

# EFFORTS TO INCREASE THE MATHEMATICAL COMMUNICATION ABILITY OF CLASS VII-F MTsN 5 SUMEDANG STUDENTS' IN LEARNING TRIANGLE FLAT THROUGH PEER TUTORING MODEL

Ade Kokom Mintarsih<sup>1</sup>, Citra Megiana Pertiwi<sup>2</sup>

<sup>1</sup> MTs Negeri 5 Sumedang

<sup>2</sup> IKIP Siliwangi

<sup>1</sup>ak.mintarsih82@gmail.com, <sup>2</sup> citra.megianapertiwi@gmail.com

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## Abstract

This research is motivated by the low Mathematical Communication Ability (MCA) of MTs students. To boost the improvement and achievement of student MCA, teachers need to create special formulations and design an effective strategies, methods, and techniques. This study aims to obtain an overview of the use of peer tutoring learning models on triangle material in improving MCA student in terms of students' minimum completeness criteria (KKM). The method used is classroom action research with the subject of the research being VII-F grade students in MTsN 5 Sumedang who are in Ujungjaya Sumedang with learning through 3 cycles consisting of the stages of planning, implementation, observation, and reflection in each cycle. The instrument used in this study was a written test in the form of MCA description questions which were carried out at the end of each cycle, observation sheets and interviews. The results of this study indicate that: 1) In each cycle the score of students under the KKM is decreases, 2) the learning can improve student MCA, 3) students are still difficult in connecting real objects, pictures, and diagrams into mathematical ideas.

**Keywords:** Peer Tutoring Model, Mathematical Communication Ability

## Abstrak

Penelitian ini dilatarbelakangi oleh rendahnya Kemampuan Komunikasi Matematika (KKomM) siswa MTs. Guna mendongkrak peningkatan dan pencapaian KKomM siswa, guru perlu menciptakan formulasi khusus dan merancang suatu strategi, metode, dan teknik yang efektif. Penelitian ini bertujuan untuk memperoleh gambaran dari penggunaan model pembelajaran tutor sebaya pada materi bangun datar segitiga dalam meningkatkan KKomM siswa ditinjau dari Kriteria Ketuntasan Minimal (KKM) siswa. Metode yang digunakan adalah Penelitian tindakan kelas dengan subjek penelitian adalah siswa kelas VII-F di MTsN 5 Sumedang yang berada di Ujungjaya Sumedang dengan pembelajaran melalui 3 siklus yang terdiri dari tahap perencanaan, pelaksanaan, observasi dan refleksi pada setiap siklusnya. Instrumen yang digunakan dalam penelitian ini berupa tes tertulis berbentuk soal uraian KKomM yang dilaksanakan setiap akhir siklus, lembar observasi dan wawancara. Hasil dari penelitian ini menunjukkan bahwa: 1) Pada setiap siklusnya nilai siswa yang berada di bawah KKM semakin berkurang, 2) pembelajaran tersebut dapat meningkatkan KKomM siswa, 3) siswa masih sulit dalam menghubungkan benda nyata, gambar, dan diagram ke dalam ide matematika.

**Kata Kunci:** Model Tutor Sebaya, Kemampuan Komunikasi Matematik

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## **INTRODUCTION**

One of the important initial competencies for students is mathematical communication. Mathematical communication is the ability to use language to understand, develop and communicate ideas or information and interact with others. Communication skills in mathematics are the basic abilities that students must have in learning in class because students must have the ability to apply and express an understanding of the mathematical concepts being learned.

Baroody (Umar, 2012) also states that there are at least two important reasons why communication in learning mathematics needs to be developed. First, mathematics is not just a tool for thinking, finding patterns, solving problems or drawing conclusions, but mathematics is also an invaluable tool for communicating ideas clearly, precisely and concisely. Second, learning mathematics is a social activity and a vehicle for interaction between students and students and students and teachers. Communication in mathematics helps teachers to be able to understand students in interpreting and expressing their understanding of mathematical concepts and processes being studied. Furthermore, BsY (2010) argues, "Mathematical Communication is not just expressing ideas through writing but more broadly namely the ability of students in terms of stating, explaining, describing, listening, asking and cooperating".

