Ethnomathematics: Exploring Traditional Games in Mathematics Learning

Lois Oinike Tambunan[1*)], Izwita Dewi[2], Lasker Pangarapan Sinaga[3]
[1,2,3]Universitas Negeri Medan
*)loistamb@gmail.com

Abstract
This study aims to examine ethnomathematics in traditional games, particularly among the Batak Toba ethnic group, where mathematical concepts such as geometry, number operations, relationships between lines, the concept of congruence, probability, number patterns, and speed are present. The traditional games analyzed in this study include *Marsitekka, Margala*, and *Pocca Piring.* This research employs a qualitative descriptive approach,where the subjects of this research are the three types of traditional games mentioned earlier. The data collection techniques used in this study include observation, field notes, and documentation. Based on this study, it was found that traditional games in ethnomathematics have different emphases in mathematical material. The game *Marsitekka* is more dominant in geometry topics such as Geometry, Probability Concept, Fractions, Counting, Number Patterns. The game *Margala* is dominant in Plane Figures, Number Operations, Relationships Between Lines, and Congruence Concept, while the game *Pocca Piring* is dominant in Geometry, Counting, and Speed. Based on the literature review conducted, traditional games in ethnomathematics can be developed as teaching materials in mathematics learning. Integrating traditional games into mathematics learning provides benefits by visualizing mathematical concepts in a tangible form, making it easier for students to understand mathematical learning.
Keywords: Ethnomathematics, Traditional Games, Mathematics Learning

Introduction

Indonesia has a rich cultural diversity, one of which is traditional games. These games have been enjoyed by society for generations; however, as time progresses, interest and enthusiasm for traditional games have declined. The advancement of technology has overshadowed the popularity of these games. The diminishing presence of traditional games among children is evident, as modern games have become increasingly prevalent in their daily lives (Tanjung & Siregar, 2021). Many children spend their time playing with gadgets or at PlayStation centers, and a significant number of them no longer recognize the names of traditional games—some are even completely unfamiliar with them.

Adults no longer introduce traditional games to the younger generation, open spaces for playing are becoming scarce, and traditional games are not included in the educational curriculum. This aligns with Husna (2021) those who argue that excessive gadget use leads to dependency, turning it into a daily habit. As a result, children become addicted to modern games, spending hours engaged in them, which is far from a trivial issue.

Traditional games carry cultural values that should be recognized and preserved by children. Through these games, children learn to socialize, interact with peers, build social relationships, communicate, and solve problems that arise in their interactions (Safitri, 2022). Traditional games are not only a source of entertainment but also serve as a means to instill cultural values and enhance cognitive and arithmetic skills. These games inherently incorporate mathematical concepts, allowing children to learn mathematics unconsciously while playing (Karina et al., 2021).

Several traditional games not only preserve cultural heritage but also offer educational benefits, including mathematics learning. During the learning process, students are expected to develop and apply mathematical concepts to real-life problems (Risdiyanti & Prahmana, 2018). However, a study conducted by the Programme for International Student Assessment (PISA) indicates that Indonesian students struggle to apply mathematical concepts in contextual problem-solving (Stacey, 2011). This challenge stems from the lack of integration between mathematics and cultural or daily activities in school curricula. Teachers often teach mathematics in an abstract manner, without linking it to students' real-life experiences, resulting in a limited understanding of mathematical concepts (Arisetyawan & Supriadi, 2020; Widodo et al., 2017).

Enhancing the quality of education is a fundamental factor in improving a nation's welfare. Therefore, it is crucial to explore, preserve, and develop Indonesia's cultural heritage. One approach that can be utilized is ethnomathematics in traditional games, which emphasizes that mathematical concepts naturally evolve within society. Ethnomathematics is an interdisciplinary field that examines the relationship between culture and mathematics (D'Ambrosio, 1985). It is defined as the various methods used by cultural groups or specific communities in applying mathematical concepts. In ethnomathematics, mathematical activities involve the process of abstracting real-life experiences into mathematical concepts and vice versa (Sarwoedi et al., 2018). Additionally, ethnomathematics explores how mathematics is intertwined with culture, traditions, and societal perspectives in managing and understanding mathematical knowledge.

