

## The analysis of scientific literacy skills in grade VII students in learning science biology

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### Abstract

Scientific literacy is the skill and ability to write and read, conclude a lesson learned, explain phenomena around us, and identify a question. This research aims to analyze the scientific literacy abilities of class VII students in science teaching at SMP Negeri 4 Kampung Rakyat. The research method used is descriptive qualitative. The sample for this research was 30 students and three teachers at SMP Negeri 4 Kampung Rakyat. The population in this research is all students and teachers. Data collection techniques include questionnaires, observation, and interviews. The research results show that students who could solve questions based on scientific phenomena obtained a percentage of 89.48% in the first indicator. In contrast, in the second indicator, students who could understand and draw conclusions received 54.34%. In the third indicator, students who could explain their knowledge of scientific literacy results were 57.19%. The decision is that students' scientific literacy abilities in solving problems based on phenomena are already high. In contrast, the indicators for drawing conclusions and explaining knowledge still need to be improved. This study can be a basis for further research focusing on learning innovation to improve indicators that are still need to enhancing.

**Abstrak**

Literasi sains adalah suatu keahlian dan kemampuan dalam menulis maupun membaca, menarik suatu kesimpulan dalam suatu pembelajaran yang dipelajari, mampu menjelaskan fenomena yang ada di sekitar, dan dapat mengidentifikasi suatu pertanyaan. Penelitian ini bertujuan untuk menganalisis kemampuan literasi sains pada peserta didik kelas VII dalam Pembelajaran IPA di SMP Negeri 4 Kampung rakyat. Metode penelitian yang digunakan adalah kualitatif deskriptif. Sampel penelitian ini adalah 30 peserta didik dan tiga guru di SMP Negeri 4 Kampung rakyat. Populasi dalam penelitian ini adalah seluruh peserta didik dan guru. Teknik pengumpulan data meliputi angket, observasi dan wawancara. Hasil penelitian menunjukkan pada indikator pertama peserta didik yang mampu menyelesaikan soal berdasarkan fenomena ilmiah memperoleh hasil persentase 89.48%. Sebaliknya, pada indikataor kedua peserta didik yang dapat memahami dan memberikan penarikan kesimpulan memperoleh hasil persentase 54.34%, dan pada indikator ketiga peserta didik yang mampu menjelaskan pengetahuan literasi sains memperoleh hasil persentase 57.19%. Kesimpulannya adalah kemampuan literasi sains peserta didik dalam menyelesaikan soal berdasarkan fenomena sudah tinggi. Sebaliknya, indikator menarik kesimpulan dan menjelaskan pengetahuan masih perlu ditingkatkan. Studi ini dapat menjadi dasar untuk penelitian selanjutnya dalam memfokuskan inovasi pembelajaran untuk meningkatkan indikator yang masih perlu ditingkatkan.

## **A. Introduction**

In the contemporary period of globalization, there is a growing societal emphasis on critical evaluation across several domains, including the realm of education. However, it is observed that the incorporation of reading activities as a pedagogical framework for learning remains relatively infrequent among instructors. As a result, students have challenges in locating resources and receiving support for their literacy development, impeding the realization of a literate generation's aspirations for a robust literacy culture (Wardani, 2021).

Within the realm of education, we find ourselves situated in the 22nd century, commonly referred to as the era of the Industry 4.0 revolution. This epoch is distinguished by the fast advancement of technology and the proliferation of substantial information. In the realm of education in the 22nd century, the objective is to foster students' acquisition of abilities that enable them to effectively adapt to and engage with contemporary advancements (Sutrisna, 2021).

Scientific literacy refers to an individual's capacity to comprehend and effectively explain scientific concepts within the context of science education. When individuals employ their scientific literacy to address an issue, they demonstrate a significant level of personal engagement and environmental awareness, enabling them to make informed judgments grounded on scientific principles (Sumarni et al., 2021). With scientific literacy, one is able to comprehend scientific concepts and processes as well as utilize science to solve commonplace problems (Sutrisna, 2021).

