

# CHAPTER I

## PRELIMINARY

### 1.1. Background

Effective learning important to adapted in class. Teacher's job and responsibilities not only delivering information but guiding students' to improve students' ability. The goal is to improve students' communication ability. Especially, communication in mathematics. However, students' mathematical communication ability is relatively poor. Therefore, students needed effective model to improve mathematical communication ability.

Referred to Minister of National Education Regulation No. 5 of 2022 about standard competences for graduated in childhood level, elementary level and secondary level. Meaning of standard competences for graduated is minimum criteria about attitudes, ability, and knowledge who show by outcomes learning at the end. One of the goals in learning mathematics is students be able to communicate concepts using symbols, tables, and diagrams for solve problem. In line with with National Council of Teachers of Mathematics (NCTM) formulated that learning mathematics means learning to communicate. There are at least two important reasons to improve student's mathematical communication ability. Firstly, mathematics as a language implies that mathematics more than simply a tool for think, detecting patterns, solving problems, and drawing conclusions. It is also a tool for presenting mathematical concepts clearly, accurately, and succinctly. Secondly, learning mathematics as a social activity means using mathematics for interaction and communication between students and teachers (Umar, 2012).

Students' mathematical abilitiy are still relatively poor according to findings of the 2015 Trends in International Mathematics and Science Study (TIMSS). In line with Program for International Student Assessment (PISA) study on 2018 called mathematical ability score differs significantly from the global average. By data for average Indonesian mathematics score is 379, compared to 487 for the global average. Students' limited capacity to study mathematics reveals that their mathematical communication abilities are equally limited.

In line with happenings on the ground, students's mathematical communication abilities are poor. One of the reasons because teacher center dominant in learning process. Students become passive as a consequence of teacher's dominance. Passive students in learning mathematics making them depends on teacher. According to Slameto (2003) the strategy in teaching mathematic have a significant impact to students. When the correct learning strategy are implemented, efficient learning may be attained. It means that right strategy needed by teacher to be professional when teaching in class.

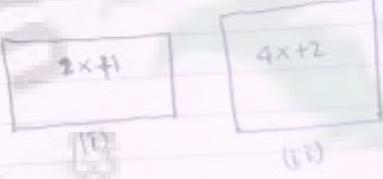
Based on preliminary observations made by researchers during the Real Work Lecture (KKN) at MTs M 09 KHA Dahlan Sapirok, shows that learning in class still focuses on the teacher as a provider of information. It means that conventional learning procedure utilized in schools does not assist the development of students' mathematical communication abilities. According to discussion with mathematics teachers at the school, only a small percentage of students able to deliver mathematical concepts into mathematical symbols. Here are some instances of student questions and responses to measure the capacity mathematical concepts in writing, capacity to comprehend, analyze, and evaluate mathematical concepts and capacity using mathematical terminology and symbols.

**Question:**

1. Rasya membeli 10 kue. Dia membagikan kue tersebut kepada teman-temannya. Setelah dibagikan, ternyata masih ada sisa 4 kue. Buatlah cerita tersebut ke dalam bentuk aljabar.
2. Pak Kardi memiliki sawah yang berbentuk persegi panjang dengan panjang  $(4x + 2)$  cm dan lebar  $(2x + 1)$  cm. Tentukanlah luas sawah Pak Kardi.
3. Sebidang tanah berbentuk persegi panjang dengan panjang 5 m lebih dari lebarnya. Jika lebarnya adalah  $x$  m. Tentukanlah luas tanah tersebut.

Based on the student answer sheets, students wasn't processed the question so the result incorrect are affected. There were 22 students (with total 30 students) who answered this question wrong. This means that the poor student analysis of the problem is 73%, and enough category for the others. Its mean that the student's mathematics communication skills are inadequate. Following the sample of students' answer sheet in Table 1.1.

Table 1.1. Sample of Student Answer Sheet

Answer sheets	Problem Detection
<p>misalkan kue = <math>x</math>            Teman Teman = <math>y</math>            Dit: tentukan bentuk aljabar            jawab :            10 kue dibagikan keteman teman            dan sisa 4            Maka bentuk aljabarnya <math>\frac{10x}{y} = 4</math></p>	<p><b>Case 1.</b> The problem is students' written text wrong. Algebraic structure made by students on the answer sheet is incorrect.</p>
<p>Diketahui : ada persegi panjang            Ukuran : <math>4x+2</math> dan <math>2x+1</math></p>  <p>Ditanya : luas ?            jawab :            Luas = <math>(2x+1) + (4x+2)</math>            Luas = <math>(2x+4x) + (1+2)</math>            Luas = <math>6x+3</math></p>	<p><b>Case 2.</b> The problem is students' drawing concept wrong. Rectangular concept and size chosen by students on answer sheet is incorrect.</p>
<p>misalkan <math>p</math> = panjang  <math>L</math> = lebar            Dik : <math>p = 5 \cdot x \text{ m}</math>  <math>L = x \text{ m}</math>            Dit : Luas ?            Jawab : <math>L = p \times L</math>  <math>L = (5 \cdot x) \text{ m} \cdot x \text{ m}</math>  <math>L = 5x^2 \text{ m}^2</math></p>	<p><b>Case 3.</b> The problem is students' mathematical expression wrong. Students can't analyze the question, it impact on mathematical symbols on student answer sheet incorrect. The conclusion reached is wrong.</p>

