CHAPTER 1
INTRODUCTION

1.1 Background

The good education system in a country can be seen from their students. Finland, an example of a country with a good education system, has succeeded in becoming the most effective education in the world. In general, education in Finland prioritizes knowledge and skills in everyday life (Federick, 2020). Besides that, attention to students was also emphasized from the early school to shape the personality of students to be more responsible with around them. The latest PISA (Program for International Students Assessment) data shows that a good education system can affect students' attitudes, including scientific literacy (Saarinen et al., 2021).

Scientific literacy is needed in 21st-century learning. In the general context of education, scientific literacy is needed in understanding environmental issues to make the right decision (Kembara et al., 2020). Someone with literacy skills in science will link the understanding of science concepts with technology, world development, and even social conditions in society. According to PISA, scientific literacy includes explain the phenomena scientifically, and interpret the data collection (Parno et al., 2020). The primary goal of studying science is to improve students' scientific literacy to understand the concepts of science and develop the science principles (Alim et al., 2019). So, in the future, students can apply scientific concepts to make daily decisions in the interaction with the environment around them.

However, the fact is that the level of scientific literacy is still low in Indonesia. PISA test results of Indonesian students are lower than average (Ramli et al., 2021). According to PISA Test Result 2018, Indonesia is in the order of 72 out of 77 countries. Most participants who conducted the PISA test showed an interest in science, thus increasing each year's test results. But, the scores achieved by Indonesian students are still below the

average international score (Sarwi et al., 2020). For the reading, Indonesia got 371 while the average is 487. For math and science, Indonesia got 379 and 396, while the average is 489 for both aspects. The lack of scientific literacy reflects that students are primarily unable to analyze and apply the concept to solve a problem (Jufrida et al., 2019). Also, the lack of students' achievement implies their weak understanding of science (Putri, Sanjaya, & Eliyawati, 2021). The abstract material in learning tends to require students to memorize how to use concepts rather than emphasizes understanding for apply the concept to daily life.

As a consequence of a lack of scientific literacy, the teacher has to consider the suitable process for teaching science. An approach that facilitates student needs is one way to improve scientific literacy in the science teaching process. The integration of scientific ideas with local culture is a principle of an ethnoscience approach that is considered relevant to the needs of today's students. Ethnoscience is the study of objects, ideas, principles, and inventions that are derived from past and present cultural practices and rituals of students in a given culture or environment (Kasi et al., 2020). An ethnoscience approach in the teaching process of science is important since it underlies various activities related to the environment that involves the student in participating. Besides, the ethnoscience approach in line with Permendikbud No. 58 in 2015 concerning the curriculum, where each student is can apply science wisely to preserve sustainability. There has been an improvement in student learning outcomes in science learning using an ethnoscience approach, which has been triggered by science learning to make students more interested, enthusiastic, and happy (Pamungkas et al., 2017).

In other research, the ethnoscience approach has been effectively developing the students' scientific literacy in the direct learning process. Learning that is based on ethnoscience can make it possible for students or learners to investigate the reality and phenomena that occur in a society that can be combined with scientific knowledge (Melyasari et al., 2018). Another researcher believes that ethnoscience is a term that can be applied

to contextual learning in science (Dewi et al., 2019). Meanwhile, learning with an ethnoscience approach in improving students' scientific literacy is still rare in Indonesia. In Hastuti, Setianingsih, & Widodo's (2019) research about scientific literacy, the researchers use the integration between ethnoscience and inquiry-based learning. Ethnoscience approach used for learning intensity topic with Bengkulu traditional dol music in (Risdianto, Dinissjah, Nirwana, Sutarno, & Putri, 2021). Also, Melyasari, Suyatno, & WIdodo (2018) and Ariyatun, Sudarmin, & Triastuti (2020) research about ethnoscience can improve scientific literacy, the researchers use the batik process and brick process as the context. Therefore, the researcher is willing to enhance scientific literacy through the ethnoscience approach in food additives topic. In addition, the implementation on ethnoscience in class conducted by online learning. So, the online class would be use ethnoscience approach to see how students' scientific literacy in food additives topic.

Food additives topic is closely related to students' daily life. Nowadays, the food consumed by young people was different from the food consumed by the parents at that time (Blanco-Rojo et al., 2019). Young people will be more attracted to foods that have bright colors and rich in flavors. Especially with junk food, you people have experienced an increase in consuming it (Singh et al., 2020). This is due to its good taste, ease of accessibility, low cost, variety, and flavor. These foods contain food additives that have the function to produce food as desired. Food additives improve the preservation of the visual aspect of food and palatability (Lemoine et al., 2020). However, most of the students who are young people still have little knowledge about the problem of ingredients in food. Therefore, the curriculum in schools accompanies an understanding of food additives to create the right attitude in consuming food.

