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THE INFLUENCE OF THE MATCH MINE TYPE COOPERATIVE LEARNING MODEL ON THE MATHEMATICS COMMUNICATION ABILITY OF CLASS VII STUDENTS AT MTS ANNIZHOMIYYAH JAHA-LABUAN

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Abstract: This research investigates the effect of the Match Mine type Cooperative Learning model on the mathematical communication skills of class VII students at MTs Annizhomiyyah Jaha-Labuan. The experimental method was used with two groups: the experimental group (which received learning using the Match Mine type Cooperative Learning model) and the control group (which received conventional learning). Data was collected through tests before and after treatment and then analyzed to evaluate the impact of the learning model. The analysis results show that applying the Match Mine type Cooperative Learning model significantly influences students' mathematical communication skills. Students in the experimental group showed better abilities in proposing ideas, reflecting on mathematical concepts, solving problems, and discussing than students in the control group. Thus, the Match Mine type Cooperative Learning model can be an effective alternative in improving students' mathematical communication skills. Teachers should consider using this model in the mathematics learning process because it can increase student engagement, creativity, and learning outcomes.

Keywords: Cooperative Learning, Tipe Match Mine, Mathematics, Communication Ability.

INTRODUCTION

Mathematics is a lesson that communicates the ability to think systematically. Communicating through mathematics in learning is very important, as stated and implied in the mathematics learning strategy that mathematics is the queen of all sciences and is an implementation of other sciences. Science cannot be separated from mathematics. Therefore, mathematics is knowledge obtained through learning regarding numbers, measurements, calculations and other things.

Mathematics is a structured science that studies the understanding of basic scientific concepts from other scientific disciplines, and mathematics education is a basic science taught to all levels of education, which has a vital role in the development of science and technology. Therefore, mathematics needs to receive serious attention from various parties, especially parties directly related to the implementation of education, to improve the quality of education and ensure that students' competencies will be realized.

One of the competencies that needs to be developed among students is mathematical communication skills because mathematical communication skills are essential in mathematics subjects. After all, people who can communicate their mathematical ideas or concepts well tend to have a good understanding of the concepts being studied and can solve problems related to the concepts studied, which will later influence student learning outcomes.

Students in learning will not be separated from communication. Communication in learning is not only between students but also between students and learning facilities or teachers. Based on research conducted by Munawarah (2010) states that "each individual's communication skills will influence the student's learning process and outcomes and can shape their personality". Apart from reasoning and problem-solving, communicating ideas, thoughts, or opinions is essential. The ability to communicate ideas and opinions will be increasingly needed. In this case, students can communicate their mathematical thinking logically and clearly to their peers, teachers and others. In addition to allowing students to analyze and evaluate other people's mathematical thinking, students are allowed to use mathematical language to express their ideas precisely.

Mathematical communication is an event that occurs in the classroom environment to transfer mathematical messages. According to Munawarah (2010), the message is mathematical material, and the transfer method can be oral or written. Mathematical communication skills are part of the reasoning process, the most critical aspect of learning mathematics. In other words, mathematical communication skills are essential abilities in mathematics learning that must be built and developed firmly in students. Mathematics is generally synonymous with calculating numbers and formulas, so there are assumptions that students' mathematical communication skills cannot be built on learning mathematics. This assumption is, of course, not entirely correct because, according to Greenes and Schulman (2008), there are 3 essential roles in mathematical communication, namely:

1. Central strength for students in formulating mathematical concepts and strategies.
2. Capital for success for students regarding approaches and solutions in mathematical exploration and investigation.
3. A forum for students to communicate with friends to obtain information, share thoughts and discoveries, brainstorm opinions, and assess and sharpen ideas to convince others.

MTs Annizhomiyyah is one of the private MTs in the Labuan sub-district area. Based on initial observations, the author obtained some information: (1) the mathematics learning process in this school still uses the lecture method, so the learning process is still teacher-centred (teacher-centred learning). (2) mathematics is the most challenging and dull subject. for MTs Annizhomiyyah Jaha Labuan students. (3) Students' enthusiasm for learning mathematics still needs to improve. (4) students are still embarrassed in communicating their ideas and are still hesitant in raising their problems when the student faces a problem in solving a mathematical problem. This reflects that student communication in the learning process could be higher; (5) students cannot communicate their ideas or opinions.

