

CHAPTER I

INTRODUCTION

1.1. Background of the problem

Numerous obstacles await the field of education in this, the twenty-first century. According to Syahputra (2018), modern education in Indonesia has a responsibility to equip future generations to embrace the social benefits of technological advancements in information and communication. One of the main goals of education is to raise the standard of human resources. Raising the bar for educational excellence is an integral part of enhancing human resource management. "National education functions to develop ability and build the character and a dignified civilization of the nation in order to educate the nation's life. It aims to develop the potential of students to become human beings who are faithful and devoted to God Almighty, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens," reads the second article of Chapter II of Law No. 20 of 2003 on the National Education System. This highlights the critical need to enhance educational standards in order to improve future generations of productive citizens.

At this time, Indonesia's educational system is plagued by multiple issues that contribute to the country's dismal educational quality. There are a lot of issues with education today, such as poor management in the field, insufficient funding from the government, societal attitudes that are stuck in the past, outdated teaching materials, and inadequate criteria for evaluating student progress (Fitri, 2021). Low student learning outcomes across a range of topics are indicative of a poorly executed educational system. Out of 81 member nations of the OECD, Indonesia ranks 69th on the international PISA 2022 scale. The reading, math, and scientific proficiency levels of Indonesian schoolchildren were 359th, 366th, and 383rd, respectively, according to the OECD (2022). The data shows that Indonesia's education system still has a long way to go before it meets international standards.

Efforts to improve the quality of education in Indonesia is started from the learning process in schools. A very important component in the learning process at school is the curriculum. The curriculum not only formulates the objectives to be achieved so as to clarify the direction of education, but also provides an understanding of the learning experience that each learner must have (Sanjaya, 2008). According to Law No. 20 of 2003 on the National Education System, the curriculum is a set of plans and arrangements regarding the objectives, content, and learning materials as well as the methods used as guidelines for organizing learning activities to achieve certain educational goals. So it can be seen that there are two dimensions of the curriculum, namely 1) plans and arrangements regarding the objectives, content, and learning materials, and 2) the methods used for learning activities (Hermawan et al., 2020).

The curriculum in Indonesia has been changed or revised at least 10 times (Ananda & Hudaidah, 2021), such as the 2013 Curriculum is an improvement of the previous curriculum, namely KTSP 2006 and emphasizes character education and mastery of intact competencies from the aspects of attitude, knowledge, and ability (Fadlillah, 2014: 24). The curriculum 2013 is characterized by a scientific approach embracing the constructivist paradigm. In constructivism, learning is represented as a constructive process in which learners build internal illustrations of knowledge, interpretations of personal experiences. Constructivism teaching is based on learning that occurs through students' active involvement in the construction of meaning and knowledge (Sugrah, 2019). So that the teacher is not in charge of transferring knowledge to students but as an accompaniment and facilitator of the learning process. The constructivism approach is used in learning physics which is a branch of science, because knowledge is constructed from within the individual.

Physics is part of natural science which is the result of human activities in the form of organized knowledge, ideas and concepts about the surrounding nature obtained from experience through a series of scientific processes. Physics is not only a collection of knowledge in the form of facts, concepts, or principles, but also a learning process that provides direct experience to students to understand the surrounding nature scientifically. Therefore, physics is a very

important science to learn because physics is related to the phenomena of the universe in everyday life.

The learning process of physics in the classroom is considered to have problems, because physics learning is presented in a less interesting theory that gives the impression that physics is difficult to master and understand. Physics is not difficult as imagined if the physics learning pattern is done in a good and correct way (Mayanti, 2022). So, the selection of physics learning models must be motivated by a contextual factor and based on considerations to place students as learning subjects who not only receive (passive), but can also involve students as natural people, have experiences, desires, and thoughts that can be utilized to learn (Zahara, 2018). In addition, the expected learning process is that students can be invited to discover and build their own knowledge so that students can develop life ability and be ready to solve problems faced in their lives. Therefore, problem solving ability are needed by students because basically students are required to try themselves in finding solutions to problems and the knowledge that accompanies them.

Based on the observations conducted by researchers at MAN 2 Deli Serdang, it was found that students face various challenges in the physics learning process. These challenges include psychological factors such as students' interests, talents, intelligence, and readiness to learn, as well as insufficient problem-solving skills in physics. Some students mentioned difficulties in understanding physics materials and being unable to independently solve physics problems or knowing what to do. It can be concluded that students' curiosity and comprehension abilities regarding physics problems are lacking. This aligns with Veronica et al.'s statement (2018) that students with weak problem-solving skills will be affected in their learning outcomes. Problem-solving skills are essential for students. Additionally, students haven't experienced a learning environment with various innovative methods and noted a lack of physics practical sessions. This indicates that the learning process has yet to effectively train problem-solving abilities, both authentically and academically, leading to students facing challenges in solving physics problems.

