CHAPTER I

INTRODUCTION

1.1 Problem Background

Currently the world were on the 4.0 era industrial revolution showed by the increased of connectivity, interaction and development of digital systems, artificial intelligence, and virtual. There are four industrial design principles on 4.0 era. One of them is interconnection, namely the ability of machines, devices, sensors, and people to connect and communicate with each other through the *Internet of Things* (IoT) or the *Internet of People* (IoP). With the convergence of boundaries between humans, machines and other resources, information and communication technology also affect various sectors of life. One of them were impacted on education system in Indonesia (Mario Herman, 2016).

Education in 4.0 era is a phenomenon that arises in response to the needs of the 4.0 industrial revolution, where humans and machines are aligned to obtain solutions, solve various problems encountered, and discover new possibilities for innovations can be utilized for the improvement of modern human life. According to Fadel (2009), the content of learning is expected to meet 21st century skills, namely 1) learning and innovation skills include the mastery of diverse knowledge and skills, the learning and innovation, critical thinking and problem solving, comunication and collaboration, and creativity and innovation; 2) digital literacy skills include information literacy, media literacy, and ICT literacy; 3) careers and life skills include flexibility and adaptability, initiatives, social and cultural interactions, productivity and accountability, also leadership and responsibility (Alismail, 2015).

According to Mark Frydenberg (2011), to face the learning in 21st century, everyone must have critical thinking skills, knowledge and digital literacy abilities, information literacy, media literacy and master information and communication

technology. This can be achieved by optimizing the use of technology as an educational aid expected to produce outputs that pursue with or change the century for the better and improve the graduate quality according to the workplace and the digital technology demands (Lase, 2019).

As one of the learning in 21st century demands, literacy has an important role in achieving the learning objectives of the 4.0 industrial revolution. 21st century literacy is a collection of many order skills. Students need to be able to critically evaluate the reability of diverse sourches of knowledge in order to construct knowledge. It also entails open arguing with diverse groups of people in order to explain and prove the truth. These 21st skills are built on the foundation of traditional literacy: reading, writing, and basic mathematics. This new literacy includes traditional literacy skills, such as critical thinking, scientific reasoning, and multi-cultural awareness. In addition to traditional literacy students also need to learn about how knowledge is created, especially how the most reliable knowledge is made. Like order forms of literacy, the new literacy requires both the "effective use" of language and "large amounts of specific information" about the world (21st Century Literacy, 2016).

21st century literacy is more than just reading and writing. It is includes thinking skills using knowledge sources in print, visual, digital, and auditory forms. Therefore, literacy ability help students to understand and analyze the learning resourches effectively. However, according to the results of the reading literacy test in PISA 2018, Indonesian students ranked 74th out of 79 participating countries. The PISA test aimed to assess reading literacy in the digital environment while retaining the ability to measure trends in reading literacy over the past two decades. PISA 2018 defined reading literacy as understanding, using, evaluating, reflecting on and engaging with texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society (OECD, 2019). The PISA test show that the literacy of Indonesian students requires special attention because by literacy student are expected to be able to gain knowledge, and new insights that

will increase intelligence so that they are better able to answer life's challenges and as provisions in the future.

Literacy is the process of using and transferring information to provide understanding for people who are need to understand the information. The growth of information in this century is truly unusual. Information has become a very important part of someone's life, both individually and socially. Information obtained by humans can no longer be restricted, ranging from social, political, art, health, and lifestyle information. The information is easily obtained from various media around human life, both in printed form and in digital form. According to Pulungan (2019), information is no longer restricted to words or sentences. Information is like a sharp-edged knife that when it comes to the wrong reader can be fatal. It cannot be denied that any information comes easily accessible to anyone and used it for any purpose. In addition there is the possibility of each individual to manipulating the information by changing existing information then creating and disseminating new information. As a result, a lot of irrelevant information on various internet network sites available, where that information has the possibility to be used by other individuals.

Lots of the available of information sources makes students confused to get relevant information. This is compatible with the results of a survey by Alison and Eisenberg in 2010, which obtained survey results from 8,353 students in carrying out a research assignment that is the students at both the secondary and undergraduate levels rely heavily on Google and sources such as Wikipedia. Use of mono-graphs and databases listing peer-reviewed journal articles is uncommon. Even when using the Internet via search engines, students do not use search strategies or mechanisms available to them to assist in the location of reliable sources. Students are unable to determine how to find cited sources and equally unable to appropriately cite the sources they use.

Therefore, it is precisely because of this increased information availability makes the knowledge of the information literacy becomes even more important.

The learner's ability to not only find but evaluate and eventually apply information in an analytical way becomes paramount. The ability to choose relevant information requires an action in searching, evaluating and using the required information effectively and efficiently, known as information literacy. According to Mulla (2014), the term information literacy, sometimes referred to as information competency, is generally defined as the ability to access, evaluate, organize, and use information from a variety of sources. The information literacy requires an awareness of the way in which information systems work, of the dynamic correlation between a particular information need to the sources and link required to satisfy that need.

