Skalosia: International Journal on Mathematics Education
Vol. 1, No. 1, Mei 2025
e-ISSN XXXX-XXXX
http://dx.doi.org/10.309xx/skalosia.v1i1.001

ORIGINAL PAPER

Building Numerical Skills in Ethnomathematics Learning in Engklek Games

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Accepted: June 11, 2025

Abstract
This research aims to explore the numerical abilities of elementary school students through ethnomathematics learning in the engklek game. Ethnomathematics is a learning approach that integrates cultural and mathematical elements to improve understanding of mathematical concepts. Engklek, as one of Indonesia's traditional games, has the potential to be used as a fun and contextual learning medium for students. Through a literature review, this research analyses various relevant literature to explore the relationship between the crank game and students' numerical abilities. The research results show that the integration of engklek games in mathematics learning can increase students' learning motivation, facilitate understanding of numerical concepts, and develop critical thinking and logistics skills. These findings have an impact on developing a more inclusive and contextual curriculum by incorporating cultural elements in mathematics learning at the elementary school level.

Keywords:
Numerical Ability
Ethnomathematics
Hopscotch Game

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INTRODUCTION

Mathematics is an important subject in education because its application can be found in almost all aspects of daily life. (Suryani et al., 2024). According to Glenn and Robert (Rahman & Saputra, 2022), mathematics is a science that studies theories about shapes, possibilities, and various interrelated theories. To emphasise how important it is for every student to learn mathematics, it is necessary to understand the concept of learning in order to increase success in mathematics. Along with the development of the times, the curriculum has also changed. The Merdeka Curriculum is a continuation of the 2013 Curriculum. This curriculum is here to answer the challenges of learning in preparing a generation that is insightful, independent, cares about the environment, and is useful for others (Salma et al., 2023). Mathematics is taught at all levels of formal education because of its importance and great contribution to various aspects of life. For students, Mathematics is often considered a difficult, uninteresting, and confusing subject. One method to make Mathematics more interesting and not boring is to include traditional games in it (Jayanti et al., 2020).

One of the traditional games that is now rarely played by children is "engklek". The game of "engklek" involves the use of objects and numbers, as well as agreed-upon rules on how to play it (Darliani Sosyawati, 2020). The traditional game of engklek is one of the games played outside the home and is able to increase students' interest. How to play it is to jump on a flat surface made on the ground in the shape of a box, then jump with one leg lifted from one box to another. This game is usually

played individually or in groups, generally played by girls, although boys also often participate. During the game, children can also learn (Widyastuti et al., 2020).

The traditional game of hopscotch can be used as a means of instructing mathematics. 2 to 5 people usually play this game (Wulansari & Wiryanto, 2023). The use of hopscotch games in mathematics has been proven to produce good effects, as found in previous studies. Other studies have also shown that hopscotch games can improve mathematics achievement (Widyastuti et al., 2020). In addition to having a positive impact on mathematics achievement in place value and spatial geometry materials, this game also increases the numerical interest of elementary school students (Wulansari & Wiryanto, 2023)

Numerical intelligence is mathematical intelligence and logical reasoning, which includes the disciplines of mathematics, classifying, grouping data, and reasoning conceptually to find relationships between things (Nisak & Nur Afifah, 2019). A person with high numerical intelligence generally has a systematic mindset in solving problems, can filter and organise information, and perform complex calculations.(Warmi & Adirakasiwi, 2018). The level of intelligence of each child is different; some have high intelligence, while others have low intelligence. Students with high intelligence usually have superior mathematical logic, while students with less intelligence tend to have less mathematical logic (Darmawati & Widyasari, 2022).

Numerical ability is the ability to think and organise information to solve problems involving numbers. This competence includes skills in addition, subtraction, multiplication, and division. Numerical ability can be improved by continuous practice and trying various calculations until finally finding a new method of calculating numbers (Lestari, 2019). Numerical ability can be measured through speed tests designed to measure basic arithmetic skills. Evaluation of numerical ability includes the ability to understand number relationships and solve problems related to understanding number concepts. Every numerical test includes the operations of adding, subtracting, dividing, or multiplying numbers. Even the most conceptual tests use the basic principles of easy methods in processing numbers. This shows that all numerical ability tests include basic arithmetic operations, namely addition, subtraction, multiplication, and division (Noviarti; Utami & Prihatiningtyas, 2020). Numerical skills are not only obtained in classroom teaching and learning activities, but can also be obtained through play activities such as games that have cultural elements (Andriyani et al., 2023).

