
INTRODUCTION OF MULTIPLICATION CONCEPTS THROUGH TRADITIONAL RUBBER THROWING GAMES IN ELEMENTARY SCHOOLS

Sri Hartatik

Nahdlatul Ulama University of Surabaya
titax@unusa.ac.id

Dewi Widiana Rahayu

Nahdlatul Ulama University of Surabaya
dewiwidiana@unusa.ac.id

Abstract

Rubber throwing game is a traditional game played by children in ancient times. The selection of traditional games as a strategy in teaching mathematical multiplication concepts. This research is a quantitative descriptive study which aims to find out how effective the Rubber Throwing game can be used in teaching multiplication concepts so that it can improve mathematics learning outcomes and how the application of rubber throwing games to mathematics learning in elementary schools. The study was conducted at the Balong Tani Sidoarjo Elementary School with a subject of 23 students. This learning model is the development of cooperative learning models using rubber throwing games as a strategy in teaching mathematical concepts especially the multiplication concept. Research results were presented on the application of the game throwing gum on mathematics, introduction of the concept of multiplication through permanent traditional throwing of rubber and can be concluded that through the traditional game pieces of gum can improve student learning outcomes related to the concept of multiplication in primary school.

Keywords: Concepts Multiplication, Games Throw rubber

Introduction

Mathematics is a study of abstract objects that rely on agreement and have a deductive mindset. In abstract mathematics learning, students need tools to be able to understand the abstractness of mathematics itself. Every abstract concept that has just been taught, needs to be reinforced by the concept so that it will further strengthen its memory and understanding. Many students are good at math but lack understanding. They only know formulas and formulas. According to Dienes in (Aisyah et al., 2008: 2-7) basically mathematics can be considered as a study of structure, separating the relationships between structures and categorizing relationships between structures. The development of mathematical concepts according to Dienes can be achieved through a continuous pattern, which every series in a series of learning activities from concrete to symbolic.

Purnomo (2015: 4) argues that learning can be interpreted as a conscious effort that involves an interactive process between teacher and students to understand and respond and move toward learning goals. In this case the teacher has an important role in controlling the learning process in the classroom. One component in learning is the use of various types of strategies and learning methods dynamically and flexibly in accordance with the material, students and learning context. So that the teacher's ability to be able to choose the learning model and media that match the material or teaching material. According to Piaget, the stages of thinking think elementary school students are at a concrete stage of operation (approximately 7-11 years) where at this stage children who have been able to think concretely have mastered a lesson with traits captured by the senses such as large and the shape of something. One of the fun for elementary school students is the game, because the world of children can not be separated from the game. According to Ahmadi (in Aisyah et al: 2008) the game is an act that contains preoccupation and is carried out on its own accord, free without coercion in order to get pleasure at the time of carrying out these activities.

Rubber throwing games are one of the traditional games that use rubber bands as a medium in rubber games. So far, rubber games have never been played by children today. The rubber throwing game serves to improve children's motor skills, even through research conducted by Asep Ardiyanto and Pamuji Sukoco (2014)

through his research that he has succeeded in developing traditional game-based learning models to improve the gross motoric abilities of light-hearted children.



Figure 1. Rubber Throwing Game Rubber

Throwing game is a traditional game of ancient children that uses rubber media as the main medium. Rubber throwing games are traditional games that are played in children's game groups. The rule in this game is that children are asked to throw rubber that has been rolled into the throwing area which contains numbers from 1 to number 10. If the rubber enters the throwing area and does not hit the line, the child will get as much rubber as the number in the area expulsion. According to Christine Lerin (2009: 133) rubber throwing games have benefits, namely (1). Students can train the accuracy in throwing and regarding targets and (2). Students can practice numeracy skills.

To begin teaching the multiplication concept, students must know in advance the concept of addition. This is in line with what was conveyed (Walle, Karp, and Williams, 2008: 158-159). that clarifying the relationship between addition and multiplication of the initial multiplication activities must write down and explain through the concept of addition. To explain the relationship is done by writing in one mathematical sentence as in the following example: $9 + 9 + 9 + 9 = 4 \times 9$ means that there is a sum of 9 times 4 times so that it can be written with 4×9 . Through the game of rubber throwing, you can used as one of the strategies in teaching.

Research Methods

This study used the Pre-Experimental design using the Pretest and Posttest One group. In this study, researchers used a group consisting of grade 3 elementary school students with 23 students consisting of 14 males and 9 females. Before the group was treated, the researcher tested the students' abilities through the pretest. After that the subject was given experimental treatment by using a learning model that had been designed by the researcher. Then the effect of treatment was assessed using posttest. All research designs are described as follows:

Description: O_1 = Pretest
 O_2 = Posttest Value

$$O_1 \times O_2$$

Research Results and Discussion

A. Application of Rubber Throwing Games to mathematics learning

Application of Traditional Game-based learning models Throw according to the stages in learning activities that are translated into preliminary activities, Core activities and closing activities are as follows:

1. Introduction

- The teacher opens the learning activities by praying.
- The teacher conveys the KD and learning objectives to be achieved.
- The teacher conveys the methods used to achieve the learning objectives.