Scientific literacy refers to the capacity to apply scientific knowledge, identify a question, and draw a conclusion based on facts and data in order to comprehend the universe and make decisions regarding changes that can result from human activities and attitudes. Scientific is an attitude that embraces other people's opinions properly and correctly without knowing despair with persistence or openness. Students who aspire to become instructors must also possess these two attitudes (Harefa, 2021).

The scientific literacy of junior high school pupils is multidimensional, encompassing not only the ability to comprehend scientific knowledge but also much more. Through scientific literacy, middle school students are able to pose questions and make decisions, discover, and develop a sense of curiosity and curiosity that is interconnected with their commonplace experiences.

Scientifically literate individuals are able to comprehend and interpret the significance of scientific characteristics. With the intended

comprehension and meaning, it can also refer to scientific investigation, the awareness that science and technology can influence an environment and material, as well as culture, and the desire of intellectuals to become involved in scientific issues (Wardani, 2022).

Natural sciences are known as subjects carried out with a scientific approach, and one of the fields of natural sciences is biology. Through Biology courses, it is also anticipated that students will be able to develop inductive and deductive problem-solving skills in relation to natural occurrences in the environment (Angraini, 2014).

The researchers of this present study have noted that SMP Negeri 4 Kampung Rakyat is one of the schools that encounters a barrier in the process of the Science Literacy Ability of Class Students in Science Learning. VII In Science Learning at SMP Negeri 4 Kampung Rakyat, Science Literacy Skills in Class VII Students in Science Learning at SMP Negeri 4 Kampung Rakyat can improve the quality of learning, especially in the implementation of learning process activities. In order to achieve good teaching and learning activities, cultivate literacy, and increase knowledge, as well as efforts to improve the quality of lessons at the school level, it is important to have supporting information that strengthens the achievement of scientific literacy in students. In this case, researchers are interested in conducting this research because no researcher has conducted this research. The research also has the aim of being able to find out and see how the Science Literacy abilities of Class VII Students are in Science Learning at SMP Negeri 4 Kampung Rakyat.

## **B. Material and Method**

The type of research used in this research is descriptive qualitative. This research was conducted from July to December 2022 at SMP Negeri 4 Kampung Rakyat. The populations used in this research were students and teachers at SMP Negeri 4 Kampung Rakyat, with a total of 35 students and 3 teachers. The sampling sample was 35 people and 3 teachers at SMP Negeri 4 Kampung Rakyat. Sampling using total sampling is taking samples where the number of samples is the same as the population because taking total sampling is because the population is less than 100 (Sugiyono 2014).

The technique used in collecting data was administering questionnaires and interviews, as well as observation and documentation regarding student and teacher responses regarding the analysis of the scientific literacy abilities of class VII

students in science learning at SMP Negeri 4 Kampung Rakyat. Using the questionnaire distribution technique carried out by distributing questionnaires to students and teachers directly, the questionnaire used in the research was designed based on a Likert scale that contained a question about the object to be expressed. The Likert scale is used to measure a person's attitudes, opinions, and perceptions regarding social phenomena and to conduct interviews with students and teachers using three options. The indicators in this research are:

- 1) Being able to solve questions based on scientific phenomena.
- 2) Being able to understand and draw conclusions.
- 3) Being able to explain scientific literacy knowledge.

This research is also supported by the results of interviews with information that can meet research needs. The initial preparation stage was carried out by observing and conducting observations as well as interviews with biology teachers and students at SMP Negeri 4 Kampung Rakyat at the research location at SMP Negeri 4 Kampung Rakyat. VII in science learning at SMP Negeri 4 Kampung Rakyat. Teacher and student answers are assessed using Table 1 and then presented as percentages.