The ethnomathematical approach in traditional games can bridge the gap between school mathematics and students' social and cultural lives. Integrating ethnomathematics into mathematics learning provides many benefits, students can understand geometry not only as an abstract concept, but also as part of everyday life (Pratama & Dahlan, 2025) .A study by (Merliza, 2021) found that traditional games played by the Lampung community

incorporate mathematical concepts such as numbers, plane and solid geometry, probability, distance, and speed, which provide students with opportunities to enhance their mathematical understanding. Furthermore, research by (Rusliah, 2016) revealed that the ethnomathematical approach in the traditional children's game "Ingkek-Ingkek" successfully introduced mathematical concepts such as number recognition, plane geometry, and probability in an engaging and enjoyable manner.

Ethnomathematics, as an approach that bridges mathematics and culture, offers significant opportunities to create more meaningful and relevant learning experiences for students (Sugiarni et al., 2025). From an ethnomathematical perspective, various forms of local mathematics are embedded within traditional games. To reintroduce and preserve these games, it is essential to identify and document the different types of traditional games that have been practiced by various communities, particularly those of the Batak Toba ethnic group. Mathematics learning can be connected to daily life activities, such as through traditional games. Contextual mathematics learning specifically integrates mathematics with real local culture, which is referred to as ethnomathematics. Ethnomathematics includes discussions on the language, values, behaviors, knowledge, and applications of cultural groups that are adapted within specific environments (Pratiwi & Pujiastuti, 2020). Mathematics and culture are inseparable aspects of everyday life. The Batak Toba community has a diverse range of traditional folk games, including Marsitekka, Margala, and Pocca Piring**.** *Marsitekka* is a popular children's game from the Batak tribe, usually played at school or in front of Batak homes. The game involves drawing several rectangular-shaped boxes on the ground. When the game begins, players must jump into the boxes, following the rule that their feet must not touch the lines or the outside of the boxes. *Margala* is a traditional Batak Toba game played by two teams, where players try to avoid being caught by the opposing team while moving through the drawn boxes on the ground. This game requires agility, speed, strategy, and teamwork. *Pocca Piring* is another traditional Batak Toba game originating from North Tapanuli Regency. It demands agility, teamwork, accuracy, and body balance. The equipment used in this game is quite simple: a piece of wood is used to draw a line approximately three meters away from a pile of broken plates, stones, or ceramics. Additionally, a small rubber ball is used to throw at the pile, aiming to knock it down.

Previous research has demonstrated that traditional games incorporate various mathematical principles. This finding has prompted researchers to conduct a literature

review on ethnomathematics in traditional games, specifically within the Batak Toba ethnic group. The findings from this literature study are expected to provide a strong foundation for future researchers interested in further exploring ethnomathematics in traditional games

Method

This research uses a qualitative descriptive approach. In line with this, the study describes the mathematical elements contained in traditional games of the Batak Toba ethnic group. Therefore, the focus of this research is on the traditional games Marsitekka, Margala, and Pocca Piring. The data collection techniques used in this study include observation, field notes, and documentation. The subjects of this research are the three types of traditional games mentioned earlier. Through this research, information will be obtained regarding the mathematical elements embedded in these traditional games. The data analysis method used in this study is triangulation. Triangulation is also defined as the process of verifying data through various sources, techniques, and timeframes (Mekarisce, 2020). The data analysis technique used in this study is a qualitative data analysis technique developed by Miles and Huberman, which includes the following steps: Data reduction is the process of selecting and abstracting raw data collected from the field. The reduced data provides a clearer picture of the observations. Next, data display involves organizing the reduced data in a way that presents information likely to lead to conclusions. After the data is displayed based on the results of data reduction, the next step is interpreting the data through data analysis.

In this research, the data collected through interviews, observations, and documentation about traditional games are reduced by selecting only the relevant information needed for the study. The results of data reduction reveal that the mathematical elements found in the Marsitekka, Margala, and Pocca Piring games include geometry, number patterns, relationships between lines, probability, congruence, and speed. After the data reduction stage, the next step is data presentation, where the results are illustrated by sketching the tools used in Marsitekka and Pocca Piring, the playing arenas, and the rules of the three traditional games. Then, the mathematical elements present in these games are explained in detail. Finally, after data reduction and presentation, conclusions are drawn to determine the mathematical elements found in Marsitekka, Margala, and Pocca Piring, whether from the game tools, playing arenas, or the rules of these games.

