# THE INFLUENCE OF MIND MAPPING TYPE COOPERATIVE LEARNING MODELS ON STUDENTS' MATHEMATICAL PROBLEM SOLVING ABILITIES

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***Abstract***
*A This study aims to determine the effect of the Mind Mapping cooperative learning model on the mathematical problem solving abilities of class VII students of MTsN 1 Tapanuli Selatan. The population in this study were all class VII MTsN 1 Tapanuli Selatan which consisted of 4 classes and the total number of students in class VII was 107 students. Sampling in this study was through Cluster Random Sampling where the sampling population did not consist of individuals, but consisted of groups that had the same characteristics (homogeneity). As a research instrument, data were used to test students' mathematical problem solving abilities in the form of an entry test on fractional material, where the questions totaled 10 questions and had been validated by lecturers and mathematics teachers. From the analysis of the score data for tests of students' mathematical problem solving abilities before using the Mind Mapping model, an average of 78.2 was obtained with a standard deviation of 5.56 and after using the Mind Mapping model an average of 82.3 was obtained with a standard deviation of 5.27 . The hypothesis used in this study uses the t test. Based on the results of data processing for the variables obtained by tests of students' mathematical problem solving abilities tcount>ttable (7.031 > 1.990847), these results prove that H0 is rejected and Ha is accepted in other words. There is an influence of the Mind Mapping Cooperative model on students' mathematical problem solving abilities in MTsN 1 Tapanuli Selatan. The effect of the Mind Mapping learning model on the Mind Mapping type cooperative model on the mathematical problem solving abilities of students at MTsN 1 Tapanuli Selatan is 42.25%*

***Keywords**: Cooperative Model; Mind mapping; Mathematical Problem Solving Ability.*

***Abstrak***
Penelitian ini bertujuan untuk mengetahui pengaruh Model Pembelajaran Kooperatif Tipe *Mind Mapping* terhadap Kemampuan Pemecahan Masalah Matematis Siswa kelas VII MTsN 1 Tapanuli Selatan. Populasi dalam penelitian ini adalah seluruh kelas VII MTsN 1Tapanuli Selatan yang terdiri dari 4 kelas dan jumlah keseluruhan siswa kelas VII sebanyak 107 siswa. Pengambilan sampel dalam penelitian ini adalah melalui *Cluster Random Sampling* dimana pengambilan sampel populasi tidak terdiri dari individu-individu, melainkan terdiri dari kelompok-kelompok yang mempunyai karakteristik yang sama (homogeny). Sampel dalam penelitian ini adalah kelas VII-A dan VII-B yang berjumlah 33 siswa. Sebagai instrument penelitian digunakan data tes kemampuan pemecahan masalah matematis siswa dalam bentuk tes isian pada materi pecahan, dimana soal berjumlah 10 soal dan telah divalidasi oleh dosen dan guru matematika. Dari analisa data skor untuk tes kemampuan pemecahan masalah matematis siswa sebelum menggunakan model *Mind Mapping* diperoleh rata-rata sebesar 78,2 dengan standar deviasi 5,56 dan sesudah menggunakan model *Mind Mapping* diperoleh rata-rata sebesar 82,3 dengan standar deviasi 5,27. Hipotesis yang digunakan dalam penelitian ini menggunakan *uji t*. Berdasarkan hasil pengolahan data untuk variable diperoleh tes kemampuan pemecahan masalah matematis siswa $t_{hitung} > t_{tabel}$ (7,031 > 1,990847), hasil ini membuktikan bahwa $H_0$ ditolak dan Ha diterima dengan kata lain Adanya pengaruh model Kooperatif tipe *Mind Mapping* terhadap kemampuan pemecahan masalah matematis siswa di MTsN 1 Tapanuli Selatan. Adapun pengaruh model pembelajaran *Mind Mapping* terhadap model kooperatif tipe *Mind Mapping* terhadap kemampuan pemecahan masalah matematis siswa di MTsN 1 Tapanuli Selatan sebesar 42,25 %

***Kata Kunci**: Model Kooperatif; tMind Mapping; Kemampuan Pemecahan Masalah Matematis.*

## INTRODUCTION

Humans undertake education as an effort to improve themselves as individuals. The quality of a nation is developed through a process in which education is very important. This means that every individual has the right to acquire and develop the skills necessary for himself and society, as well as the ability to have traits such as intelligence, self-control, personality, spiritual strength, and noble values. According to (Trianto 2011), "Good education is education that is able to support future development, meaning that it is able to develop the potential of students, so that the person concerned is able to face and solve the problems of their life. "The home, school and community environment is where education takes place.