Teachers have tried to overcome the abovementioned problems, such as holding discussions or asking questions in class. However, these efforts have yet to stimulate students to be active in learning because only a few people tend to dominate the students who answer the teacher's questions. Meanwhile, other students only listened and recorded the information conveyed by their friends. Another effort teachers make is to carry out learning in small group settings. However, students work more individually to solve the questions given by the teacher; there is less interaction between students. The efforts made by teachers have not produced optimal results in improving students' mathematical communication skills.

It is thought that students' low communication skills are caused by classroom learning, which still emphasizes problem-solving skills, thus giving them less opportunity to build their knowledge. This causes students to be less accustomed to working on problem-solving questions that require them to communicate their ideas. A student who has good communication skills will be able to take steps to solve a problem quickly.

The problems raised above require a learning solution that can solve all the problems students face. The learning model used should help students improve their mathematical communication skills. For this reason, the role of teachers is to bring their students to these abilities. Teachers must create a learning atmosphere that can explore students' mathematical communication skills. The mathematical communication skills these students possess will improve student learning achievements so that educational goals, as mentioned above, can be achieved.

Based on research conducted by Munawarah (2010), students' mathematical communication skills can be improved through changes in learning. One way that can be done to improve student's communication skills is to use learning models that are relevant to be implemented by teachers. The learning model that should be applied is a learning model that allows students to construct their knowledge so that it is easier for students to understand the concepts being taught and communicate their ideas in oral and written form. One alternative effort that supports this is implementing the match-mine-type cooperative learning model in the mathematics learning process.

The match-mine type cooperative learning model provides many opportunities for students to interact to convey their ideas, reflect on ideas given by their friends and discuss matching ideas with their friends. Mathematics learning using the match-mine model involves students in a learning process that relies on student competence. With this match-mine model, students actively express their ideas, explain the ideas given by their friends and discuss how to equate their ideas. With this cooperative learning match my model, the teacher only acts as a facilitator to form and develop knowledge, not to transfer knowledge. Choosing a suitable learning model in mathematics will activate students and make them aware that mathematics lessons are sometimes dull or scary.

RESEARCH METHODOLOGY

This research was carried out at MTs. Annizhomiyyah in the odd semester of the 2013/2014 academic year from 17 July 2013 to 22 August 2013. The population taken in this research were all class VII students of Madrasah Tsanawiyah Annizhomiyyah Jaha Labuan in the 2013-2014 academic year, consisting of 3 classes. According to Arikunto (2010), a sample is "a portion or representative of the population studied". The sampling method used was random sampling. The samples in this research were 30 students from class VII A and 30 from class VII B.

Table 1. Research Sample

No	Class	Amount	Group
1	VII A	30 students	Experiment
2	VII B	30 students	Control

The research method used is the experimental method. The experimental method is observation under artificial conditions. The researcher creates and regulates these conditions, meaning there is manipulation of the research object.

The experimental method approach will be carried out using a comparison group (control group). In this case, research was conducted to find the influence of the teachers' match-mine type cooperative learning model. Two groups with the same characteristics and attitudes towards a learning model will be selected in the learning process. The first is the experimental group, and the second is the comparison group. Both groups will be given the same material. The experimental class will use the match mine type cooperative learning model, while the control class will use the conventional model.

In this research, the data collection method used was a test. According to Suharsimi Arikunto (2010), a test is a series of questions, exercises, and other tools used to measure skills, intelligence, knowledge, abilities, or talents individuals or groups possess. After both classes were treated, the next step was for the researcher to give the same test questions to both classes or a post-test. After the post-test, the researcher conducted data analysis and prepared a research report.