Results and Discussion

Based on the exploration of ethnomathematics in traditional games of the Batak Toba ethnic group, it has been found that various mathematical concepts are embedded in these games. These concepts include number operations, geometric shapes, the concept of congruence, counting probability, and number patterns. This study focuses on exploring two traditional Batak Toba games: *Marsitekka*, *Margala* and *Pocca Piring* as described below.

Table 1. Mathematical Concepts in Traditional Games of the Batak Toba Ethnic Group

No.	Game Name	School Mathematics Concepts
1.	Marsitekka	Geometry, Probability Concept, Fractions, Counting, Number Patterns
2.	Margala	Plane Figures, Number Operations, Relationships Between Lines, Congruence Concept
3.	Pocca Piring	Geometry, Counting, Speed

Next, the details of the game are as follows:

1. Tradisional Game Marsitekka

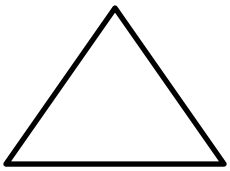
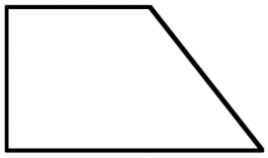
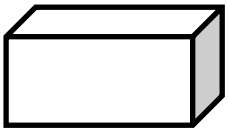
Marsitekka is a traditional game typically played in schoolyards or at home. It is commonly played by girls, with a minimum of two players, either individually or in teams. Marsitekka is not only an enjoyable game but also helps develop balance, concentration, and body coordination. To collect data for this study, the researcher conducted observations and interviews. The focus of the data collection process was on the equipment used in the game, the playing area, and the rules of Marsitekka.

Figure 1. Traditional Game Marsitekka

a. Tools in Marsitekka Game

This study explores the ethnomathematical aspects of the game by examining the shape of the gacuk (a game piece), the design of the playing area, and the game rules. The Tabak game incorporates mathematical elements that are closely related to concepts taught at the elementary school level. Overall, the ethnomathematical analysis of the Tabak game includes several mathematical concepts, namely geometric concepts, number concepts and fraction concepts. The geometric concept is evident in the gacuk, which has a square or rectangular flat surface. Additionally, the concept of three-dimensional shapes is reflected in the overall form of the gacuk, which resembles a cuboid.

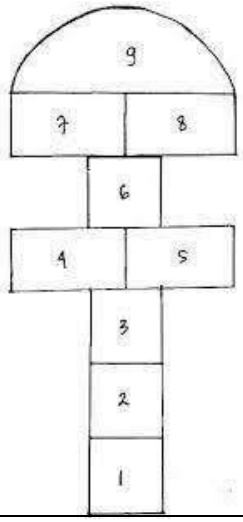
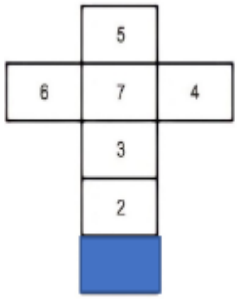
Table 2. Mathematical Concepts in the Marsitekka Game Equipment

No.	Image of the Equipment (Gacuk) and Sketch	Mathematical Concepts
1.	 	Equilateral Triangle
2.	 	Rectangle
3.	 	Isosceles Trapezoid
4.	 	Cuboid

b. Marsitekka Playing Arena

The marsitekka playing arena incorporates three mathematical concepts, including: plane figures, which can be observed in its shapes, such as squares, rectangles, and semi-circles, net diagrams concept, and line symmetry. These concepts are detailed in Table 3.

Table 3. Mathematical Concepts in the Marsitekka Playing Area

No.	Sketch of Game Arena	Mathematical Concept
1.		1. Square-shaped plane figures can be seen in numbers 1, 2, 3, and 6. 2. Rectangle-shaped plane figures appear in numbers 4, 5, 7, and 8. 3. Semi-circle-shaped plane figures are visible in number 9.
2.		1. Square-shaped plane figures are visible in all numbers. 2. Line symmetry can be seen in the plane figures beside it.
3.		1. Rectangle-shaped plane figures are visible in all numbers in the image beside. 2. If the blue-colored boxes are not used, a cuboid shape will be formed.

