



Journal of Science and Technological Education, Vol. 2 No. 1, 2023
ISSN: 2830-5043 (Print) 2830-4829 (Online)

Journal of Science and Technological Education
(META)

journal homepage: www.meta.amiin.or.id

Article history: Received Dec 11, 2022; Accepted June 15, 2023; Published June 18, 2023

SMA Plus Al-Azhar Jember Students' Scientific Literacy on Biodiversity Course

Siti Romlah

Kiai Haji Ahmad Siddiq State Islamic University, Indonesia
Correspondence author, mbsitiromlah346@gmail.com

Moch Hanif Nur Sahadha

Kiai Haji Ahmad Siddiq State Islamic University, Indonesia

Winda Nur Hakiki

Kiai Haji Ahmad Siddiq State Islamic University, Indonesia

Laylatul Vayzah Anggariny

Kiai Haji Ahmad Siddiq State Islamic University, Indonesia

Abstract The objective of this study is to determine the Scientific Literacy Profile of SMA Plus Al-Azhar Students in Class X Biology Learning on Biodiversity Material. This study was conducted during the even semester of the academic year 2022-2023. This study provides treatment in learning activities using a pre-experimental design and a one-group pre-test post-test design. Using a Google form containing 10 questions, data was gathered employing a 10-item questionnaire. In this research, 28 class X SMA Plus Al-Azhar Jember students formed the population. In the present study, qualitative descriptive data analysis techniques were used to analyze the data. 61% of the research findings on content indicators fall into the adequate category. The category for cognitive process indicators is poor, with a percentage of 40%, and the category for context indicators is very poor, with a percentage of 39%.

Keywords: Scientific literacy, Biology course, Biodiversity, SMA Plus Al-Azhar Jember

INTRODUCTION

The 21st century is based on science and technology, necessitating that human resources acquire a variety of skills, including critical thinking and the ability to solve an increasing number of problems. However, Indonesia's educational outcomes are still scientifically inferior to those of other developing nations. One of the fundamental literacy assessments is the reading aspect, which measures comprehension, application, and reflection of written reading results. Education is a crucial factor that can be used to enhance the quality of human resources in order to support the advancement of science and technology (Adisel & Pranansa, 2020; Pane & Dasopang, 2017). Through education, a person will be able to better himself so that he can obtain a position in society (Illahi, 2020).

In the era of revolution 4.0, education is conducted through technological means. In this era of globalization, technological advancements have had a significant impact on the global education system (Dewi, 2019). This has implications for education in Indonesia. The learning process is a crucial component of the teaching process; instructional activities will only be meaningful if student learning activities occur. Teachers must comprehend the learning processes of their students in order to provide guidance and an appropriate and harmonious learning environment for their students (Widayoko et al., 2018).

Humans must possess scientific literacy in order to properly organize, analyze, and interpret any obtained information. A person with a high level of scientific literacy will be sensitive to their surroundings and the interactions between science, technology, and society. In the era of globalization, scientific literacy is the capacity of students to make complex connections between events and technology using their knowledge of science. Biodiversity material consists of information regarding the extent of biodiversity, Indonesia's biodiversity, the affect of human activities on biodiversity, and preservation efforts. This material is extremely useful for gaining insight into environmental concerns, particularly conservation and management of natural resources. Learning about biodiversity typically concentrates on material already contained in textbooks and is unable to demonstrate the richness of Indonesia's biodiversity, the influence of human activities on its dynamics, and the need for conservation efforts.

METHOD

This study provides treatment in learning activities using a pre-experimental design and a one-group pre-test post-test design. A quasi-experimental design with disparities between the pre- and post-test. According to Sugiyono (2017), the experimental research technique is used to determine the effects of specific treatments. This form of research employs random sampling, which is a procedure for selecting sample units from a population in which each element or member of the population has an equal chance of being chosen as a sample.

Using a Google form, ten queries pertaining to biodiversity-related content were used to conduct the collection. Indicators are utilized to assess and evaluate students' scientific literacy skills during biology instruction. So that this study's findings can serve as a foundation for future research. Data outcomes were analyzed using descriptive statistics. Three scientific literacy indicators are measured, including content, cognitive processes, and context. Indicators of content include data and uncertainty and algebraic sub-indicators, indicators of cognitive process include comprehension, reasoning, and application sub-indicators, and indicators of context include scientific sub-indicators. As reported by Dewayani et al. (2021). The following is the data interpretation table according to Arikunto (2010).

Table 1. Criteria for students' scientific literacy level

Score	Criteria
80-100	Very Good
66-79	Good
56-65	Adequate
40-55	Poor
<40	Very Poor

Time and Place of Research

Jember's SMA PLUS Al-Azhar is the location of the research. This study was conducted during the academic year 2022-2023's even semester.

