

Use of The Cycle 7e Learning Model in Improving Science Literacy

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ABSTRACT

The purpose of this study is to improve scientific literacy by using the 7e learning cycle learning model at SDN 148 Palembang because based on the initial test results, it was shown that 70% of the 22 students had a level of scientific literacy in the low category, while based on the results of initial observations showed that learning applied in class only used discussion and assignment learning methods. This study uses a type of Collaborative PTK research with the subjects of this study being 22 students in grade 5 (five). This study collaborated with grade V teachers. This study was carried out in 2 cycles with stages, namely planning, action, observation, and reflection. The results of this study show an increase in the average results of participants' scientific literacy in the three indicators of scientific literacy, namely identifying scientific issues, explaining scientific phenomena, and using scientific evidence. The average results of scientific literacy scores on the three indicators in the pre-cycle reached 39%, in cycle I increased to 74.5%, and in cycle II reaching 88%. In cycle II, the results of students' scientific literacy scores met the research performance indicators, namely reaching >75% so the research was stopped in cycle II. So this study shows an increase in Scientific Literacy using the 7E learning cycle model at SDN 148 Palembang.

Keywords: Science Literacy; Cycle 7e Learning Model; Primary School

ABSTRAK

Tujuan penelitian ini adalah untuk meningkatkan literasi sains dengan menggunakan model pembelajaran learning cycle 7e di SDN 148 Palembang karena berdasarkan hasil tes awal menunjukan bahwa sebanyak 70% dari 22 peserta didik memiliki tingkat literasi sains yang berada pada kategori rendah, sementara itu berdasarkan hasil observasi awal menunjukkan bahwa pembelajaran yang diterapkan di kelas hanya menggunakan metode pembelajaran diskusi dan penugasan. Penelitian ini menggunakan jenis penelitian PTK Kolaboratif dengan subjek penelitian ini adalah peserta didik kelas 5 (lima) sebanyak 22 peserta didik. Penelitian ini berkolaborasi dengan guru kelas V. Penelitian ini dilaksanakan sebanyak 2 Siklus dengan tahapan yaitu perencanaan, tindakan, observasi, dan refleksi. Hasil penelitian ini menunjukkan peningkatan rata-rata hasil literasi sains peserta pada ketiga indikator literasi sains yakni mengidentifikasi isu-isu ilmiah, menjelaskan fenomena ilmiah, serta

menggunakan bukti-bukti ilmiah. Rata-rata hasil nilai literasi sains pada ketiga indikator tersebut pada pra-siklus mencapai 39%, pada siklus I meningkat menjadi 74,5% dilanjutkan pada siklus II mencapai 88%. Pada siklus II hasil nilai literasi sains peserta didik telah memenuhi indikator kinerja penelitian yakni mencapai >75% sehingga penelitian dihentikan pada siklus II. Sehingga penelitian ini menunjukkan bahwa terjadi peningkatan Literasi Sains menggunakan Model learning cycle 7E di SDN 148 Palembang.

Kata Kunci: Literasi Sains; Model Pembelajaran Cycle 7e; Sekolah Dasar

INTRODUCTION

Mastery of science and technology in the 21st century is an important key to the success of a nation (Maharani et al., 2024; Syofyan & Amir, 2019). Mastery of science is very much needed in the future because science plays a vital role in creating students who master scientific literacy and can think critically, logically, and creatively in responding to various problems that arise due to the impact of technological developments. Scientific literacy is a necessity for every individual, citizens from various levels of education need to have knowledge, understanding, and abilities in scientific literacy (Siregar et al., 2023). Scientific literacy is the ability to use scientific knowledge, identify questions, and draw conclusions based on evidence, to understand and make decisions regarding nature and changes made to nature through human activities (Yuliati, 2017).

Based on data released by PISA 2018, the scientific literacy score of Indonesian students was 396, ranking 71 out of 79 participating countries and still far below the international standard score of 438 (Fuadi et al., 2020). From the PISA data, it is known that efforts are very necessary to improve the scores and rankings of Indonesian students' science literacy. Science literacy must be possessed by every student at every level of education, such as elementary school. Based on the initial test results, showed that as many as 70% of the 22 students' science literacy levels were in the very low category, while based on the results of initial observations, showed that the learning implemented in the classroom only used discussion and assignment learning methods and there was no science-based learning. Science literacy, critical thinking, and the ability to solve problems creatively will grow in students.

