

# The Role of Ethnomathematics Based on Traditional Engklek Games in Improving the Ability to Understand Mathematical Concepts Sipirok Muhammadiyah Elementary School Students

Nur Sahara<sup>a1</sup>, Fitriani<sup>a2</sup>

<sup>a</sup>Lecture Universitas Muhammadiyah Tapanuli Selatan  
Sumatera Utara, Indonesia

<sup>1</sup>nursahara@um-tapsel.co.id

<sup>2</sup>fitriani@um-tapsel.co.id

## Abstract

*This study aims to determine the effectiveness of the role of ethnomatematics based on traditional crank game in increasing the ability of students to understand mathematical concepts at SD Muhammadiyah Sipirok and their responses to learning. This type of research is qualitative research. The learning model developed is a type of traditional game where elementary school students will be more enthusiastic about learning mathematics, especially in flat shape material where the concepts used will improve students' understanding of mathematical concepts. From the results of the analysis of observations during the learning process and the results of interviews conducted by comparing the tcount and ttable values that the calculated value is greater than the table value and the results of the questionnaire students' responses to learning with the use of ethnomatematics based on traditional crank games are already in the very happy category because each None of the students scored 30 below or obtained half the expected maximum score of 60 where all students were above 30. The results of the research will be the type of flat shape in the crank game, the problem of the suitability of the crank game with the flat shape material and its understanding, the flat shape is used as contextual learning.*

**Keywords:** *Ethnomatematics, Engklek, Traditional Games, Understanding the Concept*

## A. Introduction

Education and culture have a very important role in growing and developing the noble values of our nation which have an impact on character building based on noble cultural values. The importance of understanding regional cultural values can be included through the field of education, namely through the learning process. Mathematics which is one of the important subjects as part of the elementary school to high school curriculum can be used as a medium to preserve culture and develop the character of the Indonesian nation. Siswono stated that to develop the character of students can be done by instilling habits and actions that have character in learning mathematics consistently. It is hoped that students will have characters that reflect the Indonesian nation.

The reality on the ground is that mathematics learning that is happening today has not been able to make students develop character and preserve Indonesian culture. Mathematics learning that is carried out is still monotonous and less meaningful, so students only memorize existing concepts without understanding how to apply these concepts to everyday life. This fact is in line with the NCTM which explains that the deficiency in learning mathematics is that students are not guided to associate mathematical concepts with their own experiences. Learning models like this make students feel bored when learning mathematics. If these problems are not immediately addressed, then mathematics will always be a scourge for students. Elementary school students who are in the concrete and play phase need a touch of real math material. Traditional games are one of the fun activities and things that are close to children, in this case elementary school students.

Traditional games are entertaining activities that use simple tools and without tools that have been passed down from generation to generation. Traditional games provide good benefits for children's physical, emotional and cognitive development. The results of Sahara and Fitri's research (2018) show

that the implementation of mathematics learning at SD Muhammadiyah Sipirok is still abstract, especially on geometry material. Students do not understand the concept of learning geometry so that students' interest in learning mathematics, especially geometry material, is less attractive.

So far, the understanding of values in mathematics learning delivered by teachers has not touched all possible aspects. According to Soedjadi, quoted by Wahyu Fitroh & Nurul Hikmawati, mathematics is seen as a tool for solving practical problems in the world of science, thus ignoring the view of mathematics as a human activity. That view is not wrong at all, both are true and in accordance with the growth of mathematics itself.

Another consideration is that the mathematics obtained at school does not match the way of life of the local community so that mathematics is difficult for students to understand because there are two schemes obtained, namely the scheme obtained in the environment and the scheme obtained at school. In Agung Hartoyo's research, Bishop argues that mathematics essentially grows out of skills or activities in the cultural environment, and Pinxten also says that a person's mathematics is influenced by his cultural background. Ethnomathematics is a complex and dynamic representation that describes the cultural influence of using mathematics in its application.

Thus, it is important to empower the community and the school to use ethnomathematics in the traditional engklek game at SD Muhammadiyah Sipirok. The problem in this research is how to raise awareness of the importance of an ethnomathematical approach in children's traditional games to bridge the needs of students in understanding geometry material at SD Muhammadiyah Sipirok schools.