c. Rules of Marsitekka Game

The Marsitekka game also incorporates mathematical elements, such as counting and fractions. The counting concept is evident when a player throws the gacuk into a specific box and then hops sequentially through the other boxes using only one foot. During this process, the player can count the number of boxes they must pass. Additionally, counting is also applied at the end of the game when players count the number of stars they have earned to determine the winner. Here are the rules and how to play Marsitekka:

1) Draw several square boxes on the ground using a stick or another tool.
2) Prepare a flat stone or a smooth piece of ceramic.
3) The player throws the stone or ceramic piece into the first box and then hops through the following boxes.
4) Upon reaching the last box, the player returns to the first box to retrieve the thrown stone.
5) While hopping, the player must not step on the lines of the boxes.
6) The game requires balance and focus to avoid touching the lines.
7) If a player steps on a line, they are considered out, and the turn shifts to the next player.

The fraction concept in Marsitekka is reflected in the rule that players must not step on the box containing the gacuk. For example, in a playing area consisting of 7 equal-sized boxes, two of them are colored and contain the gacuk, as shown in Figure 1. This illustrates that the boxes that cannot be stepped on by the player represent a small portion of the total boxes in the playing area. The boxes that can be stepped on make up the remaining portion of the total boxes in the game. In terms of fractions, the boxes that must not be stepped on account for 2/7, while the boxes that can be stepped on make up 5/7.

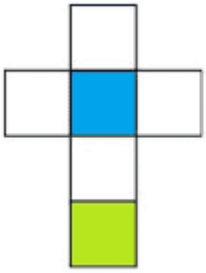


Figure 2. Marsitekka Playing Arena

The results of this exploration show that the Marsitekka game can be used in mathematics learning, both as a teaching medium relevant to daily life and as a source of real-life-based math problems. As explained by (Rudyanto, 2015) ethnomathematics can serve as a reference for teaching mathematical concepts and developing problems that are culturally relevant to students. By integrating cultural elements into learning, the learning environment is expected to become more engaging and meaningful, making it easier for students to understand mathematical concepts that are usually abstract (Muyassaroh & Sunaryati, 2021).

2. Margala Traditional Game

The Margala game is a traditional folk game of the Batak Toba people. This game reflects teamwork, unity, and mutual protection. Margala is a well-loved traditional game from the Batak region, enjoyed by children in the area and still played in several regions of North Sumatra today (Simanjuntak et al., 2023). In North Sumatra, many people are familiar with the Margala game, but different regions have their own names for it. Across various Batak Toba areas, the game is known by similar names. In the Batak Karo region, it is called *Galah Panjang*, while in Aceh, it is known as *Muen Galah*.

Margala is a team-based game played by two groups, each consisting of 4-5 members. The objective is to block opponents from crossing the lines to reach the final boundary, moving back and forth. To win, all team members must successfully pass through the designated playing area completely. The mathematical concepts present in the traditional Margala game include plane geometry, number operations, relationships between lines, and the concept of congruence. The following is a discussion of these mathematical concepts based on the objects studied by researchers, focusing on the playing field and the rules of the Margala game.

a. *Margala* Playing Arena

The *Margala* game is played on a rectangular field divided into six sections. This game incorporates mathematical concepts such as plane geometry, arithmetic operations, relationships between lines, and the concept of congruence. Below is a diagram of the geometric shapes found in the Margala playing arena, which consists of six interconnected squares.

Figure 3. Traditional Game Margala

The game arena of margala is a flat shape formed by six squares, as shown in the following picture.

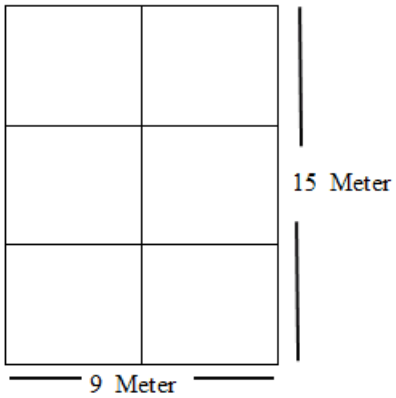


Figure 4. Shape of the Margala Playing Arena

In Figure 4, two geometric shapes form the Margala playing arena: rectangles and squares. According to (Iskandar, 2021), squares and rectangles are topics covered in mathematics. Number operations are also an element of the Margala game, where division and multiplication are applied in the process of constructing the playing arena. In Figure 2, the Margala playing field measures 15 m x 9 m and is divided into six equal sections, with the length split into three parts and the width into two parts (Rahmadani & Ananda, 2023).

