

## CHAPTER I INTRODUCTION

### 1.1. Background

Education is every effort, influence, protection and assistance provided to the child to draw child maturation or more enough to help children to carry out their own life. The influence come from an adult (or created by adults such as schools, books, daily live, and so on) and addressed to people who have not grown up (Hasbullah, 1997:2). Changing and developing in education is something that indeed supposed to occur in accordance with the changing culture of life. Therefore, development of time in the education world is constantly changing with significant and can changing the mindset of a educators from rigid mindset into a more modern, more skillful, creative, and innovative. It is very influential in the progress of education in Indonesia. Facing the facts, educational experts criticaling with expression and the real theoretical education to achieve the real education goal. Mudyaharjo (2004: 59) states:

Tujuan pendidikan dapat dibagi atas dua bagian yaitu tujuan pendidikan yang bersifat personal dan sosial. Tujuan pendidikan bersifat personal adalah untuk mengoptimalkan perkembangan kemampuan-kemampuan yang dimiliki oleh setiap orang, sehingga mengalami perubahan-perubahan dalam pola tingkah laku. Sedangkan tujuan pendidikan bersifat sosial menggambarkan pendidikan dalam memelihara dan membangun kehidupan bersama dalam masyarakat, berbangsa dan bernegara.

One of the subjects that reflect the above objectives is mathematics, because mathematical knowledge is develop according to with the developing of information technology, which causes the mathematics is seen as a structured and integrated science, the science of patterns, relationships, ways of thinking, understanding the around world, the deductive science, symbols and numerical language. Hudojo (2005 : 65) states that mathematics as a language of symbols which gives communicational facility and it can get so much information and make a new concept. It means symbols have benefit for intellectual efficiency since these can used to communicate idea effectively and efficiently. In order to symbols is

meaningful, every person have to understand idea which contain in the symbol. That is why idea has to understand ahead before it is symbolized and mathematics is universal and can be understood by anyone, anytime and anywhere. As noted Cockroft (in Abdurrahman, 2003:253) argued the importance of students learning mathematics:

Matematika perlu diajarkan kepada siswa karena : (1) Selalu digunakan dalam kehidupan sehari-hari; (2) semua bidang studi memerlukan keterampilan matematika yang sesuai; (3) merupakan sarana komunikasi yang kuat, singkat dan jelas; (4) dapat digunakan untuk menyajikan informasi dalam berbagai cara; (5) meningkatkan kemampuan berpikir logis, ketelitian, dan kesadaran keruangan, dan; (6) memberikan kemampuan terhadap usaha memecahkan masalah yang menantang.

Therefore, students need to have mathematics knowledge to facing in the future. But in reality there are many students in every level of education considers mathematics as a difficult subject, not a pleasant subject, and often lead to a variety of complex problems to solved, until have the impact in the low students' learning result. In the process of mathematics learning, the teacher focuses the students to remember "methods" that is taught in solving the problem than stimulating the students to construct their own knowledge. Almost students never given the opportunity by the teacher to understand the rational behind the formulas are given to them. As a result, the knowledge gained by the students not understanding, they are confusion when confronted with different problems with the examples given of their teachers.

In the curriculum2006 has been formulated five skill or proficiency expected in the learning of mathematics, namely, (1) learn for communicating, (2) learn for reasoning, (3) learn for problem solving, (4) learn to connecting the idea, and (5) establishment of a positive nature to mathematics. The above relates to opinions about the importance of communication in learning mathematics, communication is not only used in science but also in the overall use of mathematics learning activities.

Communication is one of the important objectives in the learning of mathematics. The process of communication is helping students to build ideas, publicize the idea, and can build a good social network in a classroom

environment. Mathematical communication is one of the important competencies that should be developed at every mathematical topic. According to Guerreiro (in Izzati and Suryadi, 2010) mathematical communication are tools in the transmission of knowledge of mathematics or as a foundation in building mathematical knowledge.

Communication ability should be owned by every student, communication ability can be built up in student. This is in accordance with the opinion expressed by Lindquist based on the National Council of Teachers of Mathematics (NCTM) revealed that mathematical communication ability need to be established so that students can: (1) reflecting in thinking about mathematical ideas in a variety of situations, (2) modeling the situation with oral, written, graphic images and algebraically, (3) developing an understanding of mathematical ideas, including the definition of the role of mathematics in a variety of situations, (4) using the skills of reading, listening and writing, interpret and evaluate mathematical ideas, (5) reviewing the mathematical ideas through conjecture and convincing reasons, (6) understanding the value of math notation and role in the development of mathematical ideas.

