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Improving Mathematics Learning Outcomes Assisted by the Snakes and Ladders Game Media for Fifth Grade Elementary School

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Abstract

This study aims to improve and determine the feasibility of the snakes and ladders mathematics educational game tool by discussing the main volume of cubic and block geometric shapes. The design of this study uses the Classroom Action Research model which in its implementation used two cycles. The independent variable in this study is the learning media for snakes and ladders game, with the dependent variable, namely the increase of student learning outcomes. The population in this study were students at SDN Jetak, with a sample of 12 students. This research consisted of two cycles, which consisted of planning, implementing, monitoring, and reflecting. Learning is increased in cycle 2 if the indicators in cycle 1 have not achieved the learning success. The collection and analysis of information is carried out on the results of the implementation of the study and the observations. The results showed that the use of snakes and ladders educational game learning media can improve learning outcomes and changes in attitudes towards mathematics learning material volume of cubes and blocks. The increase is indicated by the average cycle 1, which is 53.75 and increases to 82.9 in cycle 2, which means an increase of 29.15 or equivalent to 54.23%. Thus, it was concluded that the learning media of snakes and ladders educational games can improve learning outcomes and changes in student achievement in learning. Learning to use good media, snakes and ladders and other learning tools can make learning more active.

Key words: Game Media, Learning Outcomes, Mathematics, Snakes and Ladders, volume of geometric figures

INTRODUCTION

Education is a conscious effort to make something happen from generation to generation. So far, education has no limits to explain the hierarchy of education as a whole because of its complex nature as a target, namely learners. Complex character is often called as the education. Science education is a continuation of training. Science education is more related to educational theory prioritizing scientific thinking. There is a relationship between education and science education in practical and theoretical terms. Thus, in the process of human life, they work together with each other (Yumriani, 2022).

Mathematics in particular is still often considered a difficult subject matter for elementary school students because according to them learning mathematics is a difficult, boring and uninteresting subject. According to (Meisa, 2017) Mathematics is an important science for life; therefore, mathematics learning occurs at all levels of school, even in universities. However, the facts that occur in the field are that many female students make

mathematics the most frightening lesson. Moreover, in many schools teachers tend to teach mathematics material in a monotonous manner by providing existing formulas and are less creative and innovative, making students bored.

The use of media in learning is a serious consideration, some media will help teachers explain abstract material so that students can understand it easily. Therefore, the media has a big role in the success of learning. A teacher also has a role in the production of technology media products which can later be used to facilitate learning. A teacher's creativity is needed to create, develop and use media in the learning process.

The results of interviews with several teachers found that there were teachers who were still teaching without using learning media. The effect of deficiencies in the use of this media is a decrease in student activity and motivation in learning. One solution to the decline in student activity and motivation is the use of educational media (Faturrohman, 2015). Increasing activity and motivation to learn will ultimately improve student learning outcomes.

Based on the results of interviews conducted at SDN Jetak with the fifth grade teacher, data was obtained that there were many material problems discussed in mathematics learning, one of which was material about the area and volume of geometric shapes (cubes and blocks). This material is considered difficult by many students. Based on the results of observations and interviews conducted at SDN Jetak in class V, it shows that fifth grade students at SDN Jetak have difficulty learning in the area and volume of cubes and blocks. Most of them find it difficult to cover the area and volume of geometric shapes (cubes and blocks) because there are many formulas that they have to memorize to solve a problem related to this material.

Research conducted by (Riswari & Ernawati, 2020) showed that the method for learning mathematics in elementary schools has lower learning outcomes than learning carried out using certain media or learning models. (Harris, and Nurjannah, 2022) added that using the snakes and ladders game as a learning medium can increase elementary school students' learning motivation.

Apart from learning motivation, students' interest in learning also has a big influence on learning outcomes. It can be found that the students' low interest in learning in mathematics subjects when carrying out direct observations, for example students often talk to themselves, students lack enthusiasm for learning, students are less active in learning, and students feel bored and less happy with the subject being taught (Saputro, Setiawan, & Riswari, 2022).

