

LITERATURE REVIEW: STUDENTS' SCIENCE LITERACY SKILLS IN SCIENCE LEARNING

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Abstract: The purpose of this study is to provide evidence that the science literacy approach can help students solve problems in science learning. The type of research used is the literature review method. This method is done by searching through Google Scholar. The analysis of twenty-five relevant journals showed ten articles discussing students' science literacy skills in science learning by solving problems in student learning. The science literacy skills of students in the experimental class are better than the control class, namely the average value of the experimental class is 79.71, while the control class is 71.71 according to the article with code A 10. One of the science learning models that can be used to develop students' science literacy is inquiry-based learning "Inquiry-based life-cycle thinking project".

Keywords: Science Literacy, Science Learning, Literature Review

Abstrak: Tujuan dari penelitian ini adalah untuk memberikan bukti bahwa pendekatan literasi sains dapat membantu siswa dalam memecahkan masalah dalam pembelajaran IPA. Jenis penelitian yang digunakan adalah metode literature review. Metode ini dilakukan dengan melakukan penelusuran melalui Google Scholar. Hasil analisis dari dua puluh lima jurnal yang relevan menunjukkan sepuluh artikel membahas tentang kemampuan literasi sains siswa pada pembelajaran IPA dengan cara memecahkan masalah dalam pembelajaran siswa. Kemampuan literasi sains siswa pada kelas eksperimen lebih baik dari pada kelas kontrol yaitu nilai rata-rata kelas eksperimen sebesar 79,71, sedangkan kelas kontrol sebesar 71,71 menurut artikel dengan kode A 10. Salah satu model pembelajaran IPA yang dapat digunakan untuk mengembangkan literasi sains peserta didik yaitu pembelajaran berbasis inkuiri "Inquiry-based life-cycle thinking project".

Kata Kunci: Literasi Sains, Pembelajaran IPA, Literature Review

INTRODUCTION

In the 21st, science literacy skills are needed by students in all parts of the world. This is due to phenomena of the rapid progress of world science and technology which can be seen from the environment, challenges, or technological innovations. Thus, science literacy is needed to understand and deal with these changes (Dwicky Putra Nugraha, 2022). In line with the times, and the more modern civilization, the people of a country are expected to be able to compete and make adjustments to transform into reliable and quality human resources. A country is said to be developed and prosperous if it has superior human resources. The back and forth of a country is closely related to the aspect of education. Science literacy is the ability of a person or individual to apply their knowledge to identify questions, provide scientific explanations or understanding, compile or construct new knowledge, conclude based on various scientific evidence, and the ability to develop a hypothetical mindset so that they can play a role in overcoming various ideas and issues related to science (Yusmar & Fadilah, 2023).

The low science literacy skills of Indonesian students are caused by many things, namely the education system, curriculum, learning models and methods, learning resources, and teaching

materials that have not supported improving science literacy skills. During the learning process, students rarely ask questions and express opinions (Juriah & Zulfiani, 2019), making it difficult for students to communicate and connect their knowledge with science topics. Factors that cause low science literacy are students' lack of understanding of the importance of science, the role of parents, and the lack of development of a science literacy culture in society.

Indonesia's low science literacy is a significant problem, reflected in the PISA scores that have stagnated between 393 and 396 for almost 20 years. Several factors contribute to low science literacy, including the selection of open books that are less varied, students' misconceptions of science concepts, learning that is not contextualized, low reading skills, and an unsupportive learning environment and climate. Although Indonesia participates in international assessments such as PISA, the results obtained show that students' science literacy skills are still far below the average of OECD countries (489). Therefore, improvement efforts in education science in Indonesia are needed (Fuadi et al., 2020).

Improving science literacy can be linked to problem-solving where students can develop critical thinking skills. Starting science education early and creating more engaging learning experiences, can help students become knowledgeable and responsible adults who can contribute positively to society. Therefore, a problem-based science literacy approach in science learning is good for developing students' problem-solving skills. The purpose of this literature review is to provide evidence that the science literacy approach can help students in solving problems in science learning.

METHOD

The method used in this research is a literature review. A literature review is a method that is arranged systematically, explicitly, and reproducibly in identifying, evaluating, and synthesizing the work that has been written by someone (Tuginem, 2023). The data used in this research is secondary data. Secondary data is data obtained from previous research results. A total of 11 articles were reviewed in this study, including 10 articles in Indonesian and 1 article in English. The aim is to identify a related Literature Review: Students' Science Literacy Skills in Science Learning.

RESULT AND DISCUSSION

This article is used through a literature review process with 11 articles of research. All of these articles were reviewed through the literature review method to obtain information on the effect of the science literacy approach on solving problems in science learning. The results of this review are listed in a table that includes the article code, article title, and article review results. The results of the article review are described in Table 1.

