


Learning Mathematics On Number Patterns Using Tile Arrangement Context To Improve Students' Learning Outcomes

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Article Info	ABSTRACT
<p>Keywords: Learning Outcomes, Classroom Action Research, number patterns</p>	<p>This research aims to improve student learning outcomes through the application of mathematics learning in the context of tile arrangements in number pattern material. The research subjects were students of class VIII SMP Yayasan Bakti Prabumulih . The method used in this research is Classroom Action Research (PTK) which consists of two cycles. Each cycle includes planning stages, action implementation, observation and reflection. Data was obtained through learning results tests, observations and interviews. The research results show that the use of tile arrangement contexts in learning number patterns can improve student learning outcomes, as indicated by an increase in the average student score in each cycle. In Cycle I, only 25% of students completed and 50% were actively involved in learning. In Cycle II, students who completed increased to 85% and students who were active in learning increased to 80%</p>
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INTRODUCTION

Mathematics is one component of a series of subjects that play an important role in education. In general, mathematics learning at both elementary and secondary levels is still considered a difficult subject for students to understand, so students are initially afraid of mathematics. In the 2013 curriculum, one of the main materials for eighth grade mathematics lessons in Junior High School (SMP) is Number Patterns. The expected results based on basic competencies are (1) students are able to make generalizations of patterns in number sequences and object configuration sequences, (2) Students can solve problems related to patterns in number sequences and object configuration sequences.

To achieve the expected results above is not as easy as turning the palm of your hand because the facts in the field show that many junior high school students still have difficulty understanding number pattern material. This statement is in accordance with that expressed in the research of Ariyanti & Setiawan (2019) that in learning number patterns, students still have difficulty in formulating generalizations of number patterns. In addition, according to Yamin (2021), there are still students who are wrong in writing the formula for the n th term and are wrong in determining the value of the first term. This is because teachers still use conventional learning methods, namely by asking and answering questions and lectures only, so that students are less able to reason independently (Akbar, et al., 2018). In addition,

learning activities are still dominated by teachers, monotonous, and use procedural methods (Munawaroh, et al., 2019). To overcome this, an appropriate learning strategy is needed for number pattern material. The learning strategy in question should be contextual, namely by giving students examples based on activities carried out by students. This statement is in accordance with that expressed in the research of Dewi & Agustika (2020) that the learning used should be contextual, namely students are given real problems so that they feel challenged and interested when participating in the learning process in class. One approach that can be used by teachers in schools is the Indonesian Realistic Mathematics Education (PMRI) approach. The PMRI approach is an approach that utilizes everyday life where this approach places emphasis on the use of a situation that can be imagined by students (Prihartini, et al., 2020). According to Putri (2014), the PMRI approach is one approach that can be used in learning mathematics, where mathematics must be close to students and relevant to students' daily life situations. In the PMRI approach, context functions as a starting point for students in developing mathematical understanding and at the same time using the context as a source of mathematical applications (Zulkardi and Putri, 2006). Context is a situation or natural phenomenon/event related to the mathematical concept being studied (Zulkardi & Putri, 2006; Yansen et al., 2019). Context does not have to be a real-world problem but can be in the form of games, use of teaching aids, or other situations as long as they are meaningful and can be imagined in the minds of students (Wijaya, 2012). In PMRI, tiles can be a context in learning mathematics on number pattern material. From the description above, the author is interested in conducting research entitled "Learning Mathematics on Number Pattern Material Using the Context of Tile Arrangement to Improve Student Learning Outcomes".