RESEARCH RESULT

Pretest Data Description

A descriptive statistical overview of the mathematical communication abilities of the experimental and control classes can be seen in the table below:

Table 2. Pretest Results for Mathematical Communication Ability

Class	Xmax	Xmin	$\bar{X}$	S
Experiment	55	10	36.70	13.67
Control	50	10	31.67	11.38

Based on the table above, the experimental and control classes have the same initial abilities or are not significantly different on average. The analysis shows that 26.67% of students scored between 41.5 and 49.5 on the pretest. Meanwhile, 23.33% of students scored between 37.5 and 44.5 in the pretest for the control class.

Posttest Data Description

A descriptive statistical overview of the mathematical communication abilities of the experimental and control classes can be seen in the table below:

Table 3. Posttest Results for Mathematical Communication Ability

Class	Xmax	Xmin	$\bar{X}$	S
Experiment	100	35	70.07	16.58
Control	85	30	58.83	15.91

Based on the table above, after learning using the match mine type cooperative learning model in the experimental class with an average of 70.07 and using the conventional model in the control class with an average of 58.83, there are significant differences between the two classes. The analysis results show that

33.33% of students scored between 67.5 and 78.5 on the posttest. Meanwhile, 26.67% of students scored between 49.5 and 59.5 on the posttest for the control class.

Test Requirements Analysis

1. Normality Test Pretest Results

The normality test used the chi-square formula (χ^2), with db = k-3 and significant level ($\alpha = 0.05$). The data distribution is declared normal if price χ^2 is calculated ≤ price χ^2 table. If price χ^2 count ≥ price χ^2 table, then the data distribution is declared not normal. The following is a table of normality test results:

Table 4. Pretest Data Normality Test Results

Class	χ^2count	χ^2table	Information
Experiment	7,721	7,815	Normal
Control	4,164	7,815	Normal

Based on the table above, it is known that the test results data for the experimental class and control class are normally distributed.

After carrying out the normality test, the next step is a homogeneity test. The homogeneity test was conducted using a variance test using the F table with db = k-1 and a significance level ($\alpha = 0.05$). The data is declared homogeneous if the Fcount value ≤ the Ftable price. The data is not homogeneous if the Fcount value ≥ the Ftable price. The following is a table of homogeneity test results:

Table 5. Pretest Data Homogeneity Test Results

Fcount	Ftable	Information
1,443	1.85	Homogeneous

Based on the table above, it is obtained that Fcount ≤ Ftable value, which means that both data are homogeneous.

2. Normality Test Posttest Results

The normality test was carried out using the chi square formula (χ^2), with db = k-3 and significant level ($\alpha = 0.05$). If priceχ^2calculate ≤ price x2 table, then the data distribution is declared normal. If If priceχ^2count ≥ priceχ^2table, then the data distribution is declared not normal. The following is a table of normality test results:

Table 6. Posttest Data Normality Test Results

Class	χ^2count	χ^2table	Information
Experiment	3,803	7,815	Normal
Control	5,002	7,815	Normal

Based on the table above, it is known that the test results data for the experimental class and control class are normally distributed. After carrying out the normality test, the next step is to carry out a homogeneity test. The homogeneity test was carried out using a variance test using the F table with db = k-1 and a significance level ($\alpha = 0.05$). If the Fcount value ≤ the Ftable price, then the data is declared homogeneous. If the Fcount value ≥ the Ftable price, then the data is declared not homogeneous. The following is a table of homogeneity test results.

Table 7. Posttest Data Homogeneity Test Results

Fcount	Ftable	Information
1,086	1.85	Homogeneous

Based on the table above, it is obtained that Fcount ≤ Ftable value, which means that both data are homogeneous.

Hypothesis testing

Once it is known that both data are normal and homogeneous, the next step is to test the hypothesis using the t test with α = 0.05 and db = . If the value of tcount ≤ ttable then Ho is accepted. If tcount ≥ ttable then Ho is rejected. The following is a table of t test results:$n_1 + n_2 - 2$

Table 4.7
T test results

tcount	ttable	Information
2.6796	2.0231	Ho was rejected

Based on the table above, it is obtained that count≥ table or 2.6796 ≥ 2.0231. So Ho is rejected, meaning H1 states that using the match mine type cooperative learning model influences the mathematical communication skills of class VII MTs students. Annizhomiyyah Jaha Labuan's 2013/2014 academic year is accepted.

