

CHAPTER I

INTRODUCTION

1.1 Background of the Problem

Education is an important role in the development of a country, especially Indonesia, because the progress of a nation is determined by its level of education, the more advanced education and the more advanced the country (Hotimah & Rohman, 2022). The quality of Education is a very big challenge in Indonesia. Because of the many shortcomings in the quality of education, Indonesia continues to improve its educational sector. The shortcomings of the education system in Indonesia such as the uneven distribution of educational facilities, uneven educators and no less important is the curriculum that is still theoretical to be the cause of lagging education in Indonesia, especially in physics learning. Physics is a science that is experimental, then in implementation requires practicum so that students are able to prove the principles and concepts of physics through practical experiments (Hamid et al., 2022) .

Physical science is closely related practical activities in the laboratory (Anita M & Irma Sakti, 2022) Practical activities will run smoothly if school facilitates all needs in the laboratory and provides a guidebook in form of practicum module. Materials and practicum modules can be implemented in form of teaching materials in the classroom and also in practicum activities in the laboratory. However, in practice there are still many schools have not implemented practicum in physics, including SMA Negeri 2 Medan, due to limited resources such as lack of physics practicum equipment, limited teacher expertise in carrying out practicum in the laboratory, and the absence of physics practicum modules as a guide in carrying out practicum in the laboratory. The implementation of a good practicum is inseparable from the availability of teaching materials, in the form of practicum modules that are used as a guide for students in doing practicum activities. Modules are one of the learning tools in the form of teaching materials that are systematically designed to achieve the expected competencies and become a guide for students and teachers in carrying out practicum. Making a good practicum module requires a learning

base and also a combination of technological and communication developments to direct students to be able to work according to scientific steps independently.

Meanwhile, based on interviews and observations conducted by researchers, SMA Negeri 2 Medan does not have a module that is systematically designed using a scientific approach. The existing modules at SMA Negeri 2 Medan are still conventional and the existing modules do not keep up with technological developments. The above problems are also supported by the results of interviews and distributing questionnaires to students of class XI Mipa at SMA Negeri 2 Medan obtained the answer that, practicum is rarely carried out due to the limitations of practicum tools and materials as well as guidelines in carrying out practicum. Physics learning theory is less supported by justification through practicum activities so that students' understanding and skills are still low in carrying out practicum, even though practicum activities are very important so that abstract physics material can be answered through practicum activities.

Based on interviews and observations made two physics Teachers at SMA Negeri 2 Medan, the answer was that when carrying out practicum the teacher had difficulty because students' thinking skills had decreased due to the impact of Covid-19 which spread in Indonesia. This causes online learning so that physics learning and practicum are not carried out effectively and optimally. In order for learning to run effectively and optimally in the classroom, teachers choose the right learning model in accordance with physics learning, namely by using a scientific approach. In carrying out practicum activities in the laboratory, the teacher has a practicum guidebook but not in the form of a book but is personal and compiled by himself, this is a reinforcement for researchers to develop a physics practicum module as a guide in carrying out practicum in the laboratory. One of the solutions from researchers is to look for and find ways to be able to make students' practicum skills increase through the creation of teaching materials. One of the teaching materials that can be developed is modules. In order for practicum activities to take place and run conductively, it is necessary to develop practicum modules that are developed according to the needs of SMA Negeri 2 Medan with the K-13 curriculum applied in class XI. The practicum module to be developed is in the form of a printed module, because not all students bring smartphone to school.

Based on the above solutions, researchers are interested in developing a product Practicum Modules with a scientific approach. One of the learning bases that need to be applied in practicum is the scientific approach. The scientific approach is one of the learning models that in the process contains scientific principles, starting from data collection by observation, questioning, conducting experiments, processing information or data, to communicating (Kamil et al., 2022).

Module development with a scientific approach is a must because the scientific approach is important in encouraging learning to be more active and student-oriented and emphasizes students' ability in problem solving. The development of practicum modules by prioritizing the scientific approach can create a more active and interactive learning environment and support students in developing scientific skills and critical thinking (HM. Musfiqon & Nurdyansayah, 2015). Innovation of practicum modules using the K13 curriculum emphasizes 21st century skills by integrating technology and understanding the basic competencies and indicators that must be achieved by students through practicum modules and using local resources in the school environment in order to give students real experience and increase the link between classroom learning, learning in the laboratory, and the real world (Agus Pahrudin, 2019).