According to Fuadi et al. (2020), the factors causing low science literacy in students are that learning in the classroom is more teacher-centered, teachers are only oriented towards the target of mastering the material, and are unable to manage discovery-based learning and problem-based learning. Teachers are seen as facilitators in the learning process and have an important role in learning activities (Safitri et al., 2023). Teachers must provide enjoyable learning because students have a diamond mindset with a focus on the subject matter so that effectiveness is maintained (Faigawati et al., 2023; Teguh, 2020). Therefore, teachers must also be precise in using the right model with scientific literacy.

One of the student-centered and science-based models is the 7E learning cycle model. The 7E learning cycle learning model is student-centered (Andaru et al., 2019). This learning cycle learning model has the advantage of stimulating students to remember previous material relate it to the material to be studied and be able to convey concepts verbally (Nur & Noviardila, 2021). Students can also find out and evaluate the material they have learned so that they can enrich their knowledge (Rukmana et al., 2021; Safitri et al., 2021). Einsenkraft (Pakpahan et al., 2022) stated that the stages of the 7E Learning Cycle are elicit (bringing out

students' initial understanding), engage (involving students in that understanding), explore (investigating concepts or objects), explain (explaining the results of the investigation), elaborate (describing the results of the investigation), evaluate (the teacher assesses the performance results) and extend (expanding the new knowledge that has been obtained by students).

The results of research from Purwitasari et al., (2023) that the use of the 7E learning cycle learning model on students' mastery of science literacy in class 5 of SDN Kalibaru 05 North Jakarta influences the results of the analysis of the average science literacy test score of students in the experimental class is 69.65 and the average science literacy test score of students in the control class is 60.97. In line with this research, research from Marfilinda et al., (2019) shows that learning with the 7E Learning Cycle Model has an influence of 72% (moderate) on improving results. The results of the previously mentioned research are still being implemented in the 2013 curriculum, while they have not yet been applied to the independent curriculum.

Based on the explanation above, the researcher will conduct a study entitled "Use of The Cycle 7e Learning Model in Improving Science Literacy " with the hope that after conducting the study, students' science literacy can increase.

METHODS

This study uses a type of collaborative PTK research. According to Garces & Granada (Rasyimah & Sari, 2022), collaborative PTK is research that involves teachers in a work team and allows researchers to reflect on their pedagogical practices. This research was conducted in May 2023 at SDN 148 Palembang. The subjects of this study were 22 students in grade 5 (five). This research collaborated with grade V teachers. Teachers as observers and researchers as practitioners who carry out actions. Teachers and researchers collaboratively design, plan, revise research procedures, and discuss research results as reflections.

This research was conducted in 2 cycles with stages, namely planning, action, observation, and reflection. In the planning stage, researchers prepare teaching modules, diagnostic assessments, learning media, etc. In the action stage, researchers learn by the teaching module and use the Learning Cycle 7E learning model. During the auction process, researchers and teachers carry out observations. Observations are intended to monitor processes related to student responses, teacher behavior, and interactions between teachers and students, as well as other important things. The reflection stage is carried out to find the strengths and weaknesses of the actions that have been taken, identify obstacles faced, analyze the effects that occur by taking action, and determine the success of the cycle implementation.

The analysis techniques in this study are qualitative and quantitative analysis. Qualitative analysis data is based on the results of observations or observations during the learning process. Meanwhile, for quantitative analysis data based on the assessment results according to the indicators of scientific literacy, namely explaining phenomena scientifically, evaluating and designing scientific investigations and interpreting data and evidence scientifically (Hasasiyah et al., 2020) and the results of student activities with indicators of paying attention to teacher explanations, actively carrying out group activities, expressing opinions to group members and other friends, doing assignments seriously and on time, and concluding the results of experiments (Febriani & Al Ghazali, 2020). The indicators of success of this study are

that all stages of the 7E cycle learning model are implemented properly and the students' scientific literacy scores reach 75%.

