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Efforts to Improve Mathematics Learning Outcomes in Flat Shape Materials through Puzzle Media

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Abstract

This classroom action research aimed to improve the mathematics learning outcomes of 17 second-grade students at MI Nurul Huda, Depok, by implementing puzzle media. The study comprised three cycles, each consisting of four stages. Data were gathered through tests, interviews, and observations. Pre-cycle assessment showed a low average score of 54.11 with a 24% mastery rate (4 students completed, 13 students incomplete). After the first cycle, the average score increased to 68.23, with a 53% mastery rate (9 students completed, 8 students incomplete). The second cycle further raised the average score to 79.70, with an 82% mastery rate (14 students completed, 3 students incomplete). In the third cycle, the average score reached 86.76, with a 94% mastery rate (16 students completed, 1 student incomplete). Interviews revealed that students found learning through puzzle media enjoyable. The findings highlight the effectiveness of puzzle media in improving mathematics learning outcomes, particularly for flat-shaped materials.

Keywords: flat wake, mathematics, puzzle media.

1 INTRODUCTION

In planning and implementing teaching and learning activities, the teacher is the main key for the success of the learning process who acts as a facilitator as well as a motivator to bring students to understanding a material (Jalinus, Nabawi, & Mardin, 2017). Therefore, teachers must have teaching skills, manage lesson plans, utilize methods or media, skills in allocating time, be creative, innovative and able to generate learning energy and develop student potential.

Many teachers don't understand how to use the facilities of learning media, as a result, many students begin to feel pressured by the many assignments given by teachers who do not pay attention to the cognitive, affective, and psychomotor domains. Learning will be effective if the discussion of material uses concrete objects, considering that the development of elementary school students in terms of cognitive is at a concrete level. Presentation of material that is concrete because it has an important role in learning activities, especially learning mathematics, because it is suitable to stimulate and motivate students in teaching and learning activities.

In learning mathematics students are accustomed to gain understanding from everyday experience with the ability to think logically, analytically, systematically, critically and creatively. For example, regarding equations, tables in mathematics. Mathematics learning that is given in schools today is just the delivery of material, followed by giving assignments and ending with giving homework. Mathematics as a very important role in everyday life to solve problems, create ideas or ideas, use symbols, tables, diagrams and other media. Most students view that mathematics is difficult because mathematics is associated with formulas and numbers, so that learning has not

yet started and students are already afraid of making students less active in learning. This makes student learning outcomes less than the KKM. Learning outcomes are abilities possessed by students after participating in teaching and learning activities (Catrining & Widana, 2018). When learning activities are said to be successful, if some or even all students have experienced changes in behavior from not knowing to knowing, they cannot become able.

Flat shape is a term for two-dimensional shapes that are bounded by straight or curved lines. There are flat shapes that have four sides and a tone that has three sides (Unaenah et al., 2020). A flat shape that has four sides consisting of a square, rectangle, parallelogram, rhombus, trapezoid. While a flat shape that has three sides, namely isosceles triangle, equilateral triangle, right triangle, and any triangle. If the understanding of the concept of the properties of flat shapes that students have is low, students will have difficulty in distinguishing the shape of a flat shape in everyday life.

Teachers can take advantage of the use of media as a tool in the learning process, especially on the flat material. In general, elementary school age children are experiencing development at the level of thinking, the stages of student thinking are still not formal and still concrete. Therefore, the teacher must present material that is real so that students can understand the concept as a whole (Asri, Rahim, & Rahmad, 2021). Media are all forms and channels used to convey information or messages in the form of any tools that can be used as learning media. Learning media is anything that can be used to convey messages that can stimulate students' thoughts, feelings, and abilities to learn (Rahim et al., 2022)

Well-designed educational games and supporting materials can be a powerful medium to stimulate student motivation (Demirbilek, 2015). One of the educational games that are suitable for exploring students' minds is puzzles. Meanwhile, according to Silmi and Kusmarni (2017), that puzzles and games are real materials to motivate oneself and have a strong attraction. In solving a challenge until it succeeds.

The puzzle media used is included in the graphic media. This is in accordance that in a visual presentation using dots, lines, symbols or images (Silmi & Kusmarni, 2017). Intends to explain, illustrate, and summarize an idea and illustrate facts so that they are easy to remember.

This study has proven that the use of puzzle media is very helpful in learning flat shape material. Because the puzzle is a form of game that challenges the creativity and memory of students so that the motivation arises to always try to solve problems, but it is still fun because it can be repeated. On this basis, this study not only aims to increase students' enthusiasm in learning, but also to see if there is an increase in student learning outcomes while using puzzle media and find out how students respond to learning using puzzle media.

