A Study Investigation Students' STEM Literacy in Biology Learning

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Abstract. STEM literacy is the capacity to recognize, use, and integrate ideas from science, technology, engineering, and mathematics in order to comprehend a difficult issue and come up with novel solutions. This study intends to assess students' STEM literacy as it relates to biology instruction. Descriptive research is the method employed. 56 students from class X MIPA at SMA Negeri 9 Sijunjung made up the population and sample for this study, which used the sampling technique known as saturated sampling. In order to collect data for this study, 17 STEM literacy questions were used. Overall, the study's findings indicate that the STEM literacy of the students in biology class X MIPA at SMA Negeri 9 Sijunjung is in the middle range, at 60.52 percent. 59.58 percent of people are scientifically literate, 42.85 percent are technologically and engineeringly literate, and 73.65 percent are mathematically literate. The majority of students had intermediate STEM literacy achievements, according to research and data analysis findings regarding the analysis of students' STEM literacy achievements in biology learning class X SMA N 9 Sijunjung in the 2020/2021 academic year.

Keywords: STEM Literacy · Biology Learning

1 Introduction

The development of the current educational situation is very dynamic, especially with changes in technology and communication. This must be accompanied by a better quality of Human Resources. When we look at 21st-century learning where students think more critically, be able to integrate all real-life sciences, understand technology and information and communicate in communicating and collaborating, then human resources must adapt to conditions.

Currently, the Coronavirus Disease-19 (COVID-19) outbreak that has hit almost all corners of the world has forced learning activities to be carried out online. All levels of education are affected by the spread of the COVID-19 outbreak. One of the impacts is that students, students, and students are forced to do online learning, which requires them to use media platforms such as Edmodo, Google Classroom, Zoom Meeting, and others. Therefore, in the current pandemic conditions, students are required to be technology literate.

M. Fadilah et al. (Eds.): IcoBioSE 2021, ABSR 32, pp. 33–38, 2023.
https://doi.org/10.2991/978-94-6463-166-1_6

Education is influenced by technological developments. Where technological developments affect the quality of human resources. The quality of a country's education and human resources can be measured, one of which is through scientific literacy skills. According to the Organization for Economic Cooperation and Development (OECD(OECD))'s 2018 Program for International Student Assessment (PISA) survey results, Indonesian students' reading proficiency received an average score of 371, compared to an OECD average score of 487. The average score in mathematics then rose to 379, with an OECD average score of 487. Additionally, Indonesian students scored an average of 389 in science, compared to the OECD average of 489 for that subject. Based on these findings, it was determined that Indonesia belongs to the low-performance, high-equity quadrant.

The need to know the assessment of achievement and STEM literacy of students so that they can see the success and accuracy of the buyer lessons made by the teacher. Aside from that can see the effect of STEM literacy on understanding capacity of students based on problem-solving, reasoning based on the hypothesis, and the combined amount of information in the procurement process lesson.

The goal of STEM education is to equip students with the skills they need for the 21st century. These abilities are learning skills and the ability to provide innovation, critical thinking skills, and be ability to solve various problems as well as the ability to be creative in using technology and be able to work together in groups.

Based on the outcomes of the interviews that researchers at SMA N 9 Sijunjung, with Mrs. Siska Hiswari, S.Pd., on October 20, 2020, the influence of technological developments is quite large on students coupled with current technological demands. At SMA N 9 Sijunjung, the term STEM has been introduced and STEM has been applied to biology subjects. However, students at the school are still less enthusiastic about reading, and less skilled in mastering technology. At the time of learning, students have not been able to apply scientific, technological, engineering, and mathematical literacy in learning, and teachers have never known the profile of students' STEM literacy.

This makes researchers interested in conducting research on the analysis of STEM literacy achievements of students in class X biology learning at SMA N 9 Sijunjung. Because STEM literacy can help students apply their knowledge in solving problems related to the environment by utilizing technology and through various experiences carried out.

The research that the author conducted has the following objectives to find out the achievement of STEM literacy of students in class X biology learning at SMA N 9 Sijunjung and to find out the difference in STEM literacy achievement for boys and girls in class X SMA N 9 Sijunjung.

2 Methods

The research conducted is descriptive research, namely research that describes a symptom, fact, event or event that is currently or has occurred. In other words, descriptive research takes problems or focuses on actual problems that are or have occurred and are expressed as they are or without manipulation.