Population and Sample

This research included all 28 pupils in class X of SMA Plus Al-Azhar Jember. Class X was selected as the experimental class using a non-probability sampling technique, which is a sampling method in which all members of the population are used as samples.

Data Analysis Technique

In this study, qualitative descriptive techniques were used to analyze the data, which is data analysis that seeks to provide a description of the research subject based on the variables obtained. Students are required to respond in the form of describing, explaining, discussing, comparing, and other similar forms in accordance with the requirements of the questions using their own words and language that is easy to comprehend. The test assessed the questions' validity and dependability so that they could be used as pretest and posttest questions to ascertain the impact of the application of literacy activities on the learning outcomes of students in grade ten. The final step was data analysis, during which the collected information was arranged in a manner that made it simpler to comprehend.

FINDINGS AND DISCUSSION

Human work to increase knowledge in order to shape values, attitudes, and behavior. Education is also a means to cultivate students' self-potential and skills through the learning process as a prerequisite for their participation in society, nation, and state. Students are expected to reach their fullest potential in accordance with learning objectives as a result of the educational process in institutions.

Educators as teachers must be able to establish a positive classroom environment so that students are actively engaged in the learning process and can develop all of their inherent abilities. In the learning process, it is necessary for all pupils to comprehend what has been taught so that the process does not fail to convey the intended material.

According to Sukma and Ibrahim (2016), in Indonesia, learning outcomes are deemed effective if they satisfy the minimum completeness criteria (KKM) established by educators at each school. Ability in literacy activities has a significant impact on academic outcomes. One of the causes of poor student learning outcomes is students' lack of interest in reading, particularly in activities related to literacy and learning, such as reading fluency, text comprehension, and communication skills.

In addition to literacy activities in elementary schools, the selection of learning models used in learning is inappropriate, in that literacy-based learning models have not been implemented. The inaccessibility of facilities that support literacy activities, such as the lack of optimal infrastructure in the library and the absence of a reading corner in the classroom, also contributes to the low learning outcomes because it is difficult for students to obtain information from sources other than the educator. In addition, the success or failure of learning objectives is influenced by a number of factors, one of which is the educators' determination of how to teach a subject.

In accordance with this, Rusman (2012) stated learning outcomes are a collection of cognitive, affective, and psychomotor experiences gained by students. Not only is learning the mastery of subject theory concepts, but also of habits, perceptions, delights, interests-talents, social adjustment, various skills, aspirations, desires, and hopes.

The purpose of this research is to ascertain the scientific literacy ability profile of students in class X SMA Plus Al-Azhar Jember who are learning about biodiversity. Therefore, it is essential to understand the learning process as it should be conveyed to students, so that students can acquire scientific literacy skills, and it is anticipated that this will have an impact on problem-solving in daily life. This research was conducted in a single meeting, in conjunction with learning and literacy activities. Observation diaries in the form of Googleform were used to collect data, while biodiversity-related learning materials were utilized. At the conclusion of the meeting, a test is administered to determine student learning outcomes. Where the pretest result data measures students' scientific literacy to determine their initial understanding of the concept of Biodiversity, the experimental class provides the pretest value data. While posttest data are collected after receiving treatment (treatment).

The measurement of scientific literacy comprises three indicators, namely content, cognitive processes, and context, each with several subindicators. Based on the categorization provided by (Arikunto, 2010), the levels of scientific literacy among students are categorized as follows: very good, good, sufficient, lacking, and very lacking. Based on the overall findings of the study, each indicator of scientific literacy reveals three categories: sufficient, insufficient, and very inadequate. The percentage of students with scientific literacy abilities based on each indicator is compared in table 2 below.

Table 2. Percentage of Students' Scientific Literacy Ability Based on Each Indicator

Indicators	Percentage	Category
Content	61%	Adequate
Cognitive Process	40%	Poor
Context	39%	Very Poor
Average	47%	Poor

According to Table 2, there is a percentage difference between each indicator. 61% of the percentage results for the content indicator fall into the adequate category. The category for cognitive process indicators is poor, with a percentage of 40%, and the category for context indicators is very poor, with a percentage of 39%. According to the data described previously, the content indicator contains the highest category, while the context indicator contains the lowest category.

