Science Literacy Profile of Junior High School Students on Global Warming Material

[1]Setyaningsih Setyaningsih, [2]Fenny Roshayanti, [3]Nizaruddin Nizaruddin, [4]Nur Khoiri

[1,2,3,4] Master of Science Education, PGRI Semarang University, Indonesia
[1] SMP Negeri 1 Sambong, Blora, Jawa Tengah, Indonesia

Corresponding author, email: setyaningsihgw2@gmail.com

Article info:
Submitted: January 24, 2024. Revised: Pebruary 20, 2024. Accepted: March 11, 2024.
Publish: April 15, 2024.

Abstract

Understanding science literacy is essential to facilitating effective learning and effectively addressing environmental concerns, as global warming is a complex subject. The purpose of this study is to map the science literacy profile of junior high school students in grade 7 regarding global warming content. Using multiple-choice exams and interviews, a descriptive quantitative method is employed to gather data on science context, science content, scientific competence, and science attitudes. 64 grade 7 students from SMP Negeri 1 Sambong in the Blora district participated in this study. According to the findings, 50% of students' science literacy in the area of global warming fell into the "very poor" category. The science literacy of the students attained an average score of 28% in the context aspect, 14% in the content aspect, 14% in the competency component, and 22% in the science attitude aspect. Based on the average score, it can be inferred that the science literacy skills of the pupils remain in the "very poor" category when considering all four components. These results have implications for the necessity of creating a science curriculum that emphasizes critical thinking and application in relation to global warming in order to raise students' general science literacy levels.

Keywords: global warming, student profile, and science literacy

Recommended citation:
Setyaningsih S., Roshayanti, F., Nizaruddin, N., & Khoiri, N. (2024). Science Literacy Profile of Junior High School Students on Global Warming Material. *Lembaran Ilmu Kependidikan. 53*(1). 120-130.
https://doi.org/10.15294/lik.v53i1.4661

INTRODUCTION

Nowadays, a lot of attention is paid to teaching students 21st century abilities, particularly when it comes to curriculum development and instruction. Indonesia has incorporated a number of 21st century learning innovations, including as the usage of digital media as Canva app-based instructional films and Virtual Reality. Virtual reality and its associated technologies are revolutionizing education in terms of skill acquisition and learning (Juliana et al., 2022). Furthermore, attempts to raise the standard of instruction in schools are now centered on the adoption of 21st century skills-based learning approaches. The inclusion of 21st century abilities, such as the 4C (Collaboration, Communication, Critical Thinking, and Creativity), in curriculum development is crucial (Nurhayati, 2024). This demonstrates how curriculum designers should include 21st century skills while creating curricula in order to equip students for the demands of

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

the future.

The 21st century is marked by a growing recognition of the significance of science literacy in addressing global issues, particularly in relation to environmental concerns. Global warming is one of the main issues that the world is concerned about, and it has significant consequences. A person who possesses science literacy is able to comprehend scientific concepts, communicate scientific ideas both orally and in writing, and use scientific knowledge to solve problems in a way that fosters a positive attitude and self-awareness while making decisions based on scientific evidence (Farcis et al., 2022). Using scientific knowledge and process abilities to comprehend scientific phenomena in problem-solving and decision-making is another aspect of science literacy (Pujawan et al., 2022). Therefore, in order to overcome obstacles and make judgments based on knowledge, science literacy is a crucial skill for comprehending, using, and communicating science.

People must possess science literacy, which is the capacity to comprehend, evaluate, and apply scientific information, in order to comprehend the intricacies of global warming and its effects on the environment (Sumarni et al., 2020). Even students who have taken environmental topics may still show poor levels of environmental awareness and conduct, according to studies, despite the growing emphasis on environmental education (Arshad et al., 2020). This calls into question how well-suited the existing educational paradigm is to promote science literacy, particularly in light of global warming.