This study was carried out in the even semester of January-June at SMA N 9 Sijunjung in the 2020/2021 academic year. Students from class X SMA N 9 Sijunjung, which was

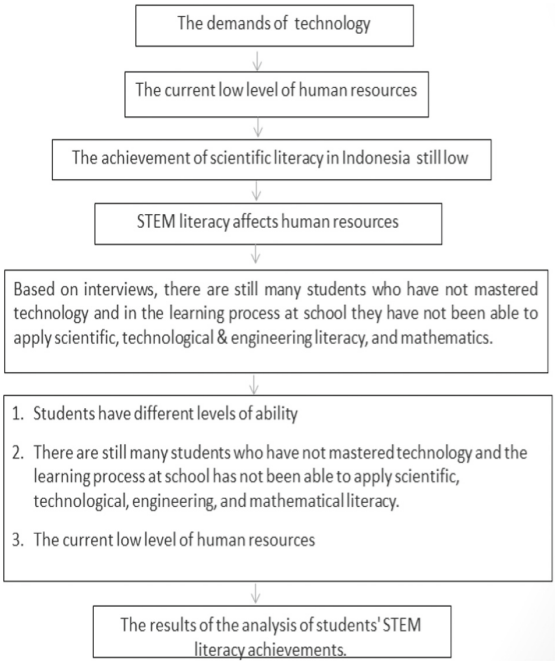

Fig. 1. Research Procedure

made up of 2 classes and 56 students, made up the population of this study. The sample is part of the population taken based on the author's affordability which is applied based on a certain method. Saturated sampling was used as the sample method in this investigation where samples drawn from the entire population are used, and the sample to be used in this study is 56 people.

The variable in this study is the achievement of STEM literacy of students in class X biology learning at SMA N 9 Sijunjung. The variable in this study is the achievement of STEM literacy of students in class X biology learning at SMA N 9 Sijunjung. Sources of data that can be obtained from this study are data on students' STEM literacy obtained from answers to students' STEM literacy questions in class X biology learning at SMA N 9 Sijunjung. Which, using the sample method of saturated sampling, came to 56 individuals. In order to collect data for this study, 17 STEM literacy questions were used.

The instrument used in this study was STEM literacy questions with multiple choice options. By using this test, the percentage of pupils who obtain STEM literacy in biology instruction can be seen. There are 30 questions that will be logically validated by the Biology lecturer at FMIPA UNP and the biology teacher at SMA N 9 Sijunjung. After that, the questions will be tested on students (Fig. 1).

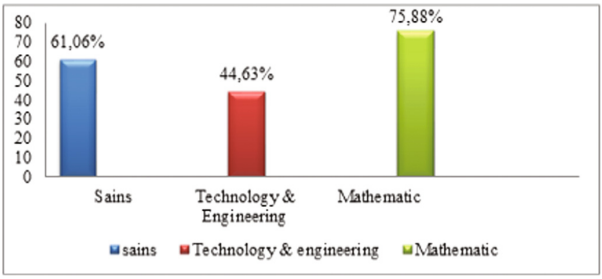

Fig. 2. Result of STEM Literacy Achievement

Table 1. Criteria of the Data

Category	Interval
Very High	86–100
High	76–85
Currently	60–75
Low	55–59
Very Low	<54

3 Result and Discussion

This research data was obtained from the results of the STEM literacy test questions given to 56 students of class X SMA N 9 Sijunjung in the 2020/2021 academic year. Data analysis was carried out quantitatively in order to of knowing the analysis of the STEM literacy achievement of students in class X biology learning at SMA N 9 Sijunjung. The data obtained were then analyzed to determine the success of STEM literacy of students in class X biology learning at SMA N 9 Sijunjung. The results obtained are as follows:

The results of the STEM literacy achievements of students in class X biology learning at SMA N 9 Sijunjung are displayed in Fig. 2.

The criteria for each data refer to the Table 1.

Based on the results of research and data analysis obtained regarding the analysis of students' STEM literacy achievements in biology learning class X SMA N 9 Sijunjung in the 2020/2021 academic year, it is known that most students have moderate STEM literacy achievements.

Based on Table 1, it can be seen that the achievement of STEM literacy of students in class X biology learning at SMA N 9 Sijunjung is classified as moderate with a percentage of 60.52%. With scientific literacy of students of 61.06% which is included in the medium category, technological and engineering literacy of 44.63% which is included in the low category, and mathematical literacy of 75.88% which is included in the high category.

STEM literacy is the ability to identify, apply, and integrate concepts from science, technology, engineering, and mathematics to understand complex problems and have

innovations to solve them. Students who have high STEM literacy will certainly be able to solve complex problems, both by answering questions or working on existing tasks and problems. While students who have low STEM literacy tend to be unable to solve a problem or work on questions or assignments.

4 Conclusion

Based on the research conducted, it can be concluded that the analysis of the STEM literacy achievement of students in class X biology learning at SMA N 9 Sijunjung is classified as moderate, with a percentage of 60.52%. With scientific literacy of 61.06%, technological and engineering literacy of 44.63%, and mathematical literacy of 75.88% with medium category.

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