EFFECTIVENESS OF APPROACH TO LEARNING DISCOVERY MODEL TOWARD MATHEMATICAL DISPOSITION

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ABSTRACT

The low mathematical disposition of students became a problem in this study. The use of guided discovery models in mathematics learning is expected to be effective in increasing mathematical dispositions. This study aims to determine the effectiveness of guided discovery learning models on grade VII students' mathematical disposition in State Junior High School (SMPN) 1 Pajangan even semester 2017/2018 school year. This study's population was students of class VII of SMPN 1 Pajangan of 2017/2018 school year consisting of 5 classes. The sampling technique uses random cluster sampling, which is sampling by random class through a lottery. Students of class VII D obtained the lottery results as the experimental group and students of class VII A as the control group. Data collection techniques in the form of tests and questionnaires. Data collection instruments in the form of test questions and form questionnaires with Likert scale. Data analysis techniques using t-test. Hypothesis testing uses a two-party t-test and a one-party t-test. The results showed: 1) Test the first hypothesis through the test obtained $t_{count} = 2.13 > t_{0.05(58)} = 2{,}00172$, and through the questionnaire obtained $t_{count} = 2.19 > t_{0.05(58)} = 2{,}00172$ then H_0 has rejected means that there are differences in students' mathematical disposition abilities in classes that use guided discovery learning models with students in classes that use expository learning models. 2) Test the second hypothesis through tests obtained $t_{count} = 2.13 > t_{0.05(58)} = 1.67155$, and through questionnaires obtained $t_{count} = 2.19 > t_{0.05(58)} = 1.67155$. H0 has rejected guided discovery learning models that are more effective than expository learning models on students' mathematical dispositions.
Keywords: Effectiveness, Learning, Disposition

INTRODUCTION

The purpose of learning mathematics in junior high schools, according to As'ari Abdur Rahman et al. (2017: 16) one of which is having an attitude of appreciating the usefulness of mathematics in life that is having curiosity, attention, and interest in learning mathematics, tenacity, and confidence in problem-solving. Based on the explanation of the purpose of learning mathematics in junior high school above and cognitive and psychomotor abilities improved, affective abilities also need to be improved. According to Polking (in Hendriana, Heris et al. 2017: 130) that in continuous mathematics learning, positive behavior will form a habit of thinking and positive behavior towards mathematics called mathematical disposition, namely: desires, awareness, tendencies, and dedication that strong to think and carry out mathematical activities (doing mathematics) in a positive way. According to Wardani (in Hendriana, Heris et al. 2017: 130) argues that mathematical disposition is one's interest in mathematics, which is shown through a tendency to be positive, confident, curiosity, perseverance, enthusiasm or enthusiasm in learning, persistent in dealing with problems, flexible, easy to share with others, reflective in carrying out mathematical activities. Based on some of the opinions above, students need a mathematical disposition to deal with mathematical problems or real problems and be accustomed to solving mathematical problems well and positively.

Based on observations made at SMPN 1 Pajangan on November 13-16, 2017, students are not confident in math answers, have no interest in working on math problems, many students are not ready to learn. For example, some students are still outside the classroom, and some are who have not issued a math book when learning takes place. When the teacher invites students to copy the writing on the blackboard, students can use this opportunity to chat so that the classroom atmosphere becomes noisy.

Based on the results of an interview with a mathematics teacher at SMPN 1 Pajangan on November 20, 2017, information was obtained that students tend to always work on math problems by means or procedures taught by the teacher, students do not look for other alternatives to work on a mathematical solution, active students are only students only certain students, and when students are asked to come forward, they will point to each other.

From the above problems, students' desires, awareness, and tendencies in learning mathematics are still lacking, which means that students have problems with mathematical dispositions. The lack of positive student attitudes towards learning mathematics is not without reason. Difficult material is one of the factors of low student interest when learning mathematics. Table 1 shows the average value of students' Middle Semester Examinations in mathematics.