Kusumah (Purwanti, 2015) stated that communication is a very important part in learning mathematics because through communication (1) Mathematical ideas can be exploited in various perspectives; (2) the way of thinking of students can be sharpened; (3) growth in understanding can be measured; (4) student thinking can be consolidated and organized; (5) mathematical knowledge and development of students' problems are constructed; (6) students' reasoning abilities can be improved; and (7) student communication can be formed.

Besides, mathematical communication skills also need to be done by teachers in learning mathematics. It needs to be familiarized in learning to encourage students to provide arguments for each answer and provide responses to answers given by others so that inadvertently train students to be able to communicate.

In addition to the importance of student MCA, the facts show that students' mathematical communication skills are still low. In general, the process of learning mathematics is often constrained by the ability of students to understand a problem, so students find it difficult to solve slightly complex problems that are associated with a problem, especially when associated with problems in the real world. The success of teaching and learning programs depends on form. This was experienced by students of class VII-F in Madrasah Tsanawiyah Negeri 5 Sumedang, Sumedang Regency where students had difficulty solving mathematical problems, both related to the application of concepts and those related to problems in daily life.

From the description that has been described, it can be concluded that the communication skills of students must be improved and developed in learning mathematics in the classroom so that students' mathematical abilities, in general, can improve properly. One alternative that can be applied in learning is to use the peer tutoring model.

The peer tutoring model is part of cooperative learning or joint learning. In this case, according to Trianto & Pd (2007) cooperative learning is a teaching strategy that involves students working collaboratively to achieve common goals with the concept that students will more easily understand difficult concepts if students discuss with each other. Cooperative learning has several learning models, one of which is the peer tutoring learning model.

The peer tutoring model itself according to Suherman (2003) is a source of learning other than the teacher, namely peers in the class who are better at providing learning assistance to other

friends. In line with this Herianto, Siahaan, & Kusnendar (2010) states that peer tutors are groups of students who have completed the subject matter, then help students who have difficulty in understanding the subject matter they learn. From these two explanations, it can be seen that the concept of peer tutors emphasizes learning between students by giving confidence to students who are more understanding to explain to other friends.

Furthermore, Febianti (2014) added that peer tutoring (peer teaching) is a learning method with a cooperative approach where there are students who act as instructors and other students who act as learners, to help learn at the same class level, develop better abilities in listening, concentrating, and understanding what is learned in a meaningful way, because the explanation given uses more familiar language. Indrianie (2015) also explained that peer learning model learning is learning that involves classmates who have the ability and criteria as tutors to guide other friends who have difficulty in understanding the subject matter described by their teacher. From some of the opinions above, it can be concluded that the peer tutor is a concept of learning with a group system and gives confidence to some students in the class with certain criteria to help and guide other students in understanding learning in class.

In general, the purpose of peer tutoring learning according to Anggorowati (2011) is to provide students the opportunity to be able to develop problem-solving skills, develop leadership abilities, train students' responsibilities to complete their respective assignments and develop skills in establishing relationships between other students. This has a positive impact on students because the added value obtained by students is not only limited to the learning material, but some competencies can be learned. Indrianie (2015) also added that in this learning there is no competition between students or groups, because they work together to solve problems together with different ways of thinking. With this concept, it is expected to foster a sense of caring and cooperation between students and give the impression that learning is not alone and to create an environment that helps one another.

An important factor for the success of peer tutors is the presence of students who can be made tutors based on certain criteria. To determine students who will become tutors is not only based on students' academic abilities but some considerations must be considered. According to Djamarah & Zain (2010) the criteria for determining a tutor are as follows. 1) He can be accepted by other students so students do not feel afraid or are reluctant to ask him. 2) Not arrogant, cruel or hard-hearted towards fellow students. 3) He has enough creativity to provide guidance, which can explain the lesson to his friends. 4) He can explain the materials or materials needed by students.