Science attitude, competency, context, and content are the elements of science literacy that are examined. The content component of science literacy pertains to scientific knowledge, which encompasses scientific facts, concepts, and theories. The context element, on the other hand, emphasizes how science is used in actual contexts and in day-to-day circumstances. Investigating, analyzing, and comprehending scientific phenomena are examples of scientific process skills that are part of the science competency component. The last component of the science attitude component is attitudes, values, and beliefs regarding science. These include a favorable attitude toward science, sensitivity to scientific concerns, and the capacity to base decisions on scientific analysis (Fitria et al., 2022). One of the content aspects of the science literacy of the global warming material would be a comprehension of scientific concepts connected to the phenomenon, such as its process, impact on the environment, and possible mitigation measures (Setiawani et al., 2021).

The application of information concerning global warming in real-world scenarios and the broader global context will be highlighted by the context component (Safrizal, 2021). The capacity to gather compelling scientific arguments and to use scientific process skills to comprehend, analyze, and evaluate data pertaining to global warming will be part of the competency component (Novitasari & Admoko, 2022). A favorable attitude toward science, environmental awareness, and a readiness to act on the basis of scientific knowledge on global warming comprise the science attitude component (Shohib et al., 2021). It is anticipated that students' science literacy in the context of global warming material will improve overall by focusing on these four areas: developing positive attitudes toward science and the environment, applying science in real-world contexts, and developing a thorough understanding of scientific concepts.

Similar studies that have been published have shown that research issues in science literacy are frequently connected to the elements that lead to students' inadequate science literacy abilities. The analysis of books, articles, notes, and other sources of information about students' low science literacy was part of the literature survey done for these studies (Fuadi et al., 2020). The primary goal of this study is to identify the elements that contribute to students' inadequate science literacy. These factors may include things like a lack of knowledge of scientific concepts, a failure to apply science in practical settings, a lack of scientific process skills, and a positive attitude toward science (Fuadi et al., 2020). Further research is necessary to address the primary

issue of students' insufficient science literacy skills, as supported by the results of previous studies of a similar nature. Finding the causes of low science literacy can give educators important information for creating instructional techniques that will raise science literacy levels in the classroom.

A crucial subject in today's education is the science literacy profile of junior high school pupils in grade 7 who study global warming. It is necessary to fill in the current gaps in scientific literacy about global warming among students in the seventh grade. Students provide a major issue because of their misconceptions and poor comprehension of scientific topics connected to global warming (Fayanto et al., 2023). One common source of research problems is students' inability to connect science ideas to real-world situations, which makes it more difficult for them to address problems (Amala & Yushardi, 2022; Lake et al., 2023). Therefore, the purpose of this study is to evaluate the grade 7 students at SMP Negeri 1 Sambong's science literacy in relation to comprehending content on global warming.

This research is vital because, in order to further science education in Indonesia, it is imperative that students' science literacy be improved (Hafizah & Nurhaliza, 2021). Research has demonstrated that several learning approaches, including free inquiry, problem-based learning, and scientific learning, can enhance junior high school students' science literacy (Rahman et al., 2022; Herman et al., 2022; Saptaningrum, 2023). It is anticipated that students' science literacy abilities will increase with the use of the appropriate learning paradigm, such as problem-based learning based on blended learning (Zulfa et al., 2022). This not only makes science materials easier to understand, but it also improves life skills, critical thinking abilities, and practical skills for using science concepts in daily situations. Furthermore, science literacy equips pupils to thrive in the fast-paced world of modern science and technology. Thus, there is a need for initiatives to enhance science education in schools.

Accurate data about the degree of science literacy success among students, particularly those in junior high school and enrolled in the nine-year compulsory education program, must be gathered in tandem with efforts to improve the quality of instruction in the classroom. An examination of the science literacy skills profile of SMP Negeri 1 Sambong Blora district students can be a useful tool for educators and other stakeholders seeking to raise the standard of instruction in schools to meet established curriculum requirements. Numerous factors, such as content, procedure, context, and science attitude, can be included when evaluating pupils' science literacy. In order to increase the science literacy of junior high school students in grade 7 in order to better grasp the problem of global warming, it is anticipated that this research will offer fresh perspectives on the creation of efficient teaching methodologies.

