



The Influence of the Connected Mathematics Project Model on Mathematics Learning on Students' Mathematics Learning on Students' Mathematical Reasoning Abilities at SMAN 2 Rumbio Jaya

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Abstrak

This research was motivated by the problem of low mathematical reasoning ability of students in mathematics learning in grade XI SMAN 2 Rumbio Jaya. One solution to overcome this problem is to use the connected mathematics project (CMP) learning model. The purpose of this study was to improve the mathematical reasoning ability of high school students. This type of research is quasi-experimental research or pseudo-experiments involving two classes that are given different treatments, namely the experimental class and the control class. The research subjects consisted of class XI where class XI IPS1 was an experimental class with a total of 19 people and class XI IPS2 in the form of a control class with a total of 21 people. The sample technique uses simple random sampling. Before being given experimental class treatment and control class is first given a test, namely pretest, and after being given experimental class treatment and control class given posttest test. The results of this study, students' mathematical reasoning ability in the control class was found to be on average in the control class of 76.19 while in the experimental class it was found to be an average of 83.00. So that the Connected Mathematics Project model has a significant effect on the mathematical reasoning ability of grade XI students of SMA Negeri 2 Rumbio Jaya. This is evidenced by an independent t-test, where the sig value is $0.000 < 0.05$.

Keywords: model, connected mathematics project, students' mathematical reasoning ability.

Introduction

Tirtarahardja and Sulo (2008) say "education is a conscious effort to prepare students so they can play an active role in their lives now and in the future". Quality education is expected to be able to form better human resources. One effort to improve the quality of education is to improve the quality of mathematics education. Hamzah (2013) stated that

mathematics education is so important that in junior and senior secondary education units it is given more than 5 hours a week and is relatively large compared to other subjects such as social studies or languages. Mathematics is a source for other sciences, meaning that much science is a development of mathematics.

Mathematics is a universal science that underlies the development of modern

technology, has an important role in various scientific disciplines and can train human thinking. In accordance with its function, mathematics learning aims to calculate, measure and use mathematical formulas that are needed in everyday life. In fact, we hear many students' complaints about mathematics that mathematics makes students confused (and also their parents) and is even considered scary by some students. The role and responsibilities of mathematics teachers are so heavy that students worry about their learning achievement. Another factor that also influences boredom in mathematics is the lack of variety in the delivery of material or mathematics learning methods. This clearly has a very bad impact on the development of mathematics education. (Astuti, 2018).

Based on the results of interviews and observations conducted with one of the class XI mathematics teachers at SMAN 2 Rumbio Jaya, it is known that students have had deficiencies in reasoning abilities. Where students still need a lot of direct direction in solving problems related to complicated questions, it is also seen when students are working on mathematics problems that students still look confused or have difficulty determining what they know and are asked so that in this case students are unable to solve or solve mathematical problems that have been given well. Apart from that, students are also familiar with the sequence of learning activities, such as being given theory, then being given example questions, then students are given practice questions. Under these conditions, students' thinking processes and mathematical reasoning abilities become less developed. So, from the results of the interview it can be concluded that students' mathematical reasoning abilities are still relatively low, which can be seen from the assignment scores or daily test scores of students in class XI at SMAN 2 Rumbio Jaya.

The aim to be achieved in this research is: "To determine the influence of

the Connected Mathematics Project model in mathematics learning on the mathematical reasoning abilities of class XI students at SMAN 2 Rumbio Jaya."

Method

This type of research is quasi-experimental or quasi-experimental research. The research design used was nonequivalent control group design. Before being given a treatment, the experimental class and the control class are first given a test, namely a pretest with the aim of finding out the condition of the class before being given treatment. After being given treatment, the experimental class and control class were given a test, namely a posttest with the aim of finding out the condition of the class after being given treatment. Quasi experimental using simple random sampling, namely this design consists of two groups chosen at random, then given a pretest to find out whether there are any differences between the experimental group and the control group. (Sugiyono, 2013). The research was carried out at SMAN 2 Rumbio Jaya. The address is Simpang Petai Village, Rumbio Jaya District.

The sampling technique in this research used a random sampling technique with a draw for class XI SMAN 2 Rumbio Jaya. The purpose of selecting the sample was due to the consideration that the researcher used two classes as an experimental group and a control group. To determine the class that will be used as a sample in the research.

The data collection techniques used in the research are as follows.

1) Observation

Observations carried out included observing teacher activities and observing student activities.

2) Test

The tests given consist of two, namely pre-test and post-test.

The research instruments used in this research were reasoning ability tests and learning implementation observation sheets.

1) Reasoning Ability Test

There are two types of tests used in this research, namely pretest test questions and posttest test questions in the form of questions testing students' mathematical reasoning abilities. This instrument is a test of students' mathematical reasoning abilities which is given before learning (pretest) and after learning (posttest). The form of test used is essay questions.

2) Learning Implementation Observation Sheet

Observations were carried out in both experimental classes. This learning implementation observation sheet is used to obtain data about learning implementation using the direct teaching model and connected mathematics project model starting from the teacher opening the lesson until closing the lesson.

