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THE INFLUENCE OF CRATIVE PROBLEM SOLVING LEARNING MODELS ON STUDENTS' MATHEMATICAL PROBLEM SOLVING ABILITIES NORTH RANTAU 2 STATE HIGH SCHOOL
(SMAN 2 RANTAU UTARA)

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ABSTRACT

A student's ability to solve mathematical problems is very, very low because in solving mathematical problems, the learning process does not accustom students to think more creatively. This is because the learning process in the teacher's class still applies conventional methods, and the students in the class have not achieved a score above the KKM. This research aims to look at the Creative Problem Solving learning model as a series of learning in solving and solving problems systematically based on students' creativity to produce effective solutions. This research is research using a quasi-experimental method using purposive sampling techniques. The population in this study were class X students of SMAN 2 Rantau Utara for the 2023/2024 academic year. The sample in this research was two classes, namely one class XIPA-3 with 38 students as the experimental class and one class XIPA-2 with 36 students as the control class. The instrument used in this research is a test of mathematical problem solving abilities in the form of written tests, results tests and observation sheets on the implementation of the learning process. The data analysis techniques used are descriptive statistical analysis and inferential statistical analysis. Based on the results of data processing, the value obtained is $thitung$ = 4,950 > $ttabel$ = 1,789, thus Ho is rejected, which means that there is an influence of creative problem solving learning on the mathematical problem solving abilities of class X students at SMAN 2 Rantau Utara.

***Keywords**: Creative Problem Solving, Problem Solving Ability, Learning Model.*

INTRODUCTION

In the world of education, mathematics is one of the fields of science that plays an important role. Mathematics is also called the Queen of Sciences, the queen of science. Mastery of mathematics requires interest and persistence in studying it. Studying mathematics can also help improve logical and critical thinking skills in solving problems. Realizing how important mathematics is, the Indonesian education curriculum provides a larger portion of mathematics learning than other subjects.

However, Indonesian students' ability is still relatively low in solving story problems related to mathematics, especially non-routine questions, this is because students are still weak in understanding problems and planning their solutions. Based on Schleicher, (2019) regarding the 2018 Program For International Student Assessment (PISA) Indonesia is ranked 72nd out of 78 countries with a score of 379 in mathematics. Fauzi & Abidin (2019) states that the level of mathematical ability tested in PISA includes identifying problems, being able to sort relevant information to solve a problem, applying problem solving strategies, generalizing a problem. These question indicators are included in the indicators of students' critical thinking abilities, so it can be concluded that students' mathematical critical thinking abilities in Indonesia are still low.

The low ability of students to solve mathematical problems is because the learning process does not accustom students to think more creatively. Rostika & Junita (2017) stated that teachers usually provide quick formulas so that students are able to solve conceptual problems, not problem solving questions.

From the results of previous research it is known that learning actions using the Creative Problem Solving method can improve a student's creative thinking in mathematics subjects and there is an increase in teacher activity, student activity, student attitudes and skills in each cycle using the Creative Problem Solving model. The learning model also has a positive and significant effect on students' thinking patterns.

Based on the results of interviews with class X mathematics teachers and students SMAN 2 Rantau Utara Class X in groups (classes) for the 2022/2023 academic year, information was obtained that the average grade point was still low, this was because the learning process in the teacher's class still applied conventional methods, and made students in the class have not reached scores above KKM. Dalam hal ini diperlukan suatu model dan strategi pembelajaran yang Rofiqoh & Rochmad (2016) can improve the ability to solve mathematics learning problems in the learning process, and make students more active and learning will achieve the desired goals.

Aljaberi & Gheith (2016) Overcoming the problems faced in the learning process, there needs to be a change in the teacher-centered learning process to be student-centered. It is necessary to develop learning experiences through learning models that relate the subject matter to the problems faced and the optimal use of learning resources. Direct involvement of students in the learning process is expected to improve learning outcomes and can improve thinking in solving problems.

Departing from the above problems, one of the efforts to improve students' mathematical problem solving skills is by using the right learning model. Shoimin (2017) states that the CPS model is a learning model that focuses on teaching and problem-solving skills followed by skill reinforcement. Whereas, according to Ngalimun (2017) CPS is a variation of learning with problem solving through systematic techniques in organizing creative ideas to solve a problem. This is confirmed by Helen & Kusdiwelirawan (2022) that the CPS learning model is a learning model that can train the level of creative thinking ability of students because this learning model uses their thinking skills to be able to solve a problem after going through mature thinking, seeing various points of view and thinking of the best solution.

The advantages of the CPS model for problem solving according to Novitasari (2015)

namely: Train students to design an invention, think and act creatively, solve problems faced realistically, identify and conduct investigations, interpret and evaluate the results of observations. This is in line with opinion Wasiran & Andinasari (2019) which states that the CPS model can train students to convey ideas / ideas and provide many alternative answers to a question (fluency), resulting in various problem solving of a concept from different points of view with different presentations (flexsibility).

Based on the description above, it can be concluded that the purpose of this study is to see the CPS learning model as a series of learning in solving and solving problems systematically based on the creativity of students to produce effective solutions.