2. Core Activities

- Forming groups

The teacher explains that learning uses traditional rubber throwing games. Then the teacher forms a group of 4 people.



Figure 2

Figure 3

In picture 2 the teacher appears to give instructions to create groups which each group consists of 4 students. Students have formed groups of 4 students (figure 3).

- Prepare tools and materials

The teacher prepares the rubber and the throwing area using floor tiles that are given boxes and numbers using spridol. Then the teacher distributes rubber to each group.

- Explaining the rules of the game

- The teacher asks if students know the game of rubber throwing, then the teacher explains about the game of rubber throwing.
- The teacher explains the rules in rubber throwing games.

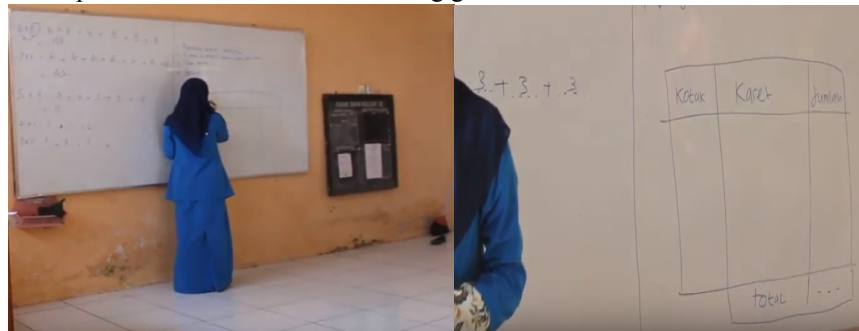


Figure 4

- The teacher also explains the multiplication concept through scoring (calculating the amount of rubber obtained) using a table (figure 4).
- The teacher gives an example of how to play rubber throwing.
- The teacher instructs students to immediately play with their respective teams. Each team has the opportunity to throw alternately. If one group throws, the other group must pay attention. Look at the picture 5.



Figure 5

- The teacher gives guidance to each group. The teacher gives an opportunity to each group to explain how much rubber is obtained by showing the table of calculation results.

3. Closing Activities

The teacher provides reinforcement related to the material that has been learned. The teacher and students conclude about today's learning. The teacher ends the learning by praying together. The teacher and students together conclude about the multiplication concept that the concept of multiplication is the result of the sum of repetitive numbers.

B. Introduction of the concept of multiplication through traditional rubber throwing machines.

During the game, each team is given the opportunity to throw 5 times. The results of throwing are recorded in the table. Each group makes a table like in Figure 4 on the paper provided as shown in Figure 6 below:



Figure 6

Recording is done based on the calculations below:

$$A \times B = \underbrace{B + B + B + \dots + B}_{\text{Sebanyak A}}$$

Description:

A = number in the throwing area

B = number of rubber in rolls

Figure below are examples of group work from team 1 and team 6 are as follows:

a. Exposure to group work results 1

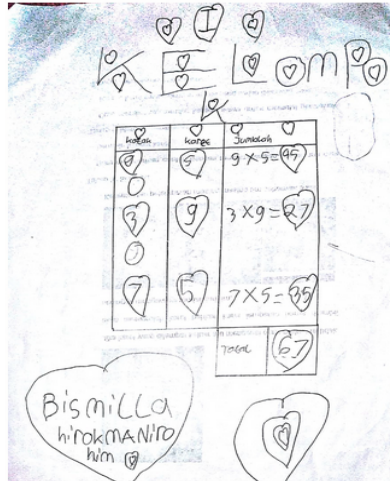


Figure 7. Worksheet Team 1

Team 1 gets the opportunity to throw as many as 5 times. Throwing 1 team successfully throws the rubber ball and goes into box number 9. The amount of rubber in the roll is 5 so that the amount of rubber obtained is $9 \times 5 = 45$ so students get 45 rubber by receiving 5 rubber + 5 rubber + 5 rubber + 5 rubber. 2nd and 4th throws, rubber is thrown out of the box so the team does not get rubber. Throwing 3, the team managed to throw 9 rubber rolls into the box numbered 3 so that the rubber obtained at throwing 3 was $3 \times 9 = 27$. Throwing 5, the team managed to throw a rubber roll containing 5 rubbers in box number 7 so that the rubber the team obtained $7 \times 5 = 35$. So that the total rubber obtained by team 1 should be $45 + 27 + 35 = 107$ but group 1 had an error in answering the total rubber total obtained by group 1 (figure 1)

