

CHAPTER I INTRODUCTION

1.1. Background

Education is one of the most important things in daily life. Along with the development of science and technology is so fast in the 21st century, especially in the field of communication and information that lead to the distance and time were no longer an obstacle in obtaining information. This Progress brings us to the era of the so-called era of globalization. There will be many things that happen in this era of globalization, one of which is the free market that demanded an increase in human resources (HR). To face this era of globalization, we need to pass up efforts in improving the quality and education of both student achievement and teacher's ability on carry out the learning process

One field of study that is a major concern in education is Mathematics. Mathematics is a basic science in the development of science and technology is growing rapidly. In truth, mathematics is a tool and a language for solving problem big and small. Mathematics is needed for everyday problems such as budgeting and saving, financing a house or car, calculating a tip at a restaurant and estimating distances and gas mileage (Akinmola, 2014:1). Therefore, mathematics became one of the subjects that must be taught in schools and have an important role in the development of communication ability.

National Council of Teacher of Mathematics (2013) refer to NCTM.org, they explain that the communication is an essential part of mathematics and mathematics education. This suggest the importance of communication in the learning of mathematics. Communication enable student to express their ideas to teachers and other students. This communication is one of the five process standards outlined in NCTM. These five process standard are problem solving, reasoning and proof, communication, connections, and representation. One of the mathematical study

based on Regulation of the Minister of National Education Indonesia No 22 of 2006 also emphasizes the student mathematical communication ability is student enable to communicate ideas with symbols, tables, diagrams, or other, idea to clarify the situation or problem.

Mathematical communication ability is the ability of the students to express their ideas, describe, and discuss mathematical concepts coherently and clearly. According to Ansari (2016: 15) there are some of indicator to measure student mathematical communication ability namely: (1) express mathematical ideas by talking, writing, demonstrations and draw in a visual form; (2) to understand, interpret, and assess the mathematical idea presented in the form of written, oral or visual form; and (3) using vocabulary/language, notation and mathematical structures to express ideas, describe the relationship and modeling.

Based on observations that have been made to the students of class VII-C in SMP Asy-Syafi'iyah International Medan on January 17, 2017 showed that students in communicating to convey information, such as express ideas, ask questions, and answer questions / opinions of other students are still low. The majority of teachers teach by lecture method and writing notes on the board. This means that the learning process in the classroom is not uncommon practice and rarely develop mathematical communication skills and the process of interaction between the students, such as cooperatives, express ideas, ask questions, and answer questions / opinions of other students. In writing mathematics, students can draw diagrams, graphs, or tables, but they are drawing with unclear. The problem that try out to students as below:

Problem

Mr. Somat has a farmland square-shaped. On the farmland planted with paddy and cassava. If the farmland planted with paddy square shape with an area of 64 m^2 . Farmland planted with cassava has a length of 10 m and a width of $\frac{1}{4}$ of the length of the farmland planted with paddy and have the rest of the farmland area of 16 m^2 .

- a. Make a mathematical model of the above problems
- b. Draw all of farmland Mr. Somat and determine the area planted with cassava!
- c. Explain with your own words how much farmland Mr. Somat!

- a. Suppose that Area of farmland planted with paddy = A_p
 Area of farmland planted with cassava = A_c
 Area of rest of the farmland = A_r
 Length of farmland planted with paddy = L_p
 Length of farmland planted with cassava = L_c
 Width of farmland planted with cassava = W_c