Culture and mathematics are closely related, making mathematics more relevant through ethnomathematics (Darmawati & Widyasari, 2022). Ethnomathematics is one method that facilitates understanding mathematics. The relationship between culture and mathematics, and vice versa, is known as ethnomathematics (Noviarti, Utami & Prihatiningtyas, 2020). In order for children to be more familiar with mathematics, the community, especially students, can learn mathematical ideas from culture through ethnomathematics, especially through the traditional game of hopscotch. In addition, materials related to mathematical concepts through hopscotch can be studied in mathematics education (Wahyuningsih & Astuti, 2023). Other research also reveals that hopscotch games based on ethnomathematics are able to improve the critical thinking skills of elementary school students (Fatonah & Naemah, 2022).

METHOD

The method used by the author in this article is a literature review. A literature review is a research conducted by collecting, reviewing, and analysing several kinds of literature that are relevant to the topic discussed. The literature review research method used in the article aims to gain an in-depth understanding of the topic being studied through the analysis of relevant literature. A literature review was chosen as a research method because it allows researchers to identify, collect, and evaluate various existing sources related to the topic discussed. By using this method, researchers can compile a

comprehensive synthesis of information, which not only enriches theoretical knowledge but also provides a strong foundation for further research.

The first step in this literature review is to identify relevant literature sources. Researchers use various academic databases, such as Google Scholar, to search for journal articles and conferences related to the research topic. The keywords used in the search are adjusted to the main topic and subtopics that are the focus of the research. After collecting relevant literature, researchers make a selection based on predetermined inclusion and exclusion criteria, such as relevance, quality, and publication date, to ensure that only the most valid and up-to-date sources are used in this study.

The next stage is the analysis and synthesis of the selected literature. The researcher reads and examines each source carefully, then notes important information and key findings related to the research question. The data obtained is then critically analyzed to identify patterns, trends, and gaps in existing research. The results of this analysis are arranged in a structured narrative form, which combines various perspectives and findings from diverse literature. Thus, this literature review not only collects existing information but also provides interpretation and critical assessment that helps form a more holistic understanding of the research topic.

RESULTS & DISCUSSION

Results

Ethnomathematics

Some students still consider mathematics a difficult, scary, and boring subject because they only see it as an activity of calculating, playing with formulas, and confusing numbers (Pusvita et al., 2019). Mathematics is also seen as a subject that only needs to be studied, even though mathematics is actually applied in everyday life (Pratiwi & Heni, 2020). To change students' views that mathematics is a difficult subject, educators should include the history of mathematics as part of the learning process (Widada, Herawaty, et al., 2020).

The history of mathematics is the study of the early discoveries of mathematics, including the notation and steps used in the past (Saraswati et al., 2020). This study also helps to understand the mathematical concepts and the reasons behind their existence (Warmi & Adirakasiwi, 2018). Unfortunately, many students are given mathematics systematically without knowing the origin and creator of the concept. Here are the functions of the history of mathematics in learning: 1) Provide a basis for obtaining diverse and in-depth knowledge, 2) Provide insight into how and why mathematical concepts develop, and 3) Strengthen students' interest in learning mathematics (Lubis & Widada, 2020). These functions will run optimally if educators are able to utilize the history of mathematics in teaching. One of the best ways to utilise it is to integrate it with existing cultural elements (Widada, Efendi et al., 2020).

Culture is something that cannot be avoided because, through culture, a group becomes united and various manifestations (Jumri & Murdiana, 2019). Culture is also defined as habits that contain important values that are passed down from generation to generation (Surmiyanti et al., 2021). Culture is the basis of educational philosophy, while education aims to create individuals who have culture (Herawaty et al., 2018). The philosophy of mathematics aims to contribute to culture and mental development and to spread knowledge that is useful for life (Surmiyanti et al., 2021).

D'Ambrosio, a Brazilian mathematician 1977, first introduced the word ethnomathematics. Initially, ethnomathematics was strongly associated with backward and illiterate communities, even people who had never studied mathematics (Rawani, 2022). In terms of language, the word "ethno" has a broad meaning that refers to the socio-cultural context as well as language, behavior, myths, and symbols. The word "mathema" means to explain, understand, and carry out activities such as coding, measuring, classifying, concluding, and modelling. The word "tics" comes from techne, which has the

same meaning as technique (Ajmain et al., 2020). Ethnomathematics is the science of how mathematics and culture relate to each other. In addition to mathematics, ethnomathematics also examines the cultural values contained therein. Ethnomathematics is very important because it has mathematical aspects that educators can use as a teaching resource (Wahyuningsih & Astuti, 2023). According to Yanuar (Ramadani et al., 2020), several things are studied in ethnomathematics, namely: 1) Existing symbols, concepts, principles, and mathematical skills, 2) Differences or similarities regarding something mathematical between one community group and another, 3) Something specific that exists in a particular group, such as ways of thinking, attitudes, language, and other things related to mathematics, and 4) Various aspects of community life related to mathematics, such as: a) Financial literacy and economic awareness, b) Social justice, and c) Cultural awareness.