METHOD

This study used a quantitative descriptive methodology to characterize the global warming material scientific literacy profile of SMPN 1 Sambong students in Blora Regency. The main focus of this study is the science literacy profile of the students, which was determined by employing authentic assessments to administer science literacy tests on global warming materials. A multiple-choice science literacy test including the context, topic, competence, and science attitudes components of science literacy is part of the authentic assessment that is employed. 217 seventh-grade pupils from the 2023–2024 school year made up the study's population. The pupils in classes VII B and VII C served as the study's samples. 64 SMPN 1 Sambong class VII students were chosen by purposive sampling to participate in the study. Given that the two courses were taught by the same science teacher and had comparatively equal skill levels, it was decided to use them as research samples. The research subjects' students were thought to possess comparable skills. The two classes may also provide insight on the general scientific literacy level of junior

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

high school pupils in Grade VII.

In order to conduct the research, the first step was to prepare it by using Zahro's research (2020) science literacy questions about global warming. Additionally, the answers to the science literacy test questions are recorded for a duration of sixty minutes as part of the data collection step. To determine the percentage of pupils who gain science literacy, the data must be analyzed in the final step.

Tests and casual interviews with a school-affiliated science teacher served as the data collection tools for this investigation. The same test questions are given to every student in the sample to gauge each student's abilities, knowledge, intelligence, skills, or capabilities. Informal interviews were done in the interim to acquire a general understanding of the students' skills and the school's approach to teaching science. This kind of interview, which is most frequently utilized in qualitative research, doesn't include any particular questions, question formats, or question sequences.

The scientific literacy tool utilized was taken from Umi Roufatuz Zahro's thesis, "Development of Test Instruments to Measure Students' Science Literacy Skills on the theme of Global Warming" (Zahro, 2020). Twenty questions on science literacy spanning competence, context, subject, and attitudes toward science make up this tool. Table 1 provides further information.

Table 1. Aspects of science literacy are covered in the questions.

No	Science Literacy Aspects	Indicator	Item
1	scientific context	Global	1,2,3,4,5,6,7,8,9,10, 12,13
		Personal	16,17, 18,19,20
2	Knowledge (scientific content)	Earth and space systems (global climate)	1,2,3,4,5,6,11, 13, 14, 15, 17
		Life System (health)	7,12
		Technology System (helps humans fulfill their needs and desires)	8,9,10
		Ozone Layer	16,17, 18,19,20
3	Scientific Competence	Explain phenomena scientifically	1,2,4,6,8,16
		Evaluate and design scientific investigations	3,9,10,11, 12,19
		Interpret scientific evidence and data	5,13, 14,15
		Analyzing and interpreting data to draw appropriate conclusions	7,18,20
4	Science Attitude	Interest in science issues	16,17, 20
		Support for inquiry	18,19

In order to determine a science literacy score by quantitative data analysis of the exam results, the following formula is used:
NP = R/SM X 100% (Sholikah et.al., 2021)
Description:
NP = Percent value sought or expected
R = Raw score obtained by students
SM = Target maximum score for the relevant
100 = Fixed number

Table 2 provides an analysis of the percentage of science literacy skills for each literacy feature that was obtained.

Table 2. Categories of Student Science Literacy Test Percentages (Sholikah et.al., 2021)

Interval	Criteria
86 % - 100%	Very Good
76 % - 85%	Good
60 % - 75%	Fair
55 % - 59%	Poor
N ≤ 54 %	Very poor

RESULTS AND DISCUSSION

In today's information-driven environment, literacy is a vital skill. Proficiency in reading, comprehending, and evaluating all kinds of texts—including scientific literature—is a prerequisite for literacy. The ability to comprehend and apply scientific concepts, principles, and procedures is sometimes referred to as literacy in the context of science. Table 3 displays the results of the seventh-grade science literacy test for all students in the SMP Negeri 1 Sambong Blora district.