Cognitive process refers to a person's method of reasoning or how they process the information they acquire, where the information is transformed into knowledge in the memory (Salsabila, 2017). In this study, the lack of cognitive processing abilities among students can be attributed to a number of factors, including learning that focuses on the teacher rather than the students, teachers who frequently use the lecture method when presenting material, and teachers who rarely employ innovative learning models, thereby making the learning process less interesting and impressive. monotonous, and the teacher has been unable to provide facilities for the development of cognitive processes because he lacks understanding of cognitive processes himself. This is consistent with research conducted by Noor and Husna (2017), which indicates that teachers who conduct teaching and learning activities use a direct learning model, in which the teacher explains the material being studied and then writes it down, so that the teacher controls the class and the flow of knowledge is unidirectional. learners. Students' cognitive processes can be improved through innovative and interactive learning, so that they can trigger students to take an active role during the learning process.

In contrast, content is the information contained in print or digital media, whereas context is a sentence or description that contains or clarifies meaning. However, the context referred to in scientific literacy pertains to aspects of life or situations within the used content. In this study, content and context indicators fell into the categories of

sufficient and very insufficient; therefore, it is necessary to enhance scientific literacy skills through innovative and interactive learning processes, such as a project-based learning model.

The cognitive process indicators are divided into three sub-indicators, with the comprehending sub-indicator comprising 25%, the reasoning sub-indicator comprising 28%, and the application sub-indicator comprising 68%. As for the context indicators, only one sub-indicator, scientific, with a 39% weight, is utilized.

This is because students are not accustomed to working on HOTS (Higher Order Thinking Skill) questions. and contextual queries whose solutions involve mathematical solutions in daily life. The low cognitive level of students is due to the fact that the majority of questions still focus on remembering, understanding, and applying, while questions in the categories of analyzing, generalizing, synthesizing, evaluating, and solving problems are not widely used.

In addition, in developing literacy skills during the learning process, the teacher must introduce students to HOTS (Higher Order Thinking Skill) questions in stages, beginning with the simplest questions and progressing to the most difficult questions, so that students can solve HOTS (Higher Order Thinking Skill) questions and gain confidence in their ability to think at a high level. In context indicators with scientific sub-indicators, 39% of the results are in the very poor category, indicating that the scientific nature of the learning process must be improved by re-studying material related to issues, activities, topics, and scientific facts, so that it can later assist students in solving problems.

This is consistent with Mahmud and Pratiwi's (2019) assertion that the presence of scientific literacy among students and interpretation of the presentation of pertinent context-based queries can facilitate the solution of each problem. In accordance with the aforementioned research findings, there are multiple methods to enhance learning outcomes, including the implementation of literacy activities. Literacy education is used to increase knowledge through reasoning activities and language skills in interacting with the community through writing and speaking. This will emerge or form when students comprehend the reading's content, allowing them to conquer the material in depth and facilitate a successful learning process. Scientific Literacy is an important ability that must be possessed by students, along with various other abilities such as critical thinking skills and creative thinking (Nasution et al., 2023), in order to face the 21st century.

CONCLUSION

Students must possess scientific literacy in order to properly organize, analyze, and interpret any acquired information. This study provides treatment in learning activities using the pre-experimental design method. The design employed is a one-group pre-

test post-test design, quasi-experimental design with distinctions between the pretest and posttest. Using biodiversity-related Google form content, ten queries were used to collect data.

61% of the percentage results for the content indicator fall into the adequate category. The category for cognitive process indicators is poor, with a percentage of 40%, and the category for context indicators is very poor, with a percentage of 39%. According to investigation results. In this study, the lack of cognitive processing abilities among students can be attributed to a number of factors, including learning that focuses on the teacher rather than the students, teachers who frequently use the lecture method when presenting material, and teachers who rarely employ innovative learning models, thereby making the learning process less interesting and impressive. monotonous, and the teacher has been unable to provide facilities for the development of cognitive processes because he lacks understanding of cognitive processes himself.

REFERENCES

- Adisel, A., & Pranansa, A. (2020). Penggunaan Teknologi Informasi dan Komunikasi dalam Sistem Manajemen Pembelajaran pada Masa Pandemi Covid 19. *Journal Of Administration and Educational Management (ALIGNMENT)*, 3(1), 1-10. <https://doi.org/https://doi.org/10.31539/alignment.v3i1.1291>
- Arikunto. (2010). *Prosedur Penelitian: Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta.
- Avikasari. (2018). The Effectiveness of Using Science Literacy Teaching Materials for Increasing Learning Achievement. *Jurnal Kependidikan*, 2(1), 221- 234.
- Azimi. (2017). Development of Scientific Literacy-Based Science Learning Media for High School Students. *Pancasakti Science Education Journal*, 2(1), 145-157. <https://scienceedujournal.org/index.php/PSEJ/article/view/91>
- Dewayani, M.A., Amin, M.A., & Dewi, V.S. (2017). *Analisis Faktor-Faktor yang Memengaruhi Ketepatan Waktu Pelaporan Keuangan (Studi Empiris pada Perusahaan Manufaktur yang Terdaftar di Bursa Efek Indonesia Periode 2011-2016)*. University Research Colloquium, 441–458.
- Dewi, P., & Primayana, K. (2019). Effect of Learning Module with Setting Contextual Teaching and Learning to Increase the Understanding of Concepts. *International Journal of Education and Learning*, 1(1), 19-26. [doi:https://doi.org/10.31763/ijele.v1i1.26](https://doi.org/10.31763/ijele.v1i1.26)
- Illahi, N. (2020). Peranan Guru Profesional dalam Peningkatan Prestasi Siswa dan Mutu Pendidikan di Era Milenial. *Jurnal Asy-Syukriyyah*, 21(1), 1–20. <https://doi.org/10.36769/asy.v21i1.94>