The great influence of mathematics means that students need to master mathematics. The main point is to be able to solve mathematical problems. Mathematical problems are something that must be solved, by solving these problems he will be more creative in real life with the knowledge he has. Students in interpreting mathematical sequences, of course, do not only have concepts that must be synthesized. Contained in the problem solving component are urgent matters. Wena (2011) for students and their future problem solving abilities are very important. Students must be able to think critically, rationally and methodically in order to solve difficulties in everyday life (Wena, 2011).

However, a number of variables contribute to children's poor mathematical problem solving abilities. There are many factors that cause students to be less interested in learning mathematics. Concepts, formulas, patterns with mathematical symbols are difficult to understand because they believe that mathematics is a very challenging topic.

Weak students' mathematical problem solving abilities immediately result in students' lack of understanding of mathematics lessons. The reflection that students have difficulties when learning mathematics related to aspects of reasoning, understanding concepts, application and solving problems is the cause of limited problem solving abilities. This is because the teacher's concept uses a direct learning model, which is centered on the educator and students find it difficult to develop their skills.

Based on preliminary research observations at MTsN 1 South Tapanuli, the results of the pre-test or first test, as well as the findings of researchers' interviews with learning teachers, show that students' problem-solving abilities are still not very visible. Observations made on July 19 2021 with mathematics subject teachers, the teacher revealed that the students guessed that mathematics, a subject that was difficult to understand and complicated, seemed very boring. Students also become less active in class because their interest in learning mathematics is very low. And the continuity of learning activities in the classroom is teacher-centered, the effect being that the majority of students are still dependent on educators or teachers.

From the results of the test given to 33 students at MTsN 1 Tapanuli Selatan, it was found that 23 students (77.14%) were unable to understand the problems seen in students who did not write down what they were asking and what they knew, totaling 21 students (69.4%). %) who had not been able to plan the solution to the problem or write down the formula that would be used, there were 16 students (55%) who had not been able to solve the problem based on the plan, and there were 33 students (100%) who had not re-checked the answers and provided conclusion. We can see that the abilities related to student problem solving are still very complicated and need to be improved, especially when taking initial tests.

To improve students' mathematical problem solving abilities, efforts need to be made to understand models, method approaches, or learning techniques derived from these problems. In order to be able to motivate students when studying, teachers must also have a good way of thinking so that the education and teaching provided gets a reliable and positive opinion, attracts attention, and can also develop students' positive attitudes. The learning model in question is a Mind Mapping type cooperative learning model.

The cooperative learning model is a teaching model where students learn in small groups who have different levels of ability in completing group assignments, each member collaborates with each other and helps to understand a lesson (Rusman, 2011). Cooperative learning emphasizes students' awareness of solving problems, applying conceptual knowledge and learning to work together with other members in the group. Mind mapping is a type of cooperative learning. Mind Mapping was

introduced by Buzan in 1990 and is a learning method that requires students to reveal the essence of the learning material (Tapantoko, 2011). Explains that the mind mapping method places greater emphasis on students' activeness and creative activities, so that it will increase students' strong memorization and understanding of concepts. Learning using the Mind Mapping method is learning designed for students who have creative learning skills as well as a method that can help students to connect important concepts in studying subject matter, so that students can understand the concepts well. According to Mulyatiningsih (2014) and Fitriatien (2017), Mind Mapping is a form of learning that is used to train the ability to present subject matter content using mind mapping. Students are invited to look for information related to the material and then put the knowledge they gain into a mind map, so that students can see the overall picture of the subject matter. Apart from that, students can also see information in detail, grouped and of course easy to remember and understand. Therefore, mind mapping is very good for influencing students' mathematical problem solving abilities.