Additionally, the concept of the relationship between lines is also found in the Margala game, particularly in the creation of its playing arena. The division or formation of the arena involves perpendicular intersecting lines and parallel lines, as shown in Figure 5 below.

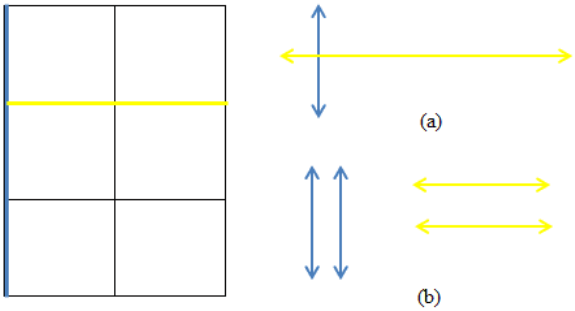


Figure 5. The Concept of Line Relationships: (a) Perpendicular Intersecting Lines; (b) Parallel Lines

A line is a geometric shape formed by moving points. According to Melati et al. (2024), a line consists of an infinite number of points that are very closely spaced. In the Margala game, the playing field demonstrates several line relationships, such as perpendicular intersecting lines and parallel lines. Two lines are said to intersect if they are on the same plane and meet at a single point. If their intersection forms a 90° angle, they are called perpendicular lines. Meanwhile, parallel lines are two lines in the same plane that will never meet, even if extended indefinitely.

Furthermore, the mathematical concept found in the Margala playing field includes the concept of congruence, as shown in Figure 6 below.

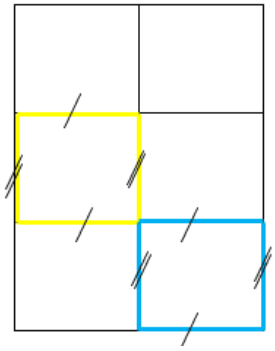


Figure 6. Concept of Congruence

In Figure 6, the Margala playing field consists of six squares of the same shape and size. The two colored squares at the top have 90° angles and identical side lengths and angles, making them congruent. According to (Siagian et al., 2022) two plane figures are considered congruent if all corresponding sides are equal in length and all corresponding angles are equal in measure.

b. Rules of *Margala* Game

Rules of the Margala Game:

1) The game is played in groups consisting of two teams.
2) Each team consists of 3-5 members, divided into an attacking team and a defending team.

3) The defending team stands on designated lines, while the attacking team tries to enter the guarded area.
4) The attackers attempt to pass through by running while avoiding contact with the defenders. If an attacker is touched by a defender, they lose, and their role is switched with the defending team.
5) If an attacker successfully passes through, they earn points and return to the starting position to play another round.

By incorporating ethnomathematics into the traditional Margala game, students can understand various mathematical concepts, including plane figures such as squares and rectangles, number operations, relationships between lines, and the concept of congruence.

3. Traditional Game Pocca Piring

Pocca Piring is a traditional game originating from the Batak Toba ethnic group. This game requires agility, teamwork, accuracy, and body balance. Within Pocca Piring, several mathematical concepts can be identified, including plane geometry, solid geometry, counting, and speed. This study focuses on specific aspects of the game, particularly the playing equipment and the game rules. The following sections discuss the key objects analyzed in this research.

Figure 7. Traditional Game Pocca Piring

a. Playing Equipment Pocca Piring

This game consists of two pieces of equipment: broken roof tiles and a ball, which is used to knock down the stacked pieces of roof tiles.