Table 1. Results of Article Review

Code	Title	Result
A1	Profil Literasi Sains dalam Pembelajaran IPA di Era Covid-19: Studi Kasus di Universitas Terbuka (Berlian et al., 2021).	Scientific literacy sees the importance of thinking and acting skills that involve mastering thinking and using scientific thinking in recognizing and addressing social issues. Scientific literacy develops in line with the development of life skills, namely the need for scientific reasoning and thinking skills in a social context, and emphasizes that scientific literacy is for everyone, not just for those who choose a career in science and technology. The learning model used is discovery learning (questionnaire). With survey learning method.
A2	The Implementation of Scientific Approach in Learning Science	The results of the discussion of this article show that if children have low literacy skills, then their problem-solving skills are also low. Because

	Through Problem Solving (Alberida, 2020)	problem-solving skills are very important for students to have. Currently, science learning in Indonesia lacks problem-solving skills for students. So the learning model used is a problem-based learning model (PBM).
A3	Penerapan Model Pembelajaran Inkuiri Terbimbing Berbasis Literasi Sains Dalam Pembelajaran IPA (Ida Ayu Putu Nova Warmadewi, 2022)	The results of the discussion of this article show that the paper test is able to improve student understanding in a more meaningful learning process, thus creating a more enjoyable learning atmosphere and improving student science literacy.
A4	Implementasi Literasi Sains dalam Pembelajaran IPA di Sekolah Dasar (Irsan, 2021)	This research shows that various strategies were identified for implementing science literacy, including problem-based learning. These methods encourage students to be active participants in their learning process, improving their critical thinking and problem-solving skills. The application of science literacy is proven to positively influence students' mindsets and behavior. The application of science literacy not only improves students' scientific understanding but also prepares them to tackle real-world problems, making them competent individuals in the 21st century. The learning model used is one of problem-based learning (PBM). By using the observation learning method.
A5	Analisis Kemampuan Literasi Sains Siswa pada Pembelajaran IPA Terintegrasi di Sekolah Dasar (Dwisetiarezi & Fitria, 2021)	This study showed that 60.25% of students demonstrated an adequate level of science literacy, while 52.7% were found to be deficient in this area. This approach allows a detailed understanding of student's abilities and challenges. The need for varied and motivating teaching methods to improve students' overall science literacy in an integrated learning environment. The observation method used is the observation method and the learning model used is integrated. Observations were made in theme 7 (Events in Life). By using the observation learning method.
A6	Penerapan Literasi Sains Dalam Pembelajaran IPA (Dewantari & Singgih, 2020)	This research shows that science literacy is a basic ability that must be possessed by students, especially in science learning. Students' science literacy skills can be developed through learner-oriented learning so that students are able to apply the science concepts they have learned in solving problems faced in everyday life. The learning model used is the inquiry model. By using the observation learning method.
A7	Implementasi Literasi Sains Dalam Pembelajaran IPA di Sekolah Dasar (Novianti & Alwi, 2024)	By applying science literacy, students can develop critical thinking skills such as problem-solving so that students are ready to face future challenges. This analysis focuses on the role of scientific literacy in forming responsible individuals who also care

		about social and environmental issues. Learning model using PBM.
A8	Implementasi Model Pogil Dalam Pembelajaran Sains Untuk meningkatkan Literasi Sains Siswa SMP (Zahro & Fauziah, 2024)	Based on the research results obtained, the science literacy skills of students have increased after the implementation of POGIL (Process Oriented Guided Inquiry Learning) learning on global warming material. The highest N-gain score obtained was 0.89 with high criteria on the indicator of explaining phenomena scientifically. All literacy indicators are known to be at high criteria. This shows that POGIL effectively improves science literacy skills. By using the observation learning method.
A9	Implementasi Literasi Sains dalam Pembelajaran Biologi SMA (Implementation of Science Literasi in Hight School Biology Learning).	This shows that the implementation of science literacy in biology learning in high school can improve student learning outcomes. This includes improving students' critical thinking, problem-solving, communication, and collaboration skills. Biology learning is more efficient to train students' science literacy. Students are accustomed to applying the scientific method in obtaining information so the learning process focuses more on developing science literacy skills.
A10	Peningkatan Kemampuan Literasi Sains Menggunakan Model PBL Berbantuan Majalah IPA TERPADU Tipe Webbed Berorientasi SETS (Sholikah et al., 2020).	From the results of the research, the use of PBL models can significantly improve students' science literacy skills. Based on the learning model applied, it shows that the N-gain value of the experimental class is in the medium category because with the PBL model students can compile their own knowledge to solve problems, seek a variety of solutions, and encourage students to think creatively. Students' science literacy skills on the experimental class science literacy skills test were better than the control class, namely the average value of the experimental class of 79.71, while the control class was 71.71.
A11	Pengembangan Media Pembelajaran Komik Digital pada Materi Ikatan Kimia untuk Peserta didik Kelas X IPA (Tsuroyya et al., 2022).	This study using the STAD-type cooperative learning model with comic learning media on chemical bonding material showed that the learning media was able to support and improve students' literacy with a percentage of 88% so as to get satisfactory learning outcomes.

