

CHAPTER I

INTRODUCTION

1.1 Background of the problem

Education is a place that has been given to students for gain knowledge, learning experiences, and equal opportunities for everyone to gain knowledge and change lives for the better. Education is expected to form creative, innovative human resources capable of solving problems and producing works that are beneficial to society (Al-Tabany, 2015).

The demands and difficulties of the twenty-first century have an effect on adjustments to the prevalent learning patterns in Indonesian education. According to Lepiyanto (2014), education must be able to produce competent human resources that are competitive in the modern world. According to Yance, Ramli, and Mufit (2013), "education is one aspect of development that must be developed in order to be hoped that the nation will be able to keep up with developments in the increasingly developing fields of science and technology." The future renewal of science education is anticipated to be able to keep Indonesians up to date with the most recent advances in science and technology.

To succeed in this, the quality of education has always been a major concern in order to advance a quality generation. However, at present, the main problem faced by the world of education is related to the quality of education, especially the quality of knowledge which is still very low. One of the factors causing the low quality of science is the weak facilities and infrastructure in learning in Indonesia, the lack of these facilities and infrastructure (Fitriyani, 2018) causing low student understanding of direct learning inadequate learning experiences (Nawawi, 2017).

Learning physics is learning science, so it must provide learning in the form of products, processes, and scientific attitudes. It also needs to foster curiosity through discoveries based on firsthand experience through scientific work to use facts, and it needs to build concepts, principles, and theories as a foundation for analysis, critical, and creative thinking. Learning physics can improve students' ability to think critically and solve difficulties in daily life (Fitriyani, 2018). The

fact is that we still encounter many students' perceptions that physics is a difficult subject to understand because of the complexity of understanding concepts, lots of formulas, and calculations. Science in the process emphasizes providing direct work experience, therefore students need to be assisted to understand a concept and develop science process skills.

Science process skills are skills students use to investigate the world around them and construct science concepts. In other words, science process skills provide opportunities for students to actually act as scientists in carrying out real and direct learning activities (Fitriyani, 2018). Science process skills emphasize giving direct experience to students to be active in learning so that there is interaction between the development of science process skills with facts, concepts and knowledge that develops (Kunandar, 2013).

Practicing science process skills is a very important process because if students can master process skills, then these students have mastered the skills needed in high-level learning, namely conducting research and problem solving (Ibrahim, 2010). To acquire science process skills can be obtained through observing, classifying, applying concepts, predicting, interpreting, designing experiments, using tools and materials, asking questions, communicating, and hypotheses (Kunandar, 2013).

The process of learning science, especially learning physics, so far there are often problems. The problems that often occur in the field are that there are still many teachers who use conventional learning models and the lack of student interest in learning physics. The conventional model is a learning model where the teacher is the center of learning so that the role of students in learning only accepts and there is no interaction and an active role so that learning objectives are not achieved (Fitriyani, 2018).

The problem found by the physics learning process where the teacher tends to explain or tell everything to students so that students become not used to learning more actively, focusing on understanding the material in the process of exposure to practicum material is rarely done resulting in a lack of student interest in learning

so that learning becomes less interesting, the problems faced world of education regarding the quality of education, especially on the quality of KPS which is still very low.

Based on the results of initial observations with students at SMA Negeri 8 Medan it was found that in the physics learning process as much as 66.7% stated a lack of student attention and student interest in learning so that not all students were active in the learning process. This result is in accordance with the results of the physics teacher interview which stated that the teacher emphasized learning more on understanding concepts, where the teacher gave the material to be studied and then discussed it and then asked questions. In addition, practicum activities that are rarely carried out cause students' science process skills to not develop. As a result, students have difficulty applying scientific concepts in everyday life.

From observations, results of questionnaires and interviews with students and physics teachers at SMA Negeri 8 Medan, it is necessary to make efforts to improve the learning process in order to improve KPS in learning physics. According to Permendikbud Number 22 of 2016, to encourage students' ability to produce contextual works, both individually and in groups, it is strongly recommended that teachers as educators use innovative learning models and produce works, one of which is the Project Based Learning learning model. This is in accordance with the objectives of the 2013 Curriculum and Freedom of Learning which is used so that students are more active and there is interaction between students and teachers in the student learning process (Student Centered Learning) (Rosmiati, Musdar, & Nurlina, 2022).

Innovation means changing the system from a less good to a better system. While learning is the stages of learning activities that are designed in such a way as to achieve learning objectives. So learning innovation is a learning activity for students that is designed, developed, and managed creatively and applies various approaches to creating a conducive atmosphere and learning process for students (Intan Indira, 2021). One of the innovative learning models that can overcome the above problems is the project-based learning model.