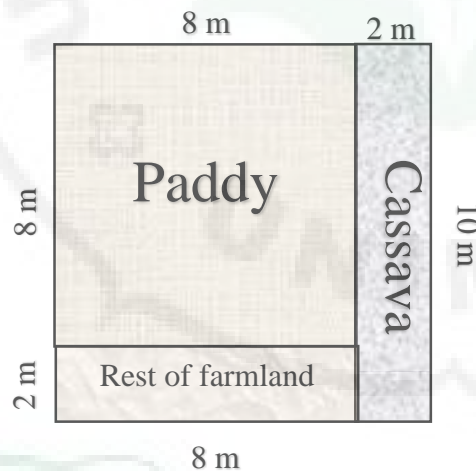
So, the model of mathematical is

$$A_p = 64 \text{ m}^2, L_p = \sqrt{64} = 8 \text{ m}$$

$$L_c = 10 \text{ m}, W_c = \frac{1}{4} \times 8 = 2 \text{ m}$$

$$A_r = 16 \text{ m}^2$$

- b. Figure of farmland has Mr. Somat



Area of farmland planted with cassava

$$A_c = L_c \times W_c$$

$$A_c = 10 \text{ m} \times 2 \text{ m}$$

$$A_c = 20 \text{ m}^2$$

- c. Area of farmland planted with paddy is 64 m^2 , area of farmland planted with cassava is 20 m^2 , and Area of rest of farmland is 16 m^2 . So the all of farmland has Mr. Somat is $64 \text{ m}^2 + 20 \text{ m}^2 + 16 \text{ m}^2 = 100 \text{ m}^2$.

We will compare expected the answer of the problem to student answer sheet as follows:

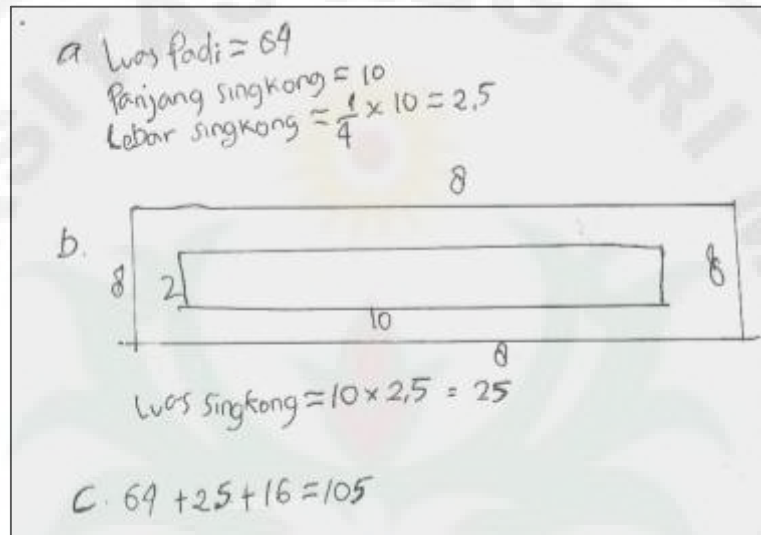


Figure 1.1. Students Answer Sheet

For students answer sheet in first question show the first indicator of mathematical communication ability is students able to state problem in writing into mathematical model (Ansari, 2016: 15). From the Figure 1.1 in first question above students can't form the mathematical model. In expected answer, student expected to determine the length of farm planted with paddy, but student only write down the value. And also the width of cassava is $\frac{1}{4}$ of length of farm planted paddy, but student answer $\frac{1}{4}$ of length of farm planted of cassava. This shows that the still low students' mathematical communication in indicator students able to state problem in writing into mathematical model

For students answer sheet in second question show the second indicator of mathematical communication ability is students able to explaining mathematical problem to figure (Ansari, 2016: 15). From the Figure 1.1 in second question above students only draw the figure without explaining or make note in figure and the figure also incorrectly. Student use a ruler, but students do not draw properly and the width farm planted paddy is different to length farm planted paddy. This shows that the still

low students' mathematical communication in indicator students able to explaining mathematical problem to figure

For students answer sheet in third question show third indicator of mathematical communication ability is students able to explaining problem situation by own words and doing calculation. (Ansari, 2016: 15). From the Figure 1.1 in third question above student only answer $64 + 25 + 16 = 105$ and also the answer is incorrectly. Student did not give an explanation of where it came from number of 64, 25 and 16. This shows that the still low students' mathematical communication in indicator students able to explaining problem situation by own words and doing calculation.