Table 1. Math Class Semester Class VII SMP Odd Semester 1 Year Examination for Academic Year 2017/2018

Score	Class					Amount	Percentage
	VIIA	VIIB	VIIC	VIID	VIIE		
The highest	90	80	67,7	65	47,5		
Lowest	45	27,5	17,5	20	15		
Average	65,42	52,83	44,84	43,08	33,87		
Complete	2	1	0	0	0	3	1,99%
Not complete	28	29	30	30	31	148	98,01%
Amount	30	30	30	30	31	151	100%

Table 1 shows that the average grade of Midterm exam mathematics for VII grade students of SMP 1 Pajangan, around 98.01%, has not yet reached the minimum completeness criteria (MCC), which is 78. In this case, the students' mathematical disposition is low, so there is a need to encourage students' positive learning attitude towards mathematics.

The application of guided discovery learning models in learning mathematics encourages students to think and analyze themselves to find general concepts and principles based on the teacher's information. Through this learning model, students are actively involved in learning, free to investigate, and conclude. The teacher acts as a facilitator and guides students to stay on track to achieve the learning objectives, so there will be a match between students' thinking and learning objectives. According to S. Nasution (in Rahman, Taufik 2017: 63), involving students fully in learning to discover the concepts of the material being taught will foster a positive attitude towards mathematics.

This study's objectives are: 1) To determine whether there is a difference in mathematical disposition between students in the class using the guided discovery learning model and students in the class using the expository learning model. 2) To determine the guided discovery learning model's effectiveness with expository learning models for students' mathematical disposition.

METHODS

This study uses a real experimental design type posttest-only control design. According to Sugiyono (2015: 112): In the type of posttest-only control design, there are two groups, each randomly selected (R), the first group is given treatment (X), and the other group does not. The treated group is called the experimental group, and the untreated group is called the control group. The study was conducted in class VII SMPN 1 Pajangan even semester of 2017/2018 academic year consisting of 5 classes. The sampling technique is cluster random sampling. According to Jakni (2016: 84), the cluster random sampling technique is usually translated through sampling based on clusters. Random non-random individual groups do sampling. This technique obtained class VII D consisting of 30 students as an experimental class, and class VII A consisting of 30 students as a control class. Data collection techniques used were tests and questionnaires with data collection instruments to test questions in description and questionnaire on a Likert scale statement. Before doing data collection in the field, the instrument must first go through a trial phase. In this case, the trial was conducted in class VII B.

Namely, and validity was carried out using content validity with experts' help through a study sheet containing statements. Experts signed it, followed by reliability testing, the questions' difficulty, and distinguishing features questions. The data analysis technique used is the analysis prerequisite test in normality test, homogeneity test, and average similarity test. Testing hypotheses using t-test.

RESULTS AND DISCUSSION

The experimental class and the control class's initial ability scores were obtained from the midterm mathematics class VII in SMP 1 odd semester Pajangans for the 2017/2018 academic year. The summary of the initial capability values is in Table 2.

Table 2. Summary Descriptions of Initial Ability Values

Parameter	Class	
	Experiment	Control
Highest value	65	90
Lowest value	20	45
$\bar{x}$	43,08	65,42
S^2	113,66	97,88
S	14,58	9,89

The initial capability values above were then tested with a normality test, a homogeneity test, and an average similarity test. A normality test is used to test whether data is normally distributed or not. Homogeneity test to determine the variance of both classes has the same variance or not. At the same time, the average similarity test is done to find out whether the two classes have the same mastery of the material or not.

Table 3. Summary of the Normality Test for Initial Capability

Class	$\mathbf{x^2_{count}}$	$\mathbf{x^2_{table}}$	Significant level	Df (k-1)	Info.
Experiment	2,104	7,8147	5%	3	Normal
Control	0,206	5,9915	5%	2	Normal

The sample criteria are standard if $\chi^2_{\text{count}} \leq \chi^2_{(\alpha),(k-1)}$. Based on table 3, in the experimental and control classes, each $\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$ so that the two classes' initial ability values are typically distributed.

Table 4. Summary Test of the Homogeneity of Initial Ability Values

$\mathbf{F_{count}}$	$\mathbf{F_{table}}$	Significant level	df	Info.
1,16	1,86	5%	29;29	Homogeneous

Table 4 shows the calculations obtained $F_{count} = 1{,}16 \leq F_{table} = 1{,}86$, which means that both classes have the same variance (homogeneous).

