

# THE EFFECTIVENESS OF THE KUMON METHOD WITH TAPERTIS MEDIA TOWARDS UNDERSTANDING THE MULTIPLICATION CONCEPT OF ELEMENTARY SCHOOL STUDENTS

Sunarsih<sup>1</sup>

<sup>1</sup>SDN Sombron, Indonesia

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## ABSTRACT

This study aims to determine the effectiveness of the Kumon method with tapertical media on understanding the concept of multiplication in mathematics. The use of tapertis media aims to make learning more interesting and students accept lessons easily at the school. This research uses a quantitative approach to the type of experimental research. This research was conducted at Lanjan 01 Public Elementary School, Sumowono District, Semarang Regency, Central Java. The population in this study were all students in SDN Lanjan 01. The sample was students in grade IV SDN Lanjan 01. The results showed that: There were differences pretest scores average is the experimental class higher than the control class ( $51.91 > 48.17$ ). There is a difference in the average posttest value of the experimental class which is also higher than the control class ( $80.64 > 75.52$ ). In addition, the results of the experimental class n-gain test were greater than the control class ( $0.507 > 0.425$ ). T test results also showed that the average experimental class was higher than the control class ( $80.64 > 72.52$ ). The t-test results also showed a significance level  $< 0.05$ , i.e.  $0.000 < 0.05$  and  $0.001 < 0.05$ . Then it can be concluded that the kumon method with tapertis media is effective in increasing concept multiplication understanding of elementary students.

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## Corresponding Author:

Sunarsih,

SDN Sombron,

Nganjuk, Indonesia.

Email: [sunarsihsombron1990@gmail.com](mailto:sunarsihsombron1990@gmail.com)

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## 1. INTRODUCTION

Mathematics is a branch of science that has an important role in life. Mathematics is almost used in all areas of life whose application is carried out in everyday life in the community which includes buying and selling, calculating the distance of an area, calculating population, calculating the area and volume of an object. In the world of education, mathematics subjects are given at all levels of education, namely primary, secondary and tertiary education (Tyson, 2016). At the basic level, mathematics is useful for developing students' mindsets to think logically, critically and systematically. In learning mathematics, concept planting is very important because it is a bridge that connects students' concrete cognitive with new abstract concepts. After learning the concept of planting the next stage is understanding the concept. According to Kovach & Montgomery (2019), concept understanding is further learning from concept planting which aims to make students better understand a concept. From this understanding, understanding the concept is very important because to apply the concept

requires a correct understanding of the concept. One of the materials in class IV mathematics is multiplication material. In grade IV students must understand various forms of arithmetic operations (Mulligan & Mitchellmore, 2009). The arithmetic operations such as addition, subtraction, multiplication and division of various numbers. Most of the students who are weak in mathematics generally cannot count well. This difficulty occurs because the teacher is sometimes confused to illustrate the learning material.

Based on interviews conducted by researchers with fourth grade teachers regarding mathematics learning problems, it is known that in learning mathematics there are problems experienced by students, namely students' low understanding of the concept of multiplication. Based on the results of the interview, it is known that students' difficulties in understanding concepts are caused by several factors including learning that tends to be teacher-centered, the use of media in the learning process is not optimal, student concentration is less so it is difficult to focus on the lesson, only a few students are actively asking questions and lack of interest. students towards mathematics. As one solution, a teacher is required to be more innovative in delivering material, using appropriate learning models and methods so that the basic concepts of mathematics can be mastered by students well. One of the effective learning methods is the Kumon method (Higgins, n.d.).

According to Bianchi et al. (2020), the Kumon method is a learning method initiated by Toru Kumon from Japan. The Kumon method is an individual method. Students learn independently according to students' abilities. Learning materials are composed of small steps so that children can acquire strong abilities. Practice questions are divided into several levels with increasing difficulty. Students work on questions independently from easy to more difficult levels. The advantages of the Kumon method according to Stephan (2014) are that the lesson material is composed of small steps, students work on questions independently from easy to difficult levels, students work on questions according to their abilities, and invite children to be disciplined.

Learning methods will be more effective and efficient if using the right media. According to Sobrinho & Sousa (2020), in the selection of media there are several criteria that need to be considered, including in accordance with the objectives, appropriately supporting the content of the lesson, practicality, and the teacher's skills in using the media. One of the appropriate media to be applied with the Kumon method is tapered media. Media tape makes it easier for students to understand multiplication of numbers. Therefore, it is necessary to do research with the title "Effectiveness of the Kumon Method with Media Tapes against Understanding Multiplication Concepts in Mathematics Subjects for Elementary School Students".

