

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Education is one of the most crucial parts of a country. It can improve the quality of human resources. The education process and the formation of quality human resources have a logical relationship that cannot be separated because through education, a person is educated and developed in a better direction. Education is also one of the goals of the Republic of Indonesia, namely to educate the nation's life as stated in Paragraph IV of the 1945 Constitution.

Education is not about imposing the teacher's will on students, but rather trying to create favorable conditions for learners to facilitate their optimal development. The container of education is the school as a place of learning activities. Learning is at the heart of the educational process in an educational institution. By learning, students are expected to gain in terms of knowledge, skills and attitudes.

One of the lessons learned that students must master is mathematics. Mathematics is a lesson that exists at every level of education from elementary to university level and has a very important role in mastering science and technology. Simbolon, et al (2020) state that mathematics is a general knowledge and is the main foundation for the progress of modern science and technology, the development of thinking, and human analytical skills. Mastery of mathematics by students is a non-negotiable necessity in structuring reasoning in decision making in today's increasingly competitive area.

The importance of mathematics is not directly proportional to what happens in the field, where many students avoid and are allergic to mathematic. Sa'id (2021) argues that students feel bored when learning mathematic because they think mathematic is complicated and difficult. In line with that, the results of interviews conducted by Rohmah, et al (2021) found

that students' lack of interest in paying attention to educators when learning mathematics took place.

There are 5 mathematical abilities that must be mastered by students mentioned by NCTM (National Council of Mathematics Teachers) known as the Mathematics Learning Standards (2000), namely: 1) mathematical problem solving ability; 2) mathematical connection ability; 3) mathematical communication ability; 4) mathematical representation ability; and 5) mathematical reasoning ability. It can be seen that problem solving ability is one of the important abilities that must be mastered by students.

In mathematics, a problem can be viewed as a question if someone cannot directly solve the problem. In accordance with this, Suherman, et al (2003) stated that a problem usually contains a situation that encourages someone to solve it but doesn't know directly what to do to solve it. Problem solving is a high-level ability to solve and find solutions. This agrees with Yusri (2018) that problem solving ability is the competence shown by students to make strategies to solve a problem.

Mathematical problem solving ability is one of the basic abilities that must be mastered by students because with this ability it is expected that students can find mathematical concepts. This agrees with Putra, et al (2018) that if students can find concepts then students can use these concepts to solve problems. Setyaningsih & Rahman (2022) also added that problem solving ability is one of the higher-level abilities and also the focus of mathematics learning in the 21st century.

Mathematical problem solving skills are very important in the learning process as well as in everyday life. Nurfatanah, et al (2018) said that problem solving is the initial stage in developing ideas in building new knowledge. Nurhayati, et al (2016) added that problem solving skills are important to be given so that students are able to solve problems both in mathematics and other sciences.

There are several indicators that someone has mathematical problem solving abilities based on the stage that mention by Polya (1957), namely:

1. Identifying what is known and asked in the problem.
2. Creating a strategy to solve the problem.
3. Applying the strategy to solve the problem.
4. Interpreting the results obtained from the problem.

Based on the results of interviews conducted by researchers with one of the mathematics teachers of SMP Negeri 6 Medan, it is known that there are a large number of students of SMP Negeri 6 who are still unable to solve mathematical problems. The teacher explained that the learning carried out in the classroom is direct instructional model which is teacher-centered learning that made students less active in learning. Student just got the information, write and do the exercise. The teacher also said that students are confused to solve problems if given outside the example even though the form of the problem is the same.

This is supported by the facts that exist when researchers made initial observations by giving diagnostic tests to 26 students in class VIII D SMP to measure mathematical problem solving skills. Here are the questions that researchers give to students:

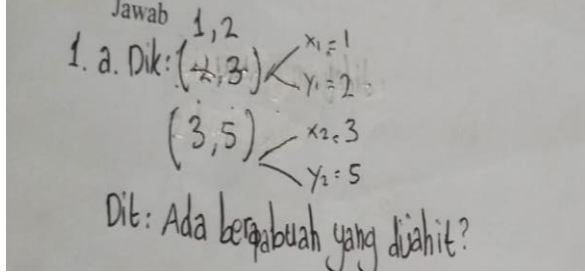
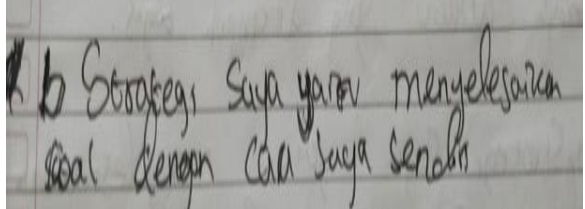
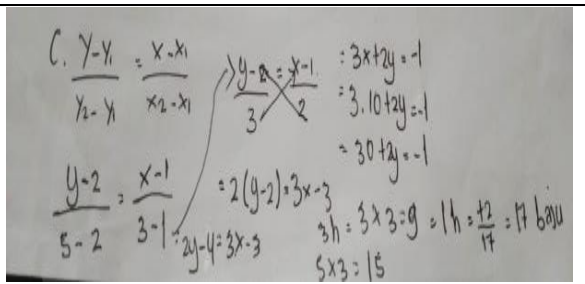
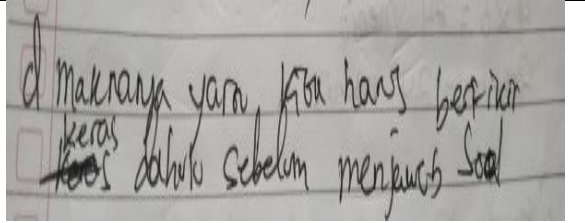
Questions:

Pak Dadang merupakan seorang penjahit baju anak-anak. Dalam sehari, Pak Dadang mampu menjahit 2 buah baju dan dalam 3 hari mampu menjahit 5 buah baju. Jika Pak Dadang mendapatkan pesanan untuk 10 hari, maka ada berapa buah baju yang dapat dijahit Pak Dadang? Dari permasalahan tersebut, coba jawab pertanyaan berikut!