Based on the description above, the researcher conducted a study entitled "Efforts to Improve Mathematics Learning Outcomes in Flat Shape Materials Through Media Puzzles for Class II Students of MI Nurul Huda Cimanggis Depok".

2 RESEARCH METHODS

The method used is classroom action research. Classroom action research is a variety of classroom-context learning research conducted by teachers to solve problems faced by teachers in the classroom. For the teacher not only to let students listen passively, but to ask students to respond to what has been conveyed by the teacher. Invite students to think, propose ideas, write down the results of the discussion, and ask students to conclude in the form of plans, diagrams, or tables briefly. This is what is called action, when students do these actions, the students' brains will be more active, students are not easily sleepy. In this way, student learning achievement will increase as expected (Arikunto, 2021). Classroom action research is included in qualitative research even though the data collected is qualitative, where descriptive descriptions in the form of

words or numbers are data collection instruments (Winarto, 2018). In classroom action research management researchers and teachers work collaboratively to find the best solution to the problems at hand, not just watching what teachers do to their students (Rahman et al., 2021).

The approach that researchers use is a quantitative approach. Quantitative data taken from cognitive learning outcomes, analyzed using descriptive analysis techniques. This approach is carried out to find out how much creativity students have in participating in the mathematics learning process, this data is taken based on observations of student learning outcomes.

The results of observations in the form of percentages are then qualified according to the criteria for the success of the learning process, in Table 1.

Table 1. Criteria for Learning Success

Achievement Rate (%)	Qualification
90 – 100	Very good
80 – 89	Well
65 – 79	Enough
55 – 64	Not enough
0 – 54	Very less

Sugiyono (2015) stated that the data collection techniques in this study were observation, learning outcomes tests, interviews, documentation, and field notes. The sample used is class II MI Nurul Huda with a total of 17 students. Conducted in the even semester of the 2021/2022 academic year. The success criteria used in this study was the application of puzzle media with multiple choice exercises (KKM=75) targeted at a minimum of 82%.

3 RESULT AND DISCUSSION

To find out whether there are differences in learning outcomes that were originally Teacher Center and puzzle media, the researchers first conducted a pre-cycle. In fact, there are still many who get scores below the Minimum Completeness Criteria (KKM) that have been set, namely 75. Researchers take action using formative tests in the form of multiple choices with a total of 20 questions. In pre-cycle researchers use student worksheets in order to find out how much students understand about the types of types and forms of flat shapes, in fact, most students are still unable to understand the shapes of flat shapes so that there are still many who get scores far from the KKM.

Table 2. The Analysis Result for Pre-cycle, Cycle I, II, and III

Cycle	Average	%	Total students	
			Uncompleted	Completed
Pre-cycle	54.11	24	13	4
Cycle I	68.23	53	8	9
Cycle II	79.70	82	3	14
Cycle III	86.76	94	1	16

Based on Table 2, Figure 1 shows the graph of mathematics learning outcome completeness through the application of puzzle media. The orange chart represents the number of students who are incomplete, while the grey chart represents the number of students who have completed.

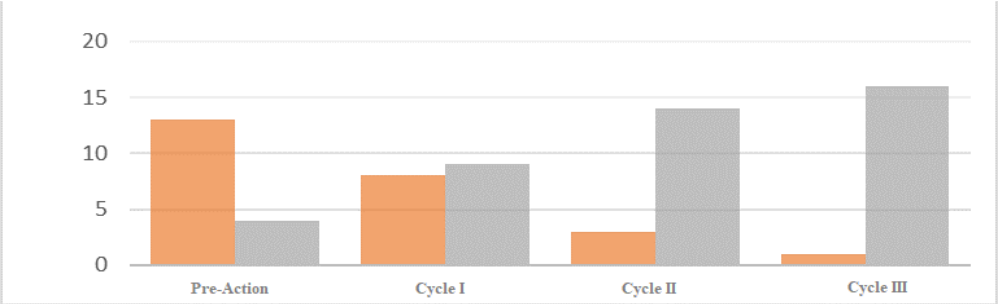

Figure 1. Graph of student learning completeness

3.1 Pre-Action

Classically, learning Mathematics on flat-shaped material is declared incomplete, because the class average value is 54.11. Meanwhile, the KKM score is 75, 4 students who get a score above the KKM and 13 students who get a score below the KKM. While classical completeness only reached 24%, while the specified classical completeness was 82%. So it is necessary to conduct research in cycle I.

3.2 Cycle I

Based on the results of the observation of the first cycle of action, it is known that the implementation of learning using Puzzle media has not been maximized. Students are still less active in learning by using puzzle media, many students still talk to their friends when the learning takes place.