## 2. RESEARCH METHOD

The research design used in this research is Quasy-Experimental Design. The form of quasi-experimental design used is a pretest-posttest control group design. The independent variable in this study was the Kumon method with tapered media, while the dependent variable in this study was the students' understanding of the multiplication concept (Heale & Twycross, 2015). This research was conducted at SDN Lanjan 01 and Lanjan 02, Sumowono District, Semarang Regency. The study was planned for seven months, from March to December 2019. The sampling technique was purposive sampling. There are several characteristics that are identical in grade 4 students at the SD, namely (1) The students come from the same area, namely Sumowono District, Semarang Regency, (2) The students have the same basic knowledge and based on the same curriculum. (3) The students are both in classes with heterogeneous student abilities, not superior or accelerated classes, (4) Adequate supporting facilities, have LCD projectors, and (5) Both students have never received Kumon method learning with tapered media.

Data collection techniques in this study were test and non-test. The tests used were pretest and post-test at the end of the lesson. The test used several questions arranged on subjects in the form of descriptions to determine student learning outcomes. The non-test method in this study uses unstructured interviews, observation, and documentation (Tout, 2020). The data analysis technique used is instrument trial analysis and final analysis. The analysis of the instrument trial includes tests of validity, reliability, discriminating power and level of difficulty. The final analysis includes tests for normality, homogeneity, gain score, and t-test.

## 3. RESULT AND DISCUSSION

The results showed that there were differences in the value of understanding the multiplication concept after learning between the experimental and control classes. These differences are listed in table 1 below.

Table 1. Differences in the Value of Understanding the Multiplication Concept

|               | Control |          | Experiment |          |
|---------------|---------|----------|------------|----------|
|               | Pretest | Posttest | Pretest    | Posttest |
| Sum           | 1108    | 1668     | 1142       | 1774     |
| Average       | 48,17   | 75,52    | 51,91      | 80,64    |
| Lowest Score  | 31      | 60       | 31         | 64       |
| Highest score | 66      | 86       | 77         | 93       |

Table 1 shows that there are differences in the value of understanding the multiplication concept between the experimental class and the control class. The average pretest value of the experimental class was higher than the control class ( $51.91 > 48.17$ ). The average post-test value of the experimental class was the same as the control class ( $80.64 > 75.52$ ). The lowest score for the experimental class and the control class was 31. The highest score for the experimental class was higher than the control class ( $93 > 86$ ). These results indicate that learning using the Kumon method with tapered media is effective in increasing students' understanding of the multiplication concept. This is in accordance with research conducted by Goldingay et al. (2014). The results showed an increase in understanding of the concept of multiplication and division of fractions seen from the class average value of the understanding of the concept of multiplication and division of fractions.

### 3.1. The Effectiveness of Learning with the Kumon Method with Tapetis Media

#### 3.1.1. Normality Test Results

The results of the normality test are in table 2 below.

Table 2. Results of the Initial Assessment of Students' Basic Literacy Ability

| Class                       | Kolmogorov-Smirnov |    |      |
|-----------------------------|--------------------|----|------|
|                             | Statistic          | Df | Sig. |
| Value Pretest Control class | .160               | 22 | .070 |
| Pretest Experimental class  | .174               | 23 | .051 |
| Posttest Control class      | .185               | 22 | .065 |
| Experiment class posttest   | .196               | 23 | .153 |

Based on Table 2, the results of the normality test of the pretest data with Kolmogorov-Smirnov obtained a significance level of 0.070 for the control class and 0.051 for the experimental class. The results of the post-test data normality test obtained a significance of 0.065 for the control class and 0.153 for the experimental class. So it can be concluded that both pretest and post-test data are normally distributed because the significance level is greater than 0.05. Thus the pretest and post-test data in both classes are normally distributed.

#### 3.1.2. Homogeneity Test Results

The results of the homogeneity test are in Table 3 below.

Table 3. ANOVA Homogeneity Test Results

|      |                | Sum of Squares | df | Mean Square | F    | Sig. |
|------|----------------|----------------|----|-------------|------|------|
| PRE  | Between Groups | 143.878        | 1  | 143.878     | .732 | .397 |
|      | Within Groups  | 8.447.233      | 43 | 196.447     |      |      |
|      | Total          | 8.591.111      | 44 |             |      |      |
| POST | Between Groups | 58.081         | 1  | 58.081      | .545 | .465 |
|      | Within Groups  | 4.586.364      | 43 | 106.660     |      |      |
|      | Total          | 4.644.444      | 44 |             |      |      |

The results of the homogeneity test showed a significance value of 0.397 for the pretest and 0.465 for the posttest. This figure is more than 0.05 ( $0.397 > 0.05$  and  $0.465 > 0.05$ ). So, it can be concluded that the two classes have the same or homogeneous variance.

