



Application of the Lok-R Learning Strategy to Science Literacy

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Abstract: This study aims to determine whether or not there is an influence of LOK-R (Literacy, Orientation, Collaboration, Reflection) learning strategies on scientific literacy skills. This type of research includes pre-experimental research with a one-group pre-test and post-test research design. This research was conducted at MI Islamiyah Kalimukti with a sample of 15 students. Data were collected by conducting a pre-test to determine students' initial scientific literacy skills and a post-test to determine the increase in students' scientific literacy abilities after implementing the LOK-R learning strategy. Research data were analyzed using descriptive and quantitative analysis. The n-gain study showed an increase in the average pretest and posttest results. Before implementing the LOK-R learning strategy, the average pretest of students was 56.47; then, it increased to 81.33 in the posttest results of students after implementing the LOK-R learning strategy. Likewise, the paired sample test results obtained a significant value of $0.000 < 0.05$, which means that H_0 is rejected and H_a is accepted. This shows that applying the LOK-R learning strategy increases students' scientific literacy skills. Therefore, the LOK-R learning strategy can be an alternative in science learning activities on heat material and its transfer.

Abstrak: Penelitian ini bertujuan untuk mengetahui ada atau tidaknya pengaruh strategi pembelajaran LOK-R (Literasi, Orientasi, Kolaborasi, Refleksi) terhadap kemampuan literasi sains. Jenis penelitian ini termasuk penelitian pra eksperimen dengan desain penelitian one group pretes and postes. Penelitian ini dilakukan pada MI Islamiyah Kalimukti dengan sampel 15 peserta didik. Pengumpulan data dilakukan dengan melakukan pretes untuk mengetahui kemampuan awal literasi sains peserta didik dan postes untuk mengetahui peningkatan kemampuan literasi sains peserta didik setelah dilakukan penerapan strategi pembelajaran LOK-R. Data penelitian dianalisis menggunakan analisis deskriptif dan kuantitatif. Hasil penelitian menggunakan n-gain menunjukkan adanya peningkatan rerata hasil pretes dan postes. Sebelum dilakukan penerapan strategi pembelajaran LOK-R rerata pretes peserta didik adalah 56,47 kemudian meningkat menjadi 81,33 pada hasil postes peserta didik setelah dilakukan penerapan strategi pembelajaran LOK-R. Begitu juga hasil uji paired sampel tes memperoleh nilai signifikansi sebesar $0,000 < 0,05$ yang berarti H_0 ditolak dan H_a diterima. Ini menunjukkan bahwa penerapan strategi pembelajaran LOK-R memiliki pengaruh terhadap peningkatan kemampuan literasi

sains peserta didik. Oleh karena itu, strategi pembelajaran LOK-R dapat menjadi alternatif dalam kegiatan pembelajaran IPA pada materi panas dan perpindahannya.

Keywords: Learning strategies, LOK-R learning, Scientific literacy

INTRODUCTION

The learning process that is expected now is a learning process that can accommodate 21st-century skills (Sarwi et al., 2019). 21st-century skills are skills that today's students need to prepare for their future (Widiyawati et al., 2021). Concerning the needs and demands of the times, the learning process in the classroom must be able to present this knowledge and skills. Some of the skills that must be developed by students today are literacy, numeracy, and scientific abilities.

Conditions that continue to develop make students' current skills must be able to face the challenges of the times (Fitri et al., 2022). The skills needed by students must be able to stimulate students' curiosity (Kristyowati & Purwanto, 2019). Such a learning process can be achieved by increasing literacy skills. One of the literacy skills that needs to be developed is scientific literacy (Jufrida et al., 2019). Scientific literacy is knowledge in responding to phenomena that occur in the surrounding environment and then making changes in the form of action as a form of understanding of the knowledge that students have learned (Nuro et al., 2020).

According to Arneson & Offerdahl (Priyangga et al., 2022), one of the main concepts of science is science learning because science continues to develop according to the conditions of the times. According to the Ministry of Education and Culture (2020), the objectives of learning science are to increase the intellectual ability to think at a higher level, solve problems systematically, achieve high learning outcomes, practice expressing ideas, and develop student characteristics. Scientific literacy can be interpreted as the

ability to identify phenomena, formulate plans for phenomena, obtain new concepts or understandings, communicate and determine attitudes as scientific skills and be able to draw conclusions based on phenomena, be aware of science in the application of technology, natural environment, culture, be actively involved in issues related to science (Utami et al., 2016). Munir et al (2021) also explains that teachers need to adapt the use of technology in the classroom in this era.

Therefore, the abilities that students in learning scientific literacy must possess as follows: a) being able to participate in society in the digital era with abilities about scientific concepts and processes, and b) being able to determine their answers from curiosity related to everyday life, c) being able to define, describe symptoms or phenomena and predict answers to these phenomena (Budiarti & Tanta, 2021). d) able to carry out social communication in understanding scientific information about science, e) able to describe scientific problems and information technology in the digital era; f) be able to evaluate scientific information with the appropriate basis and method; g) able to conclude and argue based on scientific evidence (Danianty & Sari, 2022).