Learning using the Mind Mapping type cooperative model will make it easier to make creative notes, because the creation is combined with interesting pictures and symbols so that students will easily remember the lesson material they note down. The direct learning model is oriented towards teachers only providing material and students must be able to creatively note down the points taught by the teacher in order to understand the material and ultimately be able to solve students' mathematical problems so that students' grades can reach the set KBM. Apart from that, this model can increase students' learning motivation, train students to work in groups, and can also reduce the perception that learning mathematics is difficult.

## RESEARCH METHOD

This type of research is quantitative research, this research can be interpreted as a research method used to find the effect of certain treatments on others under controlled conditions. The type of experiment used in this research is Quasy Experimental Design, namely a design that has a control group, but cannot fully function to control external variables that influence the implementation of the experiment. Research that aims to determine whether there are consequences from

"something" imposed on the subject. This research involved two classes, namely the experimental class and the control class. The experimental class was taught using the Mind Mapping type cooperative learning model, while the control class was taught using direct learning. The approach used in this research is a quantitative approach. Quantitative research is research that produces data in the form of numbers from test results.

The following research design can be described as follows:

Table 3.1 Research Design

| **Kelompok** | **Pretest** | **Treatment** | **Posttest** |
|---|---|---|---|
| **Experiment** | $O_1$ | $X_1$ | $O_2$ |
| **Control** | $O_1$ | $X_2$ | $O_2$ |

In this study the variable (X) is the influence of the Mind Mapping Learning Model. The variable (Y) in this research is students' mathematical problem solving abilities. The data collection technique used by researchers to determine how much influence the mind mapping type cooperative learning model has on students' mathematical problem solving abilities in this research is a test of students' mathematical problem solving abilities. In this research, researchers used a test in the form of an essay or in the form of story questions consisting of 10 questions for the pre-test combined with questions for the post-test that had been validated by experts. The instrument used to determine students' mathematical problem solving abilities is a mathematical problem solving ability test. The form of mathematical problem solving ability test that will be used is in the form of a description of 10 questions based on mathematical problem solving indicators. Furthermore, ensuring content validation is carried out by compiling a test grid for students' mathematical problem solving abilities. Stages of Research methode of this is validate research instruments, carry out pretests in the experimental class and control class to determine the initial abilities possessed by students, divide student study groups into experimental class and control class students, carry out learning with a learning model according to the research design, give posttests to the experimental class and control class to determine students' final abilities after being given treatment

## RESULTS AND DISCUSSION

This research was conducted in class VII MTs N 1 South Tapanuli. This research was conducted to see students' mathematical problem solving abilities with the same sample and population of students in this study, namely using two classes, namely classes VII-A and VII-B consisting of 33 students. Class VII – A as an experimental class is taught using the Cooperative Mind Mapping type model. Learning activities are carried out with the help of Student Worksheets which contain an understanding of Fraction material. Class VII-B as a control class which does not use the Mind Mapping learning strategy, is used to see the differences between the experimental class and the control class.

Before this research was carried out, the researcher first prepared instruments that would be tested on the two classes. Test testing takes the form of validity tests, test reliability, level of difficulty of questions and distinguishing power, so that an instrument is obtained that is truly suitable for measuring students' mathematical problem solving abilities. After the questions have been tested for validity, reliability, level of difficulty and differentiability of the questions, the instrument can be given to students in the experimental class and control class to determine the abilities of the two classes after receiving treatment. The test instrument tested consisted of 10 questions. After being tested and going through the tests mentioned above, 8 questions were declared valid and suitable for use. Next, the researcher provided mathematics learning to the two classes with different treatments, namely the experimental class used the Mind Mapping learning model while the control class used direct learning. After learning takes place, the next step is giving a post-test to the experimental class and control class. From the post-test results of the two classes, they were then analyzed using normality, homogeneity and difference of two means tests. This test of the difference between two averages is used as a basis for research, namely the hypothesis that has been proposed is accepted or rejected. Then the final step is to carry out a t-test analysis and obtain results from the data obtained to be used to prepare research reports based on calculations and data analysis**.**