**Table 1 Score for Each Statement Answer**

No.	Alternative Answer	Statement	
		Positive	Negative
1	Very agree	5	1
2	Agree	4	2
3	Uncertain	3	3
4	Disagree	2	4
5	Very disagree	1	5

**Table 2 Grid on the Character Questionnaire for Biology Education Students in Basic Biology Courses**

No	Indicator	Question	Total
1	The students can solve problems based on scientific phenomena	1,2,3,4,5,6,7,8	8
2	The students can understand and provide conclusion drawing	9,10,11,12,13,14,15	7
3	The students can explain Scientific Literacy Knowledge	16,17,18,19,20	5
<b>Total</b>			<b>20</b>

The instruments used in collecting data were interviews and questionnaires, which were distributed via Google Forms. As for the instrument, the scientific literacy ability of class VII students in science learning at SMP Negeri 4 Kampung Rakyat is a modification of Sutrisna (2021); Dwisetiarezi & Fitria (2021); Harahap et al. (2022). The scientific literacy abilities of class VII science students at SMP Negeri 4 Kampung Rakyat instrument grid can be seen in Table 2.

### C. Results and Discussion

The results of the research have shown that the scientific literacy abilities of class VII students in learning science at SMP Negeri 4 Kampung Rakyat are below average. The indicators contained in the research regarding the scientific literacy abilities of class VII students in learning science at SMP Negeri 4 Kampung Rakyat are: (1) being able to solve questions based on scientific phenomena; (2) being able to understand and draw conclusions; and (3) being able to explain scientific literacy knowledge. The results of the presentation on indicators regarding the research that has been carried out can be seen in the diagram. The value of the percentage obtained can be seen in Figure 1.

From the results obtained in the research that has been carried out, it has been stated that in an analysis of the scientific literacy abilities of class VII students in science learning at SMP Negeri 4 Kampung Rakyat, in the first indicator, students who were able to solve questions based on scientific phenomena obtained results of 89.48%, while in the second indicator, students who were able to understand and provide conclusions obtained results totaling 54.34%, and in the third indicator, students who were able to explain scientific literacy knowledge obtained results totaling 57.19%.

In this case, class VII students of SMP Negeri 4 Kampung Rakyat can demonstrate scientific literacy in science lessons, and these students have quite good skills and an interest in scientific literacy. However, in this case, there are still some students who are lacking in implementing scientific literacy in science learning and lack interest in reading. In this case, literacy in the world of education and learning, both in science learning and in other learning, is a very important thing. In this case, there is also literacy.

Science is very important to develop in students so that they can also explain a phenomenon scientifically, evaluate a scientific investigation design, or interpret data scientifically (Haerani et al, 2020). In this case, literacy for students can have a positive impact on a child's

academic achievement, so children are also accustomed to and familiar with the world of

literacy and have skills in communicating well with their environment.