Table 3. Percentage of students' overall Science Literacy Ability

No	Category Science Literacy	Percentage
1	Very Good	19%
2	Good	6%
3	Sufficient	25%
4	Poor	0%
5	Very poor	50%

Table 3 illustrates that the overall percentage of students' science literacy skills falls into four categories: "sufficient" at 25%, "very poor" at 50%, "good" at 6%, and "very good" at 19%. This indicates that 50% of pupils have a very limited comprehension of science ideas, placing the overall percentage in the "very poor" category. This suggests a substantial gap in their understanding of science and their capacity to use it in practical settings. Their capacity to make wise judgments in a variety of spheres of life, as well as their academic and professional futures, may be negatively impacted by this low degree of science literacy. Additionally, the data analysis results revealed that just 25% of the students were in the "sufficient" category, indicating that they comprehend science concepts (scientific concepts) to a modest degree and can apply them to some amount.

Students' Science Literacy in the Context of Science

Tests are administered in four domains of science literacy: context, topic, competency, and science attitudes. The global and personal indicators are the two that are tested in the context aspect literacy questions. Results are provided in Table 4 and are based on a descriptive examination of students' science literacy in the context of science.

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

Table 4. Science Literacy of Students in the Context of Science Aspect

No	Science Literacy Aspects	Indicator	Percentage Score
1	scientific context	Global	45%
		Personal	11%
Average Percentage		28 %	

In terms of science context, the average percentage of pupils' science literacy skills is 28%. The label of "very poor" applies to this score. Figure 1 presents the data from Table 4 in further detail.

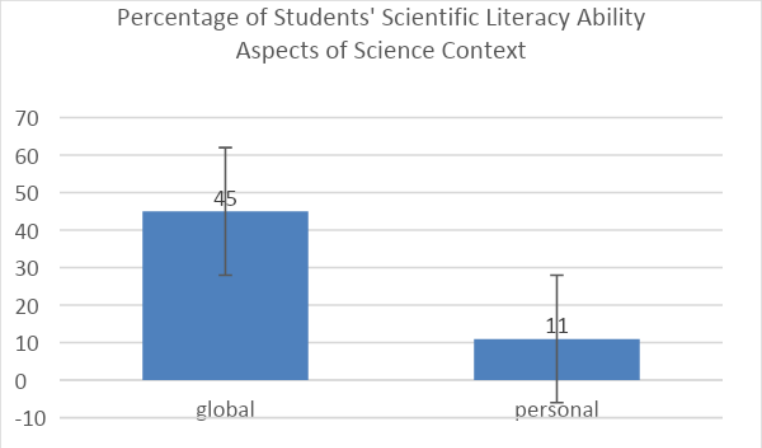

Figure 1. Percentage of Students' Scientific Literacy Ability Aspects of Science Context

Science Literacy Ability of Students in Science Content Aspect

Science content is the second component of inquiries about science literacy. Four indicators are assessed in the questions: the ozone layer, living systems (health), Earth and space systems (global climate), and technological systems (assisting humans in achieving their goals and wants). Table 5 lists the outcomes of the descriptive analysis conducted to determine the science literacy skills of the students in the science curriculum area.

Table 5. Students' Science Literacy in Science Content Aspect

No	Science Literacy Aspects	Indicator	Percentage Score
2	Knowledge (scientific content)	Earth and space systems (global climate)	29%
		Life System (health)	8%
		Technology System (helps humans fulfill their needs and desires)	8%
		Ozone Layer	11%
Average Percentage		14 %	

Overall, 14% of students are proficient in science literacy when it comes to the science curriculum area. The label of "very poor" applies to this score. Figure 2 presents the data from

table 5 in further detail.