Pre-test data from each class consisted of 33 experimental class students and 33 control class students. The following is the Pre-test statistical data

**Tabel 4.4**
**Statistik Deskriptif Pre-tes**

| Analisis Data | Pre-tes Kelas Eksperimen | Pre-tes Kelas Kontrol |
|---|---|---|
| **N** | 33 | 33 |
| **Mean** | 63,93 | 65,78 |
| **Standard Deviasi** | 6,592 | 6,974 |
| **Minimum** | 50 | 50 |
| **Maximum** | 75 | 75 |

From the table above, it can be seen that the average pre-test score for the experimental class is 63.93 with a maximum score of 75, a minimum score of 50 and a minimum score of 50 and a standard deviation of 6.592. Meanwhile, the average pre-test score for the control class was 65.78 with a maximum score of 75, a minimum score of 50 and a standard deviation of 6.974. However, to see whether the difference is significant or not, a statistical test will be carried out.

a. Pre-test Data Normality Test

1. Pre-test normality test for experimental class

**Tabel 4.5 Experimental Class Pre-test Normality**

| X | $F_k$ | Zi | $[F(Z_i)]$ | $[S(z_i)]$ | $[F(Z_i)-S(Z_i)]$ |
|---|---|---|---|---|---|
| **50** | 2 | -2,1124 | 0,01733 | 0,05 | 0,0326729 |
| **55** | 4 | -1,3539 | 0,08789 | 0,15 | 0,0621148 |
| **57** | 1 | -1,0505 | 0,14674 | 0,175 | 0,0282559 |
| **58** | 1 | -0,8988 | 0,18438 | 0,2 | 0,0156213 |
| **60** | 7 | -0,5954 | 0,27578 | 0,375 | 0,0992152 |
| **62** | 1 | -0,292 | 0,38514 | 0,4 | 0,0148629 |
| **63** | 1 | -0,1403 | 0,4442 | 0,425 | 0,0192038 |
| **64** | 1 | 0,075 | 0,52989 | 0,45 | 0,0798926 |
| **65** | 9 | 0,16307 | 0,56477 | 0,675 | 0,1102301 |
| **70** | 2 | 0,92156 | 0,82162 | 0,9 | 0,0783796 |
| **73** | 1 | 1,37665 | 0,91569 | 0,925 | 0,0093105 |
| **75** | 3 | 1,68004 | 0,95353 | 1 | 0,0464746 |
| **Jumlah** | 33 | | | | |
| $L_0$ | | | | | 0,1102301 |
| $L_{tabel}$ | | | | | 0,1400889 |

From the normality test of the experimental class pre-test data above, it is obtained that $L_0$ = 0.1102301 at a significance level of 0.05 with n = 33 obtained $L_{table}$ = 0.1400889. So that we get $L_0 < L_{table}$, the data is normally distributed.

2. Control class Pre-test Normality

**Tabel 4.6 Control Class Pre-test Normality**

| X | $F_k$ | Zi | $[F(z_i)]$ | $[S(z_i)]$ | $[F(Z_i)-S(Z_i)]$ |
|---|---|---|---|---|---|
| **50** | 2 | -2,2619 | 0,01185 | 0,05 | 0,0381478 |
| **55** | 3 | -1,545 | 0,06118 | 0,125 | 0,0638227 |
| **57** | 1 | -1,2582 | 0,10416 | 0,15 | 0,0458397 |
| **58** | 2 | -1,1148 | 0,13247 | 0,2 | 0,0675346 |
| **60** | 3 | -0,828 | 0,20382 | 0,275 | 0,0711772 |
| **64** | 1 | -0,2545 | 0,39955 | 0,3 | 0,0995519 |
| **65** | 6 | -0,1111 | 0,45576 | 0,45 | 0,0057595 |
| **66** | 1 | 0,03226 | 0,51287 | 0,475 | 0,0378682 |
| **67** | 2 | 0,17565 | 0,56971 | 0,525 | 0,0447139 |
| **68** | 2 | 0,31903 | 0,62515 | 0,575 | 0,0501481 |
| **70** | 2 | 0,6058 | 0,72768 | 0,8 | 0,0723243 |
| **71** | 1 | 0,74918 | 0,77313 | 0,825 | 0,0518735 |
| **73** | 1 | 1,03595 | 0,84989 | 0,85 | 0,0001124 |
| **74** | 1 | 1,17934 | 0,88087 | 0,875 | 0,0058677 |
| **75** | 5 | 1,32272 | 0,90704 | 1 | 0,0929643 |
| **Jumlah** | 33 | | | | |
| **$L_0$** | | | | | 0,0995519 |
| **$L_{tabel}$** | | | | | 0,1400889 |

