



The Analysis of Umar Masud Junior High School Students' Science Literacy Ability

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Abstract: Scientific literacy is the main key to facing the challenges of the 21st century. The reason for the low ability of students in scientific literacy is the lack of scientific literacy content in teaching materials. The importance of students' knowledge of scientific literacy skill information is to provide solutions to problems in the field of literacy. This study aimed to determine the scientific literacy abilities of Class VII students of the Umar Mas'ud Sangkapura School. A combination descriptive research method was used in this study. Under the direction of the Umar Mas'ud School, a cluster random sampling method was used to select the research sample, which included 40 seventh graders from MTS Umar Mas'ud and SMP Umar Mas'ud. The instrument was carried out by testing scientific literacy questions and interview guideline sheets. The results of the scientific literacy tests and interviews were carried out using data analysis techniques by giving a score to each student's answer. The data obtained were interpreted into two categories, scientific literacy scores, and interview results. The average grade VII grade IPA students of the Umar Mas'ud Sangkapura Foundation are 32,563, placing them in the low category. There are several factors that cause students' low scientific literacy skills, including a lack of interest in reading, instructional media that do not prioritize scientific literacy, and a lack of direction from the teacher.

Keywords: Scientific Literacy; Literacy Ability; The effect of Literacy.

Introduction

The Indonesian 2003 Law concerning the national education system is a deliberate and planned effort. The law aims to create an atmosphere and learning process for students, thus students are active in developing their potential. The self-potential develops religious spiritual strength, personality, self-control, noble character, and the skills needed by it. Facing the current 21st century, education in Indonesia is expected to form intellectual human beings, thus, they can face the changing of revolution (NCRL et al, 2003; Wang et al 2018). Especially in biology education (IPA) is expected to prepare students to face various challenges in the global era. Learning preparation makes students be able to literate in science (increase their scientific literacy), have good competence, logical, creative, and able to think

critically and collaborate. In the learning process, particularly in biology learning, teachers are required to be more creative and innovative (Osman et al., 2013; Kaya et al., 2012).

Scientific literacy, as defined by the Organization for Economic Co-operation and Development (OECD), (2016); Sadler et al. (2009); and Laugksch, (2000), is the capacity to comprehend ideas, understand the characteristics of science, analyze or explain scientific phenomena, draw conclusions based on facts, and intellectually. The OECD PISA (Organization for Economic Cooperation and Development) study can be used to measure scientific literacy every three years sadler. The OECD is a global organization that promotes economic growth and cooperation, and PISA is a test of ability and knowledge of reading, mathematics, and

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science. Since 2000, Indonesia has participated in this PISA study. Table 1 displays the results of the PISA study for the scientific literacy abilities of Indonesian students from 2000 to 2018.

Table 1. PISA Investigation Results of Indonesian Students' Scientific Literacy Ability from 2012, 2015 dan 2018, with an average score of 500 (OECD, 2019).

Indonesia Average Score	Level	Participated Countries
475	64	65
403	62	70
396	70	78

The results of the PISA study found that Indonesia was included in the low category with a score of <500 (below average) (OECD, 2019). This shows that Indonesian students have not been able to apply scientific knowledge in their everyday life or understand scientific concepts and processes. According to Westwood, (2008) and Holbrook et al. (2009). that the assistance of educators (teachers) can be in the form of encouragement, directions, warnings, and giving examples, so that students are able to learn independently.

In general, learning activities that have not improved the development of scientific literacy are caused by Indonesian students' lack of receiving scientific literacy instruction. According to Ardianto et al. (2016), the factors causing the lack of scientific literacy for students are the condition of school facilities and infrastructure, school management, and school human resources. Moreover, according to Kurnia and Fathurohman (2014); Pantiwati (2014), the education system, the choice of teacher teaching methods, learning facilities, and infrastructure, and the curriculum all contribute to the lack of scientific literacy in Indonesian students. The results of research from Erman et al. (2021); Gormally et al. (2012), also showed that the factors that influence learning included the existence of supporting tools (literacy), learning enjoyed by children with creative and various learning methods in order to minimize the feeling bored, and the learning saturation experienced by children when their learning activities are successful. Then, scaffolding is complete when the child is able to acquire the ability or ability while increasing independence in completing his work.

At Umar Mas'ud's school, interviews were conducted with biology instructors. The findings show that teachers struggle to teach students effectively and independently. This is because the students are accustomed to receiving information directly. Consequently, students are less involved in the learning itself. In addition, students are not able to link one concept with other concepts that have been studied

previously. For instance, by the inability to answer questions that require the student's analytical thinking. Regarding teacher evaluation, on the other hand, it is only limited to measuring students' knowledge of the subject matter they are studying, thus it is easy to identify the factors that influence students' scientific literacy abilities. In fact, based on the data mentioned above, there is no information regarding VII grade scientific literacy abilities in the Umar Mas'ud Sangkapura school. In order to be able to provide appropriate solutions to the problems faced, especially in the field of scientific literacy, it is very important to have informational knowledge related to students' scientific literacy ability at Umar Masud School.