Based on the results of test above, can be concluded that the students' mathematical communication ability was still low. Survey done by Trends in International Mathematics and Science Study (TIMSS) explain the average mathematics score students Indonesia by education system year 2015 is 39,7% from ideal score 1000. It is low of other county that had more 50% so that mathematics learning Indonesia is more emphasized on basic assignments, it is slightly focused attention on mathematical application on daily activities, mathematical communication and mathematical reasoning. Furthermore, Susanta (2012: 2) said that one of the central issues in Indonesia is low mathematics achievement when children make the transition from primary to secondary school. Mathematics as a subject area, is often considered by most students in Indonesia to be difficult when comparing it to other subjects at secondary school levels. It show that the mathematical communication ability of Indonesia still low.

One of failure of students in mathematics learning depends on the use of methods or how teacher teaches. According to Sa'ad (2014: 34) said that factor causing low or lack of student in mathematics is less of variation in the learning model which teachers do, an example of this is the learning process oriented on conventional approach (teacher-centered).

Similar with Sa'ad, Baroody (in Umar, 2012:3) stated that on mathematics learning with conventional approach, communication is still dominated by direct communication. Which is the pattern of communication in this direction the teacher plays an active role. Student communication is still very limited only to the short verbal answers given by the teacher.

Mathematics learning with conventional approach only focus on teacher-centered. According Mascolo (2009:4) explain that on teacher-centered is often described as being based upon a model of an active teacher (teacher dominant) so teacher only transferring knowledge to students. While the student quietly and passively accept the transfer knowledge from the teacher. Instructional process taking place in class makes student passive.

In new paradigm of learning mathematics, teacher are leaders of community learning in the classroom, teachers guide students to actively communicate in the classroom. The role of teachers is not as a transferring of knowledge, but as a stimulation of learning in order to construct their own knowledge trough some activities such as problem solving, reasoning and communicating. Teacher assist students to understand ideas of mathematics, and set right the students' understanding if one is incorrect.

Mathematical communication ability of Indonesian students especially in junior high school are still considered low due to the using of cooperative learning rare to applied in the learning process. According Armiati (2009: 275) explain mathematical communication skills cannot be appeared by itself, but needs to be drilled in the learning activities. Communication provides a forum for students to negotiate their strategies and to enhance the mathematical communication skill required a classroom environment designed in small-groups or cooperative setting.

Through group discussion, student can develop the mathematical communication ability. According Qohar (2011:6) found that the formation of small groups facilitate the development of mathematical communication ability. Given the small groups, then the intensity of students in expressing their opinions will be

higher. It will provide a great opportunity for students to develop mathematical communication skills.

According to Sharan (2009: 347) explain that cooperative learning is one kind of student centered learning approach offers the opportunity to help all members learn the concepts and strategies through group interaction so that support students to be more active in class and of course increasing the mathematical communication ability.

Based on the definition, cooperative learning model is not same with common study groups. There are some basic unsure in cooperative learning making different with common study groups, they are work together, responsible, compete, communicate and evaluate group process. For instance, type of cooperative learning model are Team Games Tournament (TGT) and Student Teams Achievement Division (STAD) can give students much time to think, to respond, and to help each other.

Teams Games Tournament (TGT) is type of cooperative learning model that involves all students as peer tutors and contains elements of the game. Cooperative learning model type Team Games Tournament (TGT) is one model of cooperative learning that lesson apply the concept of the game were performed between groups with members of each group. The step of TGT according to Slavin (2010: 166) is: class presentation, team, games, tournament, and recognition team. With team, student discuss and work together to solve SAS, so they express and compare their answer, opinion and also idea. In tournament, student must master the material to challenge another student. They must answer the question in card and the challenger can challenge if he want. With work in group and tournament can improve their student communication ability.

