

# CHAPTER I

## INTRODUCTION

### 1.1. Background of the Problem

The purpose of national education is to develop the ability and form the character and civilization of a dignified nation in educating the life of the nation for the development of the potential of learners to become human beings who believe and fear God Almighty, be noble, healthy, knowledgeable, capable, creative, independent, democratic and responsible (UU SISDIKNAS: 2003). The learning process that applies to the education system in Indonesia refers to the 2013 curriculum with a mindset that states that learning in the 2013 curriculum was developed with the following mindset improvements: (1) student-centered learning patterns, (2) interactive learning patterns (teacher-learners-community-environment, other media sources), (3) network learning patterns (learners can learn from anyone and from anywhere), (4) Active-seeking learning patterns. (5) group learning patterns, (6) multimedia tool-based learning patterns, (7) mass learning patterns, (8) multi-disciplines, and (9) critical learning patterns.

To fulfill this mindset, innovative, interactive physics subject matters are needed and learner-centered learning patterns are needed. Where subject matters are all forms of materials used to help teachers carry out teaching and learning activities to convey messages and information to the recipient. However, based on the online interviews with one of the physics teachers at SMA Negeri 10 Medan, namely Mrs. Newdesnetty Butarbutar's, it shows that subject matter in schools to support students' learning activities independently are still lacking, and the subject matter used are still conventional, namely package books provided by the government whose contents are still not designed for learners to find and apply their own ideas so that the learning process is still conventional. Implemented by teachers in general is still a teacher center and students are less given the opportunity to develop thinking skills (student center). In physics learning activities, teachers very rarely use technology such as: video, simulation, animation, and images, if used it is still in a separate state and educators also still

have never tried to create or develop interactive subject matter in the form of e-modules as a reference. Thus, the subject matter used by educators are still limited and existing infrastructure facilities without giving rise to new, more innovative learning approaches.

In developing interesting and interactive subject matter, it is necessary to use the results of technological developments in the world of education because education is always dynamic where there are always changes at every moment so that it requires an improvement that is continuous or moving to keep up with the era of technological development. As stated by Arsyad that the development of science and technology increasingly encourages renewal efforts in the utilization of technological results in the learning process (Prof. Dr. Azhar Arsyad 2007). In line with the statement, research conducted (Ramirez-Velarde, Garcia-Rueda, and Alexandrov 2007) "in this day and age classroom learning is starting to be filled with all sorts of technologies that can be used to learn". These resources support learning activities and assist students in acquiring knowledge. One form of utilization of technological developments is to make printed subject matter into electronics, one of which is subject matter in the form of e-modules.

Based on observations of class XI students at SMA Negeri 10 Medan, students are now very interested in digital technology. They are very enthusiastic about learning using laptops and cellphones so that students are more focused on learning through cellphones rather than reading textbooks that are loaned by the school. Students also read more learning materials through the internet on their cellphones and there are adequate internet facilities in schools where wifi is available and also students have a stable personal internet quota to support the implementation of learning activities. Therefore, a teacher must be able to read the situation and prepare learning resources and learning media that match what is liked by students so that students' attention can focus on learning. Because there are no learning resources in digital form, to support learning and the lack of available learning resources and media, the authors are interested in making electronic teaching materials. Moreover, the teaching materials used by teachers in schools are printed books. Some students find it difficult to carry printed books, especially if one day is more than two lessons. In contrast to electronic teaching

materials that can be opened with a cellphone, objects that are made are light and easy to carry everywhere. Electronic teaching materials are teaching materials whose content is contained in electronic form, which can be in the form of audio, audio-visual, or in the form of interactive multimedia. Referring to the previous understanding of teaching materials, electronic teaching materials are a set of materials that are arranged in a sequential and systematic manner and display the needs of the competencies that will be mastered by students in the learning process that is mixed in interactive multimedia. Some of the teaching materials that are included in electronic teaching materials include books such as e-books, electronic magazines or referred to as e-magazines, interactive multimedia CD/DVDs, interactive flash or slide models, e-learning, and others. which is used to make electronic teaching materials is Flip PDF Corporate. Making electronic teaching materials using Flip PDF Corporate is because this application is not only focused on writing but can include motion animation, video, and audio which can make it an interesting interactive learning media so that learning is not monotonous. Flip PDF Corporate is a software that can be used to open the pages of a module like a book. By using Flip PDF Corporate students will be more interested in learning because the appearance of Flip PDF Corporate is attractive. This is in accordance with the research of Hanifa Ainun Nisa, et al, who concluded that the results of the learning attractiveness test using Flip PDF Professional-based e-modules are in the attractive and effective category when applied to students (Nisa, et al, 2020). Another study was also conducted by Andi Dian Angriani, et al. The results of the study concluded that the development of digital book learning media using the Flip PDF application could increase the understanding of the theory and interests of students (Angriani, et al 2020). Based on the results of literature research by E. Watin, the use of e-modules with Flip PDF Corporate is effective in training science skills and has the opportunity to be developed to become good learning media (Watin & Kustijono, 2017).

Based on the description above, it is necessary to do research to develop a media that can be used in the learning process that is valid, practical and effective and can increase students' interest in learning. One way to generate interest in student learning in the learning process is to replace subject matter that can attract

interest students to more easily understand a material. Subject matter is one of the important factors in the effectiveness of learning. Lack of teaching materials, of course, can affect the quality of learning. One of the subject matter that can be integrated into interactive subject matter in accordance with the development of science and technology is book subject matter in the form of e-modules. One example of software that can create subject matter is Flip PDF Corporate which is software that is easy to apply or easy to understand and apply because it does not require an understanding of sophisticated programming languages. Therefore, the use of Flip PDF Corporate software is very informative in making teaching materials. The advantages of this teaching material are visual-based and attractive theme arrangement, so that it will make students not feel bored.