The participants in this study were all Class VII students of the Umar Mas'ud Sangkapura School for the 2022/23 academic year. The sample selection for this study used the cluster random sampling method. Class VII Junior High School Umar Mas'ud was selected as the research sample, and 86 students were sampled. Questions about scientific literacy and guide sheets for interviewing teachers and students are the instruments used in this study. In this study, the method of collecting data was by conducting interviews with students and teachers and managing scientific literacy test questions. The following steps are used to analyze data on the level of scientific literacy.

Method

General Background (Optional)

This exploration was led by semi-explorative interviews with several educators and students. Both pre-test and post-test were used to assess students' water pollution scientific literacy (Fraenkel et al., 2012).

Sample, Participant, Group

This research was carried out in an odd semester of the 2022/23 academic year at the Umar Mas'ud Sangkapura Foundation with students from MTS and class VII. The sample is 40 students. The method used is the CRS (Cluster Random Sampling) method in the selection of sampling.

Instruments and Procedures

This study used interview guide sheets for teachers and students as well as scientific literacy materials as research instruments. The data collection method used tests of scientific literacy questions and interviews with a number of teachers and students.

Data Analysis

Using data analysis techniques, scores were assigned to each student's response in the scientific literacy tests and interviews. Equation 1 illustrates

Arikunto's formula (2013) which is used to convert the score results into values. The interpretation of the results obtained is included in the category of results of interviews and achievement of scientific literacy (OECD, 2019).

$$Value = \frac{Score\ obtained}{Maximum\ score} \times 100 \tag{1}$$

The criteria in Table 2 are used to interpret the range of scores for achieving scientific literacy.

Table 2. Criteria for achieving scientific literacy

Range Score	Criteria
67 - 100	High
33 - 66	Middle
<33	Low

Result and Discussion

Scientific literacy is defined as the ability to use scientific knowledge, identify questions, and draw evidence-based conclusions to understand and make decisions about nature and the changes caused by human activity (Rustaman, 2003; Ritchie et al 2011).

Students obtained an average score of 32.563 on the scientific literacy test, which meets the low criteria. Table 3 displays all the results of the students' scientific literacy tests.

Table 3. The Results of the Scientific Literacy Test for the Students of Umar Mas'ud School

Range Score	Percentage (%)	Average Score
67 - 100	0	
33 - 66	38.196	32.563
<33	61.804	(Low)

The results of the average value shown in table 2 are 32.563. These results are included in the low category, with a percentage of 61.804%. The lack of students' scientific literacy skills is due to the lack of students' ability to understand and analyze scientific literacy tasks. The tasks given by the teacher on daily tests and midterm tests require students to improve their memory of the material that has been studied. Students experience difficulties when working on problems that require understanding and analysis. Students must be accustomed to working on problems that require understanding and analysis, as well as contextual with the real world. This will increase students' understanding of the material studied. According to Pantiwati (2017), Huryah et al. (2017), that the results of scientific assessment are not only guided by assignments to each science subject, but also on the ability to think

and the ability to carry out scientific processes in real life. The questions given demand the memory of students. This tends to make students memorize the subject matter. Thus, students are unable to understand and develop their thinking abilities. Darliana (2011), Zeidler (2009), and Zawawi, et al. (2005) stated that the habits of students using memorization techniques in mastering the material rather than thinking skills. This causes students not to understand the subject matter, although students memorize the concept. Thinking ability has a positive relationship with students' scientific literacy. This shows that students' thinking skills will be followed by good scientific literacy abilities. One factor for students' lack of scientific literacy is caused by a lack of interest in reading and repeating learning material (Yuriza et al., 2018). The results of the author's interview with the students explained that they only repeated the material and read it when they were going to face exams or daily assignments given by the teacher.

One of the factors to increase the ability of understanding and scientific literacy is reading. Reading can increase students' insights and knowledge, thus students can integrate the literacy they read with the knowledge they already have (Susiati et al., 2018 Ayu et al., 2018). The lack of scientific literacy in students is also influenced by the teacher's knowledge of scientific literacy.

The author's interviews with teachers revealed that teachers help students develop their scientific literacy by first requiring them to read the material being studied and then giving them the opportunity to ask questions if they don't understand something. This shows the teacher's ignorance of literacy science. Logic skills are not only about reading and understanding the material, but also utilizing logical information in different situations. According to Shihab et al. (2019), scientific literacy involves more than just reading, writing, and books. It also involves using knowledge and thinking in various contexts. According to research findings conducted by Sari et al (2017), one of the factors causing the low level of students' scientific literacy is the teacher's lack of understanding of scientific literacy.

Conclusion

The results of the analysis of the scientific literacy abilities of class VII students at Umar Mas'ud School concluded that the average value of students' literacy abilities was 32.563. These results indicate a low category in scientific literacy skills. Factors that cause students' scientific literacy skills to be lacking are a lack of interest in reading, evaluation tools that have not helped students develop scientific literacy, and a lack of knowledge about scientific literacy among teachers. The

advice that the author can convey for further research is that it is hoped that future researchers who wish to examine students' scientific literacy should use a test instrument by paying attention to the number and level of questions that are the same in every aspect of scientific literacy and the content of the material being tested.

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