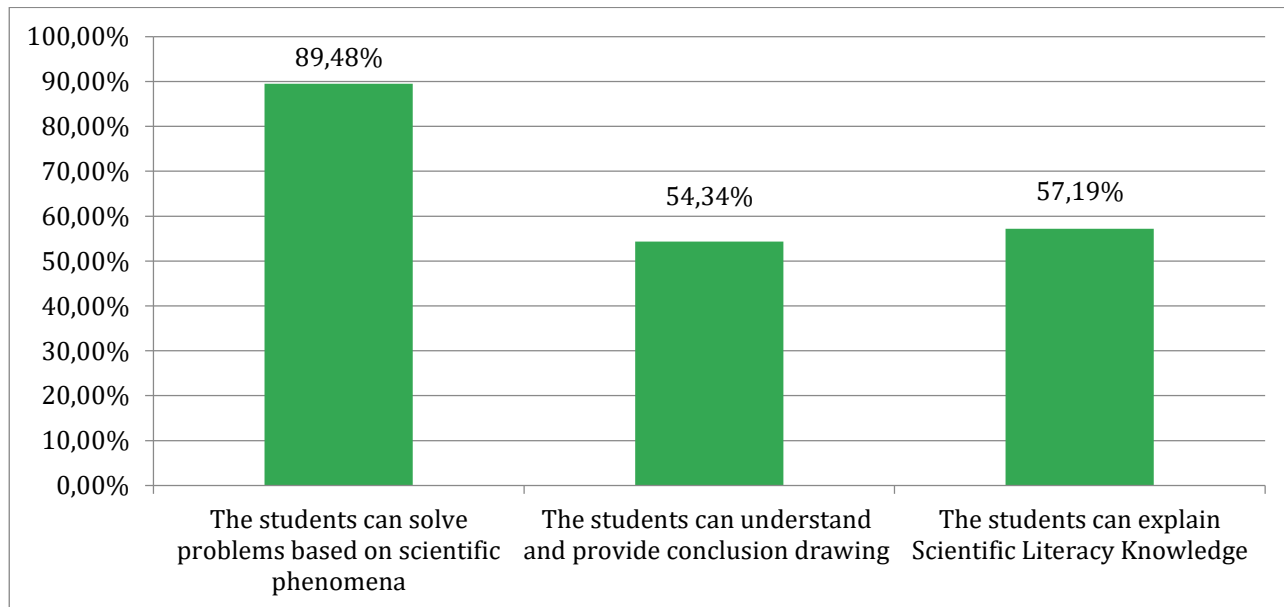


Figure 1

Analysis diagram of the scientific literacy abilities of class VII students in science learning at SMP Negeri 4 Kampung Rakyat

### 1. The students can solve problems based on scientific phenomena

The research that looked at the scientific literacy levels of class VII students learning science at SMP Negeri 4 Kampung Rakyat found that 89.48% of them were able to answer questions based on scientific phenomena. In contrast, only 10.52% of those students were not scientifically literate and could not answer questions based on scientific phenomena. Based on this research, these results are in line with Nuro et al. (2020), that in this case, scientific literacy is also considered the first goal of science education in the science learning process. However, in this case, it can be seen that from the results of these results, there are still students who have sufficient scientific literacy skills to solve a problem, and there are still students who have sufficient literacy skills.

Scientific literacy ability, showing that expertise can also explain a scientific phenomenon that is still low, can be seen in two indicators and five indicators in this category that have shown very small results, namely below 10%. In this case, it is also in line with the fact that the results in this category also use scientific evidence to show quite low results, namely below 10%.

Research by Winata et al. (2016) show that inability of students' skills in explaining a scientific phenomenon and use scientific evidence to show that students are not yet able to solve a problem scientifically and communicate. Research by Lestari & Ibrahim (2021) shows that the use of student

activity sheets can be a means of practicing scientific literacy skills and has also been proven to be effective and able to make it easier for students to understand the material in the lesson. These results are in line with Nurdin (2019) that the implementation of a culture of scientific literacy for students is something that can be expected and is an important part of increasing competence in the knowledge of students in order to connect general knowledge with other learning taught to students. Science also has an important role in improving human welfare.

### 2. The students can understand and provide conclusion drawing

In the results obtained in research regarding the analysis of scientific literacy skills in class VII students in learning science at SMP Negeri 4 Kampung Rakyat, the research results obtained on indicators of students who were able to understand and draw conclusions obtained a result of 54.34%, while students who did not understand and provided Conclusion Drawing in scientific literacy obtained results of 45.66%. In this case, it can be seen from the results that there are still students lacking in understanding and providing conclusions on scientific literacy, so in solving a problem, there are still students who lack literacy skills.