This The results of the literature review-based research above by reviewing 30 articles, there are 11 articles that discuss students' science literacy skills in science learning, using various learning models. The results of the learning models used in the science literacy approach of the 11 articles above are summarized in Figure 1 below:

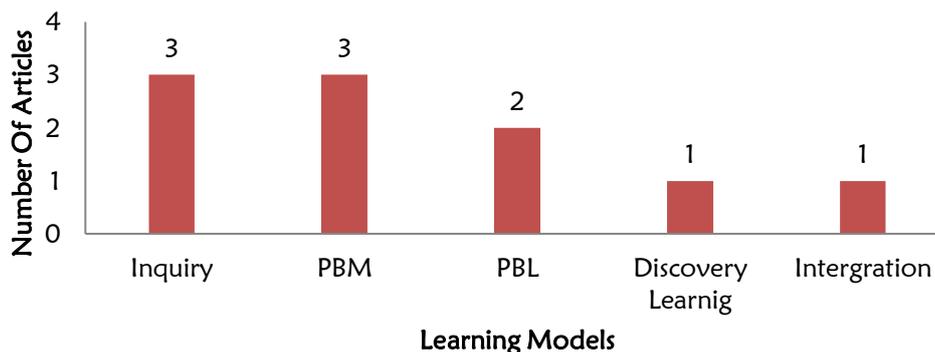


Figure 1. Graph of learning model in science literacy approach

Based on Figure 1 there are learning models used in science literacy. Where the most widely used learning model is inquiry with PBM, many articles use this model from the 10 articles reviewed, namely 3 of each model. The learning model is a conceptual framework to be a reference material for a systematic approach to communicating lessons to students (Prasetyo & Rosy, 2020). The inquiry learning model is a strategy centered on student inquiry groups to find answers to questions through clear and structured procedures (Prasetyo & Rosy, 2020). Meanwhile, the PBM learning model is one of the models based on the many problems that require authentic investigation, namely investigations that require real solutions (Kurama et al., 2022).

Of the 10 articles on the PBL learning model, 2 articles used this model. The PBL (Problem-Based Learning) model is a sequence of teaching and learning activities by focuses on solving problems that are true in everyday life (Handayani & Koeswanti, 2021)). The discovery learning model and the integration model of each model were used in as much as 1 of the journals reviewed. The discovery learning model is a learning model that emphasizes to students the importance of understanding structures, or ideas that are important to a discipline through active student order in learning activities (Setyawan & Kristanti, 2021). Meanwhile, the integration learning model is an approach and learning model that connects various aspects of various subjects that are still covered by one theme (Iskandar et al., 2024). All learning models used in the science literacy approach to science learning from 11 articles reviewed, provide an increase in science literacy and enable students to think critically in solving problems in learning. Choosing the right learning model can facilitate the learning process in the classroom.

From the review of 11 articles above, there are 6 articles that use learning methods used in the science literacy approach, namely articles with codes A1, A4, A5, A6, A7, and A10. The results of the learning methods used in the science literacy approach are summarized in Figure 2 below:

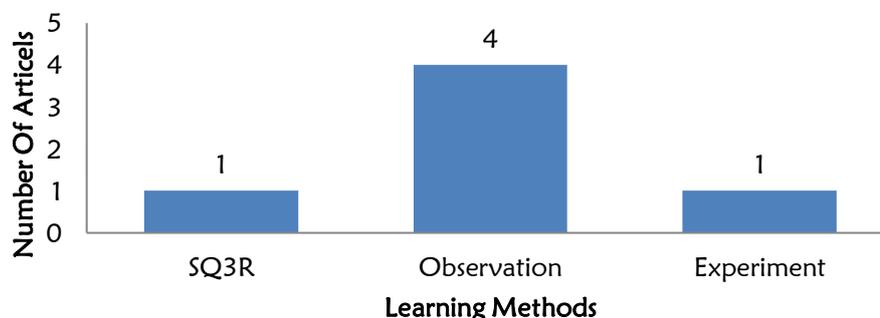


Figure 2. Graph of learning methods in the science literacy approach

Based on Figure 2, there are several learning methods used in science literacy. Where the most widely used learning method is the observation method. Many articles discuss the observation

method, namely 4 articles. The learning method is a way that can be used in delivering material to achieve goals (Pertiwi et al., 2021). The observation method (direct observation) is a method of collecting data by observing directly in the field, this method is also a method of collecting data by systematically observing and recording objects (Nurjanah, 2020).

The SQ3R and experimental learning methods were used as much as 1 article from each learning method. The SQ3R learning method is the most widely used learning method by researchers in improving a student's Indonesian language skills, seen from several studies, the application of the SQ3R method can make students more active than the teacher and students are able to convey their own opinions (Islamiyah et al., 2023). The experimental learning method is a way of presenting a lesson in which students conduct an experiment on something, observe the process, and present it by writing down the results of the experiment, then the results of these observations are presented to the class and evaluated by the teacher. By choosing the appropriate learning method, it can help teachers approach science literacy to students. Because this learning method can make students active and effective in learning.

CONCLUSION

The conclusion section contains a summary of the research findings, which correlate with the research objectives written in the introduction. Then state the main points of the discussion. A conclusion generally concludes with a statement about how the research work contributes to the field of study as a whole (shows how progress from the latest knowledge). A common mistake in this section is to repeat the results of an experiment, abstract, or be presented with a very list. The concluding section must provide clear scientific truths. In addition, the conclusions can also provide suggestions for future experiments.

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