The stages of the 7E Learning Cycle are elicited (bringing up students' initial understanding by showing videos of learning materials), engagement (involving students in this understanding such as asking questions, recalling previous experiences, etc.), explore (investigating concepts or objects, namely students are given problems related to learning materials in groups), explain (students explain the results of their investigations), elaborate (students describe the results of their investigations), evaluate (teachers provide an assessment of performance results) and extend (teachers expand on new knowledge that has been obtained by students).

RESULTS AND DISCUSSION

This research was planned and implemented in cycle I and cycle II according to the stages of the cycle 7E learning model. The series of activities in Cycle I and Cycle II can be seen in Table 1.

Table 1. Stages of Learning Activities

No.	Stage	Activity
1.	Elicitation stage (Initial knowledge)	The teacher asks questions that stimulate students' prior knowledge so that responses arise from students' thinking and arouse curiosity about the answers to the questions asked by the teacher.
2.	Engagement stage (Involving or attracting students' attention)	Focusing students' attention, stimulating thinking skills, and arousing students' interest and motivation in science lessons or the concepts taught.
3.	Exploration stage (Investigation)	Utilizing students' five senses as much as possible in interacting with the environment through observation activities and literature reviews.
4.	Explanation stage (Explanation)	Provide ample opportunities for students to convey their ideas or thoughts through discussion and presentation activities.
5.	Elaboration stage (Implementing)	Inviting students to apply the concepts they have learned by working on problem-solving questions.
6.	Evaluation stage (Evaluation)	Evaluation questions are given to determine the extent of students' understanding of the concepts they have learned.
7.	Extend stage (Expand)	Train students to be able to find and explain examples of the application of concepts and find relationships between concepts learned and other concepts that students have or have not learned.

All stages are placed in the lesson plan and implemented in the learning process. The results of reflection from cycle I, that the source of the material is not too much, so students only have a source of learning material from 1 (one) source. In Cycle II, improvements were

made to the learning process by providing more sources of learning material as many as 3 (three) sources of learning material about the parts and functions of each part of the eye and this action was quite effective in improving the indicator of identifying scientific issues. Presentation of student activities during the pre-cycle to cycle II can be seen in table 2.

Table 2. Student Activities

No.	Indicator	Presentation		
		Pre Cycle	Cycle I	Cycle II
1	Pay attention to the teacher's explanation	45%	90%	100%
2	Do group activities actively	27%	77%	95%
3	Express opinions to group members and other friends	22%	68%	95%
4	Do assignments seriously and on time	22%	68%	95%
5	Conclude the results of the experiment	27%	90%	100%
Average		28%	78%	97%

Group division in cycle I was based on student interests with the hope that students could work together according to the group members they liked, but it turned out that student performance was not effective and tended to only be a few students working in group activities. This was noted and improvements were made in cycle II. In cycle II, student groups were based on student ability levels from the results of student diagnostic assessments and made group cooperation more effective than in the previous cycle as shown in figure 1.