According to (Riswari & Ernawati, 2020), the ways to solve problems in mathematics learning can be done in various ways. The use of varied learning media can make students understand more in each lesson in class. Teachers are required to think creatively if they want students to be active in the classroom. Overcoming this problem can be done by creating learning media in the form of a snake and ladder game of area and volume (cubes and blocks). The snakes and ladders game is a fun game for students. By playing the game, they will

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feel happy. Learning will be carried out well when students are happy. It could be said that fun learning will bring a positive aura which will result in more knowledge being absorbed when learning using these learning methods, media and models.

The snakes and ladders game is a game that is often played by most children so it will be easy for children to play it (Salombe, 2021). Students can be expected to be able to follow the instructions given by the teacher even though they already know the flow of the game. According to (Afandi, 2015), the snakes and ladders game is a game played on a board that can be played by two or more people. This game is a traditional game usually played by children so there is no clear source about when this game was discovered.

The implementation of learning media is very necessary because the presence of media can help teachers to convey material in class (Wardana, Riswari, & Kinororatri, 2023). In the classroom, it is not only a learning medium, but there needs to be important motivation for students so that they can generate enthusiasm for learning and can improve their learning outcomes. This snakes and ladders game is intended to familiarize students with working on mathematics problems on the area and volume of existing spatial figures. The questions that exist and are given for each number that their pawn occupies they have to work on. With this kind of thing, they become accustomed to working on problems related to the area and volume of cubes and blocks. Over time, this habit will stick and eliminate the term "mathematics memorizes a lot of formulas" because they are used to doing it and will memorize it by themselves without having to open the book to look at the formula again.

According to (Jamalia, 2018), Educational media is anything (can be people, objects, or the environment) that can be used to convey or channel messages in learning so that they can be carried out and can stimulate students' attention, interest, thoughts and feelings towards learning activities. Learning media can be used in various ways. For example, students can play interesting and not boring games such as snakes and ladders. Implementing media when playing games can provide many benefits so it is very important at elementary school age, one of which is facilitating student activities, learning and understanding abstract educational material (Prabowo, 2020).

The aim of this research is to improve students' learning outcomes using the learning media educational game called as the snakes and ladders in mathematics with a main discussion of the volume of cubes and blocks. The focus of this research was carried out on fifth grade students at SDN Jetak, this is because the students are still low in learning mathematics, especially the volume of geometric figures, cubes and blocks. Therefore, it is necessary to carry out research on improving mathematics learning outcomes on volume and space figures using snakes and ladders media.

METODE

The approach used in this research is a qualitative and quantitative approach. The type of research used is

classroom action research. This classroom action research was carried out with the aim of improving student learning outcomes in mathematics learning on the volume of cubes and blocks. This research took samples from fifth grade students at SDN Jetak, Pati Regency, using the educational learning media of the snakes and ladders game.

The classroom action research used in this research refers to the model (Kemmis and Suhardjono, 2018). This research will carry out two cycles, each cycle consisting of one meeting. Each cycle consists of 4 steps, namely: (1) Planning, (2) Implementation, (3) Observation, and (4) Reflection.

The subjects of this research were class V students at SDN Jetak consisting of 12 students. There are two types of research collected, namely pre-test data and post-test data. Data was also obtained from observations of teacher and student activities during the learning process.

The data collection techniques used include interviews, observation, pre-cycle, cycle I and cycle II, documentation, and tests to measure learning outcomes. The data analysis technique used is qualitative and quantitative data analysis which describes the reality according to what was obtained to determine the effectiveness of the educational media of the snakes and ladders game in improving learning outcomes on the volume of cubes and blocks. There are 3 stages in analyzing qualitative data including, (1) data reduction, (2) data presentation, and (3) conclusions.(Sugiyono, 2019)

Data analysis, evaluation and reflection are carried out from the beginning to the end of research activities. Analysis begins with collecting data from interviews, observations, evaluation tests, field notes, as well as documentation. Data from observations of teacher activities, student activities, student learning outcomes, aspects of students' skills and knowledge during learning are calculated based on a specified formula.

