

## SCIENCE LITERACY IN ELEMENTARY SCHOOL GRADE 4 IN ERA SOCIETY 5.0

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**Abstract.** In the era of society 5.0, literacy is one of the needs for every human being to fulfill their needs which cannot be separated from technology. One of the important literacy in this era is scientific literacy. This study aims to examine scientific literacy in grade 4 elementary schools in improving the quality of world competition in education in the era of society 5.0. The method used is literature study. The data collection technique in this study was to collect information and data from various library materials such as books, articles, previous research, notes and journals related to scientific literacy in the era of society 5.0. Learning materials in grade 4 can bring up scientific literacy skills by utilizing technology. Between the eras of society 5.0 and scientific literacy, they have the same goal in responding to all the challenges of social life and improving decision-making skills.

**Keywords:** era of society 5.0; scientific literacy; 4th grade student

### INTRODUCTION

Mastery of science and technology is an important key in facing the challenges of education in the 21st century. Over time, industrial technology has certainly developed so that the terms industrial technology development are known according to the developments that occurred in their time. as we are facing now, namely society 5.0 which of course developed from the existence of society 1.0. The change in society 5.0 is also the development of the industrial revolution 4.0 which focuses on technological developments that are getting faster every day. This change is not a change that emphasizes the context of the curriculum, but a change in simple pedagogical aspects to a comprehensive pedagogical aspect as well as changes in conventional teaching to technology-based teaching (Afandi, Junanto, & Afriani, 2016).

The emergence of society 5.0 requires patented breakthroughs in an effort to face the challenges that will be posed by society 5.0 (Umro, 2020). According to Utami (2019) era society is the idea of society that focuses on expanding aspects of human life based on technology. With the inception of the era of society 5.0, it is hoped that it will be able to resolve people's concerns about the era of the industrial revolution 4.0 which is seen as not being fully effective in implementing it in education (Sasikirana & Herlambang, 2020). The existence of society 5.0 raises its own challenges in various fields of life, one of which is in the field of education, including in learning. Learning science in the era of society 5.0 provides a basis for discoveries made in the field of education. Education is designed to make human beings with character, quality, creativity, and have responsibility in responding to challenges in today's era. Based on this, science education as part of education plays an important role in preparing students to have scientific literacy. In the realm of science, literacy is needed in solving problems. Scientific literacy is a skill for living in the 21st century era where scientific knowledge is the basis of everyday life (Gultepe & Kilic, 2015). Students who have scientific literacy skills will apply their knowledge to solve problems both in the personal, social and life situations (Yuriza et al, 2018).

Scientific literacy is defined in PISA 2015 as the ability to handle science-related ideas and issues related to science as an active citizen' (Taş et al, 2016) but the 2018 PISA survey shows that the average scientific literacy for Indonesia is still under the low category compared to other countries. Where Indonesia is still ranked 73 out of 79 countries with a score of 396 in the field of scientific literacy (Aiman and Ahmad, 2020). This shows that Indonesian students are still very low towards

science and technology. According to Mawardini, et al (2015) that one of the factors causing the low achievement of students' scientific literacy is not being able to interpret data and information and draw conclusions.

Previous research was conducted by Lestrasi, et al (2022) where research was conducted to examine the application of scientific literacy in physics learning so that it is useful in improving the quality of world competition in education in the era of society 5.0. In contrast to the research that will be carried out which examines scientific literacy in grade 4 elementary school students in the era of society 5.0.\

Scientifically literate students are students who have knowledge as a provision to understand scientific facts, their relationship with science, technology and society and implement their knowledge to solve various problems in real life (Bond, 1989). Therefore, the purpose of this research is to examine scientific literacy in grade 4 in improving the quality of world competition in education in the era of society 5.0.

## **RESEARCH METHODS**

The method used in this research is library research. Literature study is related to theoretical studies and several references that cannot be separated from scientific literature (Sugiyono, 2012). Sources of data obtained from relevant literature such as books, journals or scientific articles related to the selected topic. Activities are carried out systematically starting from collecting data, processing data and concluding data with content analysis. Content analysis means scientific analysis of the contents of literature related to scientific literacy in grade 4 students in the era of society 5.0 on alternative energy material.

## **RESULT AND ANALYSIS**

### **1. Science Literacy**

The word scientific literacy was introduced in the late 1950 by Paul De Heart who stated the definition of scientific literacy is making decisions that include responsibility for science, technology, as well as independence and cognitive skills (Ajayi, 2018). different from Ajayi, according to Philips, (2003); Chen, (2019) reconceptualization of scientific literacy to understand scientific where students can not only read, write and speak science texts but also the ability to analyze, interpret, and construct reasons in science/science discourse. This opinion explains that ability, scientific literacy includes a variety of higher-order thinking skills as well as affective aspects of students in conveying scientific ideas.