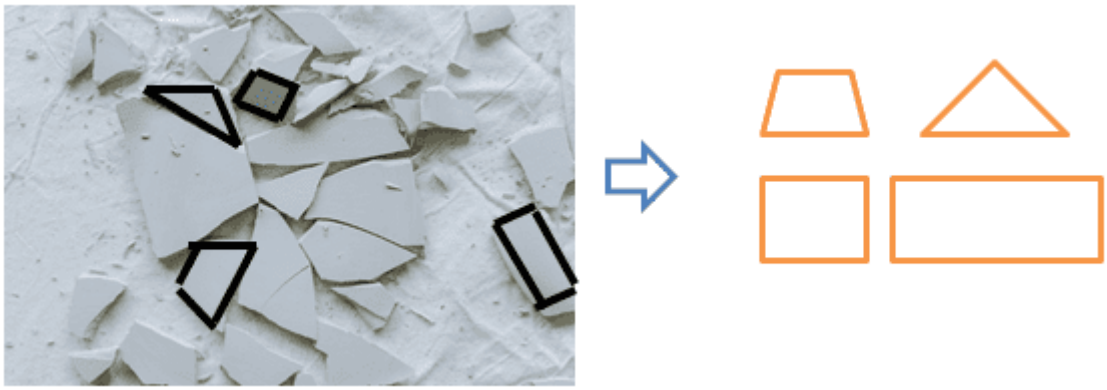


Figure 8. Broken roof tiles take the shape of geometric plane figures.

In Figure 8, the broken roof tiles incorporate mathematical elements in geometric forms, particularly the concept of plane figures. These fragments resemble various plane shapes such as triangles, squares, and isosceles trapezoids. The triangle shapes include right triangles, which have three sides and one 90° angle; equilateral triangles, which have three equal sides and three equal angles of 60°; and isosceles triangles, which have three sides with two sides of equal length. The square-shaped fragments display characteristics such as four equal sides, four equal angles of 90°, and four lines of reflective symmetry and rotational symmetry. The rectangular fragments exhibit four sides, with opposite sides being equal in length, four right angles (90°), two lines of reflective symmetry and rotational symmetry, and two equal diagonals. Additionally, some fragments take the shape of isosceles trapezoids, which have one pair of parallel sides, equal-length non-parallel sides, and two pairs of base angles that are equal.

The second tool used in this game is a small rubber ball. The mathematical concept related to this tool is the three-dimensional shape of a sphere. Below is an image illustrating the tools used in the Pocca Piring game.

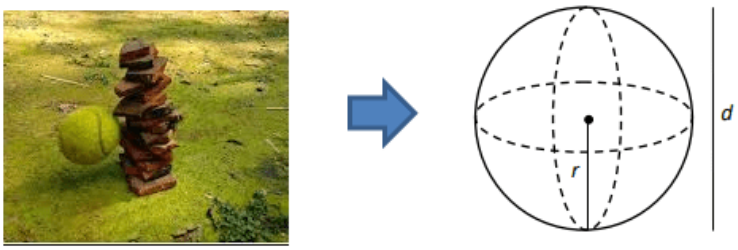


Figure 9. Small Rubber Ball and Sketch

From the image above, it can be observed that the model in Image 2 represents a three-dimensional shape, specifically a sphere. The characteristics of a sphere include having one surface, one center point, no vertices, an infinite number of radii, and a diameter that is twice the length of the radius.

b. Rules of Pocca Piring Game

In the Pocca Piring game, the concept of mathematics, particularly speed, is applied. This is evident in the game rules, where the playing team must quickly arrange the broken tiles while avoiding the thrown ball from the guarding team. The formula for calculating speed is speed equals distance traveled divided by time.

The rules of the Pocca Piring game are as follows:

1) The number of participants must be even so they can be equally divided into two teams.
2) One player from each team is chosen as the leader based on their ability to skillfully throw the ball at the stack of broken tiles.
3) The tiles must be arranged within a designated square drawn beforehand, serving as the placement area.
4) A decision is made on which team will act as the throwers and which will be the defenders of the stacked tiles.
5) The game begins when the attacking team throws the ball to knock down the stacked tiles. The attacking team must then quickly rearrange the tiles while avoiding being hit by the ball thrown by the defending team.
6) If a member of the attacking team is hit by the ball before all the tiles are successfully stacked, the game ends, and the defending team wins. Conversely, if the attacking team successfully arranges all the tiles, they are declared the winners. By integrating ethnomathematics into the traditional Pocca Piring game, students can better understand various mathematical concepts, including two-dimensional and three-dimensional shapes, counting when arranging the broken tiles, and speed.