DISCUSSION

Based on hypothesis testing using the t-test at a significance level and degrees of freedom (dk) = 58, a value of 2.679 was obtained. Meanwhile, from the calculation results, the value obtained = 2.023. The calculation results found that the average value of the mathematical communication ability of students who used the match mine type cooperative learning model was higher than that of students who used conventional methods. So, the match-mine-type cooperative learning model influences students' mathematical communication skills.

The findings in this research align with research conducted by Munawarah, which showed that the average mathematical communication ability of experimental class students was higher than that of control class students. Apart from that, Spencer Kagan also emphasized that the match mine type cooperative learning model is "communication building". This type of match mine emphasizes achieving students' mathematical communication skills; in the process, students match ideas with their partners.

The mathematical communication skills of students who applied the match mine cooperative learning type were better than those who applied the conventional learning model. Students in the experimental class can reflect on pictures and mathematical models on number material. Most students can tell relevant stories about what is contained in pictures or mathematical models because, in their learning, students are trained to create ideas and reflect ideas from friends in the form of pictures into stories and vice versa. In this process, researchers listen and look attentively at the ideas given by students and investigate the questions and tasks given by them.

In match-mine type cooperative learning, students are trained to communicate each student's ideas in pairs related to creating a picture, mathematical problem or mathematical model related to the concept of numbers. Then, the partner reflects/builds on what their friend has written. In this process, researchers assess the depth of understanding or ideas expressed by students.

Students take turns swapping roles as idea givers and idea builders given by their friends. After both of them have finished explaining (in writing and orally) the concepts related to their friend's writing, they discuss/equate the concepts they and their partner wrote. The discussion process carried out by students is monitored and supervised by researchers so that researchers can provide motivation and direct students if there are students who do not respond to ideas or assess their friends in writing.

Students in the experimental class have the advantage of being provided with diverse ideas from the material provided, and they can also build their social skills through interaction with group members. Meanwhile, students in the control class who were taught using conventional learning were less able to reflect on pictures and mathematical models related to number material, so they needed help creating stories and explaining mathematical problems in their language.

This is because, in the learning process, the teacher only explains the material and conducts questions and answers after the material has been explained. This causes students to be passive and have few opportunities to communicate their ideas. In the end, students only memorize the material given, so that students need help solving mathematical communication problems.

CONCLUSION

Based on the data analysis and hypothesis testing that has been carried out, implementing the match-mine type cooperative learning model in the experimental class influences students' mathematical communication abilities. The mathematical communication abilities of experimental group students were better than those of control class students. Thus, the results of this study show that the use of the match-mine type cooperative learning model significantly influences students' mathematical communication skills.

The mathematical communication abilities of students in the experimental class, measured based on mathematical communication indicators during the research, showed that students could submit their ideas in the form of mathematical problems, both written and verbal, during the learning process. Apart from that, students can reflect on tables or mathematical models presented by their friends and solve mathematical problems related to the concept of numbers; then, students can discuss their ideas to equate the meaning of the ideas or concepts they express to their partners. Meanwhile, mathematical communication skills in the control class based on indicators of mathematical communication during the research showed that the majority of students were less able to provide ideas or suggestions given by the researcher because, in their learning, students only received the concepts of number material given by the teacher so that students only memorized the material given.

Based on the conclusions above, the advice that can be given to teachers as facilitators and motivators in the learning process is to try using the match-mine type cooperative learning model as an alternative to learning mathematics. By using the match mine type cooperative learning model, students can be more active, creative and more attractive to students in learning mathematics. They can improve mathematical communication skills because people who can communicate their mathematical ideas or thoughts well tend to understand concepts well. Learning and solving problems related to the concepts studied will later influence student learning outcomes.

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