The formula for the percentage of results from cycles I and II is as follows:

$$\% = \frac{Cycle\ II - Cycle\ I}{Cycle\ II} \times 100\%$$

(Arikunto, 2019).

Then students' conclusions were grouped between students who got scores above the average into the categories of complete and incomplete learning, both individually and in groups. Students are concluded to have completed individually if their score reaches the specified standard, namely 70, while students have not completed if their score is below 70. Classical completion is determined by a minimum of 80% of students in the class completing their studies. If it is less than 80%, then action is needed in the next cycle.

RESULT AND DISCISSION

Data from observations obtained from interviews conducted by the homeroom teacher, obtained information that student learning outcomes were still relatively low. Of the 12 students, there were only 4 students or around 30% of students who got

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scores above the standard which had been determined by the school, namely 70. Meanwhile, 8 students or around 70% got scores below 70. This minimal percentage of student learning outcomes provide solutions that can be done to overcome this by carrying out cycle I learning for mathematics learning, especially cubes and blocks by giving pre-test questions first. The results of measuring pre-cycle values are presented in table 1 and figure 1. Data on pre-cycle and cycle I values are presented in Table 2.

Table 1 Pre-Cycle Value Data

No.	Description	Pre Cycle Values
1.	Lowest value	35
2.	The highest score	85
3.	Average value	52.91
4.	Amount of data	12

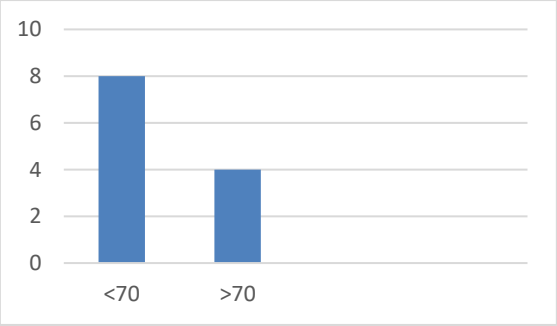

Figure 1 Precycle Value Histogram

The results of observational findings regarding student activities in cycle I at the initial meeting obtained percentage data when in class the teacher's activities explained more using the lecture method, even almost 80% with the aim of obtaining good success criteria. The information received shows that the fifth grade teacher uses educational media in teaching and learning activities at school, especially in mathematics and the volume of cubes and blocks. However, innovation in the use of learning media has not been fully maximized. There needs to be more innovation in learning media that can be used in the process of teaching and learning activities in the classroom.

According to Kemp and Dayton in(Daryanto, 2020), the contribution of learning media includes delivering standardized learning messages, making learning more interesting, making learning more interactive through the application of learning theory, shortening learning delivery time, and including improving the quality of learning. The learning process can be carried out anytime and anywhere according to needs, can increase students' positive attitudes towards learning material and the learning process, and can change the role of the teacher for the better. The existence of learning media makes the learning process more fun and effective, anytime, anywhere.

Table 2. Pre-Cycle and Cycle 1 Value Data

No.	Student's name	Precycle	Cycle I
1.	VA	35	40
2.	AD	85	85
3.	RNS	75	75
4.	SNA	70	70
5.	FNA	70	70
6.	RR	35	40
7.	AND	35	35
8.	KIN	50	50
9.	ANH	55	55
10.	SW	45	45
11.	DSP	40	40

12.	TD	40	40
>70		4	4
<70		8	8
Average		52.91	53.75
Percentage Increase			1.5%

Data from observations in cycle I, indicated an average test result of 53.75 from Jetak Elementary School students, so it is still far from the criteria for good student success.