Hopscotch Game

The word "game" in the Great Dictionary of the Indonesian Language comes from the word "*main*," which also means playing or doing actions, either using or without tools (Darmawati & Widyasari, 2022). In contrast, the word "traditional" comes from "tradition," which refers to customs that are passed down from generation to generation. In Indonesia, traditional games will continue to develop (Surmiyanti et al., 2021). Traditional games are activities that are carried out voluntarily, provide happiness and a pleasant atmosphere, and follow rules that are mutually agreed upon (Nur & Asdana, 2020). Traditional games are entertaining, easy-to-play games that are passed down from generation to generation as part of the national culture (Arifin, 2021). In addition to being a fun activity that can help children develop character and skills, traditional games are something that children genuinely enjoy (Wahyuningsih & Astuti, 2023).

Traditional games are fun and easy-to-play games that have been passed down from one generation to the next as part of the culture and spread throughout Indonesia (Darmawati & Widyasari, 2022). In addition to being a fun activity that can help children develop character and cognitive abilities, this game is also very popular with children (Wahyuningsih & Astuti, 2023). There are several benefits of this traditional game, including: 1) Traditional games generally use media that is available in the environment without having to buy it, so this can sharpen children's imagination and creativity. 2) Traditional games involve many members during the game so that children can interact with their peers and practice communication and social skills. 3) This game also contains moral values, namely togetherness, honesty, open-mindedness, discipline, the drive to win, and obedience to the rules (Didik et al., 2023)

One of the traditional games that also has a numerical content is the Engklek game. Engklek is a traditional game that is famous in Indonesia. This game involves a group of players who jump over a sequence of columns arranged in a certain pattern using one foot. The name "engklek" itself comes from Javanese, namely "klek", which means jumping. This game is known by different terms in other areas, such as "tuit-tuit" and "sundamanda" (Febrianty et al., 2023). This game is a game where players arrange objects in the form of flat areas on open ground (Darliani Sosyawati, 2020). After several boxes are made, players can use one or two hands to manipulate objects by moving their feet from one box to another (Khadijah et al., 2024). Therefore, researchers explain that the hopscotch game is one of the most effective games for improving numerical abilities in children (Lorena et al., 2020).

In hopscotch, players must jump from one square to the next using one foot; each player must have a hanger, which is usually made of broken roof tiles or ceramics, as a marker for areas that must not be stepped on and as identification of ownership of the area (Naitili & Nitte, 2023). Several rules and procedures must be followed in the game of hopscotch (Khadijah et al., 2024). The rules include: 1) Create a picture of the tiles to be played, 2) Has a pedestal as a marker for plots that cannot be stepped on, 3) Hompimpa to determine the playing order, 4) The first person places the hook on the first square, then jumps over it using one leg without stepping on a patch that has a hole in it, and 5) When returning to the place of origin, the gancu is thrown into the starting plot until the final plot

Numerical Concepts in Engklek Games

1. Hopscotch

According to research conducted by Ningsih et al., it is known that the game of hopscotch contains several mathematical concepts, including geometry (flat shapes), counting, and probability. These mathematical concepts can be seen in the shape of the hopscotch square and the pattern of the players (Maulida, 2020). Based on research conducted by Nazla R at SDN Lebaksiuh, the hopscotch game contains mathematical ideas in the form of flat geometry, as shown in Figures 1 and 2 (Khoerunnissa et al., 2023).