## B. Research Methods

This study uses a qualitative approach. In obtaining the required data, the researcher mingled with the subject, observation, interviews, and documentation. The data obtained were analyzed using scientific thinking methods, namely describing, connecting, and comparing findings in the field.

## C. Result and Discussion

The research results obtained are based on the implementation of the research which will be described based on the existing problem formulation.

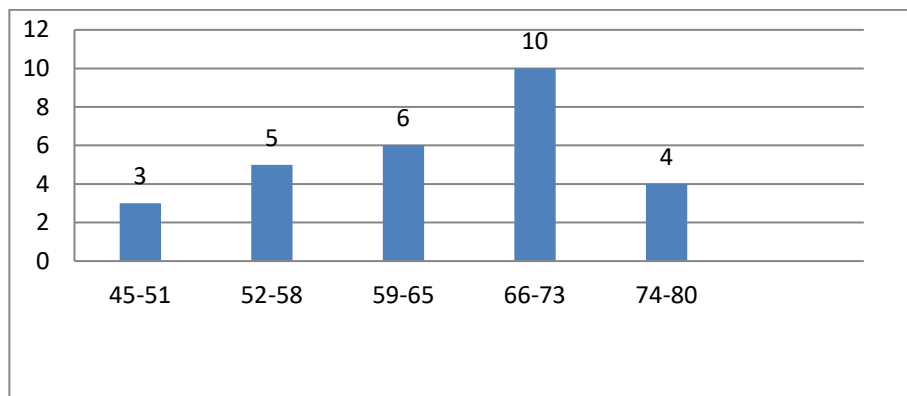
1. The role of ethnomathematics based on traditional engklek games can improve students' understanding of mathematical concepts at SD Muhammadiyah Sipirok

Based on the tests that have been given twice, namely the pre-test before the use of ethnomathematics based on the traditional engklek game, the data distribution is as follows:

**Table 1.** Frequency Distribution Of Pre-Test Understanding Of Mathematical Concept

No	Interval	Amount
1	45 – 51	3
2	52 – 58	5
3	59 – 65	6
4	66 – 73	10
5	74 – 80	4
	Amount	28

From the distribution/group table above, it is found that the students' mastery of the learning material has met the KKM success rate of 70, with a total of 28 students, which is 100% successful. So that individually and in groups the students' ability to understand mathematical concepts has reached the KKM of 70. For more details, see the following diagram:



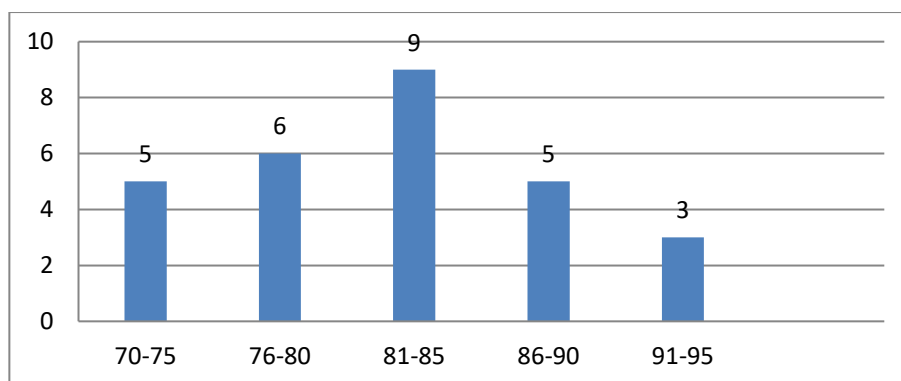
**Figure 1.** Frequency Distribution of S Concept Understanding Ability Test

Based on figure 1, it can be seen that all students have reached the KKM 70 with a total of 28 people. The next step is to analyze the effect of ethnomathematics based on the traditional engklek game on the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok by using one sample T test analysis with the help of excel, the data obtained are as follows:

**Table 2.** Frequency Distribution Of Pre-Test Understanding Of Mathematical Concepts

No	Interval	Amount
1	70 – 75	5
2	76 – 80	6
3	81 – 85	9
4	86 – 90	5
5	91 – 95	3
	Amount	28

From the distribution/group table above, it is found that the students' mastery of the learning material has met the KKM success rate of 70, with a total of 28 students, which is 100% successful. So that individually and in groups the students' ability to understand mathematical concepts has reached the KKM of 70. For more details, see the following diagram:



**Figure 2.** Frequency Distribution of S Concept Understanding Ability Test

Based on figure 2, it can be seen that all students have reached the KKM 70 with a total of 28 people. The next step is to analyze the effect of ethnomathematics based on the traditional engklek game on the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok by using one sample T test analysis with the help of excel, the data obtained are as follows:

To facilitate decision making, first formulate a hypothesis, namely:

Ha : The role of ethnomathematics based on the traditional engklek game can improve students' understanding of mathematical concepts at SD Muhammadiyah Sipirok.

H0 : The role of ethnomathematics based on traditional engklek games cannot improve students' ability to understand mathematical concepts at SD Muhammadiyah Sipirok.

# FINGER

Jurnal Pendidikan Teknologi Informasi dan Komunikasi

Furthermore, the above data is analyzed using the formula  $t = \frac{md}{\sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n(n-1)}}}$  Then compare with ttable

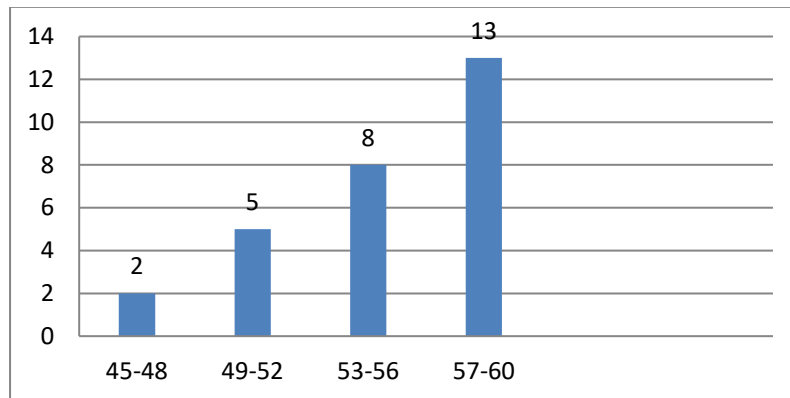
with  $\alpha = 0.05$  with  $dk = n - 1 = 27$  obtained  $t_{table} = 2.052$ . Based on the results of the analysis that has been obtained, it is obtained that  $t_{count} > t_{table}$ , then  $H_a$  is accepted and  $H_0$  is rejected, so the conclusion is that the role of ethnomathematics based on traditional engklek games can improve students' ability to understand mathematical concepts at SD Muhammadiyah Sipirok.

2. The effect of ethnomathematics based on the traditional engklek game on the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok. Based on the questionnaire that was given at the end of the meeting using ethnomathematics based on the traditional engklek game, the data distribution was obtained as follows:

**Table 3.** Frequency Distribution of Ethnomathematical Questionnaire Based on the Traditional Game of Engklek

No	Interval	Amount
1	45 – 48	2
2	49 – 52	5
3	53 – 56	8
4	57 – 60	13
	Amount	28

From the distribution/group table above, it was found that the student response questionnaire to the use of ethnomathematics based on the traditional engklek game was already in the very happy category because each student did not score 30 below or get half of the maximum score of 60 expected where all students are above the value of 30. For more details can be seen in the following diagram:



**Figure 3.** Frequency Distribution of Ethnomathematical Questionnaire Based on the Traditional Game of Engklek

Based on the results of the research on the formulation of the first problem, the role of ethnomathematics based on the traditional engklek game can improve the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok. By comparing the pre-test data with the post-test of students' ability to understand mathematical concepts, an analysis of  $t_{count} = 18.85$  was obtained. Then compare with  $t_{table}$  with  $\alpha = 0.05$  with  $dk = n - 1 = 27$  obtained  $t_{table} = 2.052$ . Based on the results of the analysis that has been obtained, it is obtained that  $t_{count} > t_{table}$ ,  $H_a$  is accepted and  $H_0$  is rejected, the conclusion is that the role of ethnomathematics based on the traditional engklek game can improve the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok so that based on this analysis, ethnomathematics is very well applied to children. children at the elementary level in order to all reintroduce the existing culture.