In the view of the experts, mathematical communication ability needs to be developed among students. Mathematical communication is the ability to include and contain a variety of opportunities for students to communicate in the form of: reflecting real objects, pictures, or ideas of mathematics, modeling situations or problems using oral, written, concrete, graphs, and algebra, using skills of reading, writing, listening, and study to interpret and evaluate ideas, symbols, terms, and mathematical information.

Baroody (in Ansari, 2009:4) mentions at least two important reasons why communication in learning mathematics should be cultivated among the students. First, mathematics is essentially a language for mathematics it self. Mathematics is not just a thinking tool that helps us to find patterns, solve the problem and make conclusion, but also a tool to communicate our thoughts about various ideas with clear, precise and concise. In fact, mathematics is considered as a "universal language" with symbols and unique structure.

Everyone in the world can use it to communicate mathematical information although they have the different original language. Second, the learning and teaching of mathematics is a social activity that involves at least two parties, namely the teachers and students. In the learning and teaching process, it is imperative that express thoughts and ideas to others through language. Basically the exchange of thoughts and ideas is a process of teaching and learning. Of course, communicating with peers is very important for the development of communication skills so that they can learn to think like a mathematician and managed to solve the problem that is really new.

According to Kosko & Wilkins ( 2010 )

Communication is an essential part of mathematics and mathematics education ( NCTM, 2000:60 ). Both writing and discussion are seen as integral parts of communication that promote deeper understanding of concepts. Writing is seen as a way for individuals to reflect on or explain in detail certain mathematical ideas. It helps students to articulate strategies, therefore increasing their procedural knowledge and producing cognitive benefits in general. Discussion between students is another avenue in deepening understanding of concepts through social interaction. It enables students to reflect upon concepts through interactions with others engaged in the same activity as well as allow students to become familiar with certain ways of describing mathematics while they are doing mathematics- therefore providing students opportunities to become more knowledgeable.

But in reality, the mathematics learning activities still found that when students are given written assignments, students always try to jump start writing answers. Although it is not something wrong, but it would be more meaningful if the students do the first activity such that think, reflect and develop ideas, and to test the ideas before starting to write.

Based on field observation is conducted by Ansari toward tenth grade students in several high schools in Nanggroe Aceh Darusalam show that the average of students' communication ability to convey information such as conveying ideas, asking questions, and responding to questions from other people's opinions.

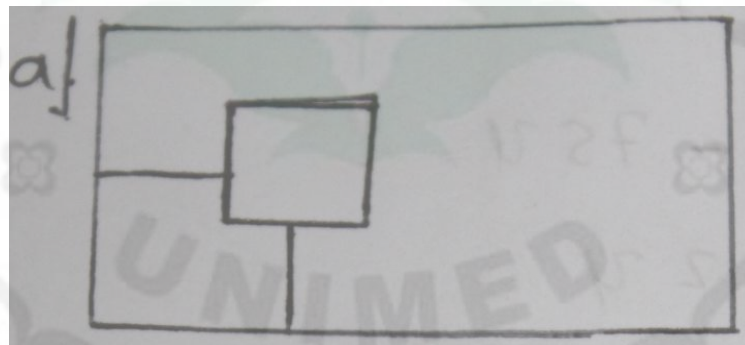
The low mathematical communication ability of students can also take a look of grade VII at SMP Negeri 1 Onan Ganjang. Based on observation is made



by the researcher to give a diagnostic test as many as two description question, it is clear that many students are not able to resolve the question.

1. Budi has a park with the area of  $180 \text{ m}^2$  behind his house, in the middle of the park there is a fish pond. The distance east side of the pond with the east side of the park is  $2 \text{ m}$  and the distance of the south side of the pond to the south side of the park is  $3 \text{ m}$ . The length of the pool is  $5 \text{ m}$  longer than the width.
  - a. Create picture based on the problem
  - b. Make a mathematics model to determine the area of Budi's fish pond
  - c. What is the area of Budi's fish pond

This is one of student's work results that illustrating students have not be able to express mathematics ideas contained in a question into the picture. Students are not able to write about the situation into images.



**Figure 1.1. Mistaken work to expressed mathematics ideas into picture**

This is one of the student's answer who have not been able to illustrate a picture into a mathematics model.

$$\begin{aligned}
 \text{b). } P &= P \times L \\
 180 \text{ m}^2 &= 5 \text{ m} \times L \\
 L &= \frac{180 \text{ m}^2}{5 \text{ m}}
 \end{aligned}$$

**Figure 1.2. Mistaken work to illustrate picture into the mathematical model**

The analysis showed that from 25 students who take the diagnostic test, which is the complete categorize with scored  $\geq 2,66$ , only 4 people who completed or about 16%, while 84% of students do not complete. Furthermore viewed from mathematical communication ability category around 4% higher mathematical communication ability, 12% medium, while 8% lower and 76% is very low. It showed that students' mathematical communication ability of students is still low.

