

The Effectiveness of Probing-Prompting Cooperative Setting Technique to Improve Students Creativity in Learning Mathematics

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ABSTRACT

This study aims to determine the effectiveness of Probing-Prompting Cooperative Setting Techniques in improving student creativity in mathematics learning in Grade XI students of SMK Muhammadiyah 2 Bontoala Makassar. This type of research was pre-experimental research with a one-group pretest-posttest design. The samples in this study were grade XI TKR-B students. This study was conducted during five meetings. The instruments used were tests to see students' learning outcomes, observation sheets to observe student activities during learning, questionnaires of students' responses to mathematics learning through Probing-Prompting Cooperative Setting techniques. Also, observation sheets of learning implementation to see the teacher's ability to manage learning in the classroom. The analysis of the results showed that: (1) The average score of student learning outcomes before applying the Probing-Prompting Cooperative Setting technique was 20.84, which was in a very low category with a standard deviation of 9,450. After implementing the Probing-Prompting Cooperative Setting technique, the average score of students' math learning outcomes was 79.60, with a standard deviation of 10,867. Of these results, 76% of students achieved individual completion, and this means classical completion has been achieved with a normalized gain score of 0.792 in the high category. (2) Student activities in either category. (3) The student response questionnaire shows that the students' response to learning through the Probing-Prompting Cooperative Setting technique received a positive response from students with an average percentage of 88.5%. Based on the results of this study, it can be concluded that the Probing-Prompting Cooperative Setting technique is effectively applied to increase students' creativity in mathematics learning.

Keywords: *Effectiveness, Probing-Prompting Cooperative Setting Techniques, Student Creativity.*

1. INTRODUCTION

Education is essential and crucial to a country's development. As a result, all related components strive to improve education quality, whether at school or outside. According to Law No. 20 of 2003 on the National Education System, education is a deliberate and planned effort to realize the learning environment and learning process. So, learners actively develop their potential to represent religious and spiritual strength, self-control, personality, intelligence, and noble morals. They can also actively

develop the skills required by themselves, society, the nation, and the country [1].

Although many conscious efforts are made by various parties to improve the quality of education, especially mathematics, in reality, the student's learning outcomes are still very low. Many students make mathematics a scary thing, so that students are not excited about the process of learning mathematics, and this results in a lack of participation of each student in the learning process in class. It follows the

Programme for International Students Assessment (PISA) survey, which states that the PISA test results and evaluation 2018 performance of Indonesian students is decreasing compared to PISA 2015 with a score of 379, while the average score of OECD is 487. That makes Indonesia increasingly need to improve itself in the field of education [2].

In line with what is presented above, researchers conducted observations at SMK Muhammadiyah 2 Bontoala Makassar in grade XI, at odd semester. It showed that information obtained at the time of the learning process of mathematics in the classroom more often focused on teachers, resulting in students being afraid to ask the teacher when there was not understood material. It made students passive during the learning process. In addition, the lack of opportunities for students to hone their creative skills resulted in students having very low math learning outcomes.

Creative thinking skills are also commonly referred to as pillars in mathematics learning to expand students' understanding of the problems they face in search of solutions to their problems [3].

That makes researchers take the initiative to apply learning techniques expected to improve students' creative thinking skills to reduce problems faced in school. In getting good math learning outcomes, more innovative teaching and learning activities are needed to be more easily understood by students and accepted by the teacher.

One alternative to overcoming existing problems is a learning approach that can improve students' creativity skills to create active students and train students to prepare better the answers to issues given by teachers. The learning in question is cooperative learning or commonly called cooperative learning. Cooperative learning is a form of learning that uses a small group approach to achieve learning goals. In cooperative learning, students can help each other find, discuss and review the knowledge being studied. Cooperative learning can combine with various learning techniques, such as Probing-Prompting. This technique can stimulate students to express their opinions, not be ashamed to answer, and think critically and independently. Probing-Prompting Cooperative setting techniques combine learning that can increase the activeness and responsibility of each individual in the group and train cooperation between group members to participate directly in the learning process in class.

A study conducted by a researcher showed that the average score of the student's math learning outcomes after applying the probing-prompting technique was

88.30. From these results, it knew that 26 students, or 100% achieved KKM, as evidenced by the improvement of learning outcomes after learning through probing-prompting technology. The activities of students in the classroom who are actively involved in learning have achieved active criteria. The student's response shows that the student's response to learning through positive probing-prompting techniques was 87.02% [4].