b. Exposure to the results of group work 6

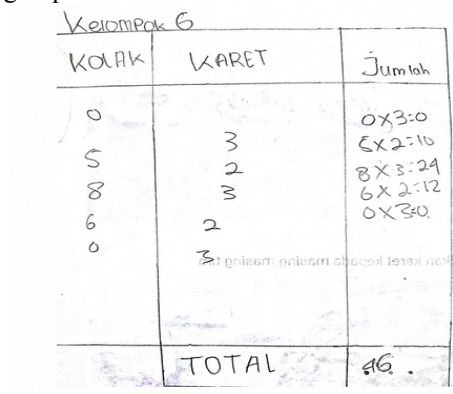


Figure 8. Team Worksheet 6

Based on the results of group 6 worksheets, it can be seen that group 6 managed to throw right on the box 3 times, namely throwing to 2, 3 and 4 while at throwing first and fifth. On the second throw, group 6 managed to throw 3 rolls of rubber into the box numbered 5 so that the team has the right to get as much as $5 \times 3 = 3 +$

$3 + 3 + 3 + 3 = 15$. The same goes for throwing 3 and 4 Through the above process, students are taught the concept of multiplication through repeated summation.

C. Effectiveness of rubber throwing games on learning outcomes

The following are the posttest and pretest results of students:

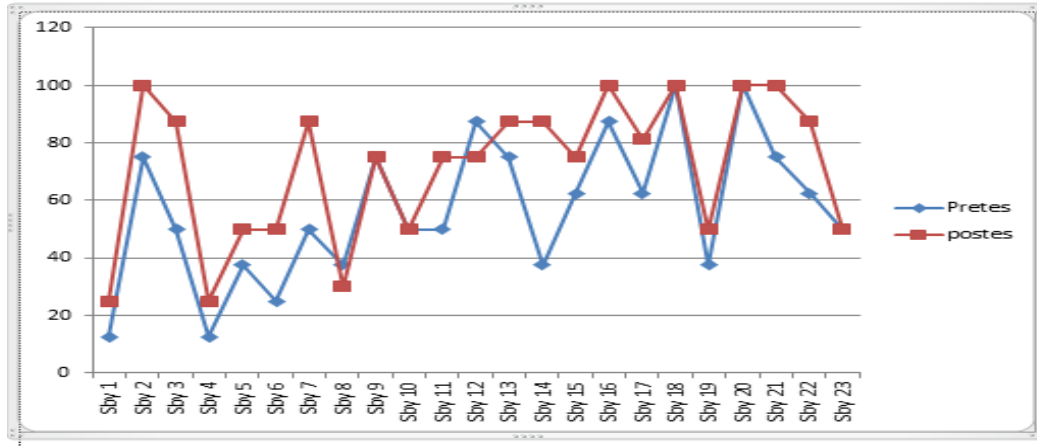


Figure 9. Graph of results of pretest and posttest of students

On the graph (figure 9), the red line shows the results of the posttest and the blue line shows the pretest. Of the 23 students, there were 3 (13%) students who had the same or fixed grades and there were 20 students who had pretest scores not the same as the posttest. Of the 23 pretest and posttest data above, it was analyzed using SPSS. From the results of SPSS, the following results are obtained:

Table 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	57,0652	23	24,95054	5,20255
	Posttest	71,6848	23	25,08397	5,23037

Table 2. Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	pretest - posttest	15.34376 3.19940 - 21.25471 - 7.98442 -4.569				14.61957	22,	000	

From the above data obtained data that the average pretest value of 23 students amounted to 57, 0652 and the posttest average value of 71.6848. From the table above the value of sig 0,000 is obtained. because the sig value is $0,000 < 0,05$, it can be concluded that there are significant differences in the mathematics learning outcomes between the results of the pretest and posttest. Based on the conclusions above, it can be concluded that through traditional rubber sheet games can improve student learning outcomes related to the multiplication concept for elementary school students. The results of this study are in accordance with what was conveyed by Christine Lerin (2009: 133) that one of the benefits of rubber throwing games is that students can train the accuracy in throwing and about targets and Students can practice numeracy skills. The results of this study are also in line

with Kahari's research (2018) that learning using learning strategies through rubber band throwing games can improve student learning outcomes. This can happen because students are motivated in learning, students feel happy, not bored and not afraid of math they feel learning while playing, so the concepts of multiplication become clearer, and students play an active role

Conclusions

From the explanation above there are several that can be concluded, namely;

1. Application of Rubber Throwing Games on mathematics learning.
Rubber throwing games are one of the traditional games that use rubber band media. The application of rubber throwing games to mathematics learning is translated into preliminary activities, core activities and closing activities. The rules of the rules in the game of rubber throwing are used as a strategy in teaching mathematical concepts in which all the rules of the game are described in the learning core activities.
2. The introduction of the multiplication concept can be done when students do the calculation of rubber acquisition from each time throwing. The amount of rubber obtained by students is the multiplication of the amount of rubber thrown with the numbers printed on the throwing area box.
3. From the statistical test conducted it can be concluded that there are significant differences from the mathematics learning outcomes between pretest and posttest. Which means that traditional rubber sheet games can improve student learning outcomes related to the multiplication concept for elementary school students.

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