Based on the results of observations carried out in cycle I at the initial meeting, the results were: 1) The teacher was felt to be less assertive and therefore less able to coordinate the class, 2) The teacher often missed conveying objectives during the lesson, 3) Lack of teacher activity when dividing groups/teachers did not monitor the groups one by one, 4) Student cooperation in group ethics was felt to be lacking, 5) When dividing into groups, the situation for students was less conducive so that the class atmosphere became busy and noisy, giving the impression of playing around, 6) In the closing activity the teacher did not carry out an evaluation /question and answer questions to students so that teachers don't know what students don't understand, 7) The results of student learning in cycle I are deemed sufficient to have achieved the target but are still not optimal so there are still some students who have not reached the standard determined at the school. Therefore, the problems and deficiencies that is encountered in cycle I need to be corrected and follow-up plans made for the next meeting in cycle II in order to achieve maximum results.

Table 3. Data from Cycle I and Cycle II Results

No.	Student's name	Cycle I	Cycle II
1.	VA	40	75
2.	AD	85	95
3.	RNS	75	85
4.	SNA	70	90
5.	FNA	70	85
6.	RR	40	80
7.	AND	35	80
8.	KIN	50	75
9.	ANH	55	80
10.	SW	45	75
11.	DSP	40	90
12.	TD	40	85
>70		4	12
<70		8	0
Average		53.75	82.9
Percentage Increase			54.23%

In cycle II, the average increase was 82.90 with good criteria. The achievement of increasing student activity from cycle I to cycle II reached 29.15 with a percentage of 54.23%.

The increase in student activity occurred because it was supported by increased student activity and courage during the learning process, and students were accustomed to learning using the snakes and ladders game as media.

Based on the results of research carried out starting from pre-action, cycle I, cycle II, it is known that the application of the educational game media snakes and ladders in class V of SDN Jetak can improve student learning outcomes in mathematics subjects volumes of cubes and blocks.

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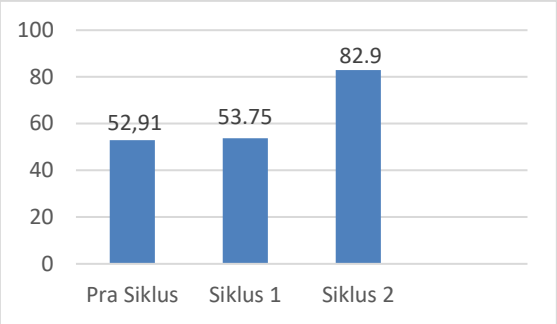

Figure 2. Improved Learning Outcomes

The learning outcomes of class V students who experienced action from the results of cycle I got a result of 53.75, which was an increase as evidenced by the questions in cycle II which had an average of 82.90 with a presentation increase of 54.23%.

Based on the results of this research, it can be seen that there was an increase in mathematics learning regarding the volume of cubes and blocks in class V students at SDN Jetak after learning using the snake and ladder game media.

Based on the results of observations made in cycle II in class meetings, the results were that: 1) the teacher was firm with the students and was able to coordinate the class, 2) the teacher had conveyed the learning objectives so that students already knew the learning objectives at the beginning of the lesson, 3) The teacher has monitored each group when carrying out group assignments, 4) Students feel they have worked together enough in groups, 5) During teaching and learning activities, student activities are conducive and can be easily managed, 6) Students have participated in learning well, including listening instructions given by the teacher, and has also carried out the guidance well, 7) In cycle II, the shortcomings contained in cycle I have been corrected, 8) The increase in student learning outcomes has achieved quite a significant increase compared to cycle I, the increase obtained was 29.15 points or 54.23%. This means that there is no need to hold cycle III and in cycle II there has been quite an increase in terms of the increase in student learning outcomes.

From the findings obtained during the implementation of cycle I and cycle II which were carried out at SDN Jetak obtained in cycle one, the findings included: 1) In the classroom conditioning the teacher felt it was still lacking and had to be improved in the future, 2) In the learning process the teacher did not convey the aims of the learning, 3) Teachers in monitoring students in groups are still lacking, 4) Students in contributing in groups are still lacking so students only ask smart students to do group assignments, 5) When dividing into groups, the situation for students is less conducive so the atmosphere the class becomes busy and noisy so it seems like they are playing around, 6) In the closing activity the teacher does not carry out evaluations/questions and answers to the students so that the teacher does not know what the students do not understand, 7) The results of the students' learning in cycle I are deemed sufficient to have achieved target but it is still not optimal so there are still some students who have not reached the standard score determined at the school. So from the findings above, it can be concluded that cycle II must be implemented to improve the problems faced in cycle I.