From the control class pre-test data normality test above, $L_0$ = 0.995519 at a significance level of 0.05 with n = 33 obtained $L_{table}$ = 0.1400889. So that $L_0 < L_{table}$ is obtained, the data is normally distributed.

b. Pre-test data homogeneity test

After knowing that the sample comes from a normally distributed population, the next step is to carry out a homogeneity test for the experimental class pre-test and control class pre-test.

$S_1^2$ = 43,45576923

$S_2^2$ = 48, 64038

Maka

$F_{hitung} = \frac{\text{varians terbesar}}{\text{varians terkecil}}$

$= \frac{48{,}64038}{43{,}45576923}$

= 1,1194

Because $F_{count} < F_{table}$, namely 1.1194 < 1.704465, $H_0$ is accepted so it can be concluded that the pre-test scores for the control and experimental classes have the same variance.

**b. Final data analysis technique (Post-test)**

Post-test data from each class consisted of 33 experimental class students and 33 control class students. The following is the post-test statistical data.

**Tabel 4.7**
**Descriptive Statistics Post-test Data**

| Data analysis | Experimental Class Post-test | Control Class Post-test |
|---|---|---|
| **N Valid** | 33 | 33 |
| **Missing** | 0 | 0 |
| **Mean** | 82,30 | 78,20 |
| **Standard Deviasi** | 5,263 | 5,557 |
| **Minimum** | 71 | 70 |
| **Maximum** | 90 | 89 |

Based on the data in the table above, it can be seen that the average post-test score for the experimental class is 82.30 with a maximum score of 90, a minimum score of 71 and a standard deviation of 5.263. Meanwhile, in the control class the average post-test score was 78.20 with a maximum score of 89, a minimum score of 70 and a standard deviation of 5.557. However, to see whether the difference is significant or not, a statistical test will be carried out.

a. Post-test data Normality test

1. Experimental class pre-test normality test

**Tabel 4.8**
**Experimental Class Post-test Normality**

| X | $F_k$ | Zi | $[F(z_i)]$ | $[S(z_i)]$ | $F(Z_i)-S(Z_i)]$ |
|---|---|---|---|---|---|
| **71** | 1 | -2,1469 | 0,0159 | 0,025 | 0,0091007 |
| **72** | 1 | -1,9569 | 0,02518 | 0,05 | 0,0248227 |
| **73** | 1 | -9,3 | 7E-21 | 0,075 | 0,075 |
| **75** | 3 | -1,387 | 0,08273 | 0,15 | 0,0672725 |
| **77** | 1 | -1,007 | 0,15697 | 0,175 | 0,018025 |
| **78** | 2 | -0,817 | 0,20697 | 0,225 | 0,0180285 |
| **79** | 1 | -0,627 | 0,26534 | 0,25 | 0,015336 |
| **80** | 8 | -0,437 | 0,33106 | 0,45 | 0,1189394 |

| | | | | | |
|---|---|---|---|---|---|
| **82** | 1 | -0,057 | 0,47727 | 0,475 | 0,0022733 |
| **83** | 1 | 0,133 | 0,5529 | 0,5 | 0,0529017 |
| **84** | 3 | 0,32299 | 0,62665 | 0,575 | 0,0516486 |
| **85** | 5 | 0,51298 | 0,69602 | 0,7 | 0,0039813 |
| **86** | 3 | 0,70298 | 0,75897 | 0,775 | 0,0160347 |
| **87** | 2 | 0,89297 | 0,81406 | 0,85 | 0,0359361 |
| **Jumlah** | 33 | | | | |
| **$L_0$** | | | | | 0,1189394 |
| **$L_{tabel}$** | | | | | 0,1400889 |

From the normality test of the experimental class post-test data above, it was obtained that $L_0$ = 0.1189394 at a significance level of 0.05 with n = 33 obtained $L_{table}$ = 0.1400889. So that we get $L_0 < L_{table}$, the data is normally distributed.