In line with this presentation, Anggorowati (2011) also added some criteria for a tutor to be considered, as follows. 1) Having above-average academic ability in the class. 2) Able to work together with other students. 3) Having a high motivation to achieve good academic achievements, 4) Having a tolerant attitude and tolerance with fellow students. 5) Having a high motivation to make the discussion group the best. 6) Be humble, brave, and responsible, and 7) Happy to help other students who are experiencing difficulties.

To support peer tutoring learning, clear learning steps are needed to provide effective learning. One of the steps in peer tutoring is based on Silberman (1996) explanation, which is as follows.

1. Pre learning activities: a) Select students who will become peer tutors; b) The group that becomes a tutor is first explained after school hours.
2. Implementation of learning: a) The teacher divides peer group members; b) The teacher puts each tutor into the group; c) The teacher explains the purpose and objectives of group division in the learning process to be carried out; c) Representatives from the group explain

the material being studied; d) The teacher gives assignments to each group; e) Correcting the final results of student work and concluding the material that has been explained; f) Give rewards to the group that gets the best results; g) Give rewards to the best tutors

Based on the description above, researchers are interested in an alternative form of learning to train students' mathematical communication skills and reflect active student involvement, namely mathematics learning with peer tutoring models. Therefore, the research is aimed at improving the communication skills of Class VII-F MTSN 5 students in Sumedang.

Based on the background of the problem above, the researcher formulated the problem, namely whether the mathematical communication skills of MTSN students by using the peer tutoring model could improve understanding of the material in flat triangle shapes?

In line with the above problems, the outline of this study aims to examine the mathematical creative thinking ability of students of MTSN 5 Sumedang Class VII-F by using the peer tutoring model on the triangle flat figure material

### METHOD

This study uses the Classroom Action Research (CAR) method, which is research that focuses on repairing and improving the quality of learning in the classroom. This is an effort to improve student MCA on the topic of a triangle. The subjects in this study were students of class VII-F at MTsN 5 Sumedang who were in Ujungjaya Sumedang with learning through 3 cycles (see figure 1) consisting of the stages of planning, implementation, observation and reflection in each cycle. Each cycle is improved according to the objectives to be achieved in learning. The instrument used in this study was a written test in the form of a description item that was carried out at the end of each cycle, observation sheets and interviews. The results of the study were analyzed descriptively qualitatively.