In addition to increasing student interest in learning, subject matter must also be able to help teachers create more active Physics learning. The Ministry of Education and Culture Number 65 of 2013 concerning Process Standards recommends an appropriate learning model to be implemented based on the 2013 Curriculum, one of which is the problem-based learning model (Permendikbud, 2013). Problem-based learning is a learning method that makes students the center of learning through unstructured problem solving (Torp & Sage, 1997). The development of problem-based learning subject matter is very necessary because this learning model is seen as in line with using the principles of a scientific approach (Mutia, Budi, and Serevina, 2014). In other words, the problem-based learning model leads students to recognize problems, formulate problems, find solutions or test temporary answers to a problem/question by conducting an investigation (finding facts through sensing), in the end they can draw conclusions and present them orally or in writing. . The steps of problem-based learning are orienting students to problems, organizing students to learn, guiding investigations or experiences individually or in groups, developing and presenting work and analysis and evaluation of problem-solving processes.

Apart from the problems above, many students also think that physics is difficult because physics is a subject that requires understanding; this is also based on previous research. For example, research conducted (Ornek, Robinson, and Haugan, 2008), the study resulted in a general conclusion that "most students find

physics difficult because they do not understand the equations, relationships between graphs and mathematical formulations."

In this research to determine the material to be used in the development of teaching materials, researchers first conducted an initial analysis to students about the material that was considered the most difficult which was carried out to a number of students to fill out a questionnaire about physics material that was difficult according to them and the results showed that out of 36 students 4 people chose thermodynamics, 11 people chose mechanical waves, 6 people chose the sound waves, 4 people chose light waves, 8 people chose optical devices and 3 other people chose global warming. From the results of the questionnaire above, it can be seen that the mechanical wave material is the material that most students choose as the most difficult material.

Based on the above background, the researchers are interested in researching "The Development of Physics E-Modules Assisted By Flip PDF Corporate On Mechanical Wave Material Based On Problem Based Learning In Senior High School."

## 1.2. Problem Identification

Based on the description of the background of the problem above, the researchers identified the following problems:

1. Lack of subject matter in schools to support student learning activities independently.
2. The subject matter used are still conventional, namely package books provided by the government whose contents are still not designed for learners to find and implement their own ideas.
3. Teachers have never tried to create or develop interactive subject matter in the form of e-modules as a reference.
4. Students need the right subject matter so that students can learn independently and think scientifically.

### 1.3. Limitations Of Problems

Given the breadth of the problem and the ability to research existing problems, it is necessary to define problem boundaries. The problem in this research is limited to:

1. The development of the e-module using the corporate flip pdf application program.
2. The development of the e-module using this professional flip pdf uses the Problem Based Learning model.
3. The material in this research is only limited to the material of mechanical waves.
4. E-module physics developed using a 4D (Define, Design, Development and Disseminate) development model is limited to defining, designing, and developing stages.

### 1.4. Formulation of the Problem

Based on the background described above, the formulation of the problem in this study is:

1. How is the validity of the physics E-module based on problem-based learning using flip PDF corporate on the material wave mechanics class XI in SMA Negeri 10 Medan?
2. How is the practicality level of physics E-module based on problem-based learning using flip PDF corporate on the material wave mechanics class XI in SMA Negeri 10 Medan based on the response of teachers and learners?
3. How is the effectiveness of physics E-module based on problem-based learning using flip PDF corporate on the material wave mechanics class XI in SMA Negeri 10 Medan? based on pretest-posttest scores seen from N-Gain score?

### 1.5. Research Objectives

1. To find out how the validity of an e-module physics learning based on problem-based learning using flip pdf corporate on the material of mechanical waves class XI at SMA Negeri 10 Medan

2. To find out how the level of practicality of e-module physics learning based on problem-based learning using flip pdf corporate on the material of mechanical wave class XI at SMA Negeri 10 Medan
3. To find out how the level of effectiveness of e-module physics learning based on problem-based learning using flip pdf corporate on the material of mechanical wave class XI at SMA Negeri 10 Medan

### **1.6. Benefits of Research**

The benefits of this research are:

#### **1. Theoretically**

- a. As reference material for further researchers who also study more profoundly about developing subject matter based on problem-based learning.
- b. As one of the reading references and to fill or add to the Medan State University library literature

#### **2. Practically**

- a. Benefits for researchers, Adding experience for researchers regarding the development of learning materials.
- b. Benefits for educators are motivated to improve teaching skills that can improve the learning system to provide the best service for students.
- c. Benefits for students, as material for self-learning so that learning becomes more interesting and help students learn each material.
- d. Benefits for schools, As input for consideration for students agency education or schools, especially for teachers and principals to pay attention to subject matter that can spur students' independence in learning.

### **1.7. Operational Definition**

1. Research and Development is a research method used to produce specific products and test the effectiveness of these products.
2. E-module is a form of presentation of independent subject matter that are systematically arranged into units in the minor learning process to achieve specific learning objectives presented in an electronic format in a which there

is animations, audio, and navigation make users more interactive with the program.

3. The flip pdf corporate application is a software that can be used to convert PDFs into digital flipping pages with several advanced features such as inserting youtube videos, Vimeo, hyperlinks, animative text, images, audio, and flash into a flipbook that allows for creating interactive learning materials with several features that support.
4. Problem-based learning (PBL) is a teaching method characterized by real problems as a context for students to learn critical thinking and problem-solving skills and gain knowledge.