2. Control class Normality Test

**Tabel 4.9**
**Control Class Post-test Normality**

| X | $F_k$ | Zi | $[F(z_i)]$ | $[S(z_i)]$ | $[F(Z_i)-S(Z_i)]$ |
|---|---|---|---|---|---|
| **70** | 5 | -1,47557 | 0,070029 | 0,125 | 0,054971 |
| **71** | 2 | -1,29563 | 0,097552 | 0,175 | 0,077448 |
| **72** | 1 | -1,11568 | 0,13228 | 0,2 | 0,06772 |
| **73** | 1 | -0,93573 | 0,174706 | 0,225 | 0,050294 |
| **74** | 1 | -0,75578 | 0,22489 | 0,25 | 0,02511 |
| **75** | 3 | -0,57583 | 0,282364 | 0,325 | 0,042636 |
| **76** | 4 | -0,39589 | 0,346095 | 0,425 | 0,078905 |
| **77** | 2 | -0,21594 | 0,414518 | 0,475 | 0,060482 |
| **78** | 2 | -0,03599 | 0,485645 | 0,525 | 0,039355 |
| **79** | 1 | 0,143958 | 0,557233 | 0,55 | 0,007233 |
| **80** | 6 | 0,32906 | 0,626996 | 0,7 | 0,073004 |
| **81** | 1 | 0,503854 | 0,692818 | 0,725 | 0,032182 |
| **82** | 2 | 0,683802 | 0,75295 | 0,775 | 0,02205 |
| **84** | 2 | 1,043698 | 0,851687 | 0,825 | 0,026687 |
| **Jumlah** | 33 | | | | |
| **$L_0$** | | | | | 0,078905 |
| **$L_{tabel}$** | | | | | 0,140089 |

From the normality test of the experimental class post-test data above, it is obtained that $L_0$ = 0.078905 at a significance level of 0.05 with n = 33 obtained $L_{table}$ = 0.140089. So that we get $L_0 < L_{table}$ then it has a normal distribution.

b. Post-test Data Homogeneity Test

After knowing that the sample comes from a normally distributed population, the next step is to carry out a homogeneity test post-test for the experimental class and

post-test for the control class.

$S_1^2$ = 27,7025641

$S_2^2$ = 30,8820512

maka :

$F_{hitung} = \frac{\text{varians terbesar}}{\text{varians terkecil}}$

$= \frac{30,8820512}{27,7025641}$

= 1,114772370

Because $F_{count} < F_{table}$, namely 1.114772370 < 1.704465, $H_0$ is accepted so it can be concluded that the experimental and control class post-test scores have the same variance (homogeneous).

c. Test for the Equality of Two Means

After testing the normality and homogeneity of the data from the post-test results, the distribution of the post-test score data for the control class and experimental class is normally distributed so that to test the difference between the two post-test averages, a parametric statistical test or t test will be carried out.The research hypothesis tested is as follows :

$H_0$ : There is no influence of the Mind Mapping type cooperative learning model on students' mathematical problem solving abilities in fraction material in Class VII MTsN 1 South Tapanuli

$H_a$ : There is an influence of the Mind Mapping type cooperative learning model on students' mathematical problem solving abilities in fraction material in Class VII MTsN 1 South Tapanuli

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$= \frac{82,3 - 78,2}{\sqrt{\frac{6,592049}{33} + \frac{6,9791266}{33}}}$$

$$= \frac{4,1}{\sqrt{\frac{13,5711756}{33}}}$$

$$= \frac{4,1}{\sqrt{0,33927939}}$$

$$= \frac{4,1}{0,582476943}$$

= 7,031

From the table above, the tcount = 7.031 and the ttable value = 1.990847, so based on the comparison of the tcount and ttable values, $t_{count} > t_{table}$ means there is an influence of the independent variable (X) on the dependent variable (Y) or the hypothesis is accepted. The conclusion is that there is an influence of the Mind Mapping type cooperative learning model on students' mathematical problem solving abilities in fraction material in Class VII MTsN 1 South Tapanuli.