Conclusion and Suggestion

Based on the research findings, traditional games of the Batak Toba ethnic group, specifically Marsitekka, Margala, and Pocca Piring, contain elements of ethnomathematics, as seen from the mathematical concepts embedded within them. The mathematical elements found in the Marsitekka game include geometry, probability concepts, fractions, counting,

and number patterns. In the Margala game, the mathematical elements include geometry, number operations, relationships between lines, and the concept of congruence. Meanwhile, in the Pocca Piring game, the mathematical elements include geometry, counting, and speed.

Contextual and meaningful mathematics learning can be realized through the integration of traditional games using an ethnomathematical approach. One example of this implementation is incorporating traditional games such as Marsitekka, Margala, and Pocca Piring into the learning process. These games originate from local cultures and have strong potential to introduce and reinforce basic mathematical concepts among students. Marsitekka, a game typically played by arranging patterns on the ground using stones or other objects, can be utilized to introduce geometry concepts, particularly two-dimensional and three-dimensional shapes. In this activity, students observe and create shapes such as squares, triangles, and rectangles, and then discuss their characteristics, perimeters, and areas. By directly interacting with physical objects and engaging in play, students can more easily grasp spatial relationships and geometric properties.

Meanwhile, the game Margala, which resembles hopscotch, focuses on sequences and strategies for jumping between ground-drawn boxes. This game can be developed to practice arithmetic operations and number patterns. Each box in the game can be filled with math problems that students must solve before moving on. This activity not only sharpens their calculation skills but also encourages logical thinking and decision-making. The game Pocca Piring, on the other hand, can be integrated into the learning of statistics and measurement. In this game, students throw an object (such as a small plate or flat stone) toward a target, then measure and record the distance or accuracy of the throws. The results are collected as data and analyzed together using concepts such as mean, maximum and minimum values, and presented in tables or charts. Through this activity, students engage in hands-on learning while understanding the importance of data processing and interpretation in everyday life. Integrating these three traditional games into mathematics lessons not only makes learning more enjoyable and interactive but also connects students to their local culture. In this way, mathematics learning becomes more contextual, relevant, and appreciative of the local wisdom that surrounds them. This approach aligns with the spirit of the Merdeka Curriculum, which emphasizes experience-based and culturally responsive learning. Consistent with the research (Pramesta & Mariana, 2022), this research proves that by using hopscotch game in the learning process can increase student's understanding the

characteristics of plane figure without memorizing because students feel enthusiastic and show an active response in learning.

Learning mathematics through the integration of ethnomathematics is highly beneficial, as it not only helps instill cultural values in students but also makes learning more enjoyable. This research highlights the potential for integrating ethnomathematics into traditional games, particularly among the Batak Toba ethnic group, to enhance mathematics education in schools. Therefore, it is recommended to conduct research using an ethnomathematical approach on traditional games from other ethnic groups or cultures more broadly, with the aim of examining how culture influences mathematics learning.

References

Arisetyawan, A., & Supriadi, S. (2020). Ethnomathematics study in calendar system of Baduy tribe. *Ethnomathematics Journal*, *1*(1), 25–29. https://doi.org/10.21831/ej.v1i1.28013

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics*.

Hendra Erik Rudyanto, Apri Kartikasari HS, D. (2015). ETNOMATEMATIKA BUDAYA JAWA : INOVASI PEMBELAJARAN MATEMATIKA DI SEKOLAH DASAR. *Jurnal Bidang Pendidikan Dasar (JBPD)*, *3*(2), 1–6.

Husna, N. P. R. A. F. H. (2021). *PERBEDAAN KECENDERUNGAN ADIKSI GADGET SISWA SEKOLAH DASAR DITINJAU DARI JENIS KELAMIN*. *19*, 65–78.

Iskandar, D. (2021). Etnomatika Pada Permainan Setatak Sebagai Bahan Pembelajaran Bangun Datar (Lingkaran, Persegi dan Persegi Panjang). *Jurnal Peka*, *4*(2), 52–56. https://doi.org/10.37150/jp.v4i2.847

Karina, C. D., U.S, S., & L.A, S. (2021). Eksplorasi Etnomatematika Pada Permainan Tradisional Indonesia Komunitas TGR (Traditional Games Return). *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(2), 1599–1615. https://doi.org/10.31004/cendekia.v5i2.674