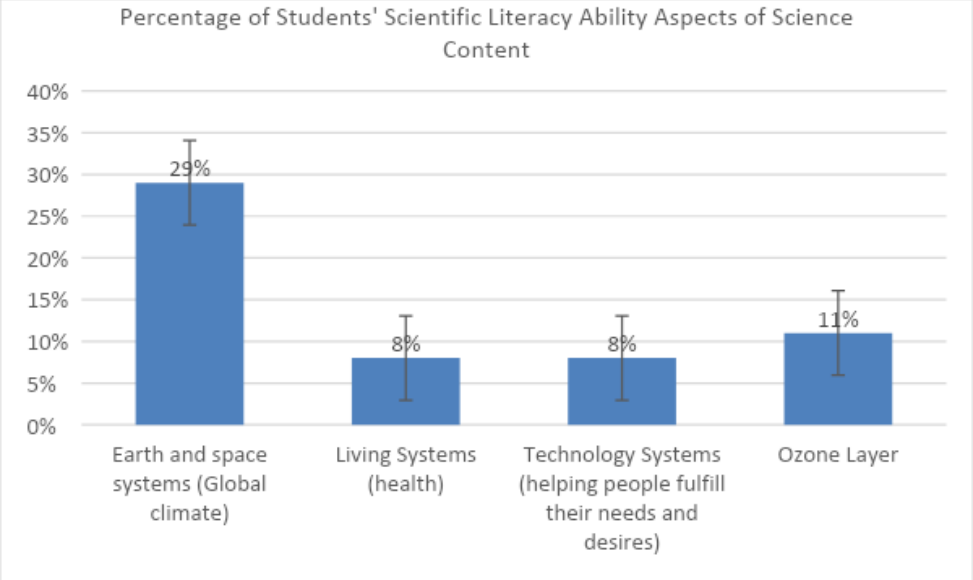

Figure 2. Percentage of Students' Scientific Literacy Ability Aspects of Science Content

Students' Science Literacy Skills Scientific Competence Aspect

Scientific competency is the third component in queries about science literacy. The questions assess four indicators: creating and evaluating scientific research, understanding scientific evidence and data, explaining phenomena scientifically, and analyzing and interpreting data to draw relevant conclusions. The findings presented in Table 6 are based on a descriptive examination of students' science literacy abilities in the context of scientific competence.

Table 6. Students' science literacy skills in the aspect of scientific competence

No	Science Literacy Aspects	Indicator	Percentage Score
3	Scientific Competence	Explain phenomena scientifically	24%
		Evaluate and design scientific investigations	17%
		Interpret scientific evidence and data	5%
		Analyzing and interpreting data to draw appropriate conclusions	9%
Average Percentage		14 %	

In terms of scientific competency, pupils' science literacy skills typically represent 14% of the total. The label of "very poor" applies to this score. Figure 3 presents the data from Table 6 in more detail.

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

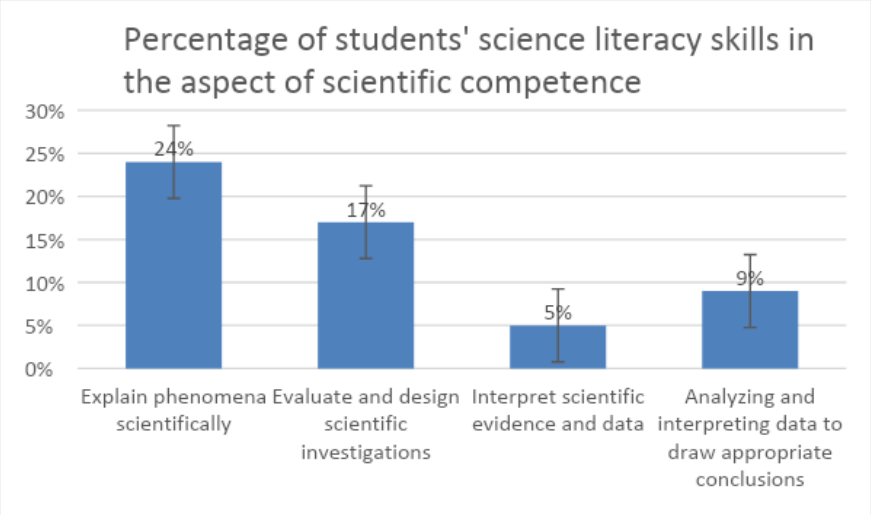

Figure 3. Percentage of students' science literacy skills in the aspect of scientific competence

Students' Science Literacy Skills Science Attitude Aspect

Science attitude is the fourth component of inquiries about science literacy. The question tests two indicators: interest in science-related subjects and support for investigation. Table 7 lists the findings from a descriptive examination of students' science literacy in relation to attitudes toward science.

