CHAPTER I
INTRODUCTION

1.1 Background of The Problem

Education is a learning process that includes receiving knowledge, developing abilities, and forming values that shape individual character in facing the realities of life. As written in the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, which states that National education serves to cultivate abilities and mold the character and civilization of a venerable nation, with the aim of nurturing the populace towards a life of fidelity and devotion to God Almighty. Its overarching goal is to foster individuals who possess noble character, robust physical health, comprehensive knowledge, creativity, independence, and the capacity to participate in democratic processes as responsible citizens. This is in line with Kairuddin & Sinaga (2023) who state that education is a basic need for every individual and is the responsibility of the state to form a society that has the understanding and skills to carry out life functions in accordance with its nature, and is able to develop life for the better from time to time.

The development of a strong education system is the key to achieving progress for a country. The progress of a country is intricately linked with educational factors (Arimurti et al., 2019). The importance of education as the main focus is a crucial foundation in building a competitive and scientifically oriented society. This is in line with Herawati & Nurhayati (2019) assertion that mathematics education holds immense importance in enhancing the quality of individuals.

Mathematics, as an integral component of the curriculum, is a key indicator of a country's success because it reflects people's ability to understand, apply, and innovate fundamental mathematical concepts. Afriansyah et al (2019) stated that in an educational environment, mathematics lessons are one of the lessons that must be learned by every individual.

Mathematics is a universal science that holds indispensable value for human existence and serves as the foundation for the advancement of modern science and technology, and also has an important role in various disciplines and advances human thinking (Permendikbud, 2014). Furthermore, mathematics maintains its relevance across all levels of education and is closely intertwined with life (Handayani, 2021). Mathematics, as a core subject at various levels of education, is the main focus in efforts to improve the quality of education in Indonesia. The capability of students to grasp mathematical concepts and demonstrate proficiency in problem solving serves as primary benchmarks for assessing the effectiveness of the educational system.

Developing advanced problem solving ability is essential for students to overcome challenges in mathematics. Khotimah et al. (2022) stated that problems in mathematics pose a challenge for students, and addressing these challenges requires a method and stages of deeper thinking. One of the common challenges encountered by students during the process of learning mathematics is their ability to solve various problems.

One of the objectives of learning mathematics, as outlined by Depdiknas (2006) is to solve mathematical problems, which includes the ability to understand the problem, design a solution model, solve the model, and provide an appropriate solution. This statement aligns with the National Council of Teachers of Mathematics (NCTM, 2000), which underscores the importance of students' problem solving ability within the realm of mathematics learning.

Reys et al. (2009) stated that problem in mathematics is something a person needs to figure out, something where there is no routine procedure that can be directly used to solve it. If a student immediately sees how to get the answer to a problem, then it is not really a problem for that student.

Nurfatanah et al. (2018) stated that mathematical problems are tools used to help students develop their thinking abilities and help them to develop their basic skills in solving problems both mathematics related problems and problems in everyday life. Problem solving ability is a strategic competency exhibited by

students in understanding problems and selecting appropriate strategies to find solutions to these problems (Lubis et al., 2017). Problem solving ability denotes an individual's capacity to recognize, formulate, and solve problems by applying certain methods and approaches.

Within the context of mathematics learning, problem solving ability involves the ability of students to use mathematical concepts that have been learned to overcome the situation or problem at hand. This does not only include calculation skills or the application of formulas, but also the ability to understand the problem's context, formulate relevant mathematical models, and interpret solutions with a nuanced understanding of the context.

Problem solving ability is a critical aspect in everyday life and has a significant role in in fostering students' mathematical literacy. It fosters the development of creativity and critical thinking skills in dealing with mathematical challenges and other life situations. Thus, this ability is not only relevant in academic contexts, but also in applying mathematical concepts in real-world situations and dealing with problems that require creative solutions.

The results of the Programming for International Student Assessment (PISA) highlight the prevalent deficiency in problem solving ability among Indonesian students. The survey, which was announced on December 5, 2023, involved about 690,000 students from 81 countries. The 2022 PISA survey was supposed to be conducted in 2021, but was postponed due to the impact of the Covid-19 pandemic. Indonesia's math score ranked 63rd with a score of 366 (PISA 2022 Results (Volume I), 2023).

Nur & Palobo (2018:141) assert that mathematics questions in the PISA study primarily assess reasoning, problem solving, and argumentation skills. More than half of Indonesian students, 75.7%, have low performance and are only able to solve the simplest problems where the context is still general. Only 0.1% demonstrate the ability to develop and engage in mathematical modeling that demands advanced thinking and problem solving skills.

Hilyani et al (2020) also states that students' problem solving skills are still in the low category. This can be seen from the teaching methods that focus more on delivering mathematical concepts theoretically rather than encouraging students to apply them in a practical context. Moreover, the lack of use of contextual approaches related to everyday life can make it difficult for students to relate mathematical concepts to real-world situations. In addition, low problem-solving skills can be influenced by students' lack of involvement in the learning process. Students who do not feel involved or challenged may lose motivation to develop problem solving skills. Therefore, Silaban & Darhim (2023) said that it is necessary to improve the ability in mathematics, especially in solving problems or in solving given problems.