Scientific literacy can be defined as the ability to use scientific knowledge to identify questions, understand scientific concepts, explain scientific phenomena, and draw evidence-based conclusions to understand the natural world and changes brought about through human activities (OECD, 2016: Lestari and Siskandae, 2020). Since the last two decades, in the world of scientific literacy education, it cannot be separated from educational goals and in every conversation it becomes the main topic in schools. This proves that educators are able to accept scientific literacy as learning which is expected to encourage students, while increasing interest in learning science (Lestasri, et al: 2022). In the era of the 21st century, schools are increasingly expanding networks in literacy, as learning in reading. provided that literacy is defined as leading to the skills to understand, identify, interpret, create, and communicate knowledge using written materials in a variety of situations. According to PISA scientific literacy is defined as "the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the changes made to it through human activity." scientific knowledge, identify questions, and draw conclusions based on evidence, in order to understand and make decisions regarding nature and changes made to nature through human activities (Harlen, 2004). and communicating knowledge using written materials in a variety of situations. According to PISA scientific literacy is defined as "the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the changes made to it through human activity." scientific knowledge, identify questions, and draw conclusions based on evidence, in order to understand and make decisions regarding nature and changes made to nature through human activities

(Harlen, 2004). and communicating knowledge using written materials in a variety of situations. According to PISA scientific literacy is defined as "the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the changes made to it through human activity." scientific knowledge, identify questions, and draw conclusions based on evidence, in order to understand and make decisions regarding nature and changes made to nature through human activities (Harlen, 2004). Understanding of science and ability to think scientifically can also increase the capacity of students to take up productive professions in the future. This is very important, so it is necessary to instill a spirit of science from an early age, it is necessary to foster children's love for texts, even though the process of developing literacy in Indonesia has not been optimally carried out, it tends to devote to the lecture model, as well as facilities for providing libraries, media and teaching materials that are it is used even less and is still very limited so that it is not sufficient for efforts to create literacy (Lestasri, et al: 2022). One of the ways or efforts that can be made so that literacy learning can run is by creating scientific literacy learning that is active, innovative, so that it can support the process of human resources who are literate in scientific knowledge. The success or failure of students in learning scientific literacy can be seen from the scores obtained on the tests given by the teacher, and this can also be used as evaluation and reflection material for further learning.

## **2. Material Science in Grade 4 Elementary School**

Learning materials in elementary schools emphasize direct giving to develop competencies in order to explore and understand the natural surroundings scientifically. Based on the 2013 curriculum, there are learning materials for grade 4 elementary schools, including: properties of sound, energy sources, changes in energy forms, and alternative energy sources, form and function of body parts in animals and plants, balance and preservation of natural resources in their environment, the properties of light, the cycles of living things, and the various styles. These materials are very important for grade 4 students to master. The importance of developing energy literacy for students is necessary because energy can run low, but most students have a low level of energy literacy (Merritt, Bowers, & Kaufman, 2019).

Alternative energy is energy that is created from new or existing energy, for example solar energy into electrical energy. Elementary school students can also learn about the process of energy production or conservation by using procedures commonly seen in everyday life such as hand-held power generation techniques (Huang et al., 2012). This material can utilize existing technology to create inventions based on existing energy sources.

Material on alternative energy at the elementary school level only presents Natural Science at the stage of understanding energy sources and various ways to save energy at home, such as turning off appliances when they are not in use thereby saving on electricity bills. Besides students learning to save electricity, students can also conduct simple research and qualitatively explain simple research functions that support small-scale energy systems (Delegkos & Koliopoulos, 2018; Koliopoulos & Argyropoulou, 2011; Dalapa, Vayena, & Sissamperi, 2019). Elementary school students can develop scientific ideas about alternative energy through meaningful learning, not only that, elementary school students can also do simple research on electrical energy.

This alternative energy material is one of the materials in grade 4 of elementary school. According to Çoker, Çatlioğlu, and Birgin (2010) stated various forms of energy, such as light, sound, electromagnet, heat, potential, gravitational and kinetic energy. This energy is energy that can be converted into alternative forms of energy and these various forms of energy are needed by humans. Along with technological developments, this material can be developed according to the current era, namely Era Society 5.0 which is able to bring up students' scientific literacy skills.