Therefore, the author analyzes and further examines the learning outcomes and mathematical problem solving abilities of students using the CPS learning model. So the author is interested in conducting a research entitled "The Effect of the CPS Learning Model on Mathematical Problem Solving Ability in Class X Students SMAN 2 Rantau Utara".

RESEARCH METHODS

Types of Research

This type of research is quasi-experimental. In this study, 2 classes were used in one school, namely one class as an experimental class and one class as a control class. Where the experimental class is given treatment using the CPS learning model while in the class the learning control applied is conventional learning or learning that is usually done by the teacher. The quasi-experimental design used by researchers is a non-equivalent control group design.

Data Collection Methods

The method in this study is to conduct interviews with teachers in the field of mathematics studies and conduct initial tests (pre-test) and final tests (post-test). The form of the test is a description test consisting of 4 points of mathematical problem solving ability on linear inequality material.

Data Analysis Techniques

The data analysis techniques applied in this study are descriptive statistical analysis and inferential analysis. At the descriptive statistical analysis stage, analysis was carried out based on observation sheets and calculations about the average learning outcomes of students in experimental classes and control classes on pretest and posttest data. In the inferential analysis stage, it is used to analyze students' mathematical learning outcomes between the experimental class and the control class. The data used for this inferential analysis are pretest and posttest data which are broken down into three steps, namely: first normality test, second homogeneity test and third independent sample t-test.

Population and Sample

This research was conducted in SMAN 2 Rantau Utara in class X with research time is the odd semester of the 2022/2023 school year on linear inequality material. The population in this study was all grade X students totaling 310 students consisting of 9 classes, namely 6 science classes and 3 social studies classes. This study used purposive sampling technique. Menurut (Sugiyono, 2016) Purposive sampling is a sampling technique with certain considerations. The samples in this study were class XIPA-2 as a control class totaling 36 students and class XIPA-3 as an experimental class totaling 38 students.

RESULTS AND DISCUSSION

Research Results

Table 1. Statistical Analysis of Mathematical Problem Solving Ability

	Min value	Max value	Average	Hours Deviasi
Pre-Test Eksperimen	57	77	68.70	6.383
Post-Test Eksperimen	60	89	74.39	6.055
Pre-Test Kontrol	57	78	69.00	6.685
Post-Test Eksperimen	62	83	69.44	5.983

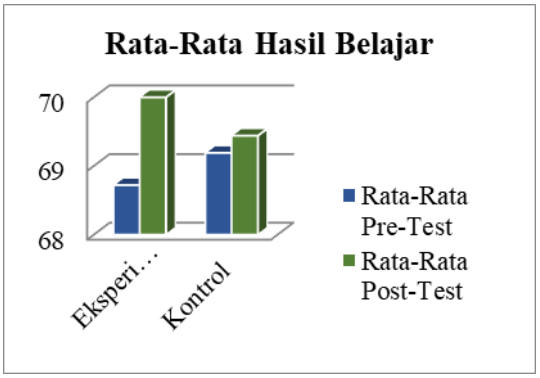

Figure 1. Average Student Learning Outcomes

Based on Table 2 and the average chart chart presented in Figure 1 above, it can be seen that there are different results between the average value of learning outcomes in the experimental class and the control class. From these results, the average pretest in the experimental class was 68.77 and the control class was 65.22. However, after being treated with the experimental class, it was seen that the experimental class post test improved better than the control class.

This can be seen from the average posttest of the control class is 65.22, while the average mathematics learning outcomes of experimental class students are better than the control class which is 68.77.

With the descriptive statistical analysis, it cannot be concluded that there is an influence of the CPS learning model on the mathematical problem solving ability of grade students X SMAN 2 Rantau Utara, Then a normality test is carried out so that the results obtained are completely accurate. A normality test is performed to find out whether both classes belong to a normally distributed population or not (Septian, 2017). The following is the formulation of the hypothesis of testing the normality of population distribution.

H0: The sample comes from a normally distributed population.
H1: The sample comes from a population that is not normally distributed.

The normality test was performed with the Kolmogorov-Smirnov test using the help of IBM SPSS Statistics software version 20. The test criteria using the significance level of 5% ($\alpha = 0.05$) are as follows:

1. If the significance value (Sig.) is 0.05 then H0 is accepted. ≥
2. If the significance value (Sig.) is 0.05 then H0 is rejected. <

The normality test results of pre-test and post-test data are presented in table 3.

Table 3. Normality Test

Class	Kolmogorov-Smirnov[a]		Information
	Signifikasi		
	Pre-Test	Post-Tes	
Experiment	0.210	0.211	Normal Distributed
Control	0,200	0,117	Normal Distributed

Based on table 3 on the calculation results of the normality test using Kolmogorov-Smisrnova, it can be seen that there is a significance of pre-test score data for the experimental class and the control class. In the experimental class 0.210 and 0.200 in the control class. The data is normally distributed data with a significant level of more than 0.05. The same thing is also shown in the table above at the level of post-test significance of both classes, namely 0.211 for the experimental class and 0.117 for the control class.