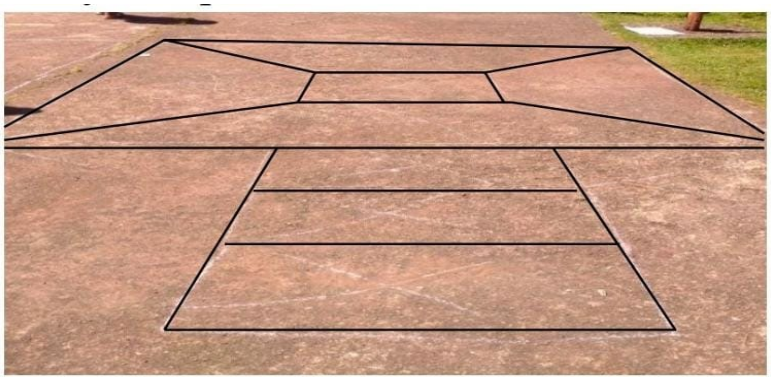

Figure 1. Hopscotch

Figure 2. Hopscotch

Figures 1 and 2 show that in the game of hopscotch, there are various geometric shapes, namely: (1) square, (2) rectangle, (3) trapezoid, and (4) semicircle. Without realising it, these flat shapes often appear in the game of hopscotch. They can even be used as a learning tool to improve mathematical knowledge and remind you of the material related to the game of hopscotch. Figure 3 shows the use of gaco in the game of hopscotch. Based on the gancu shapes seen in Figure 3, there are flat shapes in the form of triangles, pentagons, and trapezoids. Some students accidentally took gancu, which had a shape like a flat shape, but some made gancu with various shapes according to their wishes, not limited to just flat shapes.

Figure 3. Engklek Hook

According to Jonathan (Tambunan & Simanjuntak, 2021) in his research, there are several types of hopscotch games, including:

a. Common Hopper

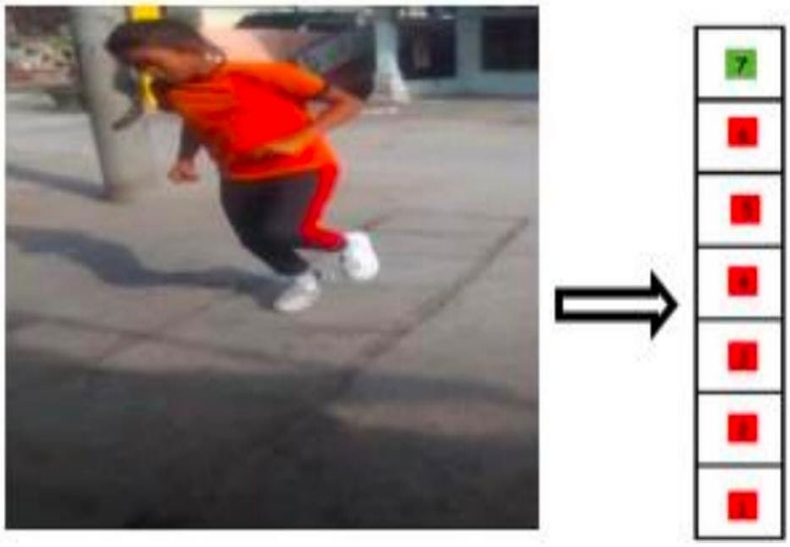

Figure 4. Ordinary Hopper

This game is a type that is often played. To play, one must jump with one foot on boxes numbered 1-6, and two feet on box number 7. Each child must take the gancu before the gancu occupies the box, then jump on the box with the gancu in it. After leaving the area, the player throws the pot into the next box, which is one level higher than the previous box. In this game, players are not allowed to step on the boundary line, and the ball they throw must land in the target box. If they break the rules, they cannot continue the game and are replaced by the next person in turn(Tambunan & Simanjuntak, 2021). In this ordinary hopscotch, there are flat shapes that are arranged into hopscotch squares. The flat shapes are rectangles (Serepinah & Nurhasanah, 2023), which have the formula:

Area of a Square = $p \times l$, Perimeter of a Square = $2\ p + l$

b. Mountain Hopper

Figure 5. Mountain Hoppers

Engklek is shaped like a mountain and consists of 9 squares. On the squares, there is a semicircle where players can take a short break when it is their turn to play. In addition, there are single squares that must be jumped over with one foot and overlapping squares that must be jumped over using each foot on one square at the same time (Annisa et al., 2020). In this mountain hopscotch, there are flat shapes that form the hopscotch square. These flat shapes are a square, a rectangle, and a semicircle. The formula for each of these flat shapes is:

Area of Square = $s \times s$, Perimeter of Square = $4 \times s$

Area of Rectangle = $p \times l$, Perimeter of Rectangle = $2\ (p + l)$

Area of a Semicircle = $\frac{1}{2} \times \pi \times r^2$, Circumference of a Semicircle = $\pi \times r$

c. Helicopter Hopper

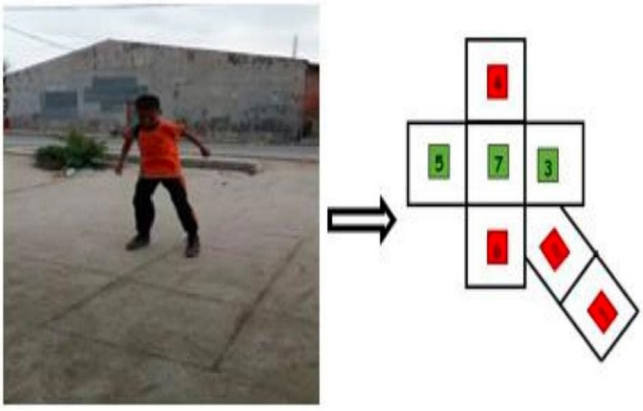

Figure 6. Helicopter Hopper

In this type, the player jumps in each box following the sequence as in Figure 2. In the red area, the player jumps using one foot, while in the green area, the player jumps using two feet, as in Figure 6. As in a normal crank, the player must take the gancu when playing and then throw it into the next box. In the game, players are not allowed to step on the game dividing line, and the ball thrown must be right in the target area. If they break the rules, they cannot continue the game and will be replaced by the next person in turn (Tambunan & Simanjuntak, 2021). In this helicopter hopscotch, there are flat shapes

arranged into hopscotch squares. These flat shapes are squares and rectangles. The formula for each of these flat shapes is:

Area of Square = s x s, Perimeter of Square = 4 x s

Area of Rectangle = $p \times l$, Perimeter of Rectangle = 2 (p+l)

d. Zinc Hopper

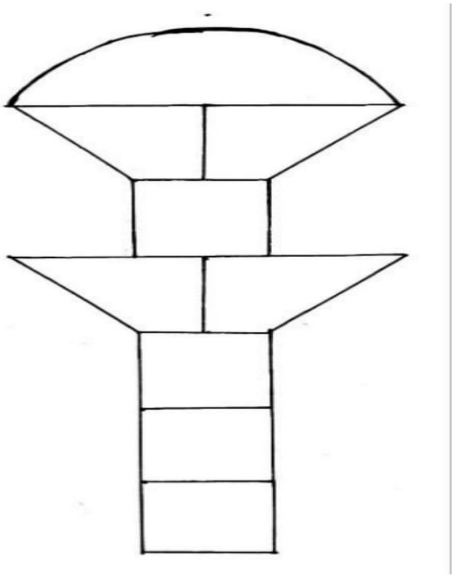

Figure 7. Zinc Hopper

Engklek seng is a traditional Indonesian game played on the ground or floor using a grid of boxes. Players use broken roof tiles or other small objects called 'gancu' as playing tools. To play, players throw the gancu at the first box and then jump using one foot from one box to another, avoiding the boxes containing the gaco. After passing through all the boxes, players stop at the end and turn around, picking up the gaco on their way back. The player who completes all stages without error wins the game. Engklek seng tests the balance, accuracy, and jumping skills of its players. In this engklek seng, there are flat shapes arranged into engklek squares (Darmawati & Widyasari, 2022). These shapes are isosceles trapezoid, right trapezoid, and semicircle, and square. The formula for each of these plane shapes is:

Area of an Isosceles Trapezoid = ½$(a + b)\times t$, Perimeter = $AB + BC + CD + AD$

Area of Right Trapezoid =½$(a + b)\times t$, $Keliling = AB + BC + CD + AD$

Area of a Semicircle = ½ $\times \pi \times r^2$, $Keliling = \pi \times r$

Area of Square = $s \times s$, Perimeter = 4 $\times s$

2. Elements of Chance in the Game of Engklek

According to research findings, opportunities occur to players. If there are three players in the first, second, and third order, then an element of opportunity is found when determining the order of the players (Ajmain et al., 2020). Suppose A, B, and C are playing, then they use hompimpa to determine the pattern of the playing order (Taskiyah & Widyastuti, 2021). By utilizing the permutation formula, the number of game step sequences is calculated, namely:

$$P_r = \frac{n!}{(n-r)!}$$

3. Elements of Counting

There is a mathematical concept in the game of hopscotch. This is evident in the pattern of squares passed during the game. Figure 9 shows an example of a mathematical concept in the game of hopscotch (Gita & Heni, 2020). The plots that players will go through include 1, 2, 3, 4, 5, 6, 7, 8, 9, then return to 8, 7, and so on until they reach plot 1.

