THE EFFECTIVENESS OF LEARNING MATHEMATICS USING THE PREVIEW OF LEARNING STRATEGIES, QUESTIONS, READ, REFLECTION, RECITE, REVIEW (PQ4R) AND EXPOSURE TOWARD MATHEMATICS LEARNING OUTCOMES

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ABSTRACT

Learning that teachers dominate, communication tends to one direction, and students' inactivity is why students often forget the material so that the learning results are not maximum. PQ4R was created to improve the memory of the matter. This research aims to determine the difference between the use of PQ4R learning strategies and learning strategies that have been used in place of research that is Expository, in its relation to the mathematics learning outcomes of students VIII grade even semester SMP Negeri 4 Sewon Bantul academic year 2016/2017. This study used a posttest-only control group design. The population in this study are three classes: the sample taken two classes with random sample technique. Data collection was conducted with the test method. The instrument used is a multiple-choice test. Before analyzing the data, a prerequisite test consisting of normality test and homogeneity test was performed. The research results on the significant level of 5% and df = 62 indicate that: (1) there is a difference in students' mathematics learning between using PQ4R learning strategies and using expository learning strategies. This is indicated by the value of t_{table} = 1.99897 and $t_{count} = t_0$ = 11.54804 which mean $t_0 > t_{table}$. Moreover, (2) PQ4R learning strategies are more effective than expository strategies. This is indicated by the value of t_{table} = 1.6698 and $t_{count} = t_0$ = 11,54804 which mean $t_0 > t_{tabel}$.

Keywords: PQ4R, Expository, Learning Outcomes.

INTRODUCTION

Education is an essential tool for the progress of a country. Progress in education cannot be separated from the influence of science and technology. The development of science and technology cannot be separated from the underlying sciences, mathematics. As one of the basic sciences, mathematics plays a vital role in mastering science and technology. Therefore mathematics education and teaching need special attention.

One problem that often occurs in our education is the problem of the weakness of the learning process. In the learning process, students are less encouraged to develop thinking skills. The classroom's learning process is directed at students' ability to memorize information without understanding the information they remember, so students find it challenging to understand learning. Mathematics is one of the subjects taught from elementary, junior high, high school, even at specific majors in college. Mathematics lessons aim to appreciate mathematics's usefulness in life, namely curiosity, attention, and interest in learning mathematics and tenacity and confidence in problem-solving.

In addition to the Ministry of Education Regulation no. 19 of 2005, the group of science and technology subjects in SMP / MTs / SMPLB is intended to obtain basic science and technology competencies and cultivate scientific thinking critically and creatively and independently. However, what happens at school, ordinary mathematics teachers use learning that tends to be monotonous and almost without creative variation in learning. Students are told to listen, take notes, and do what the teacher tells them to do. At the same time, students assume that mathematics is a complicated subject, unable to answer, afraid of being instructed by the teacher going forward, etc.

Learning in the classroom must be managed as well as possible. Because if the teacher teaches monotonously in the classroom, it can make students passive. So the learning done by the teacher becomes meaningless learning. Students, as subjects of learning, must be actively involved in the

learning process. Simultaneously, as a regulator of learning as much as possible, the teacher creates a learning process that demands student activity. How to teach has a strategic value that is affecting the course of learning. So from that, we need a learning strategy that supports student activity.

It is known that the learning outcomes of Grade VIII students have not yet reached the Minimum Completeness Criteria (MCC), which can be seen in Table 1.

Table 1. Completeness of Students in UTS Mathematics Class VIII SMP Negeri 4 Sewon Bantul 2016/2017

Class	Average	MCC	Number of students	
			Complete	No Complete
VII A	41,9	73	0	32
VII B	41,4	73	2	30
VII C	39,9	73	0	32
VII D	43,3	73	1	31

Data Source : Documen SMP Negeri 4 Sewon Bantul

Table 1 above is an illustration of student learning outcomes in SMP Negeri 4 Sewon Bantul. It appears that more than 90% of students have not yet reached the Minimum Mastery Criteria.

In teaching and learning mathematics in SMP Negeri 4 Sewon Bantul, ordinary teachers use expository strategies, usually in lectures and assignments. In the teaching and learning process, the teacher is significantly dominating the class. Every activity occurs with the instructions of the teacher. Activities start from; delivery of material, how much material is explained, the portion of time for questions and answers, and assignments. Based on the theory, this expository learning should maximize material delivery on time so that effective learning. However, in reality, in learning, many students do not pay attention well. Many are joking with their friends, so they do not understand what is taught. When asked by the teacher, students cannot answer.