Classically, learning Mathematics in this flat shape material is declared incomplete, but there is an increase in the number of students during the pre-cycle, because the average value of the class during the pre-cycle is 54.11 but has an average increase to 68.23, as for 9 students who get scores above the KKM and 8 students who are still below the KKM. While classical completeness reached 53% while the specified classical completeness was 82%. So it is necessary to conduct research in cycle II.

3.3 Cycle II

Cycle II is a follow-up to the shortcomings in the implementation of cycle I. The deficiencies in cycle I will be corrected in cycle II. The learning activities in the second cycle are still the same as the first cycle, which is discussed are the kinds of flat shapes and the number of sides.

From the test results on the student worksheets in cycle II, there was some progress in the results of the students' practice questions. In the second cycle of action, the maximum results have not been achieved, according to what the researchers expected, namely the value of learning outcomes that reach an average value above the KKM. There are still many students who do not concentrate. From the results of the second cycle of interviews, the answers given by students were quite good, but there were some students who wanted to work alone, not in groups, the activities of students had started to progress compared to cycle I. Classically, learning Mathematics in this summation material is stated has not been completed, but there is an increase in the number of students during the first cycle, because the average value of the class during the first cycle is 68, 23 but experienced an average increase to 79.70, as for 14 students who scored above the KKM and 3 students who were still below the KKM score. Meanwhile, classical completeness only reached 82%, while the specified classical completeness was 82%. So it is necessary to conduct research in cycle III.

3.4 Cycle III

From the results of observations that have been made in the form of student worksheets in the third cycle of action, there are many progress or changes in students in learning. In addition, students play an active role, concentrate more, and can cooperate with each

other in doing the tasks given by the researcher. In cycle III, the learning outcomes of students are increasing, it is indicated by the average value already above the KKM, which is 75.

Based on the data above, it can be seen that the percentage of data scores below the KKM is only 6% consisting of 1 student, while the percentage of students who have achieved a value above the KKM is 16 students or 94%. There has been an increase in student learning outcomes from the previous cycle and this is illustrated in the observation sheet. This result is the final result that researchers get while taking action with colleagues in an effort to improve student learning outcomes about flat wakes through Puzzle media.

3.5 Findings

Based on the results of the action research that has been carried out as many as III cycles with the aim of improving student learning outcomes on flat-shaped materials through puzzle media. The results of observations in the pre-cycle, the researchers introduced flat shapes. At the time of giving an explanation, many of the students were still silent (stupid) and did not focus on listening to the teacher's explanation. So that the average value obtained is only 54.11. 4 students or 24% who get a score above the KKM and 13 students or 76% who get a score below the KKM. So it is necessary to carry out the first cycle of action.

The results of observations in the first cycle of students are still less active in learning, even the average value has not met the KKM that has been set. From the results obtained, the average value in the first cycle was 68.23. Students who scored above the KKM were 9 students or 53% and students who still scored below the KKM were 8 students or only 47%. Researchers conducted interviews with informants and the results of the interviews varied, some answered happy and some answered normal. Student activities that are less visible in the first cycle of action, it is necessary to take further action, namely the second cycle.

In the second cycle of action, the researcher emphasized the active role of students. From the data collected in the second cycle, the average value was 79.70. With the number of students as many as 14 students or 82% got a score above the KKM, and 3 students or 18% still experienced a score less than the KKM, according to what researchers expected, namely the value of good learning outcomes. From the results of interviews in cycle III, students experienced a fairly good increase, but there were some students who wanted to work in groups not individually.

Then the action in the third cycle, student learning outcomes have improved better, reaching an average of 86.76. However, there are still students who score below the KKM, only 6% consisting of 1 student due to mental limitations, while the percentage achieved by 16 students or 94% has improved very well. Field notes obtained in cycle III progressed, there were no longer students joking, running and chatting. Students are more focused and listen well, even students are more active and independent in discussing. Students also feel satisfied and happy with learning through puzzle media.

Even though by applying puzzle media, learning completeness is only at 94% (already exceeding the Success Criteria, which is 82%). This needs to be studied further. According to Aeni, Evayenny, and Ratnayanti (2021), one of the factors that influence student learning motivation is family support, for example parenting styles for students. the attitude of parents who have to spend time in accompanying and helping students study at home, so that students are not lazy to do school assignments, students feel cared for, this can help students to increase their enthusiasm for learning.

4 CONCLUSION

Based on the results of the study, it showed that there was a positive influence on the use of puzzle media on learning outcomes in the Mathematics subject of Bangun Datar. It

can be seen from the comparison of the average value which initially only reached 54.11, while after using puzzle media the average value increased to 86.76. Therefore, the application of puzzle media is a suitable method in improving student learning outcomes, especially in learning Mathematics for the matter of Bangun Datar. That through puzzles used in learning is one alternative to improve student learning outcomes, besides that students can understand and understand real activities.

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