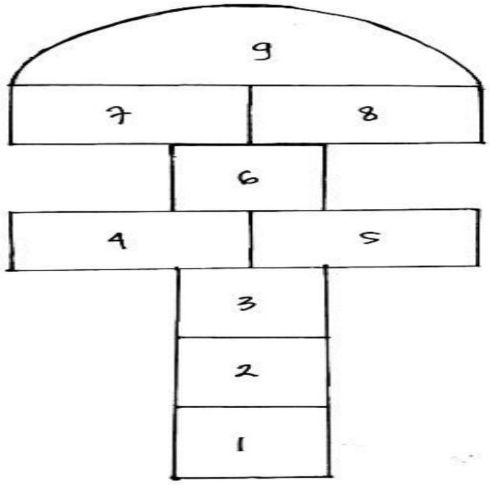

Figure 9. Illustration of Counting on Engklek Plots

Discussion

This study shows that ethnomathematics in the game of hopscotch contains various mathematical concepts such as geometry, calculation, and probability. This understanding is obtained through an in-depth analysis of the cultural and mathematical aspects contained in the game of hopscotch, as well as a literature review that supports these findings.

First, the game of hopscotch involves a pattern of tiles that players must pass through, which reflects the concept of geometry in the form of flat shapes. Each tile in the hopscotch game has a certain shape and size that players must pass through in a certain order, creating a pattern that can be analyzed mathematically. This pattern not only provides an understanding of geometric shapes but also teaches players about sequence and spatial logic. In addition, the calculation element in this game is seen from the number of squares and steps that players must take. Players must calculate their steps precisely to reach the goal of the game without stepping on squares that have gaco. This reflects the use of calculation and strategy in the game, which teaches basic mathematical concepts such as addition and subtraction in a fun and interactive context.

Furthermore, the element of chance in this game is also very clear. Each player must throw the gaco to the right square before continuing the game. Success in throwing the gaco to the desired square involves elements of probability and luck, which are integral parts of the concept of chance in mathematics. The results of this study are also supported by a literature review, which shows that integrating cultural elements in the form of traditional games in the mathematics learning process can optimise students' interest and understanding of the mathematical concepts presented. Thus, the hopscotch game not only functions as a means of recreation but also as an effective learning medium to introduce basic mathematical concepts to children.

Overall, the findings of this study underline the importance of using an ethnomathematics approach in mathematics learning. This approach not only makes learning more interesting and relevant

for students but also helps them understand and apply mathematical concepts in the context of everyday life. Through the integration of traditional games such as hopscotch, students can learn mathematics more naturally and enjoyably, which in turn can improve their learning outcomes and interest in the subject.

CONCLUSION

Based on the results and discussion, the author concludes that ethnomathematics in the traditional game of English contains mathematical concepts such as geometry (flat shapes), calculation, and probability. These concepts are reflected in the shape of the squares and game patterns. In the game of engklek, there are various shapes, sizes, and numbers of squares containing flat shapes and involving calculations. In addition, there are mathematical elements related to the number and pattern of the sequence of engklek players, which also involve the concepts of calculation and probability. Furthermore, the shape of the squares in the game of engklek also includes elements of flat shapes. Although children may not know it clearly, traditional games such as engklek can make it easier for them to learn mathematical concepts that are considered difficult.

REFERENCES

Ajmain, Herna, & Masrura, S. I. (2020). Implementasi pendekatan etnomatematika dalam pembelajaran matematika. *SIGMA (Suara Intelektual Gaya Matematika)*, *12*, 45–54.

Andriyani, A. C., Ulya, H., & Kuryanto, M. S. (2023). Pengaruh model role playing dengan permainan tradisional pasaran terhadap kemampuan numerik siswa. *Manazhim*, *5*(1), 323–334. https://doi.org/10.36088/manazhim.v5i1.2938

Annisa, C., Fauziah, A., & Erawati, E. (2020). Engklek Gen 4.0 (Studi etnomatematika: Permainan tradisional engklek sebagai media pembelajaran matematika). *Journal Focus Action of Research Mathematic (Factor M)*, *3*(1), 33–48. https://doi.org/10.30762/factor_m.v3i1.2499

Arifin, T. (2021). Pengembangan media pembelajaran berbasis etnomatematika zakat hasil sawah pada materi perbandingan senilai di SMP/MTS Aceh Besar. *Thesis Unpublished.*

