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THE IMPROVEMENT OF STUDENT'S MATHEMATICAL COMMUNICATION ABILITY BY USING COOPERATIVE LEARNING: COURSE REVIEW HORAY

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Abstrak: *Penelitian ini dilakukan untuk melihat peningkatan komunikasi matematis terhadap pembelajaran kooperatif tipe Course Review Horay berbantuan Power Point di Kelas VIII SMP Negeri 1 Takengon. Penelitian ini menggunakan jenis penelitian eksperimen dengan pendekatan kuantitatif. SMP Negeri 1 Takengon dijadikan sebagai populasi penelitian. Sebanyak dua kelas ditentukan secara* purposive random sampling *untuk sampel penelitian, selanjutnya dinamakan kelas eksperimen dan kelas kontrol. Kelas eksperimen yaitu kelas yang mendapat pembelajaran dengan pembelajaran kooperatif tipe Course Review Horay berbantuan Power Point sementara kelas control adalah kelas yang mendapat pembelajaran STAD. Kesimpulannya bahwa dengan menggunakan model pembelajaran Course Review Horay siswa lebih aktif karena dapat mengemukakan pendapat dengan teman-teman sebaya dengan bahasa sendiri. Hal ini meningkatkan kemampuan komunikasi matematis siswa. Seiring dengan berkembangnnya pemahaman mereka akan materi yang diajarkan siswa mampu melakukan kegiatan matematika yang mendorong penerapan kemampuan komunikasi matematis yang lebih mendalam.*

Kata Kunci*: Komunikasi matematis, Course Review Horay.*

Abstract: This research was conducted to look at the increase in mathematical communication towards cooperative learning type Course Review Horay assisted PowerPoint in the seventh grade of SMP Negeri 1 Takengon. This research used Experiment Research with Quantitative research. SMP Negeri 1 Takengon was the population of research. Two classes were determined by purposive random sampling for the sample of research, called experimental class and control class. The experimental class was taught by using a cooperative learning type Course Review Horay assisted PowerPoint while the control class was taught by STAD. The conclusion was that by using a learning model Course Review Horay, the students more active because it can be suggested with the peers and its language. Things can improve the ability of mathematical communication students. Along with the development of their understanding of the material has been taught students to do math activities that encourage the application of mathematical communication ability.

Keywords: Mathematical Communication, Course Review Horay

مستخلص : يستهدف البحث للوصف عن ترقية الإتصال الرياضي للتعليم التعاوني بنمط *Course Review Horay* على استعانة العروض التقديمية في الفصل الثامن بالمدرسة المتوسطة الحكومية – 1 تاكينجون. هذا البحث هو البحث التجريبي على المدخل الكمي. عينت المدرسة المتوسطة الحكومية – 1 تاكينجون كمجتمع الحث وعين الفصلان عينة البحث على سبيل العينة العشوائية الهادفة. الفصل الأول يسمى بالفصل التجريبي هو الذي استخدم فيه تعليم STAD والفصل الثاني هو الفصل الضابط الذي استخدم فيه التعليم التعاوني بنمط *Course Review Horay*. أما نتيجة البحث فإن استخدام نموذج تعليم *Course Review Horay* يصبح الطلاب أكثر نشاط لأنهم يتمكنون تقديم ما خطر بباله بنفسه لدى أقرانه. يرتفع بذلك قدرة الإتصال الرياضي لدهم ويتمكنون أداء الإنشطة الرياضية التي تدافع تنفيد قدرة الإتصال الرياضي على شكل عميق حسب تطور فهمهم للمادة التي تم تدريسها لهم.

الكلمات المفتاحية: الإتصال الرياضي، *Course Review Horay*

Introduction

The Efforts to improve the quality of education continue to be carried out both conventionally and innovatively. However, the quality of education has not shown the results as expected. This fact can be seen from the learning outcomes obtained by students who are still very low, especially mathematics. The low mathematics value of students must be reviewed from the five general learning aspects of mathematics formulated by the National Council of Teachers of Mathematics (NCTM, 2000) namely (1) learning to communicate (mathematical communication), (2) learning to reason (mathematical reasoning), (3) learning to solve the problems (mathematical problem solving), (4) learning to connect ideas (mathematical connections), (5) the formation of positive attitudes towards mathematics (positive attitudes toward mathematics).

From the results of observations of researchers at SMP Negeri, 1 Takengon found mathematical learning conventionally. The teacher is as the only source of learning and students are passive or merely receive information from the teacher so students are not actively involved in the learning because students do not develop mathematical communication in expressing ideas and answers. This is indicated by the average achievement value that is low below 65 while KKM 70. Related to this, the mathematical

communication skills of students must be improved by using learning models that can help students to be active.