#### 3.1.3. N-Gain Test Result

The N-gain test was conducted to determine the difference between cognitive scores before and after learning. The N-gain test was carried out after all prerequisite tests were met, both normality test and homogeneity test. Based on the normality test and homogeneity test, it is known that the data is normally distributed

and homogeneous, then proceed with the N-gain test. The summary of the results of the N-Gain Test is in table 4 below.

Table 4. ANOVA Homogeneity Test Results

| No | Class      | Average | Classification |
|----|------------|---------|----------------|
| 1  | Control    | 0,425   | Middle         |
| 2  | Experiment | 0,507   | Middle         |

Based on the summary of Table 4 above, it is found that the gain score for the experimental class is 0.507, while the gain score for the control class is 0.425. Based on the classification, the N-gain control and experimental classes are included in the medium category. The results of the gain test can be concluded that the difference between the experimental class is higher than the control class, so it can be concluded that the learning in the experimental class is better than the control class. Furthermore, to prove the hypothesis, it is continued with the t test.

### 3.2. T-Test Result

The results of the t test are in table 5 below.

Table 5. t-Test Result

|            | t      | Df     | Significant | Average | Lowest | Highest |
|------------|--------|--------|-------------|---------|--------|---------|
| Control    | -3.819 | 43     | .000        | 72.52   | 60     | 86      |
| Experiment | -3.792 | 38.262 | .001        | 80.64   | 64     | 93      |

Table 5 shows that the average of the experimental class is higher than the control class (80.64 > 72.52) and the significance level < 0.05 is 0.000 < 0.05 and 0.001 < 0.05, then is accepted. In other words, the Kumon method with tapered media is more effective in improving students' understanding of the multiplication concept. The Kumon method with tapered media has its advantages. The advantages of the Kumon method according to Shoimin (2014), are lesson materials are composed of small steps, students work on questions independently from easy to difficult levels, students work on questions according to their abilities, and invite children to be disciplined. Tapestry media makes it easier for students to learn multiplication material up to thousands of numbers.

The Kumon learning method is a learning method by linking concepts, skills, individual work and maintaining a comfortable and pleasant atmosphere. The learning materials are designed so that students can work on their own abilities, even allowing children to study material above their grade level at school (Sarabia & Collantes, 2020). The Kumon method is an individual learning method. Students are required to be active according to their ability level. The Kumon method is a unique educational method, which does not generalize the abilities of each student. Based on individual tutoring and learning at the right level, Kumon wants to develop each student's abilities and maximize their potential. By exploring the potential of each individual, Kumon encourages students to be the best they can be.

The Kumon method given individually at the right level and portion will develop students' mathematical abilities. In addition to studying in a short time and regularly every day, students will form the ability to concentrate, work dexterity, thinking skills, study habits and self-confidence which are the basis for learning other things. The Kumon method not only improves the mastery of mathematics, but also various learning abilities in students, ranging from concentration and work dexterity, the spirit of independent study habits, the habit of studying every day. If he can solve math practice problems from school quickly, then he can use the remaining time to study other sciences. As a result, other lessons will definitely improve (Qohar & Sumarmo, 2013).

Kumon emphasizes the independence of students in solving math problems with teacher guidance. The Kumon method also requires students to be proficient in completing the learning steps, so that students can carefully complete teaching and learning activities according to their abilities. Through individual guidance of learning at the right level, Kumon strives to enhance each child's abilities and maximize their potential. Students start from the part that they can do on their own easily, without mistakes. Through achieving targets with their own abilities, children will feel joy and satisfaction.

Media is a graphic and photo graphic tool for capturing, processing or rearranging visual or verbal information (Tzohar-Rozen & Kramarski, 2014). The development of teaching materials with media makes

learning more focused and more interesting. So that students feel they have a great curiosity and focus on paying attention to learning. According to Susanti (2013) learning media is a tool that can help the teaching and learning process and serves to clarify the meaning of the message conveyed, so that it can achieve learning objectives better and more perfectly. Learning media can be grouped into four groups, namely media resulting from print technology, media resulting from audio-visual technology, media resulting from computer-based technology, and media resulting from a combination of print and computer technology.