Meanwhile, according to Wina Sanjaya (190-191), This learning strategy is only possible for students who can hear and listen well. For students who do not have such abilities, other strategies need to be used. Because the communication style of learning strategies occurs more in one direction (One-way Communication), the opportunity to control students' understanding of learning material will be minimal. Also, one-way communication can result in students' knowledge limited to what is given by the teacher.

Requirements for success in learning using expository strategies are student activity, listening, and understanding. If not, students will not be able to absorb the material. Whereas in the writer's observation on August 1, 2016, in class VIII A, what happened was that students rarely paid attention. More often noisy themselves. According to the teacher, this also happened in almost all classes. By learning like that, it is only natural that the material is quickly forgotten. Plus, students who are lazy to study at home make students only briefly remember the material. Even worse, sometimes some students can not answer questions about the material one day ago. The teacher must review the material that has been delivered at each meeting.

So far, no other learning strategies have been tried besides the expository learning strategies. These factors further influence student learning outcomes are also low. Therefore another learning strategy is needed to improve students' understanding and memory and encourage students to learn actively.

One learning strategy can increase active student participation in the Preview, Question, Read, Reflect, Recite, Review (PQ4R) strategy. This strategy was created to increase the understanding and memory of what they read. This strategy starts with a Preview, which is to skim through the teacher's teaching material quickly. The question asks questions by asking questions to yourself, which is reading carefully, looking for answers to questions made by himself rather than making a short note of what results in he has read. Reflect is a reflection of understanding the information he has read and recorded. Recite is a question and answer using the information he has read and recorded. Finally, Review is to

repeat all the reading contents if necessary, all the notes that have been made by him, and answer questions that he submitted. Overall, the PQ4R method's steps center on student activities to find and memorize what they read.

According to Trianto (2014: 178), PQ4R is a way used to help students remember what they read and can help the teaching and learning process carried out by reading books. With reading skills, students will be able to enter the world of science. According to Weinstein in Trianto (2014: 182), Good teaching involves teaching students how to learn, how to remember, how to think, and how to encourage themselves. Nur in Trianto (2014: 181) stated that there had been much research on PQ4R learning strategies. This method has proven to be effective in helping students memorize information from reading. This was done to develop student learning independence. The strengths and weaknesses of the PQ4R strategy formulated by Tinah (2010: 48) are:

Advantages:

a. It is very appropriate for declarative knowledge in concepts, definitions, rules, and application knowledge in daily life.
b. Can help students with weak memory to memorize the concepts of the lesson.
c. Easy to apply for all levels of education.
d. Able to assist students in improving the skills of the questioning process and communicating their knowledge.
e. Can reach the subject matter in a broad scope.

Weakness:

a. Not appropriate to be applied in teaching procedural knowledge such as knowledge skills.
b. Very difficult to implement if facilities such as student textbooks are not available at school.
c. Not effective in classes with too many students because teacher guidance is not optimal in formulating.

Based on the description above, the writer feels interested in researching the effectiveness of mathematics learning by using a strategy of Preview, Question, Read, Reflect, Recite Review (PQ4R) and expository on student learning outcomes. This study's purpose is twofold: 1) Knowing the differences in student learning outcomes using the PQ4R learning strategy and expository learning strategies. In class VIII, even semester of SMP Negeri 4Sewon Bantul 2016/2017 school year. Moreover, 2) testing is better between the PQ4R strategy or the expository strategy for class VIII students' learning outcomes in the even semester of SMP Negeri 4 Sewon Bantul in the 2016/2017 school year.

METHODS

This type of research is experimental research. The design in this study uses the posttest-only control group design (Sugiyono, 2012: 112). This study using two classes, namely the experimental class, and the control class. In the experimental class, learning was carried out using the PQ4R learning strategy. In control, class learning was carried out using an expository learning strategy. This study's population were all eighth-grade students of SMP Negeri 4 Sewon, Bantul Regency in the 2016/2017 school year consisting of 3 classes, totaling 96 students. While the sample in this study was class VIII B as an experimental class that received treatment with the PQ4R learning strategy, class VIII D as a control class that received treatment with expository learning strategies, and class VIII A as an Instrument Trial class. The sampling technique used was a random sample.

The data analysis technique used is the test technique with the instrument in objective questions in multiple-choice. The instrument testing uses a validity test, a reliability test, and a different power test. The analysis prerequisite test is the Chi-square formula normality test, and the homogeneity test uses Bartlett. Research hypothesis testing uses the first hypothesis test and the second hypothesis. The first hypothesis test using a two-party t-test was conducted to determine whether there were differences in learning outcomes using the PQ4R learning strategy and expository. Simultaneously, the

second hypothesis test using a one-party t-test was conducted to determine which was more effective between the PQ4R learning strategy and the expository.