Validation of Research Instruments

- a) Validity
- b) Reliability
- c) Difficulty Level Test
- d) Differentiating Power Test

Data analysis

- a) Normality test
- b) Homogeneity test
- c) Hypothesis Testing

Results and Discussion

Based on the content validity test, 5 questions can be used as a research instrument in collecting data for students' mathematical reasoning ability tests. Next, a construct validity test was carried out with results as in the table below:

Table 4. 1 Question Validity Test Results

No. Question Items	Sig. (2-tailed)	Information	decision
1.	0,000	Valid	Used
2.	0,000	Valid	Used
3.	0,000	Valid	Used
4.	0,000	Valid	Used
5.	0,000	Valid	Used

Validity test testing criteria using SPSS 23

Using significance value (P-value)

- 1. A significance value <0.05 concludes that it is valid
- 2. A significance value >0.05 means invalid

Based on table 4.1, it is known that from the 5 essay questions, it shows that there are no questions that fall under the invalid criteria. This proves that all question items can be used as test questions for collecting data on research samples, because invalid questions do not have a function as a good measuring tool in measuring students' mathematical reasoning abilities. Questions 1, 2, 3, 4, 5 are valid questions so they can be used as a good measuring tool for the results of students' mathematical reasoning abilities.

Table 4. 2 Question Reliability Test Results

Reliability	Criteria	Description
0,744	High	Used Revisions

Source: 2023 Research Data Processing Results

Tabel 4. 1 Hasil Uji Tingkat Kesukaran

No. Questions	Difficulty Level	Interpretation	Description
1.	1,72	Easy	Used Revisions
2.	1,60	Easy	Used Revisions
3.	0,68	Currently	Used Revisions
4.	0,68	Currently	Used Revisions
5.	0,28	Hard	Used Revisions

Source: 2023 Research Data Processing Results

Table 4. 4 Differentiating Power Test Results

No. Question Items	Different Power	Interpretation of Different Powers	Description
1.	0,697	Good	Used Revisions
2.	0,740	Very Good	Used Revisions
3.	0,663	Good	Used Revisions
4.	0,734	Very Good	Used Revisions
5.	0,702	Very Good	Used Revisions

Source: 2023 Research Data Processing Results

Table 4. 5 Conclusions from the Test Results of Students' Mathematical Reasoning Ability Tests

No. Soal	Uji Validitas	Reliabilitas	Tingkat Kesukaran	Daya Beda	Kesimpulan
1.	Valid	Reliabilitas	Mudah	Baik	Digunakan Revisi
2.	Valid		Mudah	Baik	Digunakan Revisi
3.	Valid		Sedang	Baik	Digunakan Revisi
4.	Valid		Sedang	Baik	Digunakan Revisi
5.	Valid		Sukar	Baik	Digunakan Revisi

Based on the results of the analysis of validity tests, reliability tests, difficulty level tests and discrimination tests using SPSS 23, consisting of 5 total questions that have been tested, there are 5 valid questions that have easy, medium and difficult levels of difficulty. Questions that are feasible can then be used as pretest and posttest tests in the experimental class and control class.

Based on the results of the research that has been carried out, the pretest scores show that there is no significant difference

between the control class and the experimental class. The results of pretest data calculations in the control class and experimental class were calculated using the SPSS 23 program. These results can be seen in Table 4.6 below.

Table 4. 6 Pretest Score Data for Control Class and Experimental Class

Data	Pretest	
	Kelas Kontrol	Kelas Eksperimen
Mean	40,95	44,50
Median	40	45
Minimum	25	30
Maximum	60	65
Standar Deviasi	10,322	10,748
Varians	106,548	115,526

Source: 2023 Research Data Processing Results

Based on table 4.6 above, it can be seen that the results of students' mathematical reasoning abilities in the pretest in the control class were found to be an average of 40.95 in the control class, while in the experimental class the average was found to be 44.50. The posttest scores obtained show that there are posttest data calculation results in the control class and the experimental class calculated using the SPSS 23 program. These results can be seen in the significant differences between the control class and the experimental class. Table 4.7 below.

Table 4. 7 Posttest Score Data for Control Class and Experimental Class

Data	Posttest	
	Kelas Kontrol	Kelas Eksperimen
Mean	76,19	83,00
Median	75	80
Minimum	65	60
Maximum	90	100
Standar Deviasi	7,567	11,402
Varians	57,262	130

Based on Table 4.7 above, it can be seen that the results of students' mathematical reasoning abilities in the posttest in the control class were found to be an average of 76.19 in the control class, while in the experimental class the average was found to be 83.00. After the pretest and posttest scores have been obtained, these scores are processed by carrying out analysis tests using the SPSS 23 program. The analysis tests carried out are normality tests, homogeneity tests, hypothesis tests (independent sample t-test).

Conclusion

Based on the results of the research and discussion above, it can be concluded that the use of the connected mathematics project model has a significant effect on the mathematical reasoning abilities of class XI students at SMA Negeri 2 Rumbio Jaya. The mathematical reasoning abilities of students using the Connected Mathematics Project model are better than the mathematical reasoning abilities of students without treatment.

In implementing the connected mathematics project model, it can be carried out using even more interesting media. The researcher's weakness or limitation in this research is that the choice of location is limited to only one school due to limited time, money and energy. The limitations of this researcher will provide opportunities for further researchers who will study extensively, especially regarding the connected mathematics project model and its success in applying it to mathematics learning.

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