- a. Tuliskan apa yang diketahui dan ditanya dari permasalahan diatas!
- b. Tuliskan strategi Anda dalam menyelesaikan permasalahan tersebut!
- c. Selesaikan permasalahan tersebut menggunakan strategi yang telah dibuat!
- d. Jelaskan makna dari solusi yang Anda dapatkan!

Based on the students' answer sheets, 17 students (65.4%) were classified as very low, 6 students (23.1%) were classified as low, and 3 students (11.5%) were classified as medium (Appendix 10). This shows that problem solving skills are still said to be very lacking or inadequate. Here are some examples of students' answers to each question in Table 1.1.

Table 1.1 Student Answers Sheet

Student Answer Sheet	Analysis of Students' Mathematical Problem Solving Ability
	<p>In problem 1, students were asked to write down the known and asked things, but their answers were incomplete for the things asked.</p>
	<p>In problem 2, students were asked to write down the strategy in solving the problem, but the student's answer was not correct.</p>
	<p>In problem 3, students were asked to write down the steps in solving the student's answer was correct but less precise in the solution process.</p>
	<p>In problem 4, students were asked to write down the meaning of the solution they had obtained, but the answers were not correct.</p>

One of the causes of the problem is the learning model that is carried out during learning. According to Isrok'atun and Rosmala (2019) a learning model is a learning design to help students build ideas and mindsets in order to

achieve learning objectives. The learning design is organized with systematic steps. Based on these situations and conditions, it is very necessary to have a learning model that can improve mathematical problem solving skills considering the importance of these abilities. This situation also aligns with the results of observations made at SMA 1 Binjai, namely that mathematics teachers at the school still use direct instructional model (Nasution, et al, 2023).

One of the learning models that have received attention from educators is the Problem-Based Learning (PBL). The PBL model can improve problem solving ability because it encourages students to actively participate in using their own knowledge (Widyastuti & Airlanda, 2021). Suparman, et al (2021) stated that the implementation of PBL in enhancing students' mathematics problem solving skills can be applied at any education level. Djonomiarjo (2019) emphasizes that the learning process with PBL will be more meaningful because students are active both individually and in groups.

The advantage of PBL to improve mathematical problem solving ability lies in one of the syntaxes, namely guiding individual and group investigations. In this syntax, students can share their thoughts, and argue with each other. This is in accordance with Julita (2018), namely PBL focuses students on being active to share opinions to solve problems.

In addition, Wulandari (2017) and Pauweni & Iskandar (2020) also conducted previous research. The results of Wulandari's research show that learning with a problem-based learning model is higher than with a problem posing learning model. Likewise, the research of Pauweni & Iskandar shows that there is an increase in learning by using the Problem-Based Learning Model.

Based on these problems, it has been conducted this research with the title **“THE EFFECT OF THE PROBLEM-BASED LEARNING MODEL ON STUDENTS' MATHEMATICS PROBLEM SOLVING ABILITIES”**.

1.2 Problem Identification

Based on the background above, the identification of this research problem is as follows:

1. Math learning is considered difficult.
2. Low student math learning outcomes.
3. Students who are less active in learning.
4. Students only memorize formulas and examples given by the teacher.
5. Students' lack of mathematical problem-solving skills.
6. The learning model used by teacher is a direct learning model that only provides information to students.

1.3 Scope of Problems

Based on the background and identification of these problems, to direct this research so that it is more focused and specific, the researchers limited the problem in this study to the Problem-Based Learning Model on the Mathematics Problem-Solving Abilities of Class VIII Students of SMP Negeri 6 Medan on System of Linear Equation of Two Variables.

1.4 Research Questions

Based on the identification and limitation of the problems above, the research questions in this study are:

1. Is the mathematics problem solving abilities of students taught with Problem-Based Learning model better than students taught with Direct Instructional model?
2. How is the way of problem-based learning to improve students' mathematics problem solving abilities?

1.5 Study Objectives

In line with the formulation of the problem, the objectives of this study are:

1. Determine whether the mathematics problem solving ability of students taught with the Problem-Based Learning model is better than students taught with the Direct Instructional model.
2. Describing the way of problem-based learning to improve students' mathematics problem solving ability.

1.6 Research Purposes

The purposes of this research are:

1. For researchers, it is hoped that the knowledge and experience that have gained while conducting this research will be able to increase the capacity to become ideal and professional teachers.
2. For students, it provides new experiences and motivation to always be active in learning mathematics in class.
3. For teachers, the results of this research may be useful as input to teachers in improving students' mathematics problem solving abilities.
4. For schools, motivating schools to develop learning models that will improve the quality of education and services available at schools.
5. For readers, it provides information that can be used as a reference for further additional research.