

CHAPTER I

INTRODUCTION

1.1. Background

Education is one of the effort that are conscious, systematic, and focused so that learners can actively developing their potential. The learners have the spiritual strength of religious, self-control, personality, intelligence, good values, and skills needed for the society, nation and state (Undang-undang nomor 20 tahun 2003 tentang pendidikan nasional). Changing in attitude and thinking ability of students is an expectation that coveted by the various parties involved in the world of education. The various efforts to improve student learning outcomes include improvement of curriculum, adjustment subject matter, and methods of learning continues.

Learning mathematics in Indonesia so far focused on teachers, many teachers in the classroom teaching and learning activities emphasis on students 'ability to re-invent concepts and mathematical structures based on students' own experience and according to their understanding. Learning mathematics in Indonesia is repeated with emphasis on knowledge transfer and processing exercises. Dominating the class and the teacher becomes the main source of knowledge, lack of attention to student activities, student interaction and knowledge construction. Imprecision of teachers in designing and implementing learning are factor contributing to low student math achievement. The Students' difficulties learning mathematics in school is addition due to the abstract nature of mathematics it self, it is also caused by lack of proper teachers in designing and implementing learning mathematics class.

Expected to be achieve in the learning of mathematics in junior high school (SMP) is every student has the ability to think mathematically . The term includes the sense of thinking mathematically thinking related to mathematical characteristics . Therefore , the discussion about the mathematical thinking is closely related to the nature of mathematics itself . SUMARMO (2005) argues

that mathematics education has essentially two-way development is to meet the needs of the present and future needs . The need today is to direct the learning of mathematics for understanding mathematical concepts and ideas are then required to solve mathematical problems and other sciences . While the needs of the future are learning mathematics provide logical reasoning abilities , systematic , critical , and careful , foster self-confidence and a sense of beauty to the regularity of the nature of mathematics , and to develop an objective and open attitude . Such capability is needed in the face of ever-changing future .

Based on the two directions of the development of mathematics, that have an important role to meet the needs of the present and the future. Thus not surprising that in recent times many mathematicians, both educators and researchers who are interested in discussing and researching the ability to think mathematically. National Council of teacher of mathematics (NCTM: 2000) states that there are some aspects that are included in the mathematical thinking of which is the ability of mathematical problem solving, mathematical communication, mathematical reasoning and proof, mathematical connections and mathematical representation.

From the fifths' mathematical thinking ability, with not ignore the other mathematical communication skills is an important part in the activity and the use of mathematics students are learning. The importance of this capability is described in the competency standard math curriculum study materials current at the level of junior high school (SMP). In this standard is explained that the students are required to have the ability to communicate ideas with symbols, schemas, tables, charts, or diagrams to clarify a situation or problem, demonstrate the ability to create, interpret, and completing mathematical models in problem solving, and have respect for usability math in everyday life.

Communication is a very important part in learning mathematics . This is supported by the opinion of Asikin (2002) that the role of communication in learning mathematics are: (1) Communication can be exploited in a variety of mathematical perspectives, helping students sharpen thinking and sharpen

students' skills in math material see the parallels, (2) Communication is a tool to "measure" the growth of mathematical understanding and reflect an understanding of the students, (3) Through communication, students can organize and consolidate their mathematical thinking, (4) Communication between students in learning mathematics is essential to the construction of mathematical knowledge, the development and enhancement of problem solving reasoning, foster self-confidence, as well as increased social skills, (5) "writing and talking" can make a very meaningful tool (powerful) to form an inclusive mathematics community.

Mathematical Communication ability needs to be the focus of attention in the study of mathematics, because through communication students can organize and consolidate mathematical thinking and students to explore mathematical ideas. Therefore, students need to get used to learning to provide arguments against each answer and respond to the answers given by others, so that what is learned is meaningful to him. This means that teachers should strive to encourage students to be able to communicate.

The fact shows that the field of mathematics learning outcomes in Indonesia in the mathematical aspects of communication is still low. As contained in <http://jurnal.upi.edu/file/8-Fachrurazi.pdf>:

"The low mathematical communication skills demonstrated in studies Rohaeti (2003) that the average of students' mathematical communication ability are lacking in qualifications. Likewise Purniati (2003) states that students' response to the questions generally less mathematical communication. This is because the problems solving and mathematical communication are still new things, so that students have difficulty in completing it."

Recognizing the need for a renewal of learning to enable students to learn math easier, more meaningful and enjoyable. Such as by applying learning models that match their interests and needs of students as models Teams Games Tournament (TGT) and a model Student Teams Achievement Division (STAD).