In line with Wulandari & Sholihin (2020), the approach or method a teacher uses in science lessons to develop a concept in the lesson can also have an impact on a student's mastery of scientific



literacy skills. Lessons are also able to arouse curiosity in students regarding a topic in the lesson and encourage enthusiasm in students to solve a problem presented by the teacher, who is also believed to be able to build a skill or scientific process, which is part of an aspect of competency in science literacy. In line with Sumarni et al. (2021), students need to master scientific literacy. This research has shown that scientific literacy students, after the excretion system lesson using scientific literacy-based practicum guidelines, obtained a high score with a result of 70.06. Scientific literacy is also based on an aspect of competence or an aspect of knowledge in scientific literacy. Then, overall, the students have mastered the concepts regarding the material they have studied well.

Students' scientific literacy skills can also be observed from their skills in solving a given lesson problem. By being able to identify a student's scientific literacy ability, it can be seen that appropriate handling can be done to overcome a deficiency in the lesson to be able to improve skill in scientific literacy for students and errors in solving a problem that can be reduced and the objectives for the lesson that can be achieved optimally (Irwan et al., 2020).

According to research by Harlina et al. (2020), the ability in scientific literacy in the aspect of scientific competence for students in learning material for indicators, namely identifying a scientific problem that is classified as low, in indicators that explain a scientific phenomenon, and using scientific evidence that is classified as very low. Skills in scientific literacy are also very important and are possessed by everyone. This skill cannot be optimized or trained in science lessons. The ability of scientific literacy in teachers is also very high; the emergence of scientific literacy in a process during a lesson, as well as expertise in the ability of scientific literacy in students after the process of a lesson. Based on Rohman et al. (2017) & Hasanah et al. (2023), research results showed the quality of classroom teaching also needs to have high literacy skills to improve students' scientific literacy skills. According to Rezeqi & Gultom (2023), student concept understanding can be enhanced by looking for accurate references to journals and books.

### **3. The students can explain Scientific Literacy Knowledge**

According to a study that looked at the scientific literacy skills of VII science students at SMP Negeri 4 Kampung Rakyat, 57.19% of those students were able to explain what they knew about scientific literacy. Meanwhile, students who are less able to

explain scientific literacy knowledge can be seen to have achieved results of 42.81%.

In this case, it can be seen that, from the results, there are still students who are less able to explain scientific literacy knowledge. The low results obtained in the scientific literacy scores of students in Indonesia also rank Indonesia 70th out of 79 countries participating in an international-level scientific literacy assessment. Students' scientific literacy skills must also receive special attention, namely by looking for problems and efforts to improve scientific literacy outcomes for students, especially those in Indonesia (Novita et al., 2021).

With the resulting literacy skills, the overall average ability in scientific literacy also obtained a percentage score of 50.85% in a fairly low category. In one content aspect, class X students at SMAN also obtained a percentage score of 61.43% in a sufficient category. Then, for students' scientific literacy skills in the process aspect, they also obtained a percentage score of 45.81% in the low category. Meanwhile, students' scientific literacy abilities in the context aspect also obtained a percentage score of 45.32% in the low category (Erniwati et al., 2020).

Scientific literacy is also an aspect of competency for students in schools, which is still relatively low, with an average score of 32.7044. This has shown that mastery of scientific literacy in the competency aspect of students in schools needs to be well-trained. So that scientific literacy can be put into practice, the competency aspects taught can also be adjusted to the aspects or indicators of scientific literacy that will be measured. The importance of learning scientific literacy for students is to be able to develop their potential, especially in the field of science (Rosidi, 2021).

Having scientific literacy in science lessons for junior high school students will make students more knowledgeable and train the student's existing abilities, as well as develop a leadership spirit in these students and even develop the creativity that exists in students in managing the reading corner in the classroom and making literacy activities a positive cultural thing in schools. Having scientific literacy skills is the most important thing in the era of globalization. In this case, science and technology are also developing very quickly, especially in developed countries (Novita et al., 2021). Students can also develop good character and personality and train them in something, both writing and being able to put together words that have meaning, adding to vocabulary and being able to explain knowledge in scientific literacy, understanding and being able to

provide conclusions, increase a person's focus and concentration, and also being able to solve problems based on scientific phenomena with scientific literacy. Therefore, literacy is a very important thing because, with it, a person can both process and understand information when carrying out a process in reading or writing.