## **3. Era Society 5.0**

Society or society is a group of individuals that form a semi-closed or semi-open system in which most of the interactions are between individuals who are in that group. We can see the rapid development of society by comparing the life of society in ancient times with today. The existence of society 5.0 describes the 5th form of society in the history of the development of human life.

The concept of society 5.0 was explained as a new vision for Japan by the Japanese Prime Minister, Abe, at the 2019 World Economic Forum Annual Meeting in Davos, Switzerland. The

concept of society 5.0 is a development of the concept of society 4.0 or an information society by accessing data-based services on the internet (Tempo, 2019). The following is the journey of the development of society, starting from society 1.0 to now society 5.0.

### 3.1 Society 1.0

In this era humans begin to know how to form a group into society. At this time humans defended themselves by hunting for food and moving from one place to another in order to maintain their lives. Humans made simple tools and used natural forces such as fire to cook and protect themselves

### 3.2 Society 2.0

This period is also known as the era of agriculture or the agricultural revolution where humans have a focus on developing science by farming, humans do not need to worry about hunting and moving around to get a place to live and start having food sources. At this time, humans began to settle down and build more complex societies, so that various kingdoms appeared, writing was introduced, until big cities began to be established.

### 3.3 Society 3.0

With people who are increasingly focused on farming accompanied by an increasingly complex number of people, the need for food and clothing is increasing. With existing knowledge, humans began to build factories by producing something to meet human needs. Humans work in factories with a wage system.

### 3.4 Society 4.0

The growing science and technology makes people familiar with computers to the internet so they can get information quickly. The flow of data that is so fast makes human life seem like there is no distance in space and time. In this technological era, the industry is competing to build a product that helps people more easily obtain information.

### 3.5 Society 5.0

It is a refinement of society 4.0, where technology becomes part of the human being itself, not only for sharing information, but for facilitating everyday human life. Society 5.0 emphasizes an integrated, easy and fast life. For example, the use of robots that can help restaurants, clean houses, etc. can be controlled by computers and the internet. Society 5.0 makes human life practical and automatic. So that technology does not control humans but humans can get a good and comfortable quality of life (Harun: 2021).

Even though the initiation of the era of society 5.0 came from Japan, which adapted to the conditions of the country, but in several ways it is also very suitable for conditions in other countries, for example in Indonesia. The concept of Society 5.0 for Indonesia is an era that inevitably has to be faced in the future. Indonesia is directly confronted with two sophisticated eras, namely the era of Industry 4.0 and Society 5.0. These two momentums must be anticipated by strengthening national education and culture so that later there will be a mature transformation by mitigating the risk factors that can arise.

## 4. Era Society 5.0 in Science Literacy

The embodiment of the era of society 5.0 aims to create human capabilities to respond to social challenges as an innovation in the industrial revolution 4.0. The concept of society 5.0 is present in the midst of people's lives to answer the challenges of economic and technological growth that are not yet in harmony with a growing and developing society. Therefore, the era of society 5.0 is present as an answer to the problems of justice and equal distribution of shared prosperity. To increase global competitiveness in the era of society 5.0, Indonesian education must improve, namely by analyzing learning methods and the readiness of Indonesian human resources (Handayani & Muliastri, 2021).

Advances in information and communication technology in the era of society 5.0 have changed human lifestyles in working, socializing, playing and learning. In the era of society 5.0 technological progress, especially in the field of education, requires students and teachers to have skills in using technology to answer the opportunities and challenges of life in the era of society 5.0. Today, science education is directed at preparing students to be successful in life in the era of society 5.0. One of the skills needed in the era of society 5.0 is scientific literacy skills. Scientific literacy is a skill to think scientifically and critically and use this scientific knowledge in solving challenges and making decisions. There are two views of scientific literacy, namely, 1) scientific literacy is an understanding of scientific content, namely the basic concepts of science and 2)

scientific literacy is the ability to reason in a social context. Between the era of society 5.0 and scientific literacy, they have the same goal in responding to all the challenges of social life and improving decision-making skills.

## CONCLUSION

One of the materials in science learning in grade 4 is alternative energy material. This material can develop scientific ideas through meaningful learning, not only that, elementary school students are also able to do simple research on electrical energy. Alternative energy learning in grade 4 can support scientific literacy, for example in finding problems and exploring sources to solve problems with information literacy skills, learning skills and media literacy. Advances in information and communication technology in the era of society 5.0 have changed human lifestyles in working, socializing, playing and learning. Between the era of society 5.0 and scientific literacy, they have the same goal in responding to all the challenges of social life and improving decision-making skills.

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