According to Polya (1973), problem solving entails four steps, namely: (1) understanding the problem, (2) devising a plan, (3) carrying out the plan and (4) looking back. This learning begins with reading and analyzing the problem carefully, identifying relevant information, determining what is asked or sought, then students need to plan a strategy to solve the problem and solve the problem to re-examine the answers obtained, evaluate the correctness of the solution, ensure compliance with the question. Teachers play a pivotal role in guiding students through each stage with questions that support concept understanding.

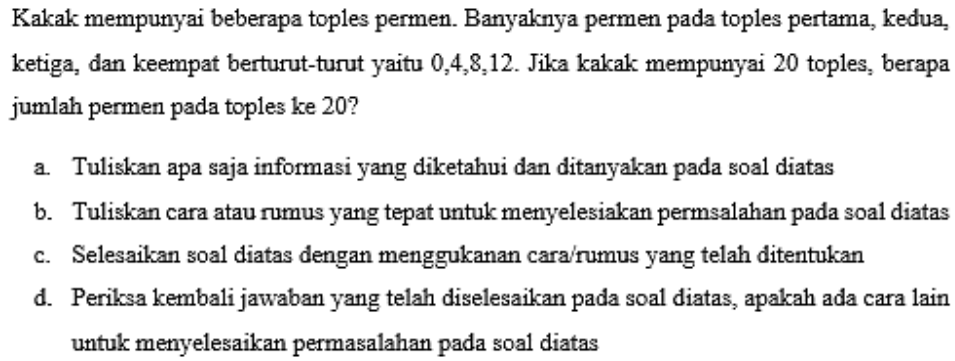
Difficulties in solving mathematical problems are experienced by grade VIII at SMP Negeri 2 Tebing Tinggi. This stems from the pre-research conducted by researcher at SMP Negeri 2 Tebing Tinggi with a series of activities involving observation of teachers and conducting initial tests.

Pre-research conducted at SMP Negeri 2 Tebing Tinggi involved a series of activities, starting from interviews on January 15, 2024 with mathematics teachers, Mrs. Fitria Susanna, S.Pd., Gr. stated that:

> “Kemampuan pemecahan masalah pada siswa masih kurang, literasi mereka kurang. Siswa belum bisa memahami apa yang diminta pada soal. Sebagian siswa masih merasa kesulitan dalam mengidentifikasi masalah mulai dari apa yang ditanya, diketahui, dan seterusnya.”

Classroom observations that were also conducted on January 15, 2024 added to the understanding of the mathematics learning conditions at the school. It was found that students tended to pay less attention to the teacher, some were even involved in playing or talking with their classmates. Learning methods that are still conventional are also a factor that hinders student understanding. The researcher noted students' passive involvement in the learning process and their inability to independently tackle mathematical problems, indicating a lack of understanding of the presented material.

To further explore the level of students' problem solving ability, the researcher conducted an initial test on January 17, 2024 in grade VIII-9 as part of the pre-research. The researcher gave 5 essay questions to students to work on, which had previously been approved by the teacher. In working on the problem, students did not seem to involve several important steps in solving the problem. Many of them could only write directly the sentence from the problem about what was known and asked from the problem and did not know the next step to do. This can be seen from one of the answers of students in grade VIII-9. One of the problems given during the initial test was:



Kakak mempunyai beberapa toples permen. Banyaknya permen pada toples pertama, kedua, ketiga, dan keempat berturut-turut yaitu 0,4,8,12. Jika kakak mempunyai 20 toples, berapa jumlah permen pada toples ke 20?

a. Tuliskan apa saja informasi yang diketahui dan ditanyakan pada soal diatas
b. Tuliskan cara atau rumus yang tepat untuk menyelesiakan permsalahan pada soal diatas
c. Selesaikan soal diatas dengan menggukanan cara/rumus yang telah ditentukan
d. Periksa kembali jawaban yang telah diselesaikan pada soal diatas, apakah ada cara lain untuk menyelesaikan permasalahan pada soal diatas

Figure 1.1 Initial test of problem solving ability

The results of the answers from one of the SMP Negeri 2 Tebing Tinggi students after being given the initial test are:

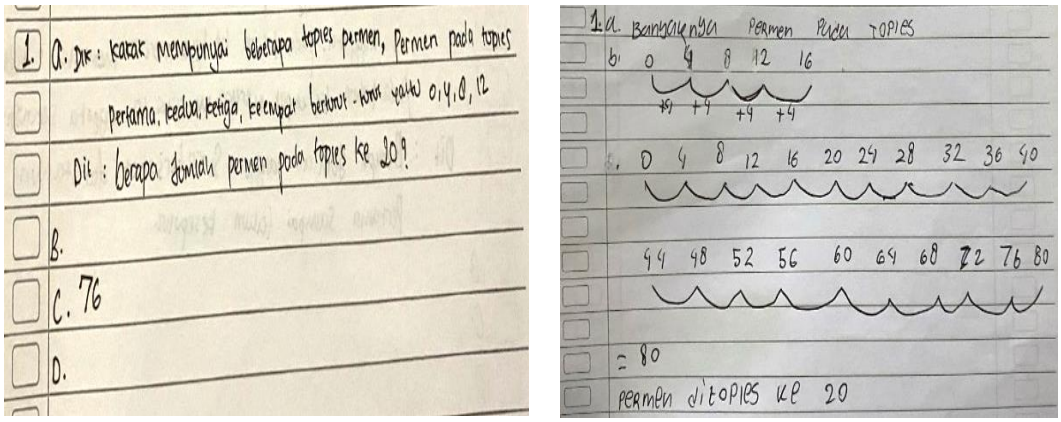


Figure 1.2 Students' initial ability test answers

Based on the results of students' answers in working on these questions, the student scores are obtained in the table below:

Table 1.1 Student's initial ability test score

Interval Percentage	Category	Student	Percentage of Students
$90 \leq Score \leq 100$	Very high	0	0%
$80 \leq Score \leq 89$	High	0	0%
$70 \leq Score \leq 79$	Medium	1	4,8%
$55 \leq Score \leq 64$	Low	0	0%
$0 \leq Score \leq 54$	Very low	20	95,2%

Nurcancana (1992) stated how to determine the level of individual students' problem solving ability that can be seen in the percentage interval above. Table 1.1 indicates that out of the 21 students assessed, the data reveals 20 students (95.2%) fall into the "very low" category, with only one student (4.8%) classified under the "medium" category. This comprehensive overview of the students' performance underscores the prevailing challenge of low mathematical problem solving ability among the students.

Addressing challenges related to students' problem solving ability necessitates the implementation of effective and sustainable solutions. One such strategy aimed at enhancing students' problem-solving abilities is through the realistic approach in

learning mathematics. This approach emphasizes the application of mathematical concepts within the context of everyday life, thereby enabling students to establish connections between mathematical principles and real world situations (Munir & Sholehah, 2020)

The realistic approach presents more contextualized learning, challenging students to understand real problems, formulate solution strategies, and communicate solutions effectively. The application of the realistic mathematics approach is expected to involve students not only in the theoretical understanding of mathematical concepts, but also in their application in various real-life situations. This contextualized mathematics learning is expected to have a positive impact in enhancing students' problem solving ability and fostering a heightened interest in mathematics as a discipline that is relevant to their daily lives. This is in line with Dewi et al (2018), who assert that through mathematics learning with a realistic approach provides opportunities for students to hone problem solving ability and it is expected that students will feel motivated to solve problem questions designed to guide them in facing and solving problems.

Based on several problems that have been described above, the researcher is interested in conducting research with the title "The Application of Realistic Approach to Improve The Mathematical Problem Solving Abilities of Grade VIII at SMP Negeri 2 Tebing Tinggi".

1.2 Problem Identification

Based on the background of the problem above, there are several problem identifications, namely as follows:

1. Teachers do not actively involve students
2. Teaching and learning activities are still teacher-centered
3. Lack of student understanding of problem solving steps
4. Students tend to be less able to use formulas / concepts needed in problem solving
5. Mathematical problem solving ability is still low

6. Teachers rarely provide information about the application of mathematics in everyday life

1.3 Problem Limitation

Based on the problem identification above, which covers a wide range of problems, the researcher limits the problem so that this research is more focused. The problem limitation in this study focuses more on the application of a realistic approach to improve the mathematical problem solving ability of grade VIII at SMP Negeri 2 Tebing Tinggi.

1.4 Problem Formulation

Based on the above background, problem identification, and problem limitations that have been described, the following problem formulation are as follows:

1. How is the improvement of mathematical problem solving ability through a realistic approach in grade VIII at SMP Negeri 2 Tebing Tinggi?
2. How is the classroom mastery of students' mathematical problem solving ability through a realistic approach in grade VIII at SMP Negeri 2 Tebing Tinggi?

1.5 Research Objective

Based on the problem formulation above, the research objectives in this research are as follows:

1. To describe the improvement of students' mathematical problem solving ability after applying the realistic approach in the learning process of grade VIII at SMP Negeri 2 Tebing Tinggi
2. To improve the mathematical problem solving ability achieving the classroom mastery after applying the realistic approach in the learning process of grade VIII at SMP Negeri 2 Tebing Tinggi.

1.6 Research Benefit

The benefits of this research are as follows:

1. For prospective mathematics teachers, as a consideration for determining the right learning approach to improve students' mathematical problem solving ability.
2. For students, through this realistic approach can help students to improve students' mathematical problem solving ability.
3. For schools, as a consideration in making policies for innovating mathematics learning at school.
4. For researcher, it can gain direct experience in applying a realistic approach and as a provision for researcher as prospective mathematics teachers in undergoing teaching practices in real formal institutions.