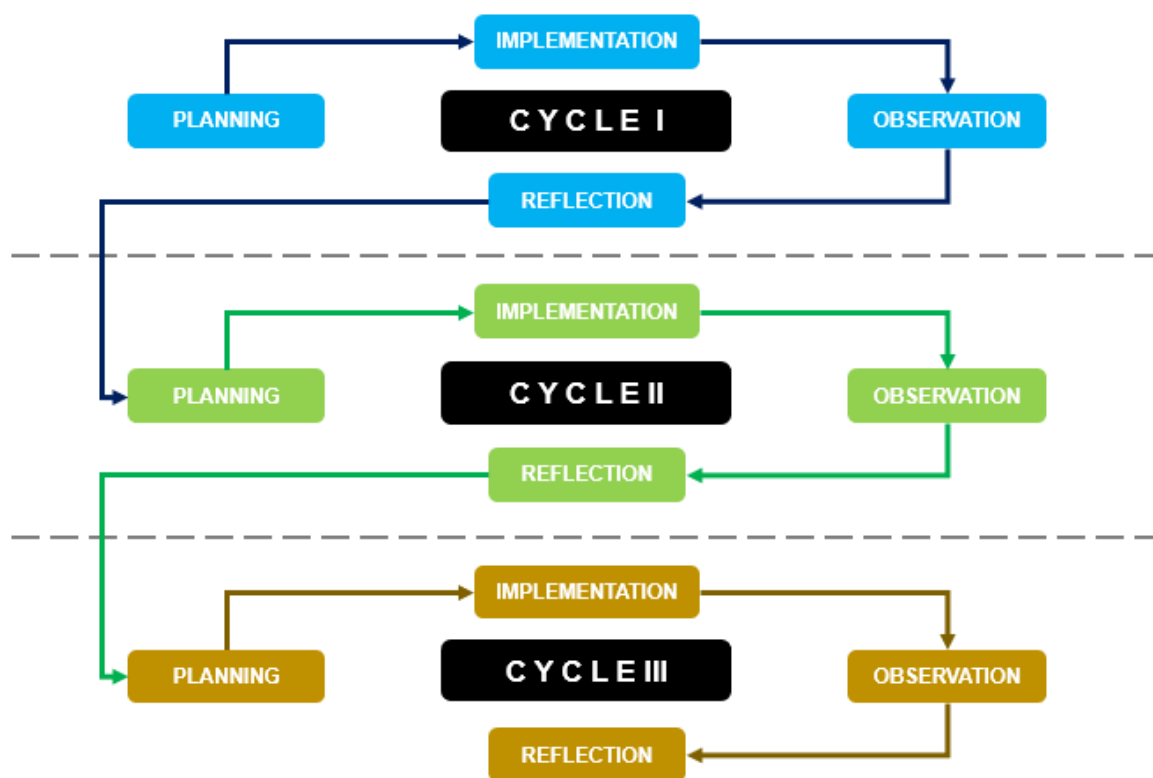


Figure 1. Classroom Action Research Flow

**RESULTS AND DISCUSSION**

**Results**

As explained earlier, this study aims to examine students' mathematical communication skills, and formative test results for each sub-subject will be carried out with descriptive analysis aimed at studying students' mathematical communication skills. When viewed from the minimum completeness criteria (KKM) of each individual, the student is said to have finished his study if the student has reached the specified completeness in each work unit.

**Table 1. MCA Test Result Recapitulation**

	<i>Problem Routine Test Math</i>		<i>Communication</i>		<i>Thinking Skills</i>	
	<b>Cycle I</b>	<b>%</b>	<b>Cycle II</b>	<b>%</b>	<b>Cycle III</b>	<b>%</b>
$\bar{x}$	67,68	67,68	70,46	70,46	73,21	73,21
KKM $\geq$ 61	20	71,43%	22	78,57%	25	89,29%
KKM $<$ 61	8	28,57%	6	21,43%	3	10,71%
max	90		95		98	
min	40		40		40	
N	28					

The teaching completeness criteria presented in Table 1 shows the average test score at the time of formative test 1 was 67.68. From this table it can be seen that students who completed learning in the first learning were 20 students (71.43%), then students who did not complete the first learning were 8 students (28.57%). Informative test 2 which was carried out in the second cycle, the average student test score was 70.46 with 22 students completing learning (78.57%) while 6 students (21.43%) had not yet completed the study. In the third cycle formative test 3 was carried out with an average test score of 73.21 and the number of students who completed learning increased by 25 (89.29%) while as many as 3 students (10.71%) were not yet finished studying.