METHOD

This type of research is Classroom Action Research (CAR). This research was conducted rationally, systematically and empirically on various actions carried out starting from planning to evaluating real actions in the classroom. The subjects of this study were students of class VIII of SMP Yayasan Bakti Prabumulih. This CAR was conducted on November 4-19, 2024. This study applies a two-cycle design that includes four main stages, namely: (1) Planning, (2) Implementation of actions (Acting), (3) Observation and evaluation (Observing & Evaluating), and (4) Reflection (Reflecting), as stated by Kemmis and McTaggart (Arikunto, 2010). In the first cycle stage, there are four stages, namely: (1) Planning, At this stage, researchers prepare learning plans, prepare observation guidelines to assess student activity, discuss with colleagues in designing research instruments, and condition students to be able to follow the learning process optimally. (2) Implementation of action (Acting), This stage is the implementation of action in the learning process in the classroom. The researcher has prepared the instruments that will be used and displayed them classically in front of the class so that they can be seen by all students. (3) Observation & Evaluation (Observing & Evaluating), At this stage, the researcher makes observations during the learning process. This observation is carried out simultaneously with the implementation of the action, where the researcher records various important aspects that occur during learning. Data collection

is carried out based on the previously prepared learning design, including in-depth observation of the implementation of the learning scenario and its impact on the process and student learning outcomes. (4) Reflection (Reflecting), At the reflection stage, the researcher thoroughly analyzes the actions that have been carried out based on the data collected.

Evaluation is carried out to improve the actions in the next cycle. Reflection in Classroom Action Research (CAR) includes analysis, synthesis, and assessment of the results of observations. If obstacles are found in the reflection process, improvements are made through the next cycle, which includes re-planning, re-implementing the action, and re-observation until the problem can be resolved. In the second cycle, the learning process still consists of four stages that are adjusted to the results of the reflection in the previous cycle: (1) Planning, the researcher re-arranges the learning plan, prepares guidelines for observing student activity, and discusses with colleagues in compiling research instruments. At this stage, the learning design is improved based on the weaknesses found in Cycle I. (2) Implementation of the action (Acting), the researcher uses a picture of a tile arrangement as a learning medium displayed in front of the class. Demonstration of the use of this media is carried out by the researcher and student representatives. (3) Observation & Evaluation (Observing & Evaluating), At this stage, the researcher observes student learning activities during the learning process and evaluates the effectiveness of learning. (4) Reflection, At the final stage, the researcher reflects on student learning activities during the learning process, which is then followed by a post-test (final test) using student worksheets to measure their learning outcomes after implementing this learning strategy.

DISCUSSION

Results

Before making improvements to learning, the researcher first carried out pre-cycle activities. In the pre-cycle activities, the researcher delivered the material without using any media and only used the lecture method. Furthermore, students were given questions related to the material as a form of evaluation. The results of the pre-cycle showed that the average score of students was only 43. Of the 20 students, only 10% achieved the KKM (Minimum Completion Criteria). Therefore, it is necessary to improve learning by implementing Cycle I.

In Cycle I, the researcher who acted as a teacher gave students the opportunity to ask questions with the teacher and discuss with fellow students. After that, the teacher gave assignments to the students. The evaluation results showed a slight increase. This increase was reflected in the increased motivation and enthusiasm of students in participating in the teaching and learning process, as well as the reduced attitude of students who were sleepy during learning. After implementing Cycle I, the average score of students increased to 61.25. In addition, the number of students who achieved the KKM also increased by 25%. Although there was an improvement, this increase was still not significant. Therefore, the researcher continued to Cycle II as an effort for further improvement.

In Cycle II, the researcher who acted as a teacher used image media in the form of tile arrangements as a context in learning. The use of this context increases students' learning motivation because learning becomes more interesting and enjoyable. Students can

participate by demonstrating number patterns using tile arrangement images. This attracts their attention, fosters enthusiasm, and gives a positive impression so that students are more motivated to learn seriously.

After learning improvements were made in Cycle II, there was a significant increase. The average student score increased to 78.75. In addition, the number of students who achieved the KKM also increased by 85%. Student learning outcomes during the pre-cycle, cycle I and cycle II can be seen in Table 1 below.