Furthermore, to analyze the second problem formulation on the role of ethnomathematics based on traditional engklek games that can affect the ability to understand mathematical concepts of students at SD Muhammadiyah Sipirok. That is, by comparing the student response questionnaire with the results of the student post test, it is obtained that  $r_{count} = 0.765$ . Then comparing with  $r_{table}$  with  $\alpha = 0.05$  with  $dk = N = 28$ , it is obtained  $r_{table} = 0.374$ . Based on the results of the analysis that has been obtained, it is

# FINGER

Jurnal Pendidikan Teknologi Informasi dan Komunikasi

obtained that  $t_{count} > t_{table}$ , then  $H_a$  is accepted and  $H_0$  is rejected, the conclusion is that the role of ethnomathematics based on the traditional engklek game can affect the ability to understand mathematical concepts of students at SD Muhammadiyah Sapirok then obtained the interpretation of the correlation coefficient with a very strong category. Based on the relationship that occurs, it can be said that ethnomathematics is very well applied in improving students' mathematical abilities.

## D. Conclusion

The role of ethnomathematics based on the traditional engklek game can improve students' ability to understand mathematical concepts at SD Muhammadiyah Sapirok. It is shown that  $t_{count} > t_{table}$  that is  $18.85 > 2.052$  then  $H_a$  is accepted and  $H_0$  is rejected

2. The role of ethnomathematics based on the traditional engklek game can affect the ability to understand mathematical concepts of students at SD Muhammadiyah Sapirok with a very strong category. This is indicated by  $t_{count} > t_{table}$ , which is  $0.765 > 0.374$ , so  $H_a$  is accepted and  $H_0$  is rejected.

## E. Acknowledgement

Thank you to the South Tapanuli Muhammadiyah University for providing financial support so that this research can be completed

## References

- [1] Afifuddin,dkk, *Metodologi Penelitian Kualitatif*, Bandung:CV.Pustaka Setia, 2012.
- [2] A. Wahyuni, A. A. Wedaring and B. Sani. *Peran Etnomatematika Dalam Membangun Krakter Bangsa*. UNY
- [3] A. D. Damayanti and R. Putranti, "Pembelajaran Matematika dalam Permainan Tradisional Engklek Untuk Siswa SD Kelas V" in *Prosiding Seminar Nasional Matematika dan Terapannya Universitas Jenderal Soedirman*, Banyumas,2016, 253–260.
- [4] E.Tandililing, *Pengembangan pembelajaran matematika sekolah dengan pendekatan etnomatematika berbasis budaya lokal sebagai upaya untuk meningkatkan kualitas pembelajaran matematika di sekolah*. UNTAN, 2013.
- [5] N. I. Hasanah and H. Pratiwi, *Pengembangan Anak Melalui Permainan Tradisional*, Yogyakarta: Aswaja Pressindo, 2017.
- [6] National Council of Teachers of Mathematics (NCTM). 2014. *Principles to Actions: Ensuring Mathematical Success for All*. [Online]. From: [www.nctm.org](http://www.nctm.org). [Accessed on 27 Juli 2017].
- [7] Tim Playplus Indonesia, *Ensiklopedia Permainan Tradisional Anak Indonesia*, Jakarta:Erlangga, 2017.
- [8] H. Ulya, "Permainan Tradisional Sebagai Media Dalam Pembelajaran Matematika" in *Prosiding Seminar Nasional Pendidikan Universitas Muhammadiyah Metro*, Lampung, 2017, 371: 376.
- [9] A. Wahyuni, A. A. W. Tias and B. Sani, "Peran Etnomatematika dalam Membangun Karakter Bangsa" in *Prosiding Seminar Nasional Pendidikan Matematika Universitas Negeri Yogyakarta*, Yogyakarta, 2013, 113-114.