RESULTS AND DISCUSSION

From the normality test at a significant level of 5% and degrees of freedom = 3, we obtain $\chi^2_{\text{count}} = 1{,}5861$ and $\chi^2_{\text{table}} = 7{,}8147$ so that $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ which means that the experimental class has the initial ability data that is usually distributed. At a significant level of 5% and degrees of freedom = 3, we get $\chi^2_{\text{count}} = 1{,}0619$ and $\chi^2_{\text{table}} = 7{,}8147$ so that $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ which means the control class has the initial ability data that is normally distributed.

From the homogeneity test at a significant level of 5% and degrees of freedom = 2, we get $\chi^2_{\text{count}} = -314{,}305$ and $\chi^2_{\text{table}} = 3{,}8415$ so that $\chi^2_{\text{count}} < \chi^2_{\text{table}}$, which means both classes have the same variance (homogeneous).

Based on the results of the analysis of hypothesis testing conducted with a significant level of 5% and a degree of freedom 62, we obtain the value of $-\text{t}_{\text{table}} = -1{,}6698 < \text{t}_{\text{count}} = -0{,}5944 < \text{t}_{\text{table}} = 1{,}6698$, then H_0 is accepted, and H_1 is rejected, which means it is not there is a difference between the initial mathematics ability scores of students in class VIII B and class VIII D in the even semester of SMP Negeri 4 Sewon, Bantul Regency in the 2016/2017 school year.

From the normality test at a significant level of 5% and degrees of freedom = 3, we obtain $\chi^2_{\text{count}} = 5{,}49$ and $\chi^2_{\text{table}} = 7{,}815$ so that $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ which means that the experimental class has final ability data that is normally distributed. At a significant level of 5% and degrees of freedom = 4, we get $\chi^2_{\text{count}} = 5{,}91$ and $\chi^2_{\text{table}} = 9{,}488$ so $\chi^2_{\text{count}} < \chi^2_{\text{table}}$, which means the control class has final ability data that is normally distributed.

From the homogeneous test at a 5% significance level and degrees of freedom = 2, we get $\chi^2_{\text{count}} = -307{,}87$ and $\chi^2_{\text{table}} = 3{,}8415$ so that $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ which means that the mathematics learning outcomes of both classes have the same variance (homogeneous).

At a significant level of 5% and degrees of freedom = 62, we get $\text{t}_{\text{table}} = 1{,}6698$ and $\text{t}_{\text{count}} = 11{,}54804$ which means $\text{t}_{\text{count}} > \text{t}_{\text{table}}$ then H_0 is rejected and H_1 is accepted. So, it can be concluded that there is a difference between mathematics learning outcomes using the PQ4R learning strategy and those using expository learning strategies for eighth-grade students in the even semester of SMP Negeri 4 Sewon, Bantul Regency in the 2016/2017 school year.

The analysis results obtained$\text{t}_{\text{table}} = 1.6698$ and $\text{t}_{\text{count}} = 1.54804$, which means $\text{t}_{\text{count}} > \text{t}_{\text{table}}$ then H_0 is rejected, and H_1 is accepted. So, it can be concluded that the PQ4R learning strategy is more effective than the expository learning strategy for the learning outcomes of class VIII odd semester students at SMP Negeri 4 Sewon, Bantul Regency in the 2016/2017 school year.

During the implementation of learning in the classroom with the PQ4R strategy, there are no significant obstacles, only enough to take time. At the stage of Preview, Question, Read, learning goes well enough, at the Reflect stage is running long enough. Smooth Review Stage.

While in the classroom with the expository learning strategy, the material is quickly conveyed as long as the process is going smoothly. Students understand the material faster than the class with the PQ4R strategy. There were no obstacles, but after the test, the results showed that the material was understood by students before. Many were forgotten, for example, the long diagonal formula of space. Also, many students forget the difference between the diagonal plane and the diagonal plane. So the strength of the PQ4R strategy over expository is memory, while the disadvantage of the PQ4R strategy is that it takes quite a long time to complete step by step. The PQ4R strategy cannot be used in all materials.

CONCLUSION

Based on the analysis of the experimental data and its discussion, this activity concludes the following:

1. There is a significant difference between the learning outcomes of mathematics using the PQ4R learning strategy and those using expository learning strategies for eighth-grade students in the even semester of SMP Negeri 4 Sewon Bantul in the 2016/2017 school year.
2. Learning using the PQ4R learning strategy is better than the expository learning strategy for the mathematics learning outcomes of students of class VIII even semester of SMP Negeri 4 Sewon in the 2016/2017 school year.

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