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THE EFFECT OF ETHNOMATHEMATICS-BASED LEARNING OF THE *ENGKLEK* GAME ON STUDENTS' INTEREST IN LEARNING FLAT SHAPES FOR 2ND GRADE ELEMENTARY SCHOOL.

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Abstract*—Mathematics is still often considered a difficult subject by students, due to their low interest in learning mathematics. Using interesting teaching methods can be important in overcoming this low interest in learning. One approach that can be taken is to implement ethnomathematics-based learning, specifically the game of engklek, within the learning process. The objective of this study is to determine the impact of ethnomathematics-based learning through the engklek game on students' interest in learning. This research is a quantitative study with a pre-experimental design using a one group pretest-posttest. The sample in this study consists of all second-grade students of State Elementary School 1 Tambakrejo, totaling 18 students. The instruments used for data collection are questionnaires and documentation. The instrument testing uses content validity. Data analysis techniques include descriptive analysis, prerequisite tests such as the normality test, and hypothesis testing. Based on the results of the research and data analysis, the average pretest score before the treatment was 72.0, and after being given the treatment in the form of ethnomathematics-based learning of the game engklek, it increased by 14.9, as shown by the average posttest score of 86.9. This is reinforced by the hypothesis test results that show a significance value of <0.001 < 0,05. It can be concluded that there is a significant effect of implementing ethnomathematics-based learning of the engklek game on the learning interest of second-grade students at State Elementary School 1 Tambakrejo.

Keywords*— Ethnomathematics, learning interest, hopscotch game.

I. INTRODUCTION

Mathematics is one of the subjects that elementary school students must master, in addition to Indonesian language, science, and civics. Mathematics is a field of study that trains students' reasoning skills so that they can think systematically and logically in making decisions and solving problems [1]. Mastering mathematics is important because it is related to problem-solving skills in everyday life. This is in line with [2], who stated that mathematics is very helpful in human life because most human activities utilize mathematics, so mathematics is closely related to everyday life and there are many benefits to be gained from learning mathematics.

Mathematics learning is a series of systematic activities designed to provide students with experiences that enable them to gain an understanding of the mathematical material being taught [1]. The activities here refer to the teacher's efforts in providing learning experiences in a safe and enjoyable environment for students. One of the key elements in learning is the teacher; the ability to create engaging and effective instruction is the primary key to success in learning, thereby making students interested in the mathematics subject [3].

Interest is a person's tendency toward something because they feel attracted to it, usually accompanied by feelings of pleasure because they feel a connection to it. Learners' interest in learning will become their basic strength for learning [4]. Learning interest is a desire accompanied by focus and deliberate actions that ultimately lead to a sense of enjoyment in behavioral changes, whether in the form of knowledge, attitudes, or skills [5]. Students' interest in learning is one of the internal aspects that can influence learning outcomes. Students who have a strong desire to learn will find it easier to achieve their learning goals. Conversely, a lack of interest in learning can make students feel less engaged in the learning process and may even lead to a negative attitude toward teachers [6]. Learners' interest in learning is not always at the same point, but will always change. This is because the interest of a learner is formed because it is influenced by several factors [7]. According to [8], the factors that influence students' interest are factors within students (internal) which include physical aspects and psychological aspects, while factors from outside students (external) include family, school, and community environment.

Mathematics is still often considered a difficult subject by most students because it involves complex numbers and formulas. This is because students' interest in learning mathematics is still very low. With such low interest in learning, students find it difficult to study, so they need to put in more effort to understand what they are learning. According to [3] interest is a motivational tool to stimulate students' desire to learn over the long term. [9] state that interest is a preference or attraction to something or an activity without being told to do so. The stronger the interest, the stronger the

motivation [10]. Therefore, fostering interest in learning mathematics among students is an important matter. Using engaging teaching methods can be an important way to address the issue of low learning motivation.

Low interest in learning can be overcome, among other things, by combining culture in the form of games into learning activities, which can make learning more interesting. In the learning process, students can be directly involved. The integration of culture with mathematical concepts is referred to as ethnomathematics. According to D'Ambrosio as cited in [11], ethnomathematics is the application of mathematical concepts within a culture that has evolved over generations in society, such as beliefs, customs, language, or behavior. [12] argue that ethnomathematics is a bridge that connects mathematics with culture, as both are inseparable from daily life. [11] state that the implementation of ethnomathematics in mathematics education aims to enable students to understand established mathematical concepts without disregarding cultural values. This is in line with [13], who state that incorporating ethnomathematics into learning can overcome difficulties in understanding mathematical concepts and can also be an innovation in mathematics learning. Ethnomathematics can facilitate students' understanding of mathematical concepts through cultural practices, thereby serving as a tool for finding solutions to real-life problems [14]. One example of ethnomathematics represented through a game is engklek.