From the opinion of experts, learning media is a tool used to deliver learning materials so that learning takes place effectively and efficiently. The learning media used in this research is visual learning media. Visual media is media that can be seen only, does not contain sound elements. Visual media are media that involve the sense of sight. This media can only convey messages through the sense of sight or can only be seen with the eyes, other senses such as the ear cannot be used for this visual media. The visual media used is "Tapertis" media. Media tapestry stands for practical multiplication table. This media will make it easier for students to learn multiplication material up to thousands of numbers.

Between mathematics and students there is a very basic difference. The characteristics of mathematics are learning abstract material, while the characteristics of students in elementary school are still concrete. They have not mastered the law of conservation of numbers which is a prerequisite for learning number operations. One of the abstract mathematical material is multiplication which has been taught is repeated addition. so many experienced errors in determining the final result of the multiplication of these numbers. If there is an error in adding up, then they have to start counting again from the beginning. Another technique is repeated exercises that emphasize the process of memorizing the results of multiplication operations. For example, the teacher usually applies the gagging technique, using multiplication tables and drills, all of which are very taxing on the memory of the students' brains. Multiplication is that multiplication is repeated addition (of the same number). This definition applies to integers. When two numbers are multiplied, the third number is called the product of the products.

Improving student learning outcomes through variations of the Kumon method. The purpose of this study was to determine the improvement of student learning outcomes through variations of the Kumon Method. The type of research used is Classroom Action Research. The results of the study using a variation of the Kumon method showed an increase in student learning outcomes. From the results of the pre-test obtained 31.81% complete learning with an average grade of 46.36. After the first cycle was carried out, the learning completeness was 59.09% with an average grade of 72.72 and teacher competence in teaching was 71.66% (competent enough). In Cycle II, completeness of learning increased to 81.81% with an average grade of 85.45 and teacher competence in teaching of 81.66% (competent). The increase in learning outcomes from the initial state (pre test) to the first cycle was 27.28% and from the first cycle to the second cycle was 22.77%. From the actions and analyzes carried out, it can be concluded that through variations of the Kumon method in learning Mathematics, it can improve student learning outcomes.

The effectiveness of combining the Kumon and TGT learning models based on character education on students' learning achievement in class VII statistics material. The analysis has been carried out and the results are that students who are given the Kumon learning model and Teams Games Tournament based on Character Education have achieved complete learning achievement with the average learning achievement obtained is 81.81 with a minimum completeness criteria of 77. influence of 0.1%, while process skills have an influence of 0.2% and activeness and process skills have an influence of 0.2%. Different tests showed that the problem-based model compared to the Kumon and Teams Games Tournament models based on Character Education had no difference. However, statistically the problem-based model is better than the Kumon and Teams Games Tournament models based on Character Education because it has a value of 84.91 more than 81.81. It can be concluded that this research is less effective.

Increasing understanding of the concept of multiplication and division of fractions through the application of the Kumon method assisted by visual media. The results of this class action research show an increase in understanding of the concept of multiplication and division of fractions seen from the average value of the class value of understanding the concept of multiplication and division of fractions, namely in the pre-action the class average value of 63.95 with a classical completeness percentage of 32.4% then increased in the first cycle with an average value of 69.86 and classical completeness of 67.56%. Then it increased again in the second cycle with the average value being 74.45 and the percentage of classical completeness was 86.48%.

#### 4. CONCLUSION

The Kumon method with Tapeertis Media is effective in increasing the understanding of the multiplication concept of elementary school students. There is a difference in the average pretest value of the experimental class which is higher than the control class ( $51.91 > 48.17$ ). There is a difference in the average posttest value of the experimental class which is also higher than the control class ( $80.64 > 75.52$ ). In addition, the experimental class n-gain test results were greater than the control class ( $0.507 > 0.425$ ). The results of the t-test also showed that the average of the experimental class was higher than the control class ( $80.64 > 72.52$ ). The results of the t test also showed a significance level of  $< 0.05$ , namely  $0.000 < 0.05$  and  $0.001 < 0.05$ . So it can be concluded that the Kumon method with tapered media is effective in increasing the understanding of the multiplication concept of elementary school students. Taperistic media needs to be developed for thematic learning in the 2013 curriculum. Teachers should be able to increase students' motivation and enthusiasm in learning, one of which is by presenting tapered media and in accordance with student characteristics and involving students in the use of media so that student learning outcomes increase.

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