The project-based learning model is a learning model that is created innovatively where students can construct their own way of learning (student-centered) and makes the teacher a motivator and facilitator, where students are given the opportunity to work independently to construct their learning. Project-based learning has a close relationship with students' science process skills, because by using a project-based learning model students can increase their creativity, activeness, thinking skills so that students' science process skills can develop. (Al-Tabany, 2015). Thus it can be said that the relationship between improving students' skills is by using a project based learning model where students are not passive in learning, students investigate directly problems with their different learning styles to explore material and carry out collaborative experiments. This is in accordance with the results of observations where they said they were more interested in group learning.

The focus of the project-based learning model (PjBL) is on the main concepts and principles that involve students in problem-solving activities and other meaningful assignments, provides opportunities for students to work independently constructing their own learning, and ultimately produces student-made products. . In the PjBL approach, students not only comprehend the subject matter, but also get knowledge on how to contribute to society. PjBL teaches a variety of abilities, such as effective communication and presentation, planning and time management, research and investigation, self-evaluation and reflection, group involvement and leadership, and critical thinking (Nurdyansyah & Fahyuni, 2016).

Study on the effects of project-based learning models on students' science process skills was conducted by Siti Kasdum (2019), which is pertinent study on project-based learning models in science process skills in Static Fluid Material at SMA 1 Kluet Tengah. The results of this study indicate that there is significant effect of the project-based learning model on students' science process skills in static fluid material at SMA Negeri 1 Kluet Tengah in the experimental class compared to the control class. Subsequent research did with (Rosmiati, Musdar, & Nurlina, 2022) with research on the Application of Project-Based Learning Models Assisted by PhET Simulations to Improve Higher Order Thinking Skills (HOTS)

in Physics found at 57.64. The application of a PhET simulation-assisted project-based learning model can increase students' HOTS.

The differences between the research to be carried out and previous research are the time and place for data collection, the number of samples used, the method of implementing the project-based learning model used in the research, the media and tools used. Based on the background of the problems described above, the authors are interested in conducting research entitled: "The Effect of Project-Based Learning Models on the Science Process Skills of Class XI Optical Instruments at SMA Negeri 8 Medan"

1.2 Identification of problems

Based on the background of the problems above, the researcher can identify the problems of learning physics at SMA Negeri 8 Medan as follows:

1. Students' perception that physics is a difficult subject to understand.
2. The learning models and methods applied by teachers are still conventional and teacher-centered.
3. Lack of students' attention and interest in learning becomes an obstacle for teachers in providing assessments and providing material to students.
4. Students find group study such as peer discussions and practical work more fun and help them learn more easily.

1.3 The scope of research

To avoid problems in the research that will be carried out, it is necessary to make a scope of research, namely this research was conducted in class XI IPA high school in the city of Medan.

1.4 Limitation of Research Problems

Based on the identification of the problems described above, the limitations of the problems in this study are as follows:

1. The learning model in this study is a project-based learning model.

2. The results of the research are in the form of a simple optical instrument project.
3. The subjects studied were class XI students in the even semester of TP 2023/2024 at SMA Negeri 8 Medan.
4. The material in this study is only the sub-chapter of Eye Optical Tool and Glasses.
5. This study only assessed the science process skills of class XI students of SMA Negeri 8 Medan.

1.5 Formulation of Research Problems

Based on the background of the problems above to go to the discussion, the researchers formulated the problems in this study as follows:

1. Is there any effect of using the Project Based Learning model on the science process skills of class XI students in the material for Optical Instruments at SMA Negeri 8 Medan?
2. How are the students' science process skills with the application of the Project Based Learning model on Optical Instrument material for class XI SMA Negeri 8 Medan?
3. How are student activities using the application of the Project Based Learning model to students' science process skills in Optical Instruments material for class XI SMA Negeri 8 Medan?

1.6 Research purposes

Based on the formulation of the problem above, the objectives of this study are:

1. To find out whether there is an effect of applying the Project Based Learning model to students' science process skills in optical instrument material for class XI SMA Negeri 8 Medan
2. To find out students' science process skills by applying the Project Based Learning model to students on optical instrument material for class XI SMA Negeri 8 Medan.

3. To find out student activities using the Project Based Learning model on students' science process skills in optical instrument material for class XI SMA Negeri 8 Medan.

1.7 Benefits of research

- a) The benefits of research theoretically

Theoretically, the results of this study are expected to be input into the development of learning models and media as well as their further application, especially in the concept of Optical Tools the eye and glasses sub-chapter, to find out how strategies are applied in physics learning, using the PjBL learning model help students. In addition, it can also affect KPS related to curiosity about problems so that ideas/opinions emerge in solving these problems.

- b) Practical benefits of research

Practically the benefits of this research are:

1. The benefit for students is to see the effect of science process skills (KPS) on students with the project-based learning model (PjBL).
2. The benefits for teachers are as a new reference in implementing the project-based learning model (PjBL).
3. Benefits for schools, as information and input as well as studies in the development of science learning, especially Physics.