With the results of these data, it can be seen that the data has a significant effect. So it can be concluded that in both classes and the pre-test and post-test data are normally distributed. Once it is known that the samples in the table are normally distributed, then proceed with the homogeneity test.

Table 4. Homogeneity Test

	Levene Statistic	df 1	df 2	Sig.
Experiment	0.125	1	70	0.700
Control				

Based on the calculation results in table 4 of the homogeneity test, data were obtained that the significance value in the average pre-test and post-test data was 0.700, provided that the level of significance or probability value was more than 0.05, then with the results of the signification value it can be concluded that the population in the experimental class and the control class has the same variance or homogeneous. The next step is an independent sample t-test, this aims to determine whether there are differences in student learning outcomes in linear inequality subjects between students who use the CPS learning model and students who use conventional learning models.

For hypothesis test data analysis using Independent Sample T-Test assisted by SPSS 25, the test results are obtained in Table 5.

Table 5. Test the hypothesis

Class	t_{hitung}	t_{tabel}	Criterion	Hipotesis
Experiment	4.950	1,789	$t_{hitung} > t_{tabel}$	H_0 ditolak

From the results of the Independent sample test, the calculated value = 4,950 > ttable = 1,789, then H0 is rejected. so it can be said that there is a positive influence between the

Creative Problem Solving (CPS) learning model on the Mathematical Problem Solving Ability of grade X students of SMAN 2 North Rantau. So it can be concluded that using the CPS learning model is better than students who have followed conventional learning.

Discussion

The Effect of Creative Problem Solving Learning Model

From the results of research that has been done and from the results of statistical data processing, it can be seen that the CPS learning model has a positive effect on the way students think in solving existing problems.

From these results, the average pretest in the experimental class was 68.77 and the control class was 65.22. However, after being treated with the experimental class, it was seen that the experimental class post test improved better than the control class with 74.39 (experimental) > 69.44 (control).

In this study, two different treatments were applied to both classes, where in the experimental class a CPS learning model was applied, while in the control class a conventional learning model was applied.

Based on the description of the results of research conducted by researchers during learning in experimental classes using the CPS learning model, students are given student worksheets (LKS) and students are asked to solve problems in the LKS by discussing in small groups that have been predetermined by the teacher. Based on observations during learning activities taking place in experimental classes, students are generally more active in understanding the material and solving problems. Activities in experimental classes are better when compared to student activities in control classes that use conventional learning.

In learning using the CPS learning model, students are more active in discussions with group members, so students are not only spectators.

In contrast to the implementation of conventional learning applied in the control class, where learning activities are dominated by teachers, starting from delivering learning material, providing sample questions, and providing practice questions that resemble examples of questions that have been given. This actually makes students as spectators who only accept what is given by the teacher, students do not interact much with other friends, making it difficult for students to express ideas.

Mathematical Problem Solving Skills

Based on the results of research on experimental classes and control classes tested at the variant level and homogeneous classes, it is known that the experimental class and control class have the same variant. This is shown from the results of the homogeneity test statistics obtained data that the significance value in the average pre-test and post-test data is 0.700, provided that the level of significance or probability value is more than 0.05.

The ability to solve mathematical problems can also be proven by the statistical results of hypothesis tests obtained tcalculate value = 4,950 > ttable = 1,789 then H0 is rejected. so it can be said that there is a positive influence between the Creative Problem Solving (CPS) learning model on the Mathematical Problem Solving Ability of grade X students of SMAN 2 North Rantau. So it can be concluded that using the CPS learning model is better than students who have followed conventional learning.

From these results, it can be seen that students can solve mathematical problems by applying the CPS learning model. With the CPS learning model, students can interact with each other, exchange ideas, and help each other not monotonously become a spectator.

The above explanation is reinforced through research conducted by (Nur et al., 2017) which concludes that learning using CPS can improve student problem-solving skills, student activity, and teacher ability to manage learning. The above explanation is clarified through research (Lubis et al., 2018) which shows that there are differences in students' mathematical problem-solving abilities using the CPS learning model using conventional models.

Furthermore, it is strengthened through research conducted by (Widodo & Kartikasari, 2017) which shows that the description of learning outcomes in the experimental class is higher than in the control class. Based on the results of the study, it showed that the experimental group given CPS treatment had a higher average final score than the average score of the control group that applied conventional learning.

CONCLUSION

Based on the formulation of the problem and the results of the research as well as the discussion of the research results, it can be concluded that:

1. The influence of the creative problem solving (CPS) learning model affects the mathematical problem solving ability of SMA N 2 Rantau Utara students. This can be seen from the average post-test score in the experimental class using the CPS learning model of 74.39 with a standard deviation of 6.055, while for the control class with a conventional learning model an average of 69.44 was obtained with a standard deviation of 5.983. Thus, the CPS learning model is better than the conventional learning model in terms of solving mathematics problems.
2. Student mathematics learning outcomes using the CPS learning model on students' mathematical problem solving abilities are better than the mathematics learning outcomes of students who have followed conventional learning. This means that there is an influence of the use of the CPS learning model on the ability to solve mathematical problems in grade X students of SMAN 2 Rantau Utara.

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