Darliani Sosyawati. (2020). Peningkatan kemampuan mengenal angka melalui permainan engklek di SD Negeri Sindang I Kecamatan Sumedang Utara Kabupaten Sumedang. *Visipena Journal*, *10*(2), 352–359. https://doi.org/10.46244/visipena.v10i2.514

Darmawati, N. B., & Widyasari, C. (2022). Permainan tradisional engklek dalam meningkatkan motorik kasar anak usia dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *6*(6), 6827–6836. https://doi.org/10.31004/obsesi.v6i6.3487

Didik, P., Sekolah Dasar, D. I., Aqobah, Q. J., Putri, C. H., Ummah, K. R., Anisah, R. W., Sultan, U., & Tirtayasa, A. (2023). Permainan tradisional engklek untuk peningkatan motorik. *Journal Olahraga ReKat (Rekreasi Masyarakat)*, *2*(1), 2023–2024.

Fatonah, S., & Naemah, Z. (2022). Analisis pengaruh games education (permainan angklek) terhadap motivasi belajar siswa dalam pembelajaran matematika pokok bahasan keliling bangun datar. *Jurnal Basicedu*, *6*(4), 7209–7219. https://doi.org/10.31004/basicedu.v6i4.3455

Gita, A., & Heni, P. (2020). Peranan permainan tradisional engklek dalam mengembangkan kemampuan matematika di Sekolah Dasar. *JUMLAHKU: Jurnal Matematika Ilmiah STKIP Muhammadiyah*, *6*(1), 66–77.

Herawaty, D., Widada, W., Novita, T., Waroka, L., & Lubis, A. N. M. T. (2018). Students' metacognition on mathematical problem solving through ethnomathematics in Rejang Lebong, Indonesia. *Journal of Physics: Conference Series*, *1088*(1), 1–6. https://doi.org/10.1088/1742-6596/1088/1/012089

Jayanti, I., Arifin, N., & Nur, D. R. (2020). Analisis faktor internal dan eksternal kesulitan belajar matematika di sekolah dasar. *Sistema : Jurnal Pendidikan*, *01*(01), 1–7.

Jumri, R., & Murdiana. (2019). Eksplorasi etnomatematika di Bumi Sekundang Setungguan (Manna-Bengkulu Selatan). *Jurnal Pendidikan Matematika Raflesia*, *4*(2), 86–92.

Khadijah, Lubis, A. M., Ayu, D., Siregar, N., Simbolon, N., & Marheni, R. (2024). Pengembangan aspek motorik AUD melalui permainan englek. *PUSTAKA: Jurnal Bahasa Dan Pendidikan*, *4*(1), 277–286.

Khoerunnissa, N. R., Sunaryo, Y., & Eva Zakiah, N. (2023). Permainan tradisional engklek sebagai media pembelajaran matematika. *Jurnal Unigal*, *1*(1), 63–71. https://jurnal.unigal.ac.id/SN-

Lestari, N. A. P. (2019). Pengaruh implementasi pembelajaran kontekstual terhadap hasil belajar matematika dengan kovariabel kemampuan numerik dan kemampuan verbal. *Jurnal Pendidikan Dasar Nusantara*, *5*(1), 72. https://doi.org/10.29407/jpdn.v5i1.12845

Lorena, H., Drupadi, R., & Syafrudin, U. (2020). Pengaruh modifikasi permainan tradisional engklek terhadap perkembangan motorik kasar anak usia 5-6 tahun. *Jurnal Pendidikan Anak*, *6*(2), 68–76. https://doi.org/10.23960/jpa.v6n2.22261

Maulida, S. H. (2020). Pembelajaran matematika berbasis etnomatematika melalui permainan tradisional engklek. *LEMMA : Letters of Mathematics Education*, *7*(01), 35–44. http://ojs.semdikjar.fkip.unpkediri.ac.id/index.php/SEMDIKJAR/article/view/67%0Ahttp://ojs.unpkediri.ac.id/index.php/matematika/article/view/12810

Naitili, C. A., & Nitte, Y. M. (2023). Efektivitas pembelajaran etnomatematika menggunakan permainan engklek terhadap pemahaman konsep geometri bagi siswa sekolah dasar. *HINEF : Jurnal Rumpun Ilmu Pendidikan*, *2*(1), 42–48. https://doi.org/10.37792/hinef.v2i1.857

Nisak, K., & Nur Afifah, S. D. (2019). Pengaruh kecerdasan dan minat belajar terhadap hasil belajar matematika siswa. *Jurnal Penelitian Didadktik Matematika*, *3*(2), 81–92.

