* plot has the following flat elements in the form of squares and rectangles.

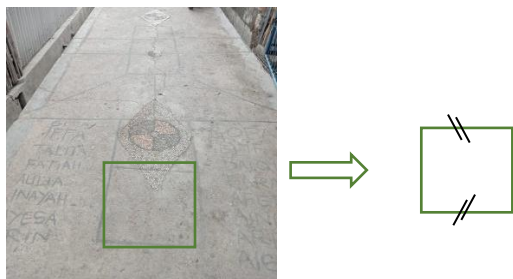


Figure 3. Illustration of the square shape of the Gopa plot

The Mpaas Gopa plot also has an element of reflection. This is based on a drawing of the shape of the Gopa plot which, if given one line as the axis of symmetry, cuts the Gopa plot so that it becomes two symmetrical right and left parts. Likewise for congruence or congruence which can be seen from the square shape

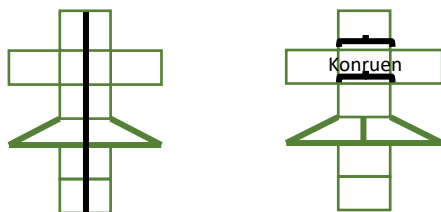


Figure 3. Illustrations of Square Shapes and Congruence Petak Gopa

The Mpaas Gopa squares contain counting elements, the counting activity can be seen from the sequence of squares that become the grooves that will be passed when playing Gopa. As the flow of the Mpaas Gopa squares that the players will go through, starting from squares number one, two, three, four, five, six, seven, and so on and then will return to the highest order squares up to square one. A number is something that is used to show quantity in the form of signs or symbols commonly called numbers.

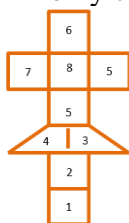


Figure 4. Illustration of Counting Gopa Squares

■ *Leo/Ince*

Based on the research results, it was found that in the form *Leo/Ince* Mpaas Gopa contains elements of flat shapes. This is based on the shape *Leo/Ince* which are made from stone slabs or ceramic shards that resemble flat shapes such as rectangles, triangles, circles, squares, and so on.

■ *Game Rules*

Mpaas game rules Gopa contains elements of mathematical logic. The implications of the rules for playing Gopa can be seen from the status of playing activities continuing or when a player dies. For example, *p*: When playing a player with initials A accidentally steps on a line on the grid; *q*: Player initials A is declared to have lost status in this Mpaas Gopa, so the rules of the game are then replaced by another player. So, the implication of the statements P and Q is: If the player with the initials A steps on the line on the plot while playing Gopa, then the player initials A is declared out of the game so that the rules of the next game are replaced by another player (Safitri and Novaldin, 2024).

■ *The Players*

It can be known that Mpaas Gopa players include mathematical elements of chance and counting. For example, there are 4 players with the order of first, second, third, and fourth players. So, it was found that there is an element of chance in determining the order of the players. For example, A, B, C, D are playing Mpaas Gopa, then they do an activity home *measure pa* as a determinant of their sequence pattern in playing. This can be done using the permutation formula to determine the number of playing sequence patterns (Safitri and Novaldin, 2024).

$$P_4^4 = \frac{4!}{(4-4)!} = \frac{4!}{0} = 4! = 24$$

2. *Mathematics Learning Mpaas Gopa*

Mpaas Gopa is a deep traditional game of the Mbojo Tribe practice can be a learning resource mathematics at the same time can

provide a new learning style in learning mathematics, in answering the problems of learning mathematics in the form of mathematical anxiety and honing students' numeracy literacy skills.

■ Math Anxiety

The lack of mathematical skills or approaches to contextual concepts in students' daily lives when learning mathematics triggers students' high levels of mathematics anxiety. It is not surprising that students who have mathematics anxiety tend to avoid studying mathematics. Another thing, students' social skills and cognitive abilities cause mathematics anxiety in the school environment which is caused by students' weak basic skills in calculating or understanding concepts in mathematics (Novikasari, 2016).

Based on the research results, introducing ethnomathematics in the form of the traditional game Mpaa Gopa is part of the process of explaining that ethnomathematics can be used as a source of learning mathematics in schools. This can be used as a basic reference in solving a problem regarding students' mathematics anxiety, because by looking at the active participation and happy responses of students when learning mathematics while playing Mpaa Gopa, it becomes an answer that mathematics in practice is not as easy and complicated as they had previously assumed.

Apart from that, the results of interviews and observations carried out on students as participants in this research found that the game Mpaa Gopa can be used as a learning resource to develop more interesting, effective mathematics learning and more active student learning. So, in this case Mpaa Gopa as ethnomathematics is able to improve students' creative thinking abilities, train thinking (cognitive) abilities, numeracy skills, and hone social skills. The role of Mpaa Gopa ethnomathematics in practice among elementary school students in Bima is the right solution in overcoming students' mathematics anxiety.

■ Numeracy Literacy

Ekowati, et al (2019) define numeracy literacy as a person's ability to use reasoning. Reasoning here means a person's way of understanding and analyzing a statement, an activity that manipulates symbols or mathematical language found in everyday life, so that they can then express the mathematical statement in written or oral form. According to Han, et al. (2017) indicators of numeracy literacy abilities are outlined in the following table.

Table 1. Numeracy Literacy Ability Indicator

No	Numeracy Literacy Ability
1	Use a variety of numbers and symbols related to basic mathematics to solve problems in a variety of daily life contexts
2	Analyze information displayed in various forms (graphs, tables, charts, diagrams, and so on).
3	Interpret the results of the analysis to predict and make decisions

Based on table 1, it is known that the indicator of numeracy literacy ability consists of three main indicators. These three indicators of literacy ability can be answered by activities in playing Mpaa Gopa. Such as using numbers expressed in the form of Gopa plots with numbering or numbers, analyzing information on the Mpaa Gopa rules in the form of mathematical logic, as well as interpreting or predicting opportunities for playing sequence patterns.

CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that there are ethnomathematical characteristics or elements in the traditional game of Mpaa Gopa, so that it can be used as a learning resource that supports students' numeracy literacy skills, as well as being able to overcome students' math anxiety. The ethnomathematical characteristics of the Mpaa Gopa square contain mathematical elements in the form of shape, size, and the amount of the square as a geometric element that contains elements of a flat shape, congruence, reflection, and counting. On game Traditional

Mpaa Gopa, ethnomathematics explored the number of Mpaa Gopa players, the form and sequence patterns in playing Mpaa Gopa, namely by identifying the elements of counting and chance.

The same goes for the exploration of Leu/Ince shapes in the Mpaa Gopa game that contains flat geometric elements. While the rules of playing Mpaa Gopa have an element of mathematical logic. Mpaa Gopa's ethnomathematics learning can not only be used as a source of mathematics learning that can overcome math anxiety and support students' numeracy literacy skills, besides that Mpaa Gopa can be one of the efforts to preserve local cultural wisdom, especially the Mbojo tribe. Cultural preservation in the form of traditional games indirectly makes the ethnomathematics method a mathematics learning based on a cultural approach.

SUGGESTION

In further research, we can use the results of the exploration of the ethnomathematics characteristics of the mpa'a gopa game to be implemented in the learning process in elementary schools.

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