Table 7. Science Literacy Ability of Students in Science Attitude Aspect

No	Science Literacy Aspects	Indicator	Percentage Score
4	Science Attitude	Interest in science issues	16%
		Support for inquiry	28%
Average Percentage		22 %	

When it comes to the science mindset component, pupils' science literacy skills average 22% overall. The label of "very poor" applies to this score. The data in Table 7 can be shown in Figure 4 for further information.

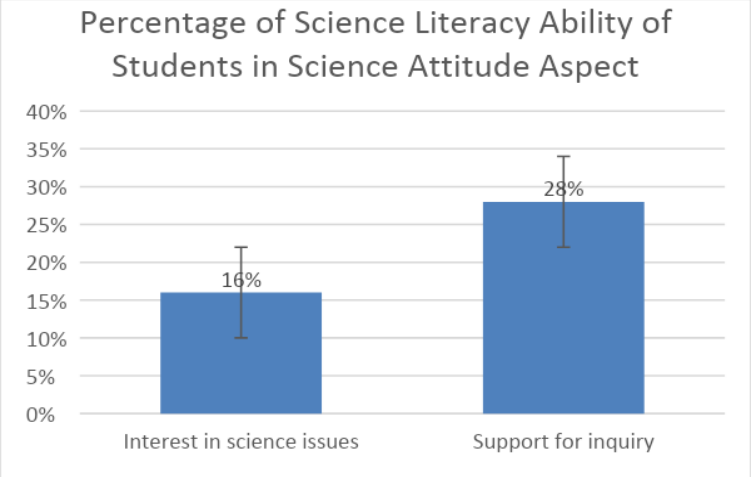

Figure 4. Percentage of Science Literacy Ability of Students in Science Attitude Aspect

The findings of the descriptive analysis indicate the four characteristics of students' science literacy skills point to a "very poor" level of science literacy. There are still several areas that require improvement, according to an analysis of students' science literacy in diverse contexts. The low number of students who attain science literacy in all areas suggests that there is a need to raise students' knowledge and proficiency in scientific concepts as well as their capacity to change their attitudes toward science. The lack of knowledge teachers has about science literacy, the necessity of precise data on students' science literacy accomplishments, and the significance of encouraging students' interest and motivation in science are some of the factors that must be taken into account in order to improve students' science literacy. Furthermore, the examination of students' science literacy abilities across a range of domains reveals further room for development.

Informal interviews with science teachers at SMP N 1 Sambong Blora Regency revealed a number of variables that may be contributing to the poor level of science literacy among students. Although certain basic science practice equipment, such optics, mechanics, and waves, is available, one of the key contributing issues is the lack of a specialized science laboratory. In the classroom, instructors typically conduct practical demonstrations, such as demonstrating the use of measuring cups and scales. Students are unable to participate in experiential learning in the laboratory due to the general lack of useful instruments and supplies. Additionally, 30% of seventh-grade children report having trouble reading, which is a contributing factor to their poor level of science literacy. This is quite difficult because science education is so dependent on reading and numeracy abilities.

The issue is further made worse by students' propensity to study just in class and parents' lack of guidance in encouraging them to revisit their lessons at home. Students' development of science literacy is further hampered by poor academic performance, a dearth of teaching tools, and a lack of encouraging reading materials. Students require a variety of science reading materials to foster an interest in reading, so relying solely on the electronic school texts provided by the Ministry of Education is insufficient. While raising pupils' science literacy might be difficult for teachers, there are ways to overcome these obstacles. In order to foster students' interest in science, stimulate their critical thinking abilities, and ultimately advance their science literacy, teachers can develop locally relevant teaching materials, use the surrounding environment for outdoor learning opportunities, and implement active learning strategies like inquiry-based learning.