Noviarti; Utami, C., & Prihatiningtyas, N. C. (2020). Hubungan motivasi belajar matematika dengan kemampuan numerik siswa pada materi aljabar. *Jurnal Pendidikan Matematika Indonesia*, *5*(September), 92–99.

Nur, H., & Asdana, M. F. (2020). Pergeseran permainan tradisional di kota Makassar. *Phinisi Integration Review*, *3*(1), 17–29.

Pratiwi, J. W., & Heni, P. (2020). Eksplorasi etnomatematika pada permainan tradisional kelereng. *Jurnal Pendidikan Matematika Raflesia*, *5*(2), 1–12. https://ejournal.unib.ac.id/index.php/jpmr/article/view/11405

Pusvita, Y., Herawati, & Widada, W. (2019). Etnomatematika Kota Bengkulu: Eksplorasi makanan khas kota Bengkulu "Bay Tat" untuk memahami pembelajaran matematika di sekolah. *Jurnal Pendidikan Matematika Raflesia*, *04*(02), 185–193. https://ejournal.unib.ac.id/index.php/jpmr/article/view/11405.

Rawani, D. F. D. (2022). Etnomatematika: Keterkaitan budaya dan matematika. *JURNAL INOVASI EDUKASI*, *2*(1), 69–76.

Saraswati, R. R., Nurizzah, N., Pitnawati, P., & Habibah, U. (2020). Integrasi sejarah matematika dalam pembelajaran matematika pada materi Phytagoras. *Risenologi*, *5*(1), 9–13. https://doi.org/10.47028/j.risenologi.2020.51.59

Serepinah, M., & Nurhasanah, N. (2023). Kajian etnomatematika berbasis budaya lokal tradisional ditinjau dari perspektif pendidikan multikultural. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *2*, 148–157. https://doi.org/10.24246/j.js.2023.v13.i2.p148-157

Surmiyanti, C., Mutia, M., & Nurhaliza, S. (2021). Etnomatematika dalam budaya berdompu pada permainan tradisional eengklek di Kalimantan Barat. *Juwara Jurnal Wawasan Dan Aksara*, *1*(1), 47–57. https://doi.org/10.58740/juwara.v1i1.9

Suryani, D., Wanabuliandari, S., & Riswari, L. A. (2024). Efektivitas media interaktif ethmamenke berbasis android untuk meningkatkan pemahaman konsep metematis. *Jurnal Riset Pembelajaran Matematika*, *6*(1 April), 31–38.

Wahyuningsih, A., & Astuti, H. P. (2023). Etnomatematika: Analisis konsep matematika pada permainan tradisional engklek. *Jurnal Pembelajaran Dan Matematika Sigma (Jpms)*, *9*(1), 239–248. https://doi.org/10.36987/jpms.v9i1.4181

Warmi, A., & Adirakasiwi, A. G. (2018). Analisis kesulitan mahasiswa pada mata kuliah sejarah matematika. *Jurnal Penelitian Pendidikan Dan Pengajaran Matematika*, *4*(1), 7–14.

Widada, W., Efendi, S., Herawaty, D., Nugroho, K. U. Z., & Putri, F. R. (2020). The genetic decomposition of students' understanding of infinite series through the ethnomathematics of Bengkulu, Indonesia. *Journal of Physics: Conference Series*, *1470*(1), 1–8. https://doi.org/10.1088/1742-6596/1470/1/012078

Widada, W., Herawaty, D., Beka, Y., Sari, R. M., Riyani, R., & Umam Zaid Nugroho, K. (2020). The mathematization process of students to understand the concept of vectors through learning realistic mathematics and ethnomathematics. *Journal of Physics: Conference Series*, *1470*(1), 1–9. https://doi.org/10.1088/1742-6596/1470/1/012071

Widyastuti, L. R., Malik, L. R., & Razak, A. (2020). Efektifitas permainan tradisional engklek dalam meningkatkan hasil belajar matematika. *Primatika : Jurnal Pendidikan Matematika*, *9*(1 Juni), 19–24. https://doi.org/10.30872/primatika.v9i1.247

Wulansari, P., & Wiryanto. (2023). Pengaruh penerapan permainan tradisional engklek dengan pendekatan RME terhadap proses belajar matematika siswa sekolah dasar. *JPGSD: Jurnal Penelitian Guru Sekolah Dasar*, *11*(02), 392–402. https://ejournal.unesa.ac.id/index.php/jurnal-penelitian-pgsd/article/view/52787