

CHAPTER I INTRODUCTION

1.1. Background

Education according to Hangestiningsih *et al.* (2015) essentially includes educating, teaching, and training activities. These activities are carried out as an effort to transform values. So in its implementation, these activities must run simultaneously, integrated, sustainable and in harmony with the development of students and their environment and last a lifetime.

The definition of the national education system according to the Law of the Republic of Indonesia (Undang-Undang Republik Indonesia) No. 20 of 2003 is a deliberate and well-thought-out attempt to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills/talents needed by themselves, society, nation and state require. The recommendations of Agustina *et al.* (2018) shows that education is important for human life which is useful for improving the quality of human resources. To improve the quality of human resources, the quality of education must also be improved. Various ways can be done to improve the quality of education, namely creating a good teaching and learning process, improving the quality of educators or teachers, and creating learning media.

Especially during this COVID-19 pandemic, the use of learning media is also important in improving the quality of education under any circumstances. Learning media as a means of simplifying teaching materials so that they are more easily captured by students. According to Panjaitan *et al.* (2021) the use of learning media can also support and attract students' interest in participating in learning activities and the use of media in learning must be tailored to the needs of the students, such that the media utilized is appropriate for the topic delivered.

Sadiman (2014) recommends examples of learning media are books, films, cassettes, and others. Other media used by teachers during the learning process such as powerpoints, worksheets, textbooks and modules.

Anisa *et al.* (2018) stated that the use of the independent teaching materials in the form of a module in learning can actively involve students in cognitive, psychomotor and scientific attitudes. Students have an opportunity solving their problems in learning. Teaching materials are provided in accordance with the demands of the curriculum by considering the needs of students is one of the objectives of making the module. In making the module, the theme chosen by the teacher is adjusted to the cognitive development of students and also to the environment around students. This is necessary so that students can understand the material systematically. Along with the development of technology, the shape of the module is also growing and has a positive impact. The development of the module starts from the form of a printed module to the form of an e-module.

E-module or electronic module is a learning media in the form of technology-based teaching materials. The use of the learning module is influenced by existing technology so that the module can be accessed anywhere and anytime so it is more flexible. The electronic module can contain interactive experiments and simulations combined with images, videos and animations. Printed media, such as textbooks, encyclopedias, student worksheets, and other forms of learning media, are frequently utilized and offered by schools for the learning process, particularly in chemistry (Silaban & Sianturi, 2021).

Silaban *et al.* (2014) concluded that chemistry is one of the subjects that is rich in abstract concepts in the compulsory specialization in the field of Mathematics and Natural Sciences 2013 curriculum, so that students already feel less able to learn it. Situmorang *et al.* (2020) implemented that studying chemistry not as it were knows the theory but too combines it with abilities. Likewise in the topic of colloids in chemistry class XI.

Colloid is a topic in chemistry subjects that contains material that requires the help of special media to visualize the properties and processes of colloid formation. This material also contains various kinds of colloid manufacture and their application in everyday life which do not allow all of it to be practiced or shown directly on the grounds that they are dangerous and expensive (Sari *et al.*, 2013). Ningsih (2015) concludes that the colloid system is one of the chemicals that has an important role in human survival, both regarding the environment and daily life so that colloidal material is certainly related to the meaning of scientific literacy itself. Learning about the colloidal system can encourage students to connect their knowledge with its application in daily life.

Based on the results of initial observations and interviews with one of the chemistry teachers at SMA Negeri 7 Medan, it was stated that learning chemistry on colloidal material carried out at the school was carried out online and still using lecture methods and discussion, so that the learning process was only guided by teachers and textbooks. The limited textbooks mean that students do not have other sources of reading related to the material. The teacher also added that the preparation of materials is not in accordance with the needs and characteristics of students can make students unable to discuss the material obtained and communicate the results of their work well and the chemistry lessons have not use module as learning resource.

Another obstacle faced by the teacher is limited online learning so that made it difficult to teach students about colloidal material. Teachers also rarely associate chemistry with scientific literacy. This results in students becoming less active and independent so that it affects the students' scientific literacy skills. Whereas scientific literacy can be used to achieve learning objectives, applications in daily life so that it has usefulness value.

Scientific Literacy by the Ministry of Education and Culture (2017) is the ability to identify, understand and interpret science-related issues that a person needs to make decisions based on scientific evidence. The results of the 2018 Program for International Student Assessment (PISA) study were revealed on December 3rd, 2019. In terms of reading ability, Indonesia is placed 74th, sixth

from the bottom. Indonesia has an average score of 371 and is ranked 7th from the bottom (73) in the maths area with an average score of 379. According to the findings, Indonesia's PISA ranking in 2018 decreased when compared to the 2015 PISA results. Therefore, it is important to apply and improve scientific literacy.