The situation described above, also occurred in class IX4 of the State 1 Junior High School of Takengon, especially in learning mathematics in circle material. Based on interviews with the teacher in the eighth grade at SMP Negeri 1 Takengon, researchers obtained mathematical communication data of students who were still low in circle material in 2015/2016. From these data, it can be seen that students have not been able to absorb the indicators of mathematical communication of students. The results of the tests conducted by the teacher as an evaluation of learning proved that with the KKM (Minimum Completion Criteria) value of 70 for mathematics subjects, there were 13 KKM incomplete students from 25 class VIII students at SMP Negeri 1 Takengon. From these data, it can be seen that 52% of students have not finished KKM. This is caused by the students do not actively participate in learning activities. Students feel bored with ongoing learning. In the end, this has an impact on student learning results that are not optimal.

Mathematical communication skills are very influential in learning. Because mathematical communication skill is a form of reciprocity of students in the scope of mathematics in the classroom. So that mathematical interactions that occur between students and students, teachers and students, students and books in complex mathematics can improve their understanding. Mathematical communication skills are important in learning mathematics because mathematics is not only a tool for thinking but also a tool for communicating students' thoughts so that there is an active learning process.

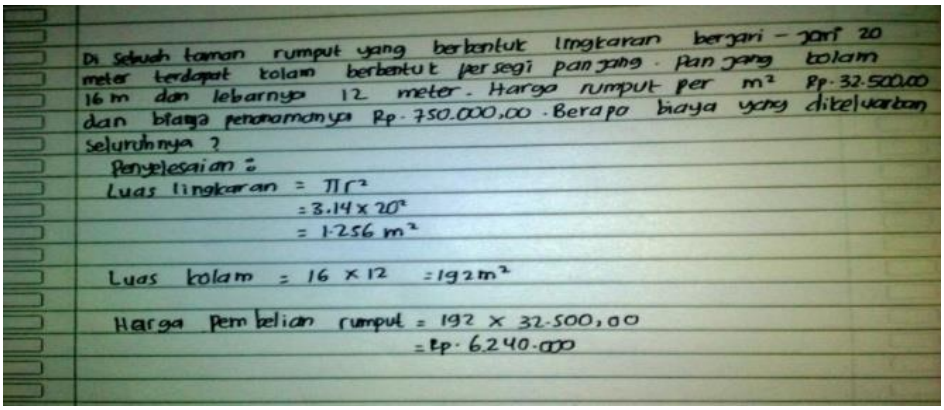
One example of the problem that shows the importance of mathematical communication skills by students is as follows.

Problems example :

In a 20-meter circular grass garden, there is a rectangular pond. The pool is 16 m long and 12 meters wide. Price of grass per m2 Rp.32,500.00 and the cost of planting Rp.750,000.00. How much is the total cost?

When students are given problems such as in the example questions, the results of student work various, for students who have high mathematical communication skills, they will not have difficulty drawing a rectangular pool first, children who have high mathematical communication skills will first interpret or evaluate these ideas, then look for the area with a predetermined formula and in the end when it has gained breadth from each lesson then the child determines the cost.

The picture below shows the results of the work of one of the students in completing the sample problem that has been given.



Picture 1. The Results of One Student's Work

Based on student work results shown in Figure 1 there are errors due to:

1. Students have not been able to understand the questions presented, so students do not interpret or evaluate these ideas into a written picture.
2. Students do not make first what is known and asked from the question.
3. Students do not calculate the total cost of the circle area so that there is an error in the presentation of costs that must be incurred.
4. Students do not make conclusions from the answers that have been done.

NTCM (2000) states that assessing the ability of students for mathematical communication must provide evidence that they can:

1. Express mathematical ideas by speaking, writing, showing and describing visually.
2. Understanding, interpreting and evaluating mathematical ideas that are presented in the form of written, oral or visual.
3. Using mathematical vocabulary, notation and structure to represent ideas, describe relationships and model situations.

Sumarno (2005) states more detailed indicators, namely:

1. Connecting real objects, pictures, and diagrams into mathematical ideas.
2. Explain ideas, situations, and mathematical relations, verbally or in writing, with real objects, images, graphics, and algebra.
3. Express daily events in a language or mathematical symbol.
4. Hear, discuss and write about mathematics.
5. Read written math presentations and compile relevant questions.
6. Making conjectures, composing arguments, formulating definitions and generalizations.
7. Explain and make math lessons that have been learned.

From some of the opinions above, mathematical communication in this research is an important part of mathematics education. So the reason for the importance of communication in mathematics learning needs to be the focus of attention, namely mathematics is not just a thinking tool, a tool to find patterns, or solve problems but mathematics is also a social activity, in mathematics learning.