The above solution is also supported by research conducted by (Okyanida, 2020) stated that the physics learning module with a scientific approach to momentum and impulse class X SMA got an average score of 80.04% so that it can be concluded that the scientific-based physics learning module on momentum and impulse material is suitable for use as a learning support device at school. A similar solution was also found in research (Mulyono, 2023) that the development of a scientific-based module assisted by QR Code on the material of the nature of sound has moderate potential effectiveness based on results of pretest and posttest so that its suitable for use. This is also in line with research conducted by (Rahman et al., 2019) that the development of scientific-based modules is effective in learning. It was proven by the results of the effectiveness of the development of science modules based on scientific approaches analyzed by inferential statistical analysis techniques found significant differences in student learning outcomes before and after using science modules based on scientific approaches.

Based on existing problems, researchers are interested in developing a product with the title **“Development of Physics Practicum Modules with scientific approach on Dynamic Fluid material in SMA Negeri 2 Medan”**, with this physics practicum guide module can help teachers and students in carrying out practicum activities.

1.2 Problem Identification

Based on the background of the problems that have been described by the author, several problems have been identified, such as

- 1 Physics practicum activities at SMA Negeri 2 Medan are not running well, especially on dynamic fluid material.
- 2 Physics practicum activities at SMA Negeri 2 Medan, especially on dynamic fluid material, experience constraints due to limited resources in the laboratory.
- 3 There is no physics practicum module with scientific approach, especially on dynamic fluid material at SMA Negeri 2 Medan.

1.3 Scope

Based on the results of problem identification, the scope of this research is more focused on the development of physics practicum modules with scientific approach on dynamic fluid material at SMA Negeri 2 Medan. In order to determine the validity of the practicum module developed through testing one two physics lecturer expert, and a teacher in physics subjects. To see the effectiveness and practicality of the physics practicum module developed, a practicum test will be carried out to class XI Mipa at SMA Negeri 2 Medan.

1.4 Problem limitation

The problem limitations in this research are:

- 1 The practicum module developed uses scientific approach.
- 2 The development of Physics Practicum Module only focuses on one subject matter, namely dynamic fluid material.
- 3 The research subject XI Mipa class students at SMA Negeri 2 Medan.
- 4 The development of this research uses the ADDIE development model
- 5 Module developed in the form of printed module.

1.5 Formulation of The Problem

Based on the background of the problem, the formulation of the problem in this research, are:

- 1 How is the validity level of physics practicum module with scientific approach on fluid dynamic material developed?
- 2 How is the level of practicality of physics practicum module with a scientific approach on dynamic fluid materials developed?
- 3 How is the level of effectiveness of physics practicum module with a scientific approach on dynamic fluid materials developed?

1.6 Research Objectives

The objectives of this research are:

1. Analyzing the validity level of physics practicum module with scientific approach on the developed dynamic fluid material
2. Analyzing the practicality level of physics practicum module with scientific approach on the developed dynamic fluid material
3. Analyzing the effectiveness level of physics practicum module with scientific approach on the developed dynamic fluid material

1.7 Benefits of Research

The benefits of this research are:

1. Theoretically

The results of this research are expected to be a source of reference in conducting practicum on dynamic fluid material in class XI Mipa at SMA Negeri 2 Medan.

2. Practically

a. Research benefits for students

The developed practicum module can be useful for students as a guide in doing practicum independently in class XI Mipa at SMA Negeri 2 Medan.

b. Research benefits for schools

The developed practicum module can be useful for schools, which is as teaching material in conducting physics practicum on dynamic fluid material in class XI Mipa at SMA Negeri 2 Medan.

c. Research benefits for teachers

The developed practicum module can be useful for teachers, which is to help and facilitate teachers in carrying out practicum activities on dynamic fluid material in class XI Mipa at SMA Negeri 2 Medan.

d. Research benefits for researchers

Increase knowledge about the procedures for conducting research on the development of physics practicum modules using the ADDIE model.