- Ilham, M. (2022). Profile of Scientific Literacy Ability of High School Students in Class X Biology Learning on Evolution Material. *Biodik: Jurnal Ilmiah Pendidikan Biologi*, 8(3), 36-42.
- Kuswanto, J., Nasir, M., & Ariyansyah, A. (2021). The Effect of the Guided Inquiry Learning Model on the Scientific Literacy Ability of Class X Students in the Material of Biodiversity at SMA Negeri 1 Wera in Academic Year 2021/2022. *Jurnal Pendidikan MIPA*, 11(2), 175-180.
- Mahmud, M. R., & Pratiwi, I. M. (2019). Literasi Numerasi Siswa dalam Pemecahan Masalah Tidak Terstruktur. *Kalamatika: Jurnal Pendidikan Matematika*, 4(1), 69-88. <https://doi.org/10.22236/KALAMATIKA.vol4no1.2019pp69-88>
- Nasution, N.E.A., Al Muhdhar, M.H.I., Sari, M.S., & Balqis. (2023). Relationship between Critical and Creative Thinking Skills and Learning Achievement in Biology with Reference to Educational Level and Gender. *Journal of Turkish Science Education*, 20(1), 66-83. <https://doi.org/10.36681/tused.2023.005>.
- Noor, A. J., & Husna, R. (2017). Meningkatkan Kemampuan Komunikasi Matematis Siswa Menggunakan Model Pembelajaran Kooperatif Tipe Student Teams Achivement Division (STAD). *EDU-MAT: Jurnal Pendidikan Matematika*, 4(2). <https://doi.org/10.20527/edumat.v4i2.2578>
- Pane, A. & Dasopang, M.D. (2017). Belajar dan Pembelajaran. *Fitrah: Jurnal Kajian Ilmu-Ilmu Keislaman*.
- Qomariyah, W., Al Muhdhar, M.H.I., & Suarsini, E. (2019). Implementation of Problem Based Learning Modules with the SQ3R Method on Biodiversity Materials to Increase Scientific Literacy and Environmental Care Attitude. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 4(3), 374-381.
- Rusman, R. (2020). Improving Biology Learning Outcomes About Biodiversity Through the Discovery Learning Model for Class X IPA 3 Students of SMA Negeri 3 Madiun Semester I Academic Year 2017-2018. *Jurnal Revolusi Pendidikan (JUREVDIK)*, 3(3), 1-6.
- Salsabila, N. H. (2017). *Proses kognitif dalam pembelajaran bermakna*, 434–443.
- Setiabudi. (2015). *Competency Education Research Methodology and Practice*. Jakarta: Bumi Aksara.
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
- Sukma, M., & Ibrahim, M. (2016). Developing Materials for Active Learning of Guided Inquiry-Integrated Bowling Campus on The Topic of Sense of Hearing and Sonar System of Living Organism. *Jurnal Pendidikan IPA Indonesia*, 5(2), 256-260. doi:<https://doi.org/10.15294/jpii.v5i2.5981>

- Sundari, A. (2016). Pengaruh Pemberian Integrated Reading And Writing Task Berbasis Problem Based Learning Terhadap Literasi Sains Siswa Pada Konsep Keanekaragaman Hayati. *Skripsi*. Jakarta: Universitas Islam Negeri Syarif Hidayatullah.
- Yokhebed, Y. (2018). Studi Literasi Informasi Mahasiswa Pendidikan Biologi. Fakultas Keguruan dan Ilmu Pendidikan Universitas Tanjungpura. *Dalam Konferensi Pendidikan Biologi Prosiding: Biologi, Sains, Lingkungan, dan Pembelajaran*, 15(1), 265-268.
- Widayoko, A., H. S. K., & Muhardjito, M. (2018). Analisis Program Implementasi Gerakan Literasi Sekolah (GLS) dengan Pendekatan Goal-Based Evaluation. *Jurnal Tatsqif*, 16(1), 78–92. <https://doi.org/10.20414/jtq.v16i1.134>