One indicator focused on this study is as follows:

1. State daily events in a language or mathematical symbol.
2. Explain ideas, situations and mathematical relations with images.
3. Connect images to mathematical ideas and connect images to mathematical symbols.
4. Connecting real objects, images into ideas or mathematical solutions.

One of the causes of students having difficulty in working on the problem is the lack of students' mathematical communication skills. Where students are still not able to understand the questions presented, have difficulty in changing the data from the problem of the story in the form of images and vice versa. Another reason is a monotonous learning process where students only hear what the teacher has to say.

Based on the above phenomenon it turns out there are still students who are unable to express their ideas through answers and even if students have a picture of ideas he is even less able to interpret or evaluate these ideas into a written picture. This is also due to the lack of students' ability to use terms and mathematical notations and their structures to present ideas, describe relationships and situations models. These things are an important relationship in mathematical communication skills.

Seeing the importance of the role of understanding mathematical communication of students, it is necessary to apply learning that is fun for students. Cooperative Learning Course Course Horray type is one example of learning that activates students' mathematical communication by means of teachers attaching samples of images that are appropriate to the learning objectives or can other images relevant to the learning objectives, then students are told to analyze them and discuss the results of their analysis with the group so students can make essential concepts. Course Review Horay learning model can facilitate students in learning the material because students can collaborate in groups, exchange thoughts and convey ideas to solve a problem, students can also express their ideas in small groups. In small groups, students are more focused because each student can rely on themselves things that cannot be obtained in large groups.

According to Mifhatul Huda (2014: 230) cooperative learning Course Review, Horay type is learning that can create a festive and pleasant classroom atmosphere. To

test students' understanding in answering questions, where the answer to the question is written on a card or a box that has a number.

Istarani and Ridwan (2014: 119) state that in the Course Review Horay model, each group member gets the opportunity to make their contribution by composing and communicating their mathematical ideas. To improve mathematical communication skills through the Course Review Horay model indicators are needed. The advantages of the Course Review Horay model are the existence of feedback from students through the stages of question and answer, learning is not boring, and increases student activity.

According to Istarani and Ridwan (2014: 117), the learning characteristics of the Course Review Horay type are characterized by several things, namely:

1. There are a question and answer for stabilizing the material that has been taught.
2. Some students or groups write arbitrary numbers and put in boxes
3. There is a reading of the questions whose numbers are chosen randomly, and answered by the group concerned
4. Learning scores are followed by "hooray" or other yells as a form of reward.

In the Course Review Horay learning type, there is a teacher activity presenting random questions. For learning to be more efficient, we need a means of supporting learning media that can display the problem. One of the learning media that can be used to present information/questions is PowerPoint.

Among the recommended learning media is using PowerPoint media. We know that in the use of PowerPoint media by operating supporting facilities in the form of a computer or laptop and LCD as learning media. Power point material to present subject matter can be made through a computer program according to our wishes. Even more interesting is that the material can be displayed using the LCD (Liquid Crystal Display) Projector, just like a monitor screen where students can see it comfortably and comfortably.

This is because PowerPoint can display information in an interesting, easy way to make and use, and is relatively inexpensive because it does not require raw materials other than tools to store data. PowerPoint is included in the multimedia category, which is a combination of various media elements such as text, images, animation, sound, and also video.

Eliza (2014) stated the advantages of multimedia, including the following:

1. A more innovative and interactive learning system.
2. Based on dual coding theory, human cognitive systems consist of verbal systems and image systems so that by using multimedia, information or subject matter through text can be remembered well if accompanied by images.
3. Another important part of multimedia is animation. Animation can be used to attract students' attention to learning.
4. According to the theory of Quantum, Learning students have different learning modalities. Learning modalities are divided into three types, namely: visual, auditive, and kinesthetic.

So it can be concluded that PowerPoint is one of the most widely used presentation applications in computers for various purposes both learning presentations.

Research Methods

This study uses a type of experimental research with a quantitative approach. The study was conducted at 1 State Junior High School Takengon, the population in this study were all eighth-grade students of SMP Negeri 1 Takengon in the 2015/2016 academic year which were divided into class VIII1 - VIII10. The sample of this study was class VIII2 (experimental class) which amounted to 28 students and class VIII10 (control class) totaling 28 students.

The design of this study is that in addition to the experimental group there is also a control group which is also characteristic of the variables with the experimental group.