To find the magnitude of the influence of students' mathematical problem solving abilities, a Determination test was carried out. Before testing, first calculate the Product moment correlation coefficient value using the formula

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{n\{\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum Y)^2\}}}$$

n =33 $\sum y$ = 2557

$\sum xy$ = 211316 $\sum x^2$ =272012

$\sum x$ = 3292 $\sum y^2$ = 16151

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{n\{\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum Y)^2\}}}$$

$$= \frac{33\,(211316) - (3292)(2557)}{\sqrt{\{40\,(272012) - (3292)^2\}\{33(165151) - (2557)^2\}}}$$

$$= \frac{8452640 - 8417644}{\sqrt{\{10880480 - 10837264\}\{6606040 - 6538249\}}}$$

$$= \frac{34996}{\sqrt{(43216)(67791)}}$$

$$= \frac{34996}{54126{,}3}$$

= 0,65

After obtaining a correlation coefficient of r = 0.65, then look for the magnitude of the influence of the relationship between variables X and Y using the correlation determination formula as follows:

D= $r^2$ x 100%

= $(0{,}65)^2$ x 100%

= 0,4225 x 100%

= 42,25%

So the influence of variables X and Y simultaneously, namely student activity variables using the Mind Mapping type cooperative learning model, on students' mathematical problem solving abilities is 42.25%. Thus the magnitude of the influence of other factors besides the Mind Mapping type cooperative learning model is 57.75%.

## CONCLUSION

In cooperative learning, students play a more active role in learning so that it has a positive impact on quality interaction and communication. By making mind maps, it becomes easier for students to understand the concepts in the material they are studying. The Mind Mapping type cooperative learning model is proven to have an influence on students' mathematical problem solving abilities based on the steps of the Mind Mapping learning model which contains indicators of mathematical problem solving abilities. Based on the results of research and data processing, the following conclusions can be drawn. Based on partial significance testing (t-test). The results obtained are that in manual calculations it was found that t count (7.031) > t table (1.990) with a significance value of 0.001 < 0.05 which shows that $H_a$ is accepted and $H_0$ is rejected, namely there is an influence of the Cooperative Mind Mapping type model on mathematical problem solving abilities students in class VII MTsN 1 South Tapanuli.

## REFERENCES


Abdurrahman, M., (2009), Pendidikan Bagi Anak Berkesulitan Belajar, Rineka Cipta, Jakarta

Ariani, M.D. Candiasa, M. dan Marhaeni, A., (2014), Pengaruh Implementasi Open-Ended Problem dalam Pembelajaran Matematika terhadap Kemampuan Pemecahan Masalah dengan Pengendalian Kemampuan Penalaran Abstrak, e-jurnal Program Pasca Sarjana Universitas Pendidikan Ganesha. Volume 4 No.2. [Online]. https://www.digilib.undisha.ac.id. 26 Juli 2017.

Aris, S., (2014), 68 Model Pembelajaran Inovatif dalam Kurikulum 2013, Arruzz Media, Yogyakarta

Dewiyani, (2008), Mengajarkan Pemecahan Masalah dengan Menggunakan Langkah Polya, STIKOM Jurnal. Volume 12 No 2. Hal 87-95 [online] https:sakura2604.files.wordpress.com/2012/01/polya.pdf,16 Februari 2017

Faturrohman, M., (2015), Model-Model Pembelajaran Inovatif, Ar-Ruzz Media, Yogyakarta

Fitriatien, S.R. 2017, Penerapan Strategi Pembelajaran Mind Mapping pada Mata Kuliah Metode Statistika dalam Seminar Nasional Pendidikan Matematika, Universitas PGRI Adi Buana, Surabaya