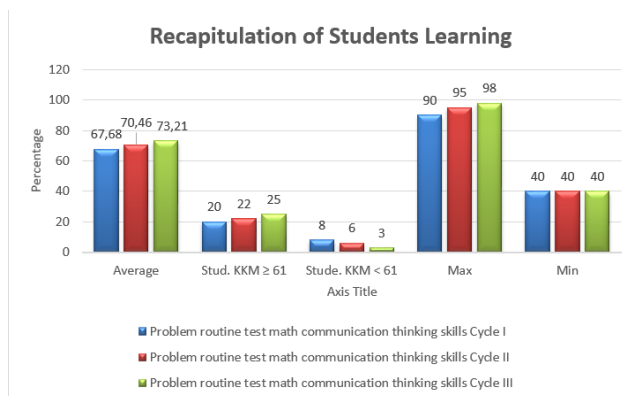
**Discussion**

Before conducting the research, an analysis of the students' classroom actions was done first about the mathematical grades. Based on the analysis, VII-F graders have difficulty in geometry material and this is the reason the subject was chosen. Next, the material of the triangle is chosen because it is following the subject matter in the semester. This class action research was conducted in 3 cycles where each cycle consisted of 2 meetings and 1 formative test. In the cycle planning stage, the teacher and observer make lesson plans, worksheets, and other teaching materials based on the steps of implementing peer tutors with sub-concepts in cycle 1 namely the types of triangles based on their sides and angles and visualizing them. The topic of material in cycle 2 is to determine the number of angles in a triangle and identify the properties of a triangle based on its sides and angles. While in cycle 3 the topics discussed are calculating the circumference and area of a triangle. Before learning begins, the teacher and observer select or determine students who will be peer tutors. The researchers' review is based on previous student grades and students' ability to explain. Then the researchers divided peer group members based on students' abilities. Each group accepts members with relatively balanced abilities between groups so that there are no gaps in the load that tutors receive. Before the implementation of learning, the teacher provides information to tutors about the group members and explains the material to be discussed in class.

During the implementation of learning, the teacher conditions and places students on each tutor. The teacher gives direction on how the learning technique will be implemented where students

who are members of the group will be taught by their friends who become tutors. At each study group meeting, students will receive assignments that must be done.

In the observation and evaluation phase, the observer will examine how the learning process occurs both in terms of the teacher, tutor and group members. From the test results, the Observer assesses student treatment, and teacher treatment. In cycle 1 there were 8 students (28.57%) whose grades were below the KKM. Difficulties experienced by students is that there are students who have not followed the provisions of the learning made, the teaching and direction of their peers. Improvements made are giving advice and understanding to these students to respect the direction of their peers. In cycle 2 there were 6 students (21.43%) whose grades were still below the KKM. Difficulties experienced by students are that there are students who have difficulty in explaining the material in their way, then there are still students who are accustomed to being guided by their tutors so that during individual tests these students find it difficult. The improvement for cycle 2 is to direct the tutors to arrange the exercises, which are not all questions are done together so that students are trained to do it themselves, then the results of the work are examined by the tutor. Then a class discussion is held together with the teacher. In cycle 3 there were 3 students (10.71%) whose grades were still below the KKM. Difficulties experienced by students are the lack of students' ability to count because the material discussed is related to the area and circumference of a triangle and to problems that discuss the relationship between real objects, pictures and diagrams into mathematical ideas. This shows that the difficulties experienced by students lies in the basic concepts of students and not from peer tutoring schemes. Learning 3 cycles shows that learning with peer tutors can improve student communication skills. Students are trained to communicate socially and mathematically. Each learning with peer tutors must be accompanied by class discussions so that teachers and students can equate answers or perceptions to increase student confidence in the material or answers learned. At the end of each cycle, the teacher rewards the group with the best results for increasing student enthusiasm for learning and being more serious in group learning.



**Figure 2.** Recapitulation of Students Learning

The implementation of this peer tutor has several advantages and disadvantages (see figure 2). The advantages of peer tutors are as follows: 1) eliminate students' doubts in asking because the questions are given to their peers, so students feel freer to communicate and the tutor can ask the teacher if there is something that is not understood; 2) foster leadership in tutors so they can organize their members; 3) the understanding of learning will be more attached to the tutor because the material is repeated and trained to his peers so that the tutor will be more active in learning and trying to understand the material; 4) foster a sense of responsibility for the tutor to try to bring members to master the material; 5) the learning process will be more open because each group will help each other and there is no doubt and shame in asking. The weaknesses of

peer tutors are as follows (see figure 3): 1) some students do not want to be taught by their peers who are tutors; 2) students who become tutors will feel burdened; 3) learners who are not serious about learning, in general, will only copy the answers of a group of friends because they feel that someone already bears the burden of learning, namely the tutor; 4) the concept of the material delivered by the tutor is not necessarily true; 5) some groups have not been able to accept group members who have been fully determined.



**Figure 3.** Learning Activities with Peer Tutor Model

## CONCLUSION

Mathematical communication skills of students in each cycle can be increased, as well as student learning outcomes whose grades are below KKM decreasing with the percentage of student learning success in each cycle above 70%. The difficulty experienced by students in solving mathematical communication problems is that students still have difficulty in understanding questions in the form of connecting real objects, pictures, and diagrams into mathematical ideas and in the calculation process.

## ACKNOWLEDGMENTS

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