Table 1 Research Design

Eksperimen (1)	O_1	X_1	O_3
Eksperimen (2)	O_2	X_2	O_4

Information O = Pretest and posttest mathematical communication skills

X1 = Learning the Course Review Horay model

X2 = Learning the STAD model

Data collection techniques in the form of observation sheets and tests of mathematical communication skills.

Research Results And Discussion

Research Results

The results of the research were carried out in class VIII at the Takengon 1 Public Middle School. The test provided consisted of the initial test and the final test, the initial test was given the experimental class and control to determine the level of students' ability to recognize the circle.

Furthermore, the final test was given to the experimental class and control class after the teaching and learning process provided by the researcher to students with treatment, namely for the experimental class using the Course Review Horay method, while the control class used the STAD learning model because they shared group learning and collaboration skills between the more trained students, the material is given for the final test is circle material.

After obtaining the results of the initial test and the final test of the control and experimental classes, the results are processed using the formula in the next chapter. The results of the initial test and final tests in the experimental and control classes are as follows:

The following will be presented tables that show data on learning outcomes through the tests given.

1. Experimental and Control Class Preliminary Test Results

The initial class is given before the teaching and learning process given to the experimental class and the treatment class without treatment to know the students' initial ability to the material to be given for the initial test is a circle.

Table 2 Data Processing Results Value of Initial Test and Final Test of Class Students Experiments and Control Classes

Class	First Test		Last Test
Experimen	***N***	28	28
	Max	63	96
	Min	58	76
	$\bar{X}$	60,5	86,85
	S^2	23,51	29,25
	S	1,87	5,04
Control	***N***	28	28

	Max	51	80
	Min	40	60
	$\overline{X}$	45,25	68,60
	S^2	12,7	75,2
	S	3,56	8,67

From the table above, in the initial test the experimental class was obtained = 60.5 and the standard deviation (S) = 1.87 with the highest value 63 and the lowest value 58, while the average value of the experimental class final test = 86.85 and standard deviation (S) = 5.04 with the highest value of 96 and the lowest value of 76.

In the initial test the control class was obtained = 45.25 and the standard deviation (S) = 3.56 with the highest value 51 and the lowest value 40, while the average value of the experimental class final test = 68.60 and the standard deviation (S) = 8, 67 with the highest score of 80 and the lowest score of 60.

2. Normality Test

After the researcher carried out the final test on each of the experimental classes and then the experimental class and obtained results, the normality test for both classes was carried out. The criteria for normality test is if <then the data is normally distributed based on the calculations that have been made on the control class, the calculated value = 5.10 and table = 7.81 or 5.10 <7.81 so that it can be concluded that the data contained in the control class is distributed normally.

Whereas in the control class after calculation, the calculated value = 4.63 and table = 7.81 or 4.63 <7.81 so that it can be concluded that the data contained in the experimental class is normally distributed and for more details, we can see the table below :

Table 3 Results of Normality Test Data Processing

Class	χ^2_{hitung}	χ^2_{tabel}	Information
Experiment	5,10	7,81	Normal
Control	4,63	7,81	Normal

The above normality test is carried out using the X2 test formula with a significant level of 0.05 with criteria <then the data is normally distributed. From the calculation results, obtained data on the control class and experiments are normally distributed.

3. Homogeneity Test

The homogeneity test was carried out using the F test which is with a significant level of α = 0.05 with the F count criterion ≤ F table then the homogeneous variance. Based on the calculations carried out in the control class and experimental class for the final test and obtained the value of F count = 1.72 and F table = 1.94 or 1.72 <1.94 so it can be concluded that the two variances are homogeneous.

Data homogeneity testing is done by using the F test formula with a significant level of 0.05 with criteria <then homogeneous data. From the results of calculations in the control class and experiments obtained homogeneous data.

4. Test Gain

Analysis of atomized gain test data using the g form, namely:

$$g = \frac{S_{postest} - S_{pretest}}{S_{maksimum} - S_{pretest}}$$

$$g = \frac{86,85 - 60,5}{100 - 60,5}$$

$$g = \frac{26,35}{39,5}$$

$$g = 0,66$$

From the results of the calculation above, it is obtained that the value of g = 0.66 with the medium criteria is obtained so that it can be concluded that there is an increase in Mathematical Communication of Cooperative Learning Course Review Horay Type Assisted by PowerPoint in Circle Material in Class VIII Takengon 1 Middle School.

5. Teacher Performance Observation Sheet

Based on the results of observations of the teacher's performance in the experimental class and the control class, all the activity activities stated have been carried out by the researcher. However, there are still some activities that have not been implemented properly such as preparing students' physical and psychological conditions before learning begins and guiding students to use steps to solve problems. However, with the observation sheet, the researcher can find out the shortcomings and immediately correct at the next meeting. The following are observations of teacher performance in the experimental class and the control class.