## D. Conclusion

From the results of research regarding the analysis of the scientific literacy abilities of class VII students in science learning at SMP Negeri 4 Kampung Rakyat, the following indicators have been obtained: the data obtained is in the form of the first indicator is that students who are able to solve problems based on scientific phenomena obtained 89.48%, while in the second indicator, students who were able to understand and students who gave conclusions obtained 54.34%, and in the third indicator, students who were able to explain scientific literacy knowledge obtained 57.19%. So, it can be concluded that scientific literacy in science learning can also improve scientific literacy competencies and skills in students.

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## F. References

- Angraini, G. (2014). Analisis kemampuan literasi sains siswa SMA kelas X di Kota Solok. In *Prosiding Mathematics and Sciences Forum 2014*, (pp. 161–170). Retrieved from <http://prosiding.upgris.ac.id/index.php/masif2014/masif2014/paper/view/427>
- Dwisetiarezzi, D., & Fitria, Y. (2021). Analisis kemampuan literasi sains siswa pada pembelajaran IPA terintegrasi di sekolah dasar. *Jurnal Basicedu*, 5(4), 1958-1967. Retrieved from <https://www.jbasic.org/index.php/basicedu/article/view/1136>
- Erniwati, E., Tahang, L., Hunaidah, H., Mongkito, V. H. R., & Fayanto, S. (2020). Kemampuan literasi sains siswa SMA di Kota Kendari: Deskripsi & analisis. *Jurnal Kumparan Fisika*, 3(2), 99-108. DOI: <https://doi.org/10.33369/jkf.3.2.99-108>
- Haerani, A., Siska, S., & Dadi S., D. A. C. (2020). Pengaruh model inkuri bebas terhadap kemampuan literasi sains. *J. Pijar MIPA*, 15(2), 140–144. <https://doi.org/10.29303/jpm.v15i2.1682>
- Harahap, D. G. S., Nasution, F., Nst, E. S., & Sormin, S. A. (2022). Analisis kemampuan literasi siswa sekolah dasar. *Jurnal Basicedu*, 6(2), 2089-2098. DOI: <https://dx.doi.org/10.31004/basicedu.v6i2.2400>
- Harefa, A. R. (2021). Aspects profile of literacy science and scientific attitudes students of Biology Education Study of IKIP Gunungsitoli. *Jurnal Pendidikan Intelektium*, 2(1), 72–79. DOI: <https://doi.org/10.37010/int.v2i1.375>
- Hasanah, U., Putra, A. P., & Badruzsaufari, B. (2023). Digital literacy of biology science teacher in learning during the covid-19 pandemic. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 5(1), 71-77. DOI: <http://dx.doi.org/10.20527/bino.v5i1.13914>
- Harlina, H., Ramlawati, R., & Rusli, M. A. (2020). Deskripsi Kemampuan literasi sains peserta didik kelas IX di SMPN 3 Makassar. *Jurnal IPA Terpadu*, 3(2), 96-107. DOI: <https://doi.org/10.35580/ipaterpadu.v3i2.12320>
- Irwan, P. A., Usman, U., & Amin, B. D. (2020). Analisis kemampuan literasi sains peserta didik ditinjau dari kemampuan menyelesaikan soal fisika di SMAN 2 Bulukumba. *Jurnal Sains dan Pendidikan Fisika*, 15(3), 17–24. DOI: <https://doi.org/10.35580/jspf.v15i3.13494>
- Lestari, D. P., & Ibrahim, M. (2021). Keefektifan LKPD pada submateri pencemaran lingkungan untuk melatih keterampilan literasi sains siswa kelas X SMA/MA. *Berkala Ilmiah Pendidikan Biologi (BioEdu)*, 10(1), 165–170. DOI: <https://doi.org/10.26740/bioedu.v10n1.p165-170>
- Novita, M., Rusilowati, A., Susilo, S., & Marwoto, P. (2021). Meta-analisis literasi sains siswa di Indonesia. *UPEJ Unnes Physics Education Journal*, 10(3), 209–215. DOI: <https://doi.org/10.15294/upej.v10i3.55667>
- Nurdin, N. (2019). Urgensi literasi sains dalam meningkatkan kompetensi Widyaiswara PAI BDK Aceh di era millennial. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, 7(1), 55–63. DOI: <https://doi.org/10.24815/jpsi.v7i1.12476>
- Nuro, F. R. M., & Suwandayani, B. I. (2020). Penerapan literasi sains di kelas IV sekolah dasar. *Jurnal Pemikiran dan Pengembangan Sekolah Dasar (JP2SD)*, 8(2), 179-187. DOI: <https://doi.org/10.22219/jp2sd.v8i2.15189>
- Rezeqi, S., & Gultom, N. (2023). Student science literacy ability in Basidiomycota material