Table 5. Summary of Equivalence Tests for Average Initial Values

Class	$\bar{x}$	S^2	Significant level	df (N-2)	t_{count}	t_{table}
Experiment	43,08	113,66	5%	58	-8,41	2,00172
Control	65,42	97,88				

Based on the test criteria if $-t_{(1-\frac{1}{2}\alpha)} < t_{count} < t_{(1-\frac{1}{2}\alpha)}$ then H_o is accepted because $t_{count} = -8{,}41 < -2{,}00172$ so H_0 is rejected. Means it can be said that the two classes have different mastery of the material. For this reason, an experimental class has been taken that has an average value of lower initial ability.

After passing the prerequisite test, the test results and the mathematical disposition questionnaire results are then performed. Description test with two questions and a Likert scale

statement questionnaire with 42 statements given to students in the experimental and control classes at the last learning meeting. The summary description of the test results and the mathematical disposition questionnaire are presented in Table 6 and Table 7.

Table 6. Summary Description of Mathematical Disposition Test Results

Parameter	Class	
	Experiment	Control
Highest value	90,4	90,4
Lowest value	40,4	17,3
$\bar{x}$	73,21	63,72
S^2	242,9	383,8
S	14,58	19,59

From the students' mathematical disposition tests above, the first hypothesis testing is done through a two-party t-test. It compares the mathematical disposition test's average value in the two sample classes.

This hypothesis test was conducted to determine whether there were differences in students' mathematical disposition in the class using the guided discovery learning model with students in the class using expository learning models in class VII students of SMPN 1 Pajangan even semester for the academic year 2017/2018. Based on the results of the analysis conducted, it is known that the average mathematical disposition test results in the experimental class are higher is 73.21, than the average mathematical disposition test results in the control class that is equal to 63.72. The difference from the average test results of the two classes was 9.49.

Furthermore, in testing the second hypothesis using a one-party t-test to determine which model is more effective in increasing mathematical disposition, it is obtained that $t_{count} = 2{,}13 > t_{table} = 1{,}67155$ means that H_0 is rejected. Then through the analysis, the results of the questionnaire were obtained as Table 7.

Table 7. Summary of Results of Mathematical Disposition Questionnaire

Parameter	Class	
	Experiment	Control
Highest value	94	92,9
Lowest value	65,5	60,7
$\bar{x}$	76,5	72,04
S^2	55,63	66,53
S	7,46	8,16

From the results of the mathematical disposition questionnaire above, it was found that the average mathematical disposition questionnaire results in the experimental class were higher at 76.5 than the average results of the mathematical disposition questionnaire in the control class that was 72.04. The difference from the average test results of both classes amounted to 4.46. Furthermore, in testing the second hypothesis using a one-party t-test, it is known that $t_{count} = 2{,}19 > t_{table} = 1{,}67155$ means H_0 is rejected. Based on the results of the test and questionnaire analysis above, it can be said that the guided discovery learning model is more effective than the expository learning model for the mathematical disposition of Grade VII students of SMPN 1 Pajangan even semester for the 2017/2018 academic year.

Students are encouraged not just to sit, be quiet, and listen through the guided discovery learning model. Through this model, students can search for themselves and analyze themselves about the teacher's material through guidance. When students try to solve mathematical problems, it will encourage curiosity, tenacity, confidence, and students' fondness to develop a positive attitude towards mathematics. When students successfully solve mathematical problems, it will provide intrinsic satisfaction and increase their mathematical disposition. This is also shown by the increase in students

'mathematical disposition test results in classes using guided discovery learning models better than students' mathematical disposition tests using expository learning models.

CONCLUSION

Based on the results of research and discussion as described, the following research conclusions can

1. There are differences in mathematical disposition between students who use the guided discovery learning model and students in the class who use expository learning models in class VII SMPN 1 Pajangan even semester for the 2017/2018 academic year.
2. The guided discovery learning model is more effective than the expository learning model for the mathematical disposition of Grade VII students of SMPN 1 Pajangan even semester for 2017/2018.

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