Table 4 Results of Teacher Performance Observations

Class	Meeting	Percentage	Criteria
Experiment	1	74%	Pretty good
	2	82%	Good
	3	85%	Good
	4	90%	Very Good
Average		83%	
Control	1	67%	Pretty Good
	2	77%	Good
	3	85%	Good
	4	85%	Good
Average		79%	

Based on the table above, the average teacher performance in class management in the experimental class was 83% and in the control class 79%. Thus, it can be concluded that the teacher's performance in the management of the class both the experimental class and the control class is in a good category.

6. Student Activity Observation Sheet

Based on the results of observations of student activities, most of the student activities expected by researchers have been carried out. Nevertheless, there are still some activities that are only carried out by a few students such as asking questions and presenting the results of the discussion. The following are observations of student activities in the experimental class and the control class.

Table 5 Observation Results of Student Activities

Class	Meeting	Percentage	Criteria
Eksperimen	1	72%	Pretty Good
	2	80%	Good
	3	82%	Good
	4	90%	Very Good
Average		81%	
Control	1	45%	Bad
	2	47%	Bad
	3	72%	Pretty Good
	4	75%	Pretty Good
Average		75%	

Based on the observations of student activities, the average percentage of the activity of the experimental class students was 81% while the average percentage of students' activeness in the control class was 75%. Thus, it can be concluded that the performance of students in the classroom management both experimental and control classes with categories well. Also, the percentage of activity in the experimental class is higher than the percentage of the control class.

7. Hypothesis Testing

Based on the results of the normality and homogeneity tests above, it was found that the two samples came from normal populations and a homogeneous population. Then the data is analyzed by testing the hypothesis. Hypothesis testing is done to find out whether or not there is an influence in learning using the Course Review Horay learning model on students' mathematical communication skills. In this study hypothesis testing using the t test. The pair of statistical hypotheses to be tested are:

H0: $\mu 1 = \mu 2$

H1: $\mu 1 > \mu 2$

After obtaining the average value, variance, standard deviation, normality test and data homogeneity test on the final test results of students for the experimental class and the control class then proceed with the t test, with testing criteria: If t count> t table, then Ha is accepted and If t count <t table, then H0 is accepted with $\alpha = 0.05$.

Based on the calculation results obtained value = 2.61, the value of t count = 29.43 and t table = 2.005 or 29.43> 2.005, with dk = 54 so that t count> t table, Ha is accepted or it can be understood that there is an increase in Course Review horay (CRH) in mathematical communication skills of seventh grade students at Takengon 1 Junior High School.

Discussion

After testing with the t test it can be concluded that the value of t = 29.43 and t table = 2.005 or 29.43> 2.005. From the results of the test, it was found that the average ability of students 'mathematical communication taught with the cooperative review model Course Review Horay type was higher than the students' mathematical communication skills taught with STAD learning. So it can be concluded that there is an increase in the application of the cooperative review model Course Review Horay type to students' mathematical communication skills.

The average mathematical ability of the experimental class students is higher than the average mathematical ability of the control class students caused by several things. The following will be put forward the results of the author's analysis which includes the

learning process that occurs in students in each class (experimental class and control class) and students' mathematical communication skills in both classes.

1. Learning Process

Application of Course Review Horay Learning Model Assisted by Power Point Course Review Horay is learning that emphasizes more on giving questions in testing students' understanding of the material being taught. Questions are given to improve students' mathematical communication. In addition, by working on the problem will also improve the learning experience of students in working on mathematical questions so that if students are accustomed to working on problems or have more learning experience, students will be more proficient in mathematical communication.

The Course Review Horay learning model is applied to the experimental class. The implementation of this learning model is combined with Power Point which is used to present questions so that learning is more efficient. The implementation of learning activities is based on the RPP that has been prepared. After the teacher delivers the material and gives examples of questions related to the material, students are grouped into several groups to be tested for mathematical communication skills by working on some of the questions presented using Power Point.

At the first meeting, the teacher encountered several obstacles such as students who had not actively answered questions from the teacher, students had not dared to ask if there was an explanation that had not been understood, and discussion activities were still many students who worked individually or only depending on group members to work on the questions.

This happens because students are not accustomed to being taught by researchers and the learning model used so students need to adapt. After students know what is known and asked, students tend to work directly without using steps such as identifying problems and making plans for completion. As a result, incomplete workmanship steps make many student answers wrong because there are steps that have not been completed or are not thorough in working on. After students finish working on the problem, the teacher calculates the correct answer and the amount of horay of each group. The group that gets the right number of answers yells horror while showing the card.