Table 1. Student Learning Outcomes

No	Uraian Description	Precycle	Cycle I	Cycle II
1	Percentage of KKM	10 %	25%	85%
2	Average test score	43	61,25	78,75
3	Number of students who completed learning	2	5	17
4	Number of students who did not complete learning	18	15	3

Based on Table 1, it can be seen that the number of students who completed their studies increased from the pre-cycle, Cycle I, to Cycle II. In addition, the average test scores also increased in each cycle. In Cycle I, students began to be given actions through assignments. However, when the learning activities took place, only a few students appeared active and enthusiastic in completing the assignments given. In Cycle II, students' enthusiasm for learning increased significantly, and the learning process was more interactive between students and teachers. The results of student learning activities in the pre-cycle, Cycle I, and Cycle II can be seen in Table 2 below.

Table 2. Student Learning Activities

No	Student involvement in learning	Precycle number of students	%	Cycle I number of students	%	Cycle II number of students	%
1	Actively Engaged	3	15%	10	50%	16	80%
2	Passively Engaged	4	20%	5	25%	4	20%
3	Not Engaged	13	65%	5	25%	0	0%
Amount		20	100%	20	100%	20	100%

Based on the table above, it can be seen that the number of students and the percentage of students actively involved in learning, both before and after the learning improvement, showed an increase. Before the learning improvement, there were 3 students actively involved (15%), then increased to 10 students (50%) in Cycle I, and increased again in Cycle II to 16 students (80%).

The condition of students who learn actively, enthusiastically, and interactively can

affect student learning outcomes. This can be seen from the results of the researcher's observations regarding student motivation and improvements in student learning outcomes.

Discussion

The things found by the researcher at the beginning of Cycle I greatly influenced the next cycle. As previously stated, in Cycle I, students were less enthusiastic, passive, and tended not to pay attention to the lesson, so that student learning outcomes were low. This encouraged the researcher to find a solution in order to find the right way to improve learning in the next cycle.

After Cycle II was conducted in class VIII of SMP Yayasan Bakti Prabumulih, the researcher felt confident that high student motivation could improve learning outcomes. This is done by using tile arrangement image media as a context, as well as demonstration methods and group discussions that involve students directly, so that students can play an active role in learning.

Based on the results of observations and evaluations of student learning in the subject of mathematics on number pattern material, there was an increase in learning outcomes from the pre-cycle, Cycle I, to Cycle II. This increase in student learning outcomes was influenced by the use of context in the form of tile arrangement images with the demonstration method.

Student learning outcomes in the pre-cycle, Cycle I, and Cycle II showed an increase. This can be seen from the average score in each cycle. The average score of students in the pre-cycle was 43, which then increased in Cycle I to 61.25. In Cycle II, the average score of students increased even higher, namely 78.75. This shows that the use of context in the form of tile arrangement images in learning number patterns can improve the learning outcomes of class VIII students of SMP Yayasan Bakti Prabumulih. Several classroom action studies that use context in mathematics learning, namely (1) Nuriza (2022) Implementation of Indonesian Realistic Mathematics Education (PMRI) to Improve Mathematics Learning Outcomes in the Context of Stick Media for Elementary Madrasah Students; (2) Anitasari et al. (2023) Improving Learning Outcomes Using the PBL Model Assisted by Concrete Media for Mathematics Class IV SDN 1 Sukorejo; (3) Setyowati (2023) The Effect of Concrete Media in Improving Mathematics Learning Outcomes in Class IV MIN Gunungkidul; (4) Yansen (2024) Mathematics Learning Uses The PMRI Approach to Improve Student Learning Outcomes.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that learning mathematics on number pattern material using the context of tile arrangement can improve the learning outcomes of class VIII students of SMP Yayasan Bakti Prabumulih. The improvement in student learning outcomes can be seen from the average post-test results in each cycle. The average post-test results increased from 61.25 in Cycle I to 78.75 in Cycle II. The percentage of learning completion also increased from 25% in Cycle I to 85% in Cycle II. In addition, the percentage of students who were actively involved also increased from 50% in Cycle I to 80% in Cycle II.

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