Based on this condition, it needed a learning model may help to improve students' mathematical communication ability and it is essential. Problem posing is one of learning model that can help students (Dwi and Herawati, 2010). Problem posing pressing on formulation of questions by student. Students will comprehend how to solve complex question with simple questions first. Problem posing enables to construct their own knowledge through problem formulation, this process makes understand and express problems more easily. Problem posing is also practiced in group, with the main goal is pressing students to be active and creative in their learning to improve their mathematical communication abilities in speaking and writing. According to Brown and Walter (2005) called that students who pose their own questions have a better chance to understand the topic than students who are expected to respond to the teacher's questions.

Additionally Alif Ringga Persada (2014) and Asterius Juano and Pardjono (2016) did previous research. The result research of Alif Ringga Persada's is problem posing model influences students' mathematical communication ability in class VII MTs Negeri Karangampel's (Persada, 2014). In line with Asterius Juano and Pardjono's study, problem posing model has a positive impact on mathematical communication ability in both high and low students in class V SD Negeri Pujokusuman I Yogyakarta (Juano, 2016). This impact happens because students are more enthusiastic, ready to talk their knowledge, and respond to teachers' questions with a range of formal and non formal responses.

Finally, refer to strength of problem posing, the research about the effect of problem posing model in class VIII MTs M 09 KHA Dahlan Sipirok 2021/2022 to improve students' mathematical communication ability had been done.

## **1.2. Identification of Problem**

The following is the problem's identification:

1. The result of students' task are poor.
2. Students are passive in classroom.
3. Classroom dominated by teacher.
4. Students' mathematical communication ability are poor.

5. Conventional model doesn't support student to improve mathematic communication ability.
6. Learning hasn't varied like problem posing model never applied

### 1.3. Scope of Problem

The following is the scope:

1. Research focuses on effect of learning model that are expected to improve students' mathematical communication ability in class VIII MTs M 09 KHA Dahlan Sipirok.
2. Research focuses on problem posing model used to improve mathematical communication ability which is applied in Pythagorean Theorem topic.

### 1.4. Formulation of Problem

The following is the formulation:

1. How the effect of problem posing to improve student's mathematical communication abilities in class VIII MTs M 09 KH Ahmad Dahlan Sipirok?
2. How the way of problem posing to improve student's mathematical communication abilities in class VIII MTs M 09 KH Ahmad Dahlan Sipirok?

### 1.5. Purpose of Research

The following is the purpose:

1. Describing the effect of problem posing to improve student's mathematical communication abilities in class VIII MTs M 09 KHA Dahlan Sipirok.
2. Describing the way of problem posing to improve student's mathematical communication abilities in class VIII MTs M 09 KH Ahmad Dahlan Sipirok.

## 1.6. Benefit of Research

The following is the benefit:

1. For the researchers, the knowledge and experience obtained during this research are used to enhance self-capacity in the direction of professional teaching ideals.
2. For students, giving fresh experiences and motivating kids to participate in mathematics learning in class.
3. For teachers, the findings of this study may be utilized as input by teachers to improve students' mathematical ability by broadening their understanding of problem posing models.
4. For school, it can motivate schools to continue to develop the learning model in order to improve the quality of education services provided in schools.
5. For readers can utilize this information as a starting point for additional investigation.

## 1.7. Operational Definition

To ensure that everyone understands the words used in this study, the operational definitions must be explained as follows:

1. The capacity to communicate mathematical ideas/ideas from context issues to mathematical modeling is known as mathematical communication (symbols, pictures, graphs, diagrams, tables). Written mathematical communication is the type of mathematical communication that is measured in this study.
2. Posing model is a model to instruct students to pose problems based on the information provided. The steps of the problem posing model are as follows: (1) the teacher explains the subject matter in advance, (2) sufficient practice questions are given to students, (3) students pose challenging questions and can solve them in groups, (4) the teacher directs students to present their findings in front of the class at the next meeting, and (5) the teacher assigns homework to students individually.