There are several models of information literacy skills that are aligned with the fulfillment of *Information Literacy Standards for Student Learning* such as Empowering 8, Seven Pillars, and The Big6. The Big6 information literacy model by Robert E Berkowitz in 1987 integrated the skills of finding and using information with technological tools in a systematic process to find, use, apply and evaluate for specific needs and any assignment. The stages in this model can completed not sequentially, but some experience shows that almost all successful problem solving situations by carried out all the stages (Pulungan, 2019).

Information literacy is very closely related to the learning process, where students are in need of appropriate and accurate sources of information in understanding each learning material. The current learning process requires students to be more independent in learning, especially in learning biology. Learning biology requires more learning resources to create a more lively imagination in order to understand biological material, especially in learning Protista.

The concept of "protists" originally embraced all the microorganisms in the biotic world. The entire assemblage thus included the protists plus the bacteria, the latter considered at that time to be lower protists. The great evolutionary boundary between the prokaryotes and the eukaryotes, however, has meant a major taxonomic

boundary restricting the protists to eukaryotic and the bacteria to prokaryotic microorganisms (Britannica, 2020).

In 2004, Cavalier-Smith established a six kingdom system based on molecular, ultrastructural, and palaeontological. At this time the term protist was used to refer a single-celled eukaryotes either independent cells or even if colonized did not show differentiation in tissues. The term protozoa is used for heterotrophic species of protists that do not form filaments. This term is no longer used in modern classifications (Sina M Adl, 2005).

Protists have a very large scope, so the literacy ability of students' biological information is needed for students are able to choose the appropriate and relevant information sources in learn Protista that is constantly developing following technological developments with modern classification techniques that have emerged lately. Protista as one of the biology learning topic that requires extensive sources of information.

The observations results of grade X student in SMA Negeri 4 Medan about the biology learning activities on Protist showed, when the teacher gave assignments to students then instruct the students to look for learning resources independently from various literatures, most of students look for learning resources by searching and browsing on the internet. The students have been able to independently search for information about learning material through computers or smartphone that are connected to internet. But it is not certain whether students are able to sort and identify the appropriate and accurate of information obtained as learning source of Protista.

Through the application of The Big6 information literacy model, it is hoped that Indonesia student become interest, have reading habits, writing, listening, and critical thingking are increased so that Indonesia avoid letterless. Therefore, the writer intend to do a research about the biology information literacy ability of grade X students in SMA Negeri 4 Medan by using the Big6 information literacy skill.

So the authors set the title of the research "**Biology Information Literacy Ability of Grade X Student on The Protist Topic Using *The Big6* Model in SMA Negeri 4 Medan** ".

1.2 Problem Identification

Based on the background above, the problem identification are:

1. One of the 4.0 era education industrial demands is the ability of information literacy that Indonesian students unfulfilled yet.
2. The availability of many information sources make student confuse to find appropriate and accurate sources for learning
3. The grade X student in SMA Negeri 4 Medan is not certain whether students are able to sort and identify the appropriate and accurate of information obtained as a learning source of Protist

1.3 Problem Scope

Based on the problem identification above, the research problem scope are:

1. This research is scoped to measure the student biology information literacy ability in completing assignments given by teacher.
2. This research is scoped to measure students' biology information literacy ability through The Big6 Information Literacy skills.
3. This research is scoped to measure the student biology information literacy ability on Protist.

1.4 Research Question

Based on the problem identification and the problem scope above, the problem formulation are:

How is the biology information literacy ability of grade X students to completing Protista assignments given by teachers in SMA Negeri 4 Medan?

1.5 Research Objectives

This research purposes to determine how the biology information literacy ability of grade X students in SMA Negeri 4 Medan on Protista topic.

1.6 Research Benefits

The benefits of this research are:

1. Providing information for other researchers to still continue the research about the important of information literacy skills in completing school assignment.
2. The results of this research can be a practical contribution to SMA Negeri 4 Medan as an evaluations input to apply information literacy in schools.
3. The results of this research are expected to use as a reference for further research.

1.7 Operational Definition

1. Information literacy is to understand, evaluate and analyze sources of information needed critically and can utilize the information effectively in creating new knowledge.
2. Biology information literacy is the ability to understand, evaluate and analyze the needed information of biology learning sources through print or digital media until it capable to regulate the obtained biological information into new information in learning biology.
3. The Big6 information literacy model is the skills of finding and using the information with technological tools in a systematic process to find, use, apply and evaluate for specific needs and any assignment.
4. Protista are a kingdom in living things classification system that aerobic respiration and Protista live as heterotroph or autotroph, mostly eukaryotic unicellular organism and divided into three categories, namely, Animal-like Protista, Plant-like Protista, and Fungus-like Protista.