In the local context, many traditional additives are being used, so the use of an ethnoscience approach is very relevant to enhance meaningful learning (Sudarmin et al., 2018). In West Java, surabi is one of the very popular traditional foods. Surabi in west java has strong pandan aroma

rather than surabi in another city. That's become the uniqueness of west java surabi. So, by the research, it has been studied the implementation of learning on using ethnoscience approach in food additives with surabi context and study its impact on students' scientific literacy.

1.2 Research Problem

The research problem of this study is "how is the enhancement of student's scientific literacy with an ethnoscience approach in surabi context for learning food additives?"

1.3 Research Question

Based on the research problem, the researcher explores to detailing the problem into these following questions:

a. How is the implementation of the ethnoscience approach in learning food additives?
b. How is the improvement of students' scientific literacy with the ethnoscience approach in learning food additives?
c. How is the improvement of students' scientific literacy on competence domain with ethnoscience approach in learning food additives?
d. How is the improvement of students' scientific literacy on attitude towards science domain in learning food additives?

1.4 Research Objective

The general purpose of this research is to investigate the enhancement of students' scientific literacy with the ethnoscience approach. The particular objectives of this research are:

a. To analyze the implementation of learning food additives with the ethnoscience approach.
b. To investigate the improvement of students' scientific literacy with the ethnoscience approach in learning food additives.
c. To investigate the improvement of students' scientific literacy on competence domain with ethnoscience approach in learning food additives.
d. To investigate the improvement of students' scientific literacy on attitude towards science domain in learning food additives.

1.5 Limitation of Problem

a. Ethnoscience Approach

As an approach, ethnoscience is facilitated students to learning with the nearest object such as traditional food. The researcher uses Surabi as the main context for learning. The process and the use of ingredients inside surabi are analyzed by students. Another traditional food is also discussed to reflect the same principle of science which is the classes of food additives.

b. Students' Scientific Literacy

Based on PISA, students' scientific literacy has 4 domains: Context, Knowledge, Competence, and Attitude. For constructing the scientific literacy test, some domains are considered. The scale of science proficiency level is from Level 1 – Level 6 and it includes 3 knowledge types such as content, procedural, and epistemic. For context, it uses the personal, local, and global aspects. The aspect in attitude is covered by interest in science and environmental aspects. The researcher has limited the domain for discussion into two: Scientific Competence and Attitude toward science. The blueprint of the questions is made by the researcher following the standard in the PISA assessment framework.

c. Food Additives

In both the 2013 National Curriculum and Cambridge, the topic of food additives is combined with addictive substances. The topic is learned in grade 8^{th} semester one for national and semester two for Cambridge curriculum. However, in this study, the chapter is divided into two topics and only food additives were discussed. Food additives topic is limited by discussing the definition, the differences between natural and synthetic recourses, the class of food additives, and the effects of their use based on the competencies and learning objectives in annual plan school.

1.6 Research Benefit

The expectation of the research result is giving good input to certain people as follows:

a. For students

Students are able to reflect on a variety of simple activities aided by science. They also train from simple ways of thinking to become more complex because they have to know the reasons behind a process in an activity. Students have a new experience that motivates them to be more curious and focus on developing students' scientific literacy. The main benefit, students are able to choose the good food or drink for their body because they have enough scientific knowledge to differentiate the food.

b. For teachers

The approach can be used for the teacher as a new experience because it is directly related to daily life. Since the scientific literacy has to be expected in learning outcomes, the use of new approach would treat students differently. The teacher also improves their skill of the way to engage student participation. In addition, the creativity in teacher is challenged to produce learning that attracts students' attention and also provide meaningful learning in class.

c. For researchers

This research can be used as references in further research and become an example of a variety teaching-learning process which influence some factors. Also, another researcher can develop it in another topic or media. Some strengths and limitations in this research could be analyzed to improve the result in this study area.

1.7 The Organization of Research Paper

a. Chapter I: Introduction

This chapter includes background, research problem, research question, research objective, limitation of problem, research benefit, and organization of research paper.

b. Chapter II: Literature Review

This chapter contains literature, information, and theory of research variables. The explanation consists of the ethnoscience approach, students' scientific literacy, and food additives as lesson topics.

c. Chapter III: Methodology

This chapter describes the methodology of this research including research method, research design, population, sample, operational definition, research instrument, and research procedure.

d. Chapter IV: Result and Discussion

The highlight of this chapter is the discussion on data collection. The researcher analyzed the data statistically and making interpretations based on data results for answering the research question.

e. Chapter V: Conclusion and Recommendation

This chapter explains the result of the previous chapter. Also, the key points of the research problem answers would be listed in this chapter. In addition, the recommendation for further research will be here.