2. RESEARCH METHODS

This type of research was a pre-experimental study involving one group as an experimental class or treatment class. This research aimed to determine the effectiveness of mathematics learning in grade XI at SMK Muhammadiyah 2 Bontoala Makassar taught through Probing-Prompting Cooperative Setting Techniques in improving student creativity. The variables in this study consisted of an independent variable and a dependent variable. An independent variable was learning using Probing-Prompting Cooperative Setting Techniques. A dependent variable was the effectiveness of student math learning, consisting of student learning outcomes, student activities, and student responses. Researchers used the design of the one-group pretest-posttest design. Namely, the design of this study only involves one group as implemented without class/group appeal. These models used were pre-test before treatment and post-test after treatment so that the treatment results can be more accurate. This design can be described as follows [5]:

Table 1 One Group Pretest-Posttest Design

Pre-test	Treatment	Posttest
O ₁	X	O ₂

Descriptions:

O₁ = Tests for groups of students before the implementation of Probing-Prompting Cooperative Setting Techniques.

O₂ = Tests for groups of students after the implementation of Probing-Prompting Cooperative Setting Techniques

X = Teaching through the application of Probing-Prompting Cooperative Setting Techniques.

The population in this study was all students of grade XI Department of Light Vehicle Engineering at SMK Muhammadiyah 2 Bontoala Makassar, divided into two classes of 50 people. Each class had the same number of students as 25 students on average.

The research sample was class XI Automotive Engineering Light Vehicle B (XI TKR-B), with as many as 25 students, all male students.

Data collection in this study was conducted using the following instruments: (1) Test learning results. The instrument used was a test based on learning objectives to obtain data on student learning outcomes after implementing Probing-Prompting Cooperative Setting Techniques. The test given to students was in the form of an essay question. The score of the student's test results used a free scale that depended on the weight of the item in the question. (2) The student activity observation sheet. The Student activity observation sheet was a research instrument. It was used to obtain student activities while attending classroom learning by implementing Probing-Prompting Cooperative Setting Techniques. (3) Student response questionnaire: The Student response questionnaire was a research instrument used to determine students' responses to mathematics learning Probing-Prompting Cooperative Setting Techniques. This instrument contained questions about implementing Probing-Prompting Cooperative Setting Techniques. (4) Observation sheet of learning implementation: An observer's data collection was taken during the teaching and learning process.

The collected data was then analyzed using descriptive statistical techniques and inferential statistical techniques. Inferential statistical analysis was intended to test research hypotheses but must first go through a data normality test.

3. RESULTS AND DISCUSSION

The test results of learning mathematics with linear program subjects before being taught using Probing-Prompting Cooperative Setting Techniques were obtained by descriptive statistics. The average score of students in grade XI at SMK Muhammadiyah 2 Bontoala Makassar before the learning process through the application of Probing-Prompting Cooperative Setting Techniques was 20.84. It was obtained from the initial ability test (pre-test) of the ideal score of 100 that students may achieve with a standard deviation of 9,450. When the test scores of the learning results were grouped into five categories, all students scored in the very low category. There were 25 students (100%), and no students scored in the low, medium, high, and very high categories.

The test results of learning mathematics with linear program subjects before being taught using Probing-Prompting Cooperative Setting Techniques were obtained by descriptive statistics. The average

score of students in grade XI at SMK Muhammadiyah 2 Bontoala Makassar before the learning process through the application of Probing-Prompting Cooperative Setting Techniques was 79,60. It was obtained from the final ability test results (post-test) of the ideal score of 100 that students may achieve with a standard deviation of 10,867. If the test scores of the learning outcomes were grouped into five categories, it showed students who scored in the very low category as much as one student (4%). Then, students who scored in the low category as many as four students (16%), students who scored in the moderate category as many as five students (20%), students who scored in the high category as many as 11 students (44%), and students who scored in the very high category as many as four students (16%). That is following the research conducted [4]. The results of her study concluded that the average score of students' math learning outcomes after the implementation of Probing-Prompting Cooperative Setting Techniques was 88.30. From these results, it is known that 26 students, or 100% achieved KKM. In other words, there was an increase in learning outcomes after learning through Probing-Prompting Cooperative Setting Techniques.

In obtaining one type of data, researchers created the student activity observation sheet that supports learning effectiveness. Contained in this instrument were instructions and seven indicators of student activity observed. The observer carried out an observation to observe student activities during the learning process. There were three meetings. After the learning process was completed, researchers summarized the data obtained at each meeting. From some of the activities observed during the three meetings, the average percentage of positive activities of students was 78.889% of students who were actively involved in the learning process. It can also be seen that of the three meetings observed, as many as 6.6667% of students conducted learning outside activities. The results of research conducted [4] stated that the average percentage of student activity reaches the active criteria.