CONCLUSION

Based on the examination of the science literacy test taken by seventh graders at SMP Negeri 1 Sambong, the overall percentage falls into the "very poor" category at 50%. The context, competency, competency, and science attitude aspects of the students' science literacy scores ranged from an average of 28% to 14%, 14%, and 22%, respectively. This average score indicates that, overall and when viewed from all four perspectives, pupils' science literacy abilities remain in the "very poor" range. This is brought on by the kids' poor academic performance and the dearth of resources to enhance science education. According to the study's findings, there is room for improvement in the process of acquiring a deeper, more comprehensive understanding of science. Therefore, this study adds to our understanding of the science literacy abilities of SMP Negeri 1 Sambong seventh grade students and emphasizes the value of learning development in enhancing science literacy.

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

REFERENCES

Amala, I. and Yushardi, Y. (2022). Analisis literasi sains dan kemampuan pemecahan masalah siswa smp pada materi zat aditif dan zat adiktif. *Jurnal Pendidikan Mipa, 12*(2), 373-378. https://doi.org/10.37630/jpm.v12i2.610

Arshad, H. M., Saleem, K., Shafi, S., Ahmad, T., & Kanwal, S. (2020). Environmental awareness, concern, attitude and behavior of university students: A comparison across academic disciplines. *Polish journal of environmental studies, 30*(1), 561-570. https://doi.org/10.15244/pjoes/122617

Farcis, F., Budi, G., & Wijayanti, E. (2022). Effect of project-based learning and science literacy ability on critical thinking skills in virtual learning of the thermodynamics course. *JPPS (Jurnal Penelitian Pendidikan Sains), 12*(1), 56-68. https://doi.org/10.26740/jpps.v12n1.p56-68

Fayanto, S., Sulthoni, S., Wedi, A., Takda, A., & Fadilah, M. (2023). Exploration of integrated science-physics textbooks based on science literacy indicators: a case study in kendari city indonesia. *Anatolian Journal of Education, 8*(1), 159-172. https://doi.org/10.29333/aje.2023.8111a

Fitria, Y., Alfa, D., Irsyad, M., Anwar, M., Adisva, Q., & Abdullah, H. (2022). Student literacy competence in science learning in junior high schools with the reading to learn model. *Al-Ishlah Jurnal Pendidikan, 14*(2), 1607-1616. https://doi.org/10.35445/alishlah.v14i2.1321

Fuadi, H., Robbia, A., Jamaluddin, J., & Jufri, A. (2020). Analisis faktor penyebab rendahnya kemampuan literasi sains peserta didik. *Jurnal Ilmiah Profesi Pendidikan, 5*(2), 108-116. https://doi.org/10.29303/jipp.v5i2.122

Hafizah, E. and Nurhaliza, S. (2021). Implementasi problem based learning (pbl) terhadap kemampuan literasi sains siswa. *Quantum Jurnal Inovasi Pendidikan Sains, 12*(1), 1. https://doi.org/10.20527/quantum.v12i1.9497

Herman, H., Nurfathurrahmah, N., Ferawati, F., Ariyansyah, A., & Suryani, E. (2022). Penerapan model problem based learning (pbl) untuk meningkatkan hasil belajar literasi sains siswa smp kelas viii. *Jurnal Ilmiah Mandala Education, 8*(4). https://doi.org/10.58258/jime.v8i4.4068

Juliana, A., Nurqamarani, A. S., Fadila, S., Rullinawati, R., & Aripin, S. (2022). Virtual Reality in Business Education: Systematic Literature Review. *Lembaran Ilmu Kependidikan, 51*(1), 21-32. https://doi.org/10.15294/lik.v50i2.29754

Lake, M., Naen, A., & Pasaribu, R. (2023). Penerapan media video animasi pada materi pemanasan global untuk meningkatkan hasil belajar dan kemampuan literasi sains siswa kelas xi ipa sman binino. *Magneton Jurnal Inovasi Pembelajaran Fisika Unwira, 1*(1), 1-7. https://doi.org/10.30822/magneton.v1i1.2038