The game of *engklek* originated in Rome, Italy, and is known as hopscotch. The name comes from the words "hop" and "scotch." Hop means to jump, while scotch refers to lines [11]. In Indonesia, this game has different names in each region, such as *Selatak* in Riau, *Tejek-tejekan* in Jambi, and *Tepok Gunung* in West Java [15]. Despite the different names, the game essentially shares the same characteristics. *Engklek* is a game closely related to mathematics because it involves combining various two-dimensional shapes drawn on a flat surface, typically the ground. The game focuses on several components, including the tools for creating the playing area, the playing area itself, the *gaco*, the players, and the rules of the game [16]. *Engklek* is commonly played by students by jumping from one box to another using one foot, which is part of mathematics learning [17]. By using this culture-based learning approach, it is hoped that learning will become more interesting, less boring, and enjoyable, while also fostering a love for learning.

II. RESEARCH METHOD

In conducting this study, the researcher used a quantitative research method with a pre-experimental design using a one-group pretest-posttest. The research was conducted at Tambakrejo 1 Public Elementary School. The population of this study was all 83 students at Tambakrejo 1 Public Elementary School. The sampling technique used in this study was purposive sampling, with 18 students from grade 2 selected as the sample.

The instruments used in this study were questionnaires and documentation. These were then tested using content validation, prerequisite tests in the form of normality tests assisted by Jamovi, descriptive statistics, and Paired T-Test tests assisted by Jamovi as a research hypothesis testing tool.

III. RESULT AND DISCUSSION

In the data collection for this study, 15 learning interest questionnaires were administered as pre-tests and post-tests, which had been validated. These questionnaires were given to students with the aim of determining their learning interests in grade 2. Once all the learning interest questionnaire data has been collected, calculations will be performed using the JAMOVI for Windows Version 2.3.28 software. The pretest and posttest scores of the second-grade students will be used for normality tests and hypothesis testing. In this study, a Paired T-test analysis will be conducted. The data is presented in the following table:

TABLE I. NORMALITY TEST

Normality Test (Shapiro-Wilk)

			W	p
Pre-Test	-	Post-Test	0.958	0.564

Based on the Jamovi calculation results on the data above, it is known that the p-value is 0.564 > 0.05, so it can be concluded that the data is normally distributed. This normally distributed data indicates that parametric statistical tests can be used, and the data can then be tested with a Paired T-Test hypothesis test.

TABLE II. STATISTIC DESCRIPTIF

Descriptives

	N	Mean	Median	SD	SE
Pre-Test	18	72.0	74.0	8.17	1.93
Post-Test	18	86.9	86.0	6.15	1.45

This study used descriptive statistics of the mean of both data sets to test a hypothesis, as shown in the table above, which shows that the mean pretest score was 72.0, while the mean posttest score was 86.9. The mean posttest score was higher than the mean pretest score.

TABLE III. PAIRED SAMPLE T-TEST

Paired Samples T-Test

			statistic	df	p
Pre-Test	Post-Test	Student's t	-8.70	17.0	< .001

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} \neq 0$

The results of the Paired T-Test analysis are shown in the table above, which shows that the Jamovi output has a p-value of < 0.001. Based on the criteria for accepting or rejecting the hypothesis, it can be seen that < 0.001 < 0.05. Therefore, it can be concluded that Ho is rejected and Ha is accepted. Thus, the conclusion of the hypothesis test in this study is that there is an effect of ethnomathematics-based learning activities using the engklek game (X) on the learning interest of students (Y) in grade 2 at State Elementary School 1 Tambakrejo.

The use of the *engklek* game as implemented is a new experience for students. Whereas the *engklek* game is usually only used for playing, in this case it can also be used as a learning medium. Learning interspersed with playing makes students better understand the learning process. The requirement to answer questions before moving on to the next box triggers interest and enthusiasm among students in the learning process. The *engklek* game has proven to foster students' interest and attraction in learning mathematics. This aligns with research [3] stating that the *engklek* game can enhance students' interest in learning and their positive response during instruction, demonstrating that students are interested in learning mathematics using the *engklek* game.

IV. CONCLUSION

Based on the results of the research and data analysis described above, it can be concluded that there is a significant effect of implementing ethnomathematics-based learning using the *engklek* game on the learning interest of second-grade students at Tambakrejo 1 Public Elementary School. This can be seen in the average pretest scores of the students before the intervention, which were 72.0, and after the intervention, which involved ethnomathematics-based learning using the *engklek* game, the scores increased by 14.9, as shown in the average posttest scores of 86.9. This result is supported by the t-test results, which show that the significance value is <0.001. The significance value is less than 0.05. Therefore, it can be stated that Ho is rejected and Ha is accepted, meaning that there is a significant effect of implementing ethnomathematics-based learning using the *engklek* game on the learning interest of second-grade students at State Elementary School 1 Tambakrejo in the subject of two-dimensional shapes.

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