- content aspect. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, 5(2), 211-219. DOI: <http://dx.doi.org/10.20527/bino.v5i2.16020>
- Rohman, S., Rusilowati, A., & Sulhadi, S. (2017). Analisis pembelajaran fisika kelas X SMA Negeri di Kota Cirebon berdasarkan literasi sains. *Physics Communication*, 1(2), 12-18. DOI: <https://doi.org/10.15294/physcomm.v1i2.10402>
- Rosidi, I. (2021). Profil literasi sains aspek kompetensi siswa pondok pesantren di masa pandemi dengan menggunakan penilaian berbasis digital. *Natural Science Educational Research*, 4(1), 1-9. DOI: <https://doi.org/10.21107/nser.v4i1.11467>
- Sugiyono, S. (2014). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.
- Sumarni, R., Soesilawati, S. A., & Sanjaya, Y. (2021). Literasi sains dan penguasaan konsep siswa setelah pembelajaran sistem ekskresi menggunakan pedoman praktikum berbasis literasi sains. *Assimilation: Indonesian Journal of Biology Education*, 4(1), 32-36. DOI: <https://doi.org/10.17509/aijbe.v4i1.34824>
- Sutrisna, N. (2021). Analisis kemampuan literasi sains peserta didik SMA di Kota Sungai Penuh. *Jurnal Inovasi Penelitian*, 1(12), 2683-2694. DOI: <https://doi.org/https://doi.org/10.47492/jip.v1i12.530>
- Wardani, D. T., (2021). Peningkatan kemampuan literasi siswa kelas XI MIPA SMA Negeri 5 Muara Teweh dengan pemanfaatan Academia.Edu. *Meretas: Jurnal Ilmu Pendidikan*, 8(2), 153-163. <https://jurnal.upgriplk.ac.id/index.php/meretas/article/view/241>. Retrieved from upgriplk.ac.id/
- Wardani, G. D. (2022). Implementasi literasi sains sekolah dasar melalui media animasi mata pelajaran ilmu pengetahuan alam. In *Prosiding Seminar Pendidikan Dasar*, (Vol. 1, No.1, pp. 275-283), Mahesa Research Center. DOI: <https://doi.org/10.34007/ppd.v1i1.199>
- Winata, A., Cacik, Sri., & I. S. R. W. (2016). Analisis kemampuan awal literasi sains mahasiswa pada konsep IPA. *Education and Human Development Journal*, 1(1), 34-39. DOI: <https://doi.org/10.33086/ehdj.v1i1.291>
- Wulandari, N., & Sholihin, H., (2020). Analisis kemampuan literasi sains pada aspek pengetahuan dan kompetensi sains siswa SMP pada materi kalor. *Edusains*, 8(1), 66-73. DOI: <https://dx.doi.org/10.15408/es.v8i1.1762>