One of way to overcome the low of students' mathematical communication ability is the teacher effort to improve learning model. The learning model that should be applied is a learning model that provides the opportunity for students to construct their own knowledge so that the students easier to understand the concepts that are taught and communicate ideas in oral and written form.

One of learning model that is expected to increase the students' communication ability is to implement Think - Talk - Write learning model. Think - Talk - Write introduced by Huinker and Laughin basically through thinking, speaking and writing. Think-Talk-Write learning model is one of the cooperative learning that builds precisely to think, to reflect, to coordinate ideas and test these ideas before students are asked to write.

From the description above is so important to explain the meaning of the role of education to improve students' mathematic communication ability. In connection with the above problems, researcher interested in conducting research entitled "Increasing of Students Mathematical Communication Ability by Using Think-Talk-Write (TTW) model in Quadrilateral of Grade VII at SMP Negeri 1 Onan Ganjang".

## **1.2. Problem Identifications**

Based on the background above, the problem becomes identifying a problem in this study are:

1. Students having difficulty to completing the new question or different question which are different from the examples described by teachers.

2. The students' mathematical communication ability is still low.
3. Think-Talk-Write (TTW) model does not use in the school yet.
4. Usually students' activity is passive.
5. Students' interest in math is less

### **1.3. Limitation of The Problems**

Based on background and problems identification above, it needs problems limitation to be more focused. Researcher limits the problems only in:

1. The increasing of students' mathematical communication ability by using Think-Talk-Write in quadrilateral of grade VII at SMP Negeri 1 Onan Gajang academic year 2014/2015.
2. In learning process the students' activity tend to be passive.
3. Students' response who not interest in mathematics lesson.

### **1.4. Problem Formulations**

The problems formulation of this research are:

1. Does students' mathematical communication ability increase after learning with Think-Talk-Write cooperative learning in topic quadrilateral?
2. How the students' activity with TTW leaning model?
3. How the students' response with TTW learning model?

### **1.5. Research Objectives**

In accordance with the formulation of the problem above, the expected goal of this study are:

1. To determine the improvement of students' mathematical communication ability after participating in cooperative learning think-talk-write the material quadrilateral.
2. To describe how students' activity with TTW learning model.
3. To describe how students' response with TTW learning model.

### 1.6. Result Benefits

After doing this research study is expected to provide benefits for all people, including:

1. For Teacher : Can improve the quality of mathematics learning achievement through the create mathematical communication and as one of learning model alternative that can be used in mathematics learning.
2. For Students : Able to develop the students' communication ability.
3. For Researcher :
  - a. From problem solution will get new learning model to increase srudents' mathematical communication ability.
  - b. Get experience and knowledge by doing research in applying in mathematics concept.
  - c. As information and reference for researcher to teach next time.

### 1.7. Defenition of Operational

To avoid the differencies in interpretation of the terms contained in the problem formulation in this research, it should be noted the operational definition as follows:

#### 1. Mathematical Communication

Mathematical communication consists of two aspects, namely oral communication (*talking*) and written communication (*writing*).

*Talking*, such as reading, listening, discussing, explaining, and sharing.

While *writing*, such as expressing mathematical ideas in a real-world phenomenon through graph/figure, table, algebraic equation, or with daily language (written words).

#### 2. Mathematical Communication Ability

Mathematical communication ability referred to in this research is the ability of students to write the situation or mathematical idea into picture, illustrate the mathematical idea in mathematical model, explain the procedures of solution.



3. Cooperative learning model Think-Talk-Write is a learning model into action, there are several parts:
  - a. Think, that the activities of students in reading the text and then make little notes in their own words containing teaching materials they read.
  - b. Talk, which allow the exchange of student activities (discussions) with each group about the little notes that they discussed.
  - c. Write, write down the results of which activities students construct their knowledge at the same discussion on the student activity sheet that has been available.
4. Students' activity are the activities performed by students during the learning process and observed by two observers and measured based on the achievement of the ideal time include: (1) listening, pay attention to the teacher's explanation, (2) reading / understanding the contextual problem in SAS, (3) resolve the problem / find a way and the answer to the problem, (4) writing the problem solution, summarize and conclude a procedure / concept, (5) demonstrate the results / presentation, (6) discussing / asking to friends / asking to teacher, (7) making conclusion of a procedure / concept, (8) writing the things that are relevant to the learning process, (9) activities that are not relevant with learning process.
5. Students' response questionnaires are used to determine students' opinions or comments to TTW learning. The questionnaire will be given to students and filled after learning, include: students' opinion on the subject matter component, SAS, students' books, how to learn and how the teachers teach.



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