Scientific literacy is multidimensional, namely understanding more than scientific knowledge. The application of the concept of literacy in the process of science education is not only intended to understand a collection of facts and theories but is actually the realm of a learning process towards a key idea in understanding and interpreting phenomena and events that are relevant to everyday life. Actually, curriculum 2013 accommodates the development of scientific literacy for students. To analyze that, it must be seen based on the basic competencies and learning activities carried out by the teacher individually. That is why it is important to implement scientific literacy based electronic modules.

Based on a preliminary study by Novia F. J (2020) with the title design and trial of an Android e-module based on scientific literacy integrated with Islamic values in reaction rate material, the research was tested valid with percentage (of) 91.2% (very valid) and tested practical with a percentage of 89.7% (very practical) and got a good response to the overall content. The difference with the research that will be carried out is that the selected material also only uses scientific literacy. The same result is also obtained from Janurlia Haryati (2020) with title design and trial E-handout based on scientific literacy on reaction rate material tested valid with a percentage of 84.61% (very valid) and media expert validation tested valid with a percentage of 80% (valid), the practicality assessment of chemistry teachers was tested practical with a percentage of 91.07% (very practical) and received a good response from students with percentage 85.74% (very practical).

The electronic module also shows a good influence on research conducted by Rizka Annisa Rahman (2021) stating that the development of an electronic module based on Problem Based Learning (PBL) on thermochemical material obtained a total student response of 92.21%, which means that students accept and respond to teaching materials very well.

Based on the explanation above, the researcher realizes the importance of e-modules based on scientific literacy for students to use where the e-modules can be accessed anywhere with high flexibility that considered very feasible to use, improve students' literacy skills, and increase students' independence and interest in learning. Therefore, researchers are interested in conducting research with the title "Development of Electronic Module Based on Scientific Literacy on Colloidal Topic".

1.2. Problem Identification

Based on the description in the background, then the problems that can be concluded are:

1. Lack of students' interest in learning Colloidal topic
2. Learning resources in chemistry lessons are still limited and have not utilized technology.
3. Student textbooks in schools cannot develop students' scientific literacy skills
4. Lack of teaching materials such as learning modules for students so that it does not motivate students' enthusiasm for learning in chemistry learning

1.3. Problem Formulation

In order to provide a more specific research direction, the problem formulations that will be studied in this research are:

1. What are the result of the needs analysis for the electronic module of colloidal topic?
2. How to get the developed e-module of colloidal topic based on scientific literacy?
3. Is the developed E-module based on scientific literacy feasible on BSNP standards?
4. How do students' respond to teaching materials developed in colloidal topic learning?

1.4. Scope of Problem

So that this research does not deviate from the research objectives, the problems in this study must be limited. Based on the scope the problem, the boundaries of the problem are as follows:

1. Teaching materials developed using the type of research R&D (Research and Development) using the 4-D model
2. The teaching materials that will be applied in this research can be accessed offline or without the need for an internet connection
3. This research was conducted at SMA Negeri 7 Medan, which implemented the 2013 curriculum in class XII (12th grade) in odd semesters
4. This research focuses on the colloid system, the properties of colloids, the manufacture of colloids, and the role of colloids in daily life and industry
5. This research is only at the limited disseminate stage

1.5. Research Objectives

The research objectives to be achieved from this study are as follows:

1. To find out the result of needs analysis for the electronic module of colloidal topic
2. To get the developed e-module of colloidal topic based on scientific literacy
3. To identify the feasibility of E-modules based on scientific literacy which were developed based on the BSNP standard
4. To find out the response of students to teaching materials developed in learning colloid topics at SMA Negeri 7 Medan

1.6. Research Purposes

This research is expected to provide the following benefits:

1. Students who study chemistry can understand and improve scientific literacy skills in colloidal topics

2. Teachers can use this learning module as a learning resource to create an interesting, efficient and effective learning atmosphere. achieving the learning objectives of this colloidal topic
3. Researchers can develop and make teaching materials with good standards so that they can be used by students
4. Further researchers can make contributions in other studies

1.7. Operational Definitions

In order to equate views on several terms used as research titles, operational definitions are made as follows:

1. Scientific Literacy is an ability to identify, understand and interpret science-related issues that are needed by every individual in terms of making decisions based on scientific evidence (Center for Curriculum and Books, 2017).
2. The module is one of the teaching materials that is packaged in a systematic and complete form which contains a set of planned learning experiences to assist students in achieving learning goals (Rahdiyanta, 2016).
3. The colloid system is one of the chemicals that has an important role in human survival, both concerning the environment and daily life (Ningsih, 2015).