Cooperative learning model is still rarely used in the learning process and teachers have not used cooperative learning type STAD and TGT, more frequently

use of the learning model of lectures and continued by discussions. As a result, students become less active so that students have difficulty in understanding and solve the algebra problem and also have an impact on learning outcomes based on test score and dissatisfactory for some students' score.

Cooperative learning model can be used as an alternative model that is expected to activate student in teaching and learning mathematics, this means that student should be active and interact with others, exchange information and solve problems.

Mathematical communication ability is important in the learning process, but in fact the mathematical communication ability junior high school students is still low. As reflected in the initial observations by the author in State 9 Junior High School in Medan in grade VIII₅ class. The model of test item is:

Five of the triangle has a base of the same length, the first triangle has an area of 30 cm^2 , the second triangle has an area of 40 cm^2 , the third triangle has an area of 50 cm^2 , the triangle has an area of 60 cm^2 fourth, and fifth triangle has an area of 70 cm^2 . Based on these data answer the following questions!

- Write down the data to table!
- Describe line diagram that illustrates the relationship between the extent of the triangle.
- Determine the area of the triangle to eight!

Students' answer strategies:



Figure 1.1 The results of students' answers

On the question of part (a) the student can complete and write data on the problem correctly, the frequency table written complete yet, triangular replaced with frequency. So if another student read a frequency table would be difficult to interpret its meaning. One alternative is the correct answer:

Table: 1.1 The relationship triangle with area

Triangel	Wide
1	30cm ²
2	40cm ²
3	50cm ²
4	60cm ²

On the question of part (b) the student has described the diagram, but has not been completed because the student is not connecting each point of intersection, so it is not connected to a line. In the diagram also no title and labels for the x and y axis. The students should have been following diagram illustrates:

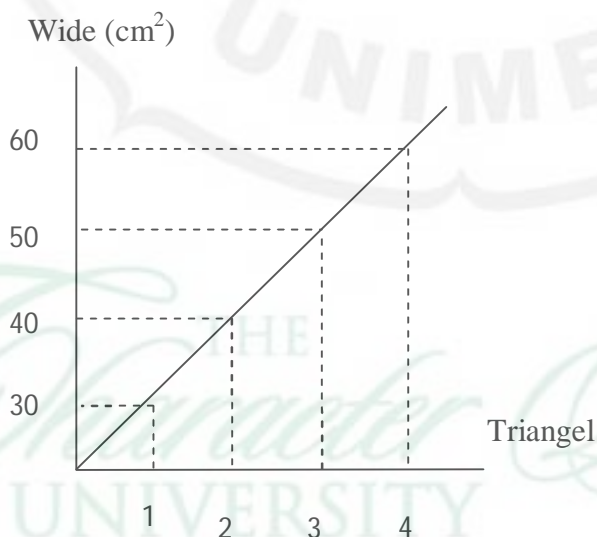


Figure 1.2 The relationship triangle with an area of each triangle

On the question of part (c) of students answered correctly, but the student is not expected to form a mathematical model emerged. The students record the data one by one until the 10th. The expected completion is: pay attention

to the pattern of preparation, from the matter of the above sequence of numbers which will be formed are: 30, 40, 50, 60, 70, ... The sequence numbers can be formed into a model of $10n + 20$, n is triangular, so into eight triangles is $10n + 20 = 10 \times 8 + 20 = 100\text{cm}^2$.

Completion of the above problem can be solved by either if the student is able to write the information in question correctly, changing word problems into mathematical form of variables or symbols in order to simplify the calculation, and is able to describe the Cartesian diagram associated with the triangle and breadth. So it is clear the student's ability to express a situation in the diagram, or tangible objects into the language, symbols, or mathematical models are still lacking. The ability of the above are part of students' mathematical communication skills, it can be concluded as a result of mathematical communication ability of students is still low.

Based on the test results obtained in the above picture communication skills VIII₅ Class of State 9 Junior High School in Medan as follows: the average value of communication skills obtained by students is 5,85. The cause of the average value is low is there are 21 of the 31 students were able to write down the information and ideas that exist in terms of mathematics in the form of tables. There are 17 of the 31 students were able to turn the matter into a form variable or mathematical symbols, and of the 17 students there are 10 students who can solve problems correctly. There were 16 students from 31 students who were able to describe about the story in the form of line diagrams, although the diagram illustrates the time line has been studied in elementary school (SD) but in reality there are many students who are not able to finish.

Therefore, mathematical communication skills need to be improved, while the field findings indicate that the ability is still low. Is grown so necessary communication skills in mathematics. Teachers must seek learning by using learning models that can provide opportunities and encourage students to practice mathematical communication skills of students.