In other hand, Cooperative learning model type STAD is a model of learning that promote collaboration capabilities, creativity, critical thinking and the ability to help a friend to achieve their respective goals and group. According to Mustika (2016: 41) explain that STAD emphasizes on the process of learning writing that

happened in both through study in teams or individual learning. Then the step of STAD according to Slavin (2010:143) is class presentation, team, quiz, score individual progress and team recognition. Working in group by using SAS can improving the abilities that have been student. He also explain that students emphasized to understand the SAS, not just for a condition and transferable. In Quiz, Students are not allowed to help each other during the quiz takes place. This is to ensure that each individual student is responsible for the knowledge they have acquired. With both step expected to improve students' mathematical communication ability allegedly

Based on this background that the researcher intends to conduct a research entitled **“The Difference of Students Mathematical Communication Ability Taught by Cooperative Learning Model Team Game Tournament (TGT) and Student Teams Achievement Division (STAD) types at SMP Asy-Syafi'iyah International Medan”**.

1.2. Problem Identification

Based on analysis of the background above, some problem identification in this research are:

1. Mathematical communication ability of students is still low
2. The less of variation in the learning model which teachers do in the learning process.
3. Student's activity is passive during the learning goes on.
4. The cooperative learning is rare to be applied in the learning process at SMP Asy-syafi'iyah International Medan

1.3. Problem Limitation

Based on problems identification above, it needs problems limitation to be more focused. The problem to be examined in this research is limited to:

1. The model used are cooperative learning model Team Games Tournament type and Student Teams Achievement Division type.
2. The student's mathematical communication ability in this research is bounded in student's mathematical communication ability on topic statistic in grade VII semester II.
3. This research is conducted at SMP Asy-Syafi'iyah International Medan

1.4. Problem Formulation

Problem formulation in this research as follow: Is there any difference between student's mathematical communication ability taught by cooperative learning model Team Games Tournament (TGT) and student's mathematical communication ability taught by cooperative learning Student Teams Achievement Division (STAD) type?

1.5. Research Objective

Research objective in this research are: To know whether the student's mathematical communication ability taught by cooperative learning model Team Games Tournament (TGT) better than Student Teams Achievement Division (STAD) types

1.6. Research Benefit

This research aims to provide meaningful input to the learning activities in the class, especially in an effort to increase student's mathematical communication ability. The inputs include:

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 researcher, additional insight and experience as prospective teachers, in the future and information, reference material for other researcher associated with this research.
3. For students, it can provide motivation to learn, practice skills, are responsible for any duties, developing ability, positive thinking, argued, and provided supplies to be able to cooperate with others in bot 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. Operation of each variable is described as below:

1. The indicator of student's mathematical communication ability which be measured are:
 - The ability of express mathematical problem into mathematical model
 - The ability of explain mathematical problem into figure or table
 - The ability of explain problem situation by own words and its calculation.
2. The syntaxes of TGT as below:
 - a. Class Presentation

Teacher explain the outline of the material in front of the class and the student close attention to teacher.
 - b. Team

Team on cooperative learning model type Team Games Tournament (TGT) consist between 4 – 5 student that represent academic of student, gender, race and ethnicity.

c. Games

Games consist of questions designed to test student' knowledge gained from classroom presentation and discussion in group.

d. Tournament

Tournaments usually starts at the end of the week or after the class ended after the presentation and study groups have completed the worksheet.

e. Recognition Team

In this component, teacher give reward for team that won the tournament.

3. The syntaxes of STAD as below :

a. Class Presentation

In the class presentation, teacher introduces new material through lecturing, class discussion, demonstration, or some form of teacher presentation.

b. Team

Team is the most important feature in STAD which emphasize on doing the best for the team to help each other in achieving their study.

c. Quiz

In this key component, all of the students have to work individually and their team mates are not allowed to help one another during these quizzes.

d. Individual Progression Score

After doing the quiz, teacher needs to give individual progression score to each team. This aims to motivate the student to do better for next quizzes.

e. Recognition Team

In this key component, teams that surpass the criterion set out should be given some kind of "reward for their success.