Scientific literacy can also be considered scientific knowledge and attitude in seeing a phenomenon that occurs (Fakhriyah et al., 2017). Thus scientific literacy is critical to be applied in learning. The lack of understanding of the concepts in the science learning process shows that scientific literacy skills still need to improve (Benjamin et al., 2017). Students have yet to show scientific attitudes and skills; students are used to only using their knowledge (Utami et al., 2016).

The results of observations that have been carried out on the fifth-grade students who are in KKM MIN 5 Cirebon Regency, which includes the Pabedilan sub-district, obtained data that students' understanding is related to science learning on hot material and its displacement is still relatively low as evidenced from the pretest results on 15 students only 3 students scored above 70. Even though heat material and its transfer are natural phenomena whose application is usually carried out by students in everyday life. students are more likely to memorize material than understand it. The science learning process in elementary schools relies on a collection of material or concepts in textbooks, both student and teacher handbooks. The teacher teaches natural science subject matter conventionally by taking notes on all material, making the learning atmosphere unpleasant and tedious.

The results of research conducted by Perwitasari et al. (2017), Hasasiyah et al. (2019), and Juwita & Rosidin (2022) related to scientific literacy show results in a low category. Meanwhile, the project learning process (Sari et al., 2017) shows results in the medium category. In contrast to the learning process which uses the guided discovery model (Anggriani et al., 2020), linking science subject matter to surrounding environmental conditions through ethnoscience and the use of e-LKPD (Irmia & Yuliani, 2022) can improve scientific literacy skills.

To support the process of teaching and learning activities, of course, it is necessary to apply appropriate learning methods to achieve learning objectives (Sarwi et al., 2019). One way to do this is with learning strategies based on literacy activities (Nuro et al., 2020). The strategy that can be implemented is LOK-R learning, which consists of literacy, orientation, collaboration, and reflection activities. The LOK-R learning strategy was first introduced during the 2022 AKMI results

technical guidance activity conducted by the Ministry of Religion of the Republic of Indonesia. The LOK-R learning strategy is the answer so that students have literacy skills.

The LOK-R learning strategy can be an alternative learning strategy for improving scientific literacy skills. This is because the LOK-R learning strategy uses a method of optimizing literacy skills. It can stimulate students' understanding in understanding information and connecting it with personal experiences to form lifelong learners (Yusrah et al., 2020). In addition, learning activities that begin with the stages of literacy, orientation, collaboration, and reflection increase students to think critically so that students have the expertise to process information and communication skills that utilize writing, visuals or digital. Hence, they can solve the problems they are facing.

Unlike the previous research, this focuses on applying LOK-R learning to scientific literacy skills. LOK-R learning is expected to improve students' ability to understand scientific literacy. This study aims to determine the effectiveness of LOK-R learning in improving scientific literacy skills. With the H0 hypothesis, LOK-R learning strategies have no effect on scientific literacy skills, and Ha, there is an effect of LOK-R learning strategies on scientific literacy abilities.

METHOD

This research was pre-experimental research with one group pretest and posttest design. The initial step of this research was to conduct a pretest to see students' initial abilities in scientific literacy skills. The pretest results were then tested for validity and reliability with the SPSS program, and the results showed valid and reliable criteria. Next, applying the LOK-R learning strategy was carried out in the science subject of hot material and its transfer. The final step is to

carry out a posttest to see an increase in scientific literacy skills.

This research was conducted in class 5 MI Islamiyah Kalimukti with a sample of 15 students. Data collection used a scientific literacy ability test totaling ten questions on heat and its transfer. The students' pretest and posttest results were then carried out with a prerequisite test with normality and homogeneity tests. The results of the prerequisite test show that the research data is normally distributed and homogeneous. Furthermore, the assumption test is carried out through parametric or non-parametric hypothesis testing.

In addition, data collection was also carried out with documentation used to describe the LOK-R learning strategy process. The research data were then analyzed using descriptive analysis and the t-test to see the effectiveness of using the LOK-R learning strategy on scientific literacy abilities.

RESULTS AND DISCUSSION

Descriptive Analysis Results

The first stage of the analysis used descriptive analysis to collect data collected from the pretest and posttest of scientific literacy skills. Following are the results of the descriptive analysis, which can be displayed in Table 1.