Low communication ability can be caused by internal factors and external students. Internal factors are factors that originate from within the students, whereas environmental factors (external) factors that are derived from outside the student. One of the internal factors that can affect student learning outcomes is the ability to start. Initial capability is the ability possessed by students or learners before teaching and learning take place. Students who have a high initial ability, usually tend to be easier to accept the material than students taught by teachers who have low initial ability.

Initial ability of the students has a huge influence on the success of the teaching-learning process. Students' prior knowledge is a provision in receiving further material. Readiness and ability to follow the course determined by prior knowledge possessed by the student so that the initial capability is supporting learning success. Math lessons given in schools has been systematically arranged so as to fit in the other subject, the ability of the students at the beginning of the prior subject to further consideration. In the teaching and learning activities , any material submitted should be absorbed by students beginning capable low, medium and high rate capability.

But not always high on students' prior knowledge on the impact of high achievement as well or otherwise, it can happen if it is done right so that learning can encourage students to be active and energetic in learning. Teachers are not only required to master the material, but in actual need for attention from the teacher to combine several methods of teaching. It is intended that students do not easily get bored when learning activities are ongoing, thus increasing student learning outcomes can be better than the previous one.

Based on this background that the researcher is described, intend to do a research with the title **“The differences of students’ mathematical communication ability by using Cooperative Learning Model *Teams Games Tournament (TGT)* and *Student Teams Achievement Division (STAD)*”** Case study in class VII SMP Negeri 2 Porsea academic year 2013/2014.

1.2. Problem Identification

Based on the background problem identificate are:

1. Learning methods are used less various.
2. Student's activity is passive during the learning process.
3. Students' Mathematical communication ability in writing, especially in Quadrilateral and triangular material is still low.
4. The school has not used cooperative learning model yet.

1.3. Problem Limitation

Seeing the extensive scope of the problem identified compered to the time and ability of the researcher, the researcher limited the problem is the difference of students' mathematical communication ability by using cooperative learning model type Team Games Tournament and Student Teams Achievement Division on Quadrilateral and Triangular matter in seventh grader SMP Negeri 2 Porsea.

1.4. Problem Formulation

Problem formulation in this research is :

“Is students' mathematical communication ability by using cooperative learning model type Teams Games Tournament higher than Student Teams Achievement Division cooperative learning method type? ”

1.5. Research Objective

Research objective in this research are: To know whether student's mathematical communication ability using *Teams Games Tournament* (TGT) is higher than *Student Teams Achievement Division* (STAD).

1.6. Research Benefit

This study aims to provide meaningful input to the learning activities in class, especially in an effort to increase students' mathematical communication skills. The inputs are:

1. For teachers, to improve the quality of learning and professional development of teachers as well as the changing patterns and attitudes of teachers in teaching, also can use the model type TGT and STAD cooperative as an alternative in the learning process.
2. For researchers, additional insight and experience as prospective teachers in the future and information and reference material for other researchers associated with this research
3. For students, it can provide motivation to learn, practice skills, are responsible for any duties, kemampuan develop positive thinking and argued, and provided supplies to be able to cooperate with others in both learning and community.
4. For schools, can be used as consideration and input to school in improving the quality of teachers and classroom learning system and improvement of education quality.

1.7 Operational definitions

Operational definition is necessary to avoid errors in interpreting and interpret in the context of this study variables. Operations of each variable is described as follows:

1. The indicator of student's mathematical communication ability which will be measured are :
 - a. The ability of stating mathematical problem into mathematical model.
 - b. The ability of explaining mathematical problem into figure.
 - c. The ability of explaining problem situations by own words and doing calculation.
2. The syntaxes of TGT like the following
 - a. Presentation Teacher

The teacher explains the outline of the material in front of the class and the student pay close attention.

b. Group

Students are distributed in small groups that are heterogeneous.

c. Academic tournament

Implementation of academic tournament is the hallmark of the cooperative learning TGT.

d. Group award

Group value is calculated based on the average values obtained by each member of the original heterogeneous group.

e. Bumping (Shift)

This shift is always done after each implementation of academic tournament, which aims to regulate the position of the student at the table next tournament in the competition.

3. The syntaxes of STAD like the following :

a. Presentation Teacher

The teacher explains the outline of the material in front of the class and the student pay close attention.

b. Group

Students are distributed in small groups that are heterogeneous for the discussion.

c. Quiz

Students doing the individual test.

d. Individual Scores

Students donated points on his team based on how much their quiz scores exceeded their baseline score.

e. Team Award

Teams can earn a certificate or other award if the average score they exceed certain criteria.