Mekarisce, A. A. (2020). Teknik Pemeriksaan Keabsahan Data pada Penelitian Kualitatif di Bidang Kesehatan Masyarakat. *JURNAL ILMIAH KESEHATAN MASYARAKAT : Media Komunikasi Komunitas Kesehatan Masyarakat*, *12*(3), 145–151. https://doi.org/10.52022/jikm.v12i3.102

Merliza, P. (2021). Studi Etnomatematika: Eksplorasi Konsep Matematika pada Permainan Tradisional Provinsi Lampung. *Suska Journal of Mathematics Education*, *7*(1), 21. https://doi.org/10.24014/sjme.v7i1.12537

Muyassaroh, I., & Sunaryati, T. (2021). Etnomatematika: Strategi Melahirkan Generasi Literat Matematika Melalui Budaya Lokal Yogyakarta. *Dikoda: Jurnal Pendidikan Sekolah Dasar*, *2*(01), 1–12. https://doi.org/10.37366/jpgsd.v2i01.810

Pramesta, S. P. E., & Mariana, N. (2022). Implementasi Rme Berbasis Etnomatematika Materi Ciri-Ciri Bangun Datar Menggunakan Permainan Engklek. *Jurnal Review Pendidikan Dasar : Jurnal Kajian Pendidikan Dan Hasil Penelitian*, *8*(2), 111–120. https://doi.org/10.26740/jrpd.v8n2.p111-120

Pratama, E. Y., & Dahlan, J. A. (2025). Ethnomathematics : Exploring Lamban Pesagi to

Instill the Concept of Plane Figures. *MATHEMA JOURNAL*, *7*(1), 137–147.

Pratiwi, J. W., & Pujiastuti, H. (2020). Eksplorasi Etnomatematika pada Permainan Tradisional Kelereng. *Jurnal Pendidikan Matematika Raflesia*, *5*(2), 1–12. https://doi.org/10.33369/jpmr.v5i2.11405

Rahmadani, A., & Ananda, R. (2023). Belajar Matematika Dengan PermainanTradisional Galasin. *Jurnal Pendidikan Matematika*, *7*(1), 297–313. https://doi.org/10.31100/histogram.v7i1.2546

Risdiyanti, I., & Prahmana, R. C. I. (2018). Etnomatematika: Eksplorasi dalam Permainan Tradisional Jawa. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, *2*(1), 1. https://doi.org/10.31331/medives.v2i1.562

Rusliah, N. (2016). Pendekatan Etnomatematika dalam Permainan Tradisional Anak di Wilayah Kerapatan Adat Koto Tengah Kota Sungai Penuh Propinsi Jambi. *Proceedings of The International Conference on University-Community Engagement*, 715–726.

Safitri, S. T. (2022). Etnomatematika pada Permainan Tradisional Boy-Boyan. *Jurnal Pendidikan Matematika Undiksha*, *13*(2), 86–90.

Sarwoedi, Marinka, D. O., Febriani, P., & Wirne, I. N. (2018). Efektifitas etnomatematika dalam meningkatkan kemampuan pemahaman matematika siswa. *Jurnal Pendidikan Matematika Raflesia*, *03*(02), 171–176.

Siagian, T. A., Harahap, S. Y., & ... (2022). Analisis Tingkat Kognitif Soal Kesebangunan Dan Kekongruenan Pada Lkpd Terbitan Viva Pakarindo Berdasarkan Taksonomi Bloom …. *Jurnal Pendidikan …*, *07*(03), 50–64.

Stacey, K. (2011). The PISA view of mathematical literacy in Indonesia. *Journal on Mathematics Education*, *2*(2), 95–126. https://doi.org/10.22342/jme.2.2.746.95-126

Sugiarni, R., Sari, W., Adetia, E., & Azmy, D. S. (2025). Exploration of Ethnomathematics in Batik Pandanwangi as a Source of Contextual Learning. *MATHEMA JOURNAL*, *7*(1), 266–275.

Tanjung, T. H., & Siregar, N. N. (2021). Analisis Permainan Tradisional Yang Telah Hilang Dari Peredaran Di Kampung AFD IV Sei Kebara. *Jurnal Pusat Studi Pendidikan Rakyat*, *1*(1), 8–13.

Widodo, A., Purnami, A. S., Charitas, R., & Prahmana, I. (2017). *Team Accelerated Instruction , Initials , and Problem-Solves Ability i n Junior High School*. *1*(2), 193–204.