Based on the problem mentioned above, efforts must be made in learning that is problem-oriented, creating student engagement in the learning process to grow and develop problem-solving ability. According to Sumartini (2016), improving students' problem-solving abilities requires support from appropriate learning models and methods. One effective learning model for enhancing problem-solving abilities is Problem-Based Learning (PBL). PBL involves students in solving real-world problems through scientific methods, allowing them to acquire knowledge related to the problem and develop problem-solving abilities (Kamdi, 2007: 76). Jemarus W (2022) states that students' problem-solving abilities are better when applying the Problem-Based Learning model compared to conventional models. Nazifah et al., (2022) conclude that the average physics learning outcomes of students using Problem-Based Learning are better than those not using it.

Besides using models involving students in problems, there is need strategy for supporting the learning process for problem-solving ability. The low problem-solving abilities of learners result from factors such as their lack of attention to problem-solving processes and metacognitive skills (Kumalasari, 2021). Success in problem-solving depends on awareness of what is known and how to apply it. Thus, a balance between doing and thinking is crucial in the physics learning process. The thinking process in problem-solving is essential, requiring educators' attention to help students develop problem-solving skills. Thinking about one's thoughts is closely related to students' awareness of their ability to develop various approaches in problem-solving. A student's success is determined by their knowledge, awareness, and control over the knowledge they possess (Yulianawati, 2016). Therefore, a strategy that can assist in the Problem-Based Learning (PBL) process is metacognitive strategy.

Metacognitive learning emphasizes students' awareness of their thinking processes. According to Schunk, Zimmerman, and Campillo, metacognition is a crucial factor contributing to physics learning. Involving metacognition in problem-solving allows the development of a strong and comprehensive understanding of the problem accompanied by logical reasoning. According to Pambudi (2017) Metacognition establishes a connection between what students

know and how they apply it. Problem-solving activities are closely related to high-level thinking skills, so a metacognitive approach can sharpen an individual's problem-solving abilities. Himawan and Winarti (2018) conclude that there is an improvement in physics problem-solving ability and learning activities in the experimental class using metacognitive strategies compared to the control class using conventional strategies.

Research on Problem-Based Learning (PBL) and metacognitive strategies has been widely conducted, proving their effectiveness in improving problem-solving ability. However, research specifically combining PBL with metacognitive strategies is still limited. Based on the explanation above, the researcher will conduct a study with the title "**The Effect of Metacognitive Strategy in Problem Based Learning Model on Physics Problem Solving Ability of Students at MAN 2 Deli Serdang.**"

1.2. Problem Identification

Against the background of the above issues, the investigation identified several problems:

1. Most students have difficulty in learning physics material.
2. The problem solving ability and learning outcomes of students still need improvement.
3. Innovative learning models and strategies are needed to improve students' physics problem solving ability.
4. Practical experiment has never been conducted in physics learning.

1.3. Problem Scope

The scope of the problem discussed in this research is Metacognitive Strategy in Problem Based Learning Model on Physics Problem Solving Ability of Students.

1.4. Problem Formulation

As guided by the background of the title above, the following problems can be formulated:

1. Is there an effect of metacognitive strategy in Problem Based Learning model on physics problem solving ability of students on elasticity and Hooke's law at MAN 2 Deli Serdang?
2. Is there an increase in physics learning activities in the classroom after implementing a metacognitive strategy in Problem Based Learning model on elasticity and Hooke's law?

1.5. Problem Limitations

Based on the background and identification of problems, researchers limit the problems that will be examined in this study. The problem restrictions in this study are:

1. Looking at the problem solving ability of high school students on elasticity and Hooke's law.
2. Implementing metacognitive strategy in Problem Based Learning model.
3. Seeing the increase in student learning activities after applying the metacognitive strategy in Problem Based Learning model.
4. The subjects of this study were students of class XI MIA at MAN 2 Deli Serdang.

1.6. Research Objectives

Based on the formulation of the existing problems, the research objectives to be achieved are:

1. Knowing the effect of metacognitive strategy in Problem Based Learning model on physics problem solving ability on elasticity and hooke's law at MAN 2 Deli Serdang.
2. Knowing the improvement of physics learning activities in the classroom after applying a metacognitive strategy in Problem-Based Learning model on the material of elasticity and Hooke's law.

1.7. Research Benefits

In carrying out research, of course, it will bring a use, both written and unwritten, and the results of this research are expected to be useful for:

1. For Schools

This research is expected to be able to provide solutions and contributions in the scope of developing contextual metacognitive strategy in Problem Based Learning models that can increase learning independence in physics materials at school.

2. For Educators

This research can be used as insight, reference, and creativity of educators in terms of evaluating the ability of students, especially for students' problem solving ability.

3. For Students

This research can add to students' learning experience by using the metacognitive strategy in Problem Based Learning to improving problem solving ability in physics subjects, especially elasticity and Hooke's law at MAN 2 Deli Serdang.

4. For Future Researchers

The results of this study can be used to add insight into research knowledge regarding the metacognitive strategy in Problem Based Learning model to improving students problem solving ability in physics subjects, especially elasticity and Hooke's law at MAN 2 Deli Serdang.