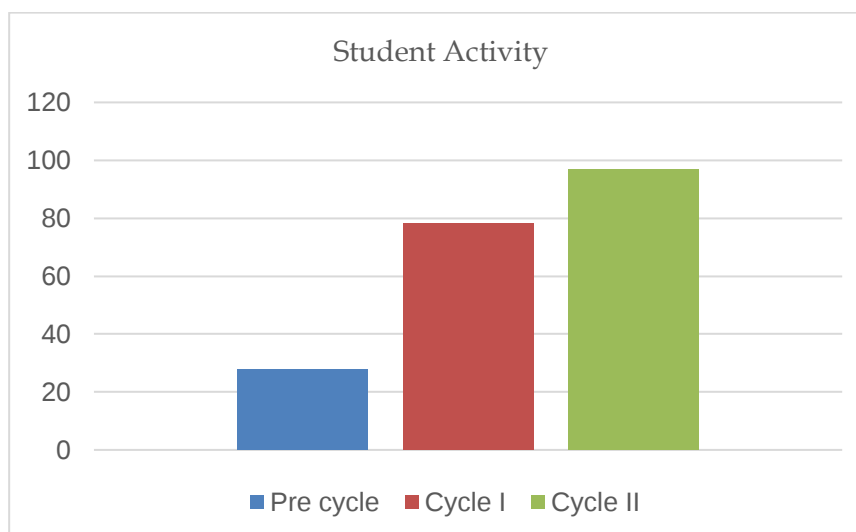


Figure 1. Increased Student Activity

Cycle I and cycle II were carried out well and there was an increase in student activity during the learning process, increasing student science literacy. The following are the results of student science literacy from the pre-cycle, cycle I, and cycle II as shown table 3.

Table 3. Students' Science Literacy Results

No.	Indicator	Presentation		
		Pre Cycle	Cycle I	Cycle II
1	Identifying scientific issues	46%	90%	100%
2	Explaining scientific phenomena	39%	69%	86%
3	Using scientific evidence	34%	65%	79%
Average		39%	74,5%	88%

The Cycle 7E learning model in learning activities as an effort to improve scientific literacy has been successfully carried out. The results of the study showed an increase in the average results of scientific literacy of participants in the three indicators of scientific literacy, namely identifying scientific issues, explaining scientific phenomena, and using scientific evidence. The average results of scientific literacy scores on the three indicators in the pre-cycle reached 39%, in cycle I, increased to 74.5%, and in cycle II, reaching 88%. In cycle II, the results of students' scientific literacy scores met the research performance indicators, namely reaching >75%, so the study was stopped in cycle II. More clearly the increase in students' scientific literacy in each cycle is presented in Figure 2.

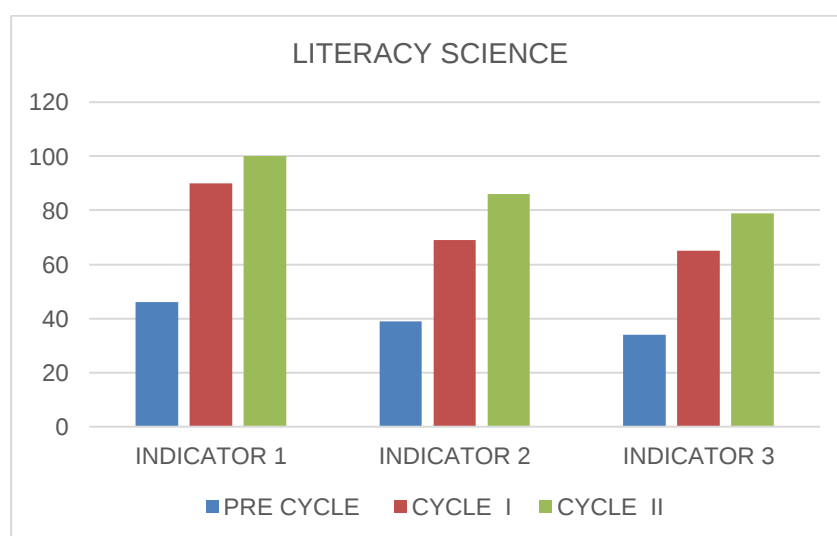


Figure 2. Improving Student Literacy

From the diagram above, it is known that there was an increase from the pre-cycle to cycle II and this proves that there was an increase in Science Literacy using the 7E learning cycle model at SDN 148 Palembang. In line with the results of this study, namely research from Lestari & Rosdiana (2018) showed that Self-Regulated Learning (learning independence) of students studying mathematics using the Learning Cycle 7E learning model in class VIII MTsN 3 Solok Selatan obtained the criteria for learning independence with a percentage of 80.76% which is in the good category. Learning with the 7E learning cycle model experienced greater improvements than with conventional learning (Alsahhi, 2023; Sa'diyah et al., 2024).

The results of research from Ningsih et al., (2020) also prove that the use of the lesson study-based learning cycle 7E learning model can improve students' critical thinking skills with the results of interpretation indicators of 0