Novitasari, N. and Admoko, S. (2022). Pengembangan lkpd pembelajaran argument-driven inquiry untuk meningkatkan ketrampilan literasi sains pada materi hukum newton. *Jurnal Penelitian Pembelajaran Fisika, 13*(1), 19-30. https://doi.org/10.26877/jp2f.v13i1.11528

Nurhayati, I. (2024). Keterampilan 4c (*critical thinking, creativity, communication and collaboration*) dalam pembelajaran ips untuk menjawab tantangan abad 21. *Jurnal Basicedu, 8*(1), 36-43. https://doi.org/10.31004/basicedu.v8i1.6842

Pujawan, I., Rediani, N., Antara, I., Putri, N., & Bayu, G. (2022). Revised bloom taxonomy-oriented learning activities to develop scientific literacy and creative thinking skills. *Jurnal Pendidikan Ipa Indonesia, 11*(1), 47-60. https://doi.org/10.15294/jpii.v11i1.34628

Rahman, M., Latif, S., & Saban, M. (2022). Implementasi model discovery learning untuk meningkatkan kemampuan literasi sains siswa kelas xi man 2 halmahera utara. *Jurnal Pendidikan Fisika, 10*(2), 259. https://doi.org/10.24127/jpf.v10i2.5660

Safrizal, S. (2021). Gambaran kemampuan literasi sains siswa sekolah dasar di kota padang (studi kasus siswa di sekolah akreditasi a). *El-Ibtidaiy Journal of Primary Education, 4*(1), 55. https://doi.org/10.24014/ejpe.v4i1.12362

Saptaningrum, E. (2023). Profil penguasaan literasi sains berdasarkan kerangka pisa (programme for international student assessment) pada siswa smp negeri se-kota semarang tahun 2022.

Jurnal Penelitian Pembelajaran Fisika, 14(2), 240-250. https://doi.org/10.26877/jp2f.v14i2.15482

Setiawani, E., Apsari, N., & Lestari, N. (2021). Assessment literasi sains dimensi kompetensi pada materi pamanasan global. *Quantum Jurnal Pembelajaran Ipa Dan Aplikasinya, 1*(1). 1-8. https://doi.org/10.46368/qjpia.v1i1.314

Shohib, M., Rahayu, Y., Wasis, W., & Hariyono, E. (2021). Scientific literacy ability of junior high school students on static electricity and electricity in living things. *Ijorer International Journal of Recent Educational Research, 2*(6), 700-708. https://doi.org/10.46245/ijorer.v2i6.170

Sholikah, L., & Pertiwi, F. N. (2021). Analysis of science literacy ability of junior high school students based on Programme for International Student Assessement (PISA). *INSECTA: Integrative Science Education and Teaching Activity Journal, 2*(1), 95-104. https://doi.org/10.21154/insecta.v2i1.2922

Sumarni, W., Faizah, Z., Subali, B., & Wiyanto, W. (2020). The Urgency of Religious and Cultural Science in STEM Education: A Meta Data Analysis. *International Journal of Evaluation and Research in Education, 9*(4), 1045-1054. https://doi.org/10.11591/ijere.v9i4.20462

Zahro', U. R. (2020). Pengembangan Instrumen Tes untuk Mengukur Kemampuan Literasi Sains Siswa SMP pada Tema Pemanasan Global. *Penelitian Pendidikan IPA, 6*(1), 5-13. https://doi.org/10.29303/jppipa.v6i1.193

Zulfa, E., Setiadi, D., Merta, I. W., & Sukarso, A. A. (2022). Pengaruh Pembelajaran Problem Based Learning Berbasis Blended Learning dan Outcome Based Education terhadap Kemampuan Literasi Sains Biologi Siswa di SMAN 7 Mataram. *Jurnal Ilmiah Profesi Pendidikan, 7*(2b), 559-564. https://doi.org/10.29303/jipp.v7i2b.559