In cycle II, teaching and learning activities increased quite rapidly so that

problems that arose in cycle I could be resolved in the actions taken in cycle II. In cycle II, the findings during the learning process which include: 1) The teacher is good enough at coordinating the class so that students are conducive and have experienced improvement in this second cycle, 2) The teacher has conveyed the learning objectives at the beginning of the learning activity. , 3) Students are used to carrying out group activities so that students do not ask one of the smart students to complete the assignment, 4) The classroom situation is conducive when the teacher releases learning media and students are more focused compared to the first cycle yesterday, 5) Learning media is already used according to its use and not used for playing around, 6) Student learning outcomes in cycle II experienced a significant increase compared to cycle I, so that the percentage increase reached the specified target and was considered successful in implementing this problem.

The learning media for the snakes and ladders game in mathematics subjects with material on the volume of cubes and blocks which was carried out in class V of SDN Jetak has gone well and is in accordance with the initial planning. This research activity was carried out over two cycles, in each cycle it was carried out during one meeting in Allocate 35 minutes for each meeting.

The percentage in the implementation of learning using the learning media of the snakes and ladders game in mathematics by the teacher is in accordance with the guidebook that has been created and the steps for its implementation are in accordance. In cycle I, the average result of teacher activity in implementing the snake and ladder game learning media of 3.6 with a total of 4 so it can be said to be very feasible. In this first cycle, good achievements were achieved, but there were still several subjects included in the lesson plan that were missed. In cycle I the teacher was not able to coordinate the students and did not convey the objectives of the learning, when the core learning activities were carried out the teacher did not monitor and guide the students in the tasks carried out by the students in groups, in the closing activity the teacher did not carry out questions and answers to the students so the teacher could not find out what things the students don't understand and finally the teacher hasn't reflected on the students.

Cycle II experienced an increase in student test results after using the snakes and ladders educational game media. The increase obtained almost reached 29.15, from the initial pre-test score of 53.75, it rose to 82.90. This increase occurred because the learning carried out experienced improvements in accordance with what was wanted to be achieved.

The activities carried out by students in the experimental use of the snakes and ladders educational game media for cycle I obtained an average result of 53.75, proven when working on questions with less than satisfactory success criteria. This average achievement of students is considered to still have difficulty adapting to mathematics learning.

The learning outcomes of class V students who experienced action from

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the results of cycle I got a result of 53.75, which was an increase as evidenced by the questions in cycle II which had an average of 82.90 with a presentation increase of 54.23%.

This problem is also in line with the problem developed by (Setyawan, 2020) that there are several problems such as difficulty remembering multiplication, difficulty determining the formula to be used to solve problems, and difficulty calculating using multiplication. This can be seen in the students' inability to understand mathematical geometry material. As a result, student learning outcomes continue to decline and decline. These problems stem from the fact that students do not want to repeat what they have learned. Students study only once or just before taking the exam.

Research carried out (Novita & Sundari, 2020) in class 4 of SDN Court 2 Kota Bogor, it was found that an increase in student learning outcomes through the use of the digital snakes and ladders game media had been demonstrated. This shows that the use of this media can make learning more enjoyable for students, which can be considered as a result of improving student learning outcomes.

Based on the results of the research, fifth grade students at SDN Jetak achieved better results in learning mathematics on the volume of cubes and blocks after using the snakes and ladders game. Students became more active during the lesson, especially on volume material, cubes and blocks.

CONCLUSION

Based on the research results, it shows that the use of the snakes and ladders educational game learning media can improve learning outcomes and change students' attitudes towards learning mathematics regarding the volume of cubes and blocks. The increase is shown by the average in cycle I, namely 53.75 and increasing to 82.9 in cycle II, which means an increase of 29.15 or the equivalent of 54.23%. Learning uses good media, snakes and ladders.

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