The analysis of student response data to the implementation of mathematics learning through the application of Probing-Prompting Cooperative Setting Techniques filled by 25 showed that students who responded positively averaged a percentage of 88.5%. In comparison, those who answered with negative responses reached an average percentage of 11.5%. Students' responses were positive because the intermediate answer on the positive aspect obtained 88.5%. Thus, the application of Probing-Prompting

Cooperative Setting Techniques received a positive response from students. It is in line with the results of research conducted, which stated that the student's response showed that the student's response to learning through the Probing-Prompting technique was positive at 87.02%

The implementation of learning through Probing-Prompting Cooperative Setting Techniques in grade XI students of SMK Muhammadiyah 2 Bontoala Makassar found that most aspects were a good and very good scale. The other implementation of learning through Probing-Prompting Cooperative Setting Techniques with an average of 3.5 entered on the assessment scale was very good. That means the teaching and learning process runs effectively.

For hypothesis testing, researchers used inferential statistics, t-test with a significant degree of $\alpha = 0.05$. The requirement that was met to perform hypothesis testing was data obtained at normal distribution. Normality tests were done on each of the obtained data. All calculations were done with the help of computers with IBM SPSS (Statistical Package for Social Science) software 24.0 version, with the Kolmogorov-Smirnov test. The average score analysis for the pre-test shows a P-value $> \alpha$ value of $0.200 > 0.05$ and the average for the post-tests showed a P-value $> \alpha$ value of $0.143 > 0.05$. It indicated that the average pre-test and post-test scores were in the normal category.

Furthermore, after conducting a data normality test, the average student's learning outcomes after being taught with Probing-Prompting Cooperative Setting Techniques were calculated using a t-test one sample test. Based on the results of the inferential analysis, i.e., with the t-test, the value of P-value = 0.041 with a significance level $\alpha = 0.05$. It indicated that the P-value $< \alpha$, meaning H_0 , was rejected, and H_1 was accepted. In other words, the average post-test learning outcome reached 75, which was 79.60.

After being taught using Probing-Prompting Cooperative Setting Techniques, students' learning completion was classically calculated using a t-test for one sample because the number of samples was 30. For the t-test, one sample used a significant level of $\alpha = 0.05$ and obtained t-table = 1,708. Because t-count (2,116) $>$ means H_0 was rejected and H_1 was accepted, which means that 75% of the average student's ability falls within the ideal criteria set. The analysis results showed that by using a significant level of $\alpha = 0.05$, the obtained t-count value = 18,308 $>$ t-table = 1,708, then H_0 was rejected and H_1 was accepted. It means that the average normalized gain in

grade XI students at SMK Muhammadiyah 2 Bontoala Makassar exceeded 0.30.

From the above analysis, it can be concluded that the average score of student learning outcomes after learning through Probing-Prompting Cooperative Setting Techniques has met the criteria for effectiveness to improve students' creative thinking skills.

4. CONCLUSION

Based on the results of research and discussion that has been described, the following conclusions are obtained:

1. The learning outcomes of grade XI students of SMK Muhammadiyah 2 Bontoala Makassar after implementing Probing-Prompting Cooperative Setting Techniques were processed using descriptive analysis into a high category with an average score of 79.60. The results of the inferential analysis also showed that the completion of learning outcomes after the implementation of Probing-Prompting Cooperative Setting Techniques met the criteria for completion with the value of t-count (2,116) $>$ t-table (1,708) means H_0 is rejected and H_1 is accepted. The average results of post-test learning students grade XI at SMK Muhammadiyah 2 Bontoala Makassar classical completion reached 75%. The average normalized gain students taught with Probing-Prompting Cooperative Setting Techniques was 0.792, in the high category. The results of the inferential analysis obtained t-count value = 18,308 $>$ t-table = 1,708, then H_0 is rejected, and H_1 is accepted, meaning the average normalized gain in grade XI students at SMK Muhammadiyah 2 Bontoala Makassar exceeded 0.30. It represents an increase in students' math learning outcomes after implementing Probing-Prompting Cooperative Setting Techniques in grade XI students at SMK Muhammadiyah 2 Bontoala Makassar.
2. Student activities in mathematics learning by implementing Probing-Prompting Cooperative Setting Techniques in grade XI students at SMK Muhammadiyah 2 Bontoala Makassar shows that students are active in understanding. It follows the average percentage of student activity during the learning process through Probing-Prompting Cooperative Setting Techniques of 78,889. Students have been said to actively pursue the mathematical learning process by implementing Probing-Prompting Cooperative Setting

- Techniques, which can improve students' creative thinking skills.
3. Students' response to the application of Probing-Prompting Cooperative Setting Techniques is seen from eight aspects. In general, the percentage of students who responded positively to the application of Probing-Prompting Cooperative Setting Techniques of 88.5% can be said to be effective because it has met the criteria of student response as a predetermined standard that reaches 75%.

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