Table 1. Descriptive Analysis Results

	N	Min	Max	Mean	Std. Deviation
Pretest	15	35	75	56.47	11.122
Posttest	15	65	96	81.33	10.140

From the results of the descriptive analysis above, it can be seen that before the LOK-R learning strategy was implemented, the lowest score was 35, and the highest score was 75 during the pretest. After applying the LOK-R learning strategy, the lowest score was 65, and the highest was 96 on the posttest. The

mean results also show a change; during the pretest, it was 56.47 with a standard deviation of 11.122, then increased to 81.33 with a standard deviation 10.140. This shows a significant change between the average pretest results before the LOK-R learning strategy is implemented and the posttest average results after the LOK-R learning strategy is implemented. Furthermore, to determine the effect of the LOK-R learning strategy on scientific literacy skills, the n-gain test was carried out. The results of the n-gain test can be presented in Table 2.

Table 2. The N-gain Test Results

	N	Min	Max	Mean	Std. Deviation
N-gain Score	15	,00	91	5496	28590
N-gain Score Percent	15	,00	91,11	54,9635	28,59021

The n-gain test results obtained an n-gain score of 0.54 and a percent n-gain of 54.96. The division of categories for obtaining N-gain values can be seen in Table 3.

Table 3. Categories of N-gain Effectiveness Interpretation

Percentage (%)	Interpretation
0.00 < N-gain < 0.30	Low
0.30 N-gain 0.70	Medium
N-gain > 0.70	High

The application of the LOK-R learning strategy to scientific literacy skills is included in the medium category. Meanwhile, if interpreted with an n-gain percent score, applying the LOK-R learning strategy is less effective in increasing scientific literacy skills.

Normality and Homogeneity Test Results

Normality and homogeneity tests are performed as prerequisite tests to determine whether the hypothesis test uses parametric or non-parametric. Following are the results of

the normality test, which can be shown in Table 4.

Table 4. Normality Test Results

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Pretest	,181	15	,200*	,953	15	,574
Posttest	,204	15	,095	,926	15	,237

The normality test results were carried out using the Shapiro-Wilk normality test because the number of samples was less than 50. The pre-test significance value was 0.574, and the post-test significance value was 0.237, more significant than 0.05, so the data is typically distributed.

After the prerequisite test is carried out through the normality test, a homogeneity test is carried out to determine whether the data is homogeneous or heterogeneous. The following results of the homogeneity test can be presented in Table 5.

Table 5. Homogeneity Test Results

Result			
Levene Statistic	df1	df2	Sig.
,031	1	28	,862

The homogeneity test results obtained a significance value of 0.862. This shows that the significance value is more significant than 0.05, meaning the research data is homogeneous. Because the results of the normality test and homogeneity test get expected and homogeneous results, the hypothesis test can be carried out by parametric hypothesis testing using paired sample t-tests.

Paired Test Samples

The paired sample test is used to see whether there is a relationship between the pretest and posttest results after applying the LOK-R learning strategy. The following are the results of the paired sample test, which can be presented in Table 6.

Table 6. Paired Sample Test Results

	Paired Differences			t	df	Sig. (2-tailed)
	Mean	Std. Dev	Std. Error Mean			
Pretest – Posttest	-24,86	12,73	3,28	-7,56	14	,000

The paired sample test produces a significance value of 0.000 < 0.05 so that it can be said that H_0 is rejected and H_a is accepted. This means that the LOK-R learning strategy affects scientific literacy skills.

Based on the research results described above, the LOK-R learning strategy influences increasing scientific literacy skills. The pretest results showed an average of 56.47 below the minimum completeness criteria limit of 70, while the pretest results showed an average of 81.33, which can be said to have increased the average student learning outcomes. The n-gain results show a value of 0.5496 which can be interpreted in the medium category. The results of the paired sample test show a significance value of 0.000 < 0.05, which means there is a real difference between students' pre-test and post-test results after implementing the LOK-R learning strategy on scientific literacy abilities. The LOK-R learning strategy applies literacy activities helpful in exploring and broadening students' insights. Orientation activities provide breadth and a combination of methods in conveying learning so that students become more active (student centre). Collaborative activities provide creative space for students, making teaching and learning activities easier to understand. Reflection activities provide an opportunity for teachers and students to conclude activities by

providing suggestions and input on the learning activities that have been carried out.

The results of this study are also reinforced by research that has been conducted related to the implementation of LOK-R learning which is very effective in the classroom (Pasongli et al., 2022). Likewise, the research conducted by Dhesita (2020), learning LOK-R in social studies lessons can be a solution to increasing historical literacy. LOK-R learning is also suitable for the Madrasah Ibtidaiyah level (Yusrah et al., 2020).

CONCLUSION

Based on the description of the research results, the LOK-R learning strategy influences increasing scientific literacy skills. This can be seen from the results of the n-gain test, which showed an increase in students' average pre-test and post-test results after implementing the LOK-R learning strategy. Likewise, the results of the paired sample test, the application of LOK-R learning strategies affects increasing students' scientific literacy abilities. Therefore, the LOK-R learning strategy can be an alternative learning activity in heat material and its transfer.

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