Hudojo, H., (2005), Pengembangan Kurikulum dan Pembelajaran Matematika, Universitas Negeri Malang, Malang

Huda, Miftahul., (2013), Model-model Pengajaran dan Pembelajaran, Pustaka Pelajar, Yogyakarta

Isjoni, (2010), Cooperative Learning Efektivitas Pembelajaran Kelompok, Alfabeta, Bandung

Istarani, (2011), 58 Model Pembelajaran Inovatif, Media Persada, Medan

Kusaeri, (2014), Acuan dan Teknik Penilaian Proses dan Hasil Belajar dalam Kurikulum 2013, Ar-Ruzz Media, Yogyakarta

Napitupulu, E.E., dan Mansyur,A., (2017), Kemampuan Pemecahan Masalah Matematis Siswa (Studi Kasus di SMA Negeri Parongrong Kabupaten Bandung Barat), GENERASI KAMPUS, Vol 4 No 1, [Online]https://scholar.google.co.id/citations , 2 Agustus 2017

NCTM, (2000), Principles and Standards for School Mathematics, National Council of Teacher of Mathematics, Inc, New York

Nurmalasari, Ai Linda, dkk., Pengaruh Strategi Predict, Observe, Explain Berbantuan Permainan Tradisional Terhadap Kemampuan Berpikir Kritis Siswa Pada Materi Gaya, Jurnal PGSD, Tahun 2016 Nomor 1 Volume 1,Universitas Pendidikan Indonesia, Diakses 6 Januari 2017

OECD. (2019), Framework for the Assessment of Creative Thinking in PISA 2021: Third Draft, OECD, Paris

Polya,G., (1973) , How To Solve It. Princeton. Princeton University Press ,Jersey

Rusman. (2012), Model-Model Pembelajaran: Mengembangkan Profesionalisme Guru, PT Raja Grafindo Persada, Jakarta

Shadiq, Fajar., (2014), Pembelajaran Matematika; Cara Meningkatkan Kemampuan Berpikir Siswa, Graha Ilmu, Yogyakarta

Sudjana, (2005), Metode Statistika,Tarsito, Bandung

Suharsimi,Arikunto., (2012), Dasar-dasar Evaluasi Pendidikan Edisi 2, PT Bumi Aksara, Jakarta

Suprijono, A ., (2013), Cooperative Learning Teori & Aplikasi PAIKEM , Pustaka Pelajar, Yogyakarta

Sumartini, T.S. (2016), Peningkatan Kemampuan Pemecahan Masalah Matematis Siswa melalui Pembelajaran Berbasis Masalah, Jurnal Pendidikan Matematika STKIP Garut, Vol. 8, No. 3

Sri,A., (2016), Peningkatan Kemampuan Pemecahan Masalah dan Hasil Belajar Matematika melalui Strategi Kooperatif Tipe TPS, Skripsi, FKIP UMS [Online] https://www.digilib.ums.ac.id ,21 Desember 2016

Tapantoko, A.A. 2011. “Penggunaan Metode Mind Map Peta Pikiran) Untuk Meningkatkan Motivasi Belajar Siswa Dalam Pembelajaran Matematika Siswa Kelas VIII SMP Negeri 4 Depok”. Skripsi Universitas Negeri Yogyakarta. Tidak Diterbitkan

Trianto, (2010) , Mendesain Model Pembelajaran Inovatif-Progresif : Konsep, Landasan, dan Implementasinya Pada Kurikulum Tingkat Satuan Pendidikan (KTSP),Kencana Prenada Media Group, Jakarta

_____, (2011), Mendesain Model Pembelajaran Inovatif-Progresif, Kencana Prenada Media Grup, Jakarta

Wena,M., (2009), Strategi Pembelajaran Inovatif Kontemporer Suatu Tinjauan Konseptual Operasional, Bumi Aksara, Jakarta

Yakim,A., (2013), Pengaruh Model Pembelajaran Student Teams Achievement Division (STAD) Terhadap Kemampuan Pemecahan Masalah Matematika di SMP Negeri 2 Berastagi, Skripsi , FMIPA, UNIMED, Medan