However, in the first meeting the teacher had not yet obtained the results of maximum mathematical communication skills, there were still many students who could not work on the problem. The teacher ends the learning by reflecting on the learning activities that have taken place and giving homework that contains questions about the material that has been learned that day.

At the second meeting, the researchers tried to improve the activities that had not been implemented well at the first meeting. Improved aspects include testing students' prerequisite skills, giving practice questions, and reflecting. At the second meeting, students were more active in answering questions from the teacher. Next to increase student participation in groups, the teacher announces that the presentation of the results of the discussion will be conducted by randomly calling the names of students rather than representatives of groups as in the first meeting.

Then in guiding students to use the steps, researchers anticipate using the answer sheet to work on the questions given. Each group is obliged to write the completion on the answer sheet and if the questions have been given, the student must collect the answer sheet to the researcher. From these activities, researchers can find out groups that have not worked on the problem. Students' mathematical communication skills at the second meeting were better than the first meeting but still did not reach the expected criteria. The teacher ended by reflecting on learning on that day and giving homework with questions for training students at home.

At the third meeting, almost all the activities contained in the RPP can be carried out properly by the researcher. Students have been able to apply the steps to solve the problem of mathematical communication and work with their group friends to compete to get the most horror cries. At the fourth meeting, besides the researcher giving questions using Power Point like the previous meeting, the researcher also gave a quiz to test students' individual abilities in mathematical communication. At the fourth meeting, students' mathematical communication skills have reached the expected criteria. The teacher ends the learning by reflection and announces that the upcoming meeting will be tested.

2. Student Mathematical Communication Ability

As stated earlier that students' mathematical communication skills referred to in this study are mathematical communication skills in written form which includes mathematical communication indicators. The following will be presented by some of the final test answers that students have worked on both the experimental class and the control class.

a. Expressing Everyday Events in Language

Expressing one-day events in this language includes the ability of students to provide answers using their own language. The question instrument that measures this aspect is one of them is the question no. 1. The following are examples of questions and answers of students in the experimental class.

Question:

1. Look at the following picture!

a. 

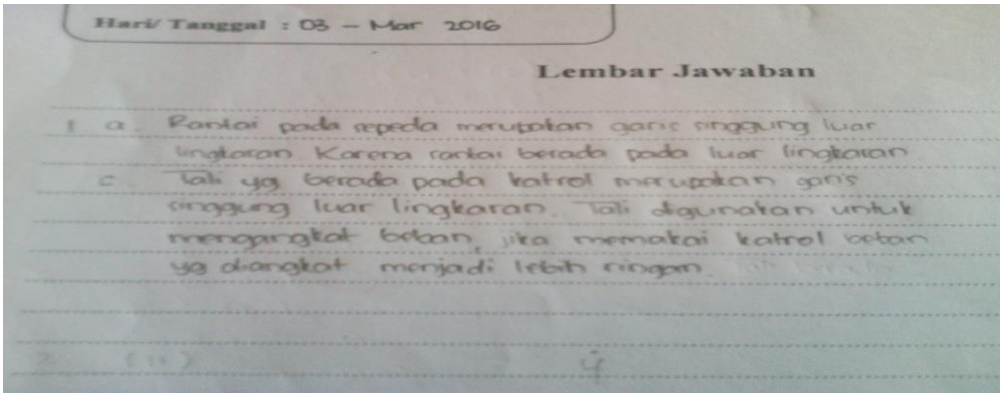
c. 

b. 

d. 

From the four images above, which image includes the application of tangent circles in everyday life? Give the reason!

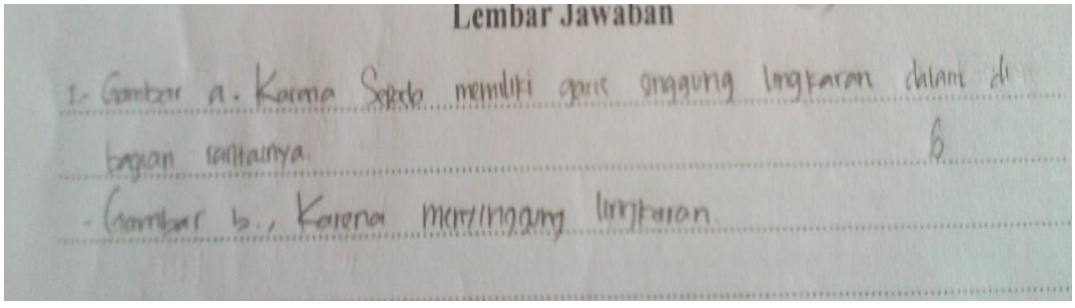
Student Answers:



Picture 2. Final Test Results for Experimental Class Students

This shows that the mathematical communication skills of the experimental class students in expressing day-to-day events in language have developed well. Whereas students in the control class, most students still have not been able to develop mathematical communication skills in expressing one-day events in language. The reasons stated by students still do not give meaning in accordance with the material circle that is asked on the question. The following is an example of students' answers to the control class.

The following is an example of students' answers to the control class.



Picture 3. Final Test Results of Control Class Students

b. Explaining Ideas, Situations and Mathematical Relationships in Pictures

These mathematical communication indicators include the ability of students to explain ideas, situations and mathematical relations into the picture. One of the instruments to measure this indicator is the question no. 2. The following are examples of questions and answers of students in the experimental class.

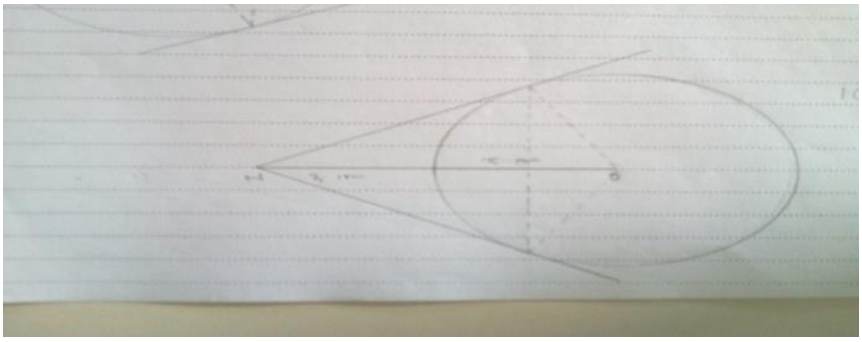
Question:

2. Make a circle with radius 5 cm with center point O

a. Make a tangent through point P in the circle!

b. Make a tangent through the point Q outside the circle with the distance OQ = 8 cm!

Student Answers:

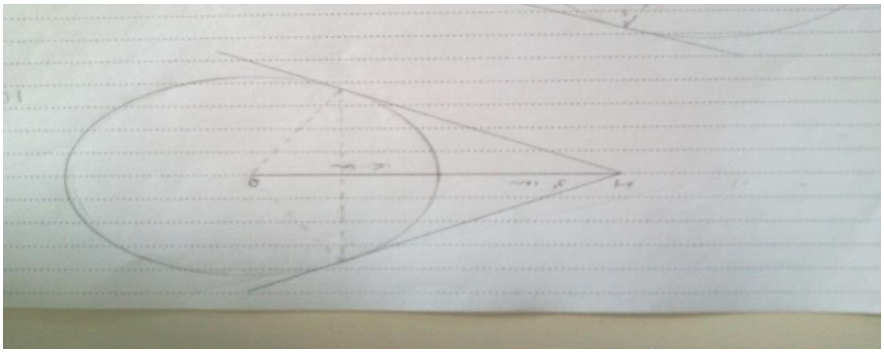


Picture 4. Final Test Results for Experimental Class Students

Before a circle is expressed in the form of an image, the student must first state the radius with the term. Then students must connect the point with the center of the circle. In addition, students also need to know the conjunctions used in the question sentence. In this question the conjunction used is the word "with" which means the outer circle. Because what is asked in the question is a picture of the outer circle with a radius of 5 cm and a distance of 8 cm.

Students' answers to the image have shown that the mathematical communication skills of the experimental class students on mathematical communication indicators have developed well. Students have been able to express fingers with an outer circle.

While one example of students' answers to the control class is as follows.



Picture 5. Final Test Results of Control Class Students

The picture shows that students in the circle control class are expressed in the form of images, students must first declare the fingers with the term. Then students must connect the point with the center of the circle. In addition, students also need to know the conjunctions used in the question sentence. In this question the conjunction used is the word "with" which means the outer circle. Because what is asked in the question is a picture of the outer circle with a radius of 5 cm and a distance of 8 cm.

c. Linking Real Objects to Mathematical Ideas

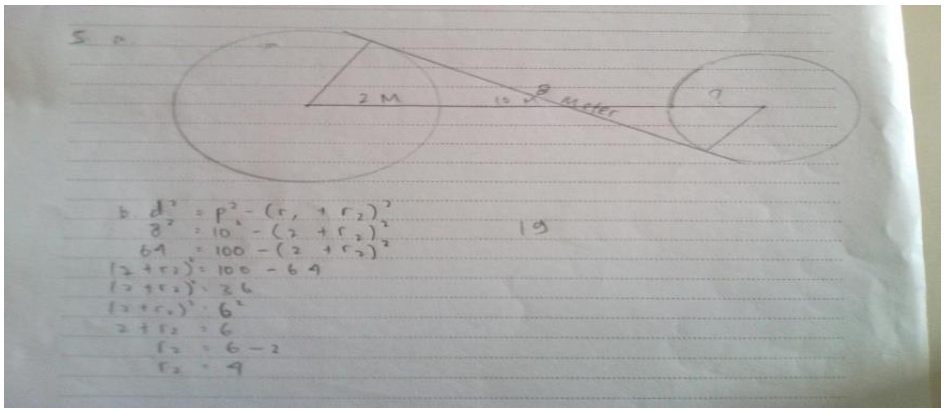
This indicator includes the ability of students to express mathematical concepts by connecting real objects into mathematical ideas. The instrument of the question that measures this indicator is one of them is question number 5. The following are examples of questions and answers of students in the experimental class.

Question:

Mr. Helmi will make two circular ponds. Between the ponds, a road along the alliance tangent in the two ponds will be made with a length of 8 m. if the first pool has a radius of 2 m and the distance between the two centers is 10 m

a. Describe the problem above so that it is easy to understand.

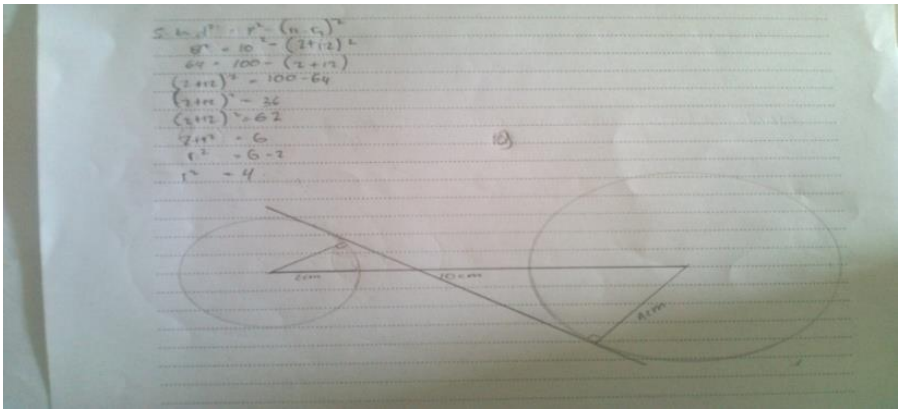
b. Calculate Mr. Helmi's second pool that has size with fingers.



Picture 6. Final Test Results for Experimental Class Students

The picture shows that students have been able to write information that is known in the problem with the form of mathematical language in the form of images, then solve the problem using complete and correct algebraic calculations. This shows that students' abilities on this indicator.

While one of the work results of students in the control class is as follows.



Picture 7. Final Test Results of Control Class Students

The picture shows that student answers show that this aspect has not been achieved well. Although students have been able to describe the conditions contained in the question in the form of a circle image, but students have not been able to state the information contained in the problem with a symbol or mathematical language perfectly and students also have not been able to do algebraic calculations in a complete and correct manner.

Based on the description presented, it can be concluded that students taught with the Cooperative Learning Course Course Horay type have better mathematical communication skills than students taught with conventional learning.

Conclusion

Based on data analysis and hypothesis testing that has been done, it can be concluded that:

a. The mathematical communication skills of students taught with the cooperative learning model Course Review Horay (CRH) type are better than students' mathematical communication skills taught with STAD learning. The test results show that all indicators of mathematical communication skills, and Course Review Horay (CRH) have been achieved well by students in the experimental class, while in the control class mathematical communication skills that have been achieved well are students' ability to indicator daily events in language , explain ideas, situations and mathematical relations into images, and state daily events in mathematical symbols.

b. Based on the results of the gain test using the gain test, it was found that the average mathematical communication skills of students taught with the Cooperative Learning Course Course Horay (CRH) type were higher than the average mathematical communication skills of students taught with STAD learning. This can be seen from the gain test value of the study. It can be concluded that: the value of g = 0.66 with the medium criteria is obtained so that it can be concluded that there is an increase in mathematical communication on the Course Review Horay learning model assisted by Power Point on circle material in class VIII of the 1 State Junior High School Takengon.

Suggestions

Based on the results of research that has been obtained, the author can provide suggestions as follows:

a. For schools and teachers in particular, this study proves that the application of the cooperative learning model type Course Review Horay (CRH) can improve students' mathematical communication skills so that they can be used as alternative learning that can be applied in the classroom.
b. This research was only shown on mathematics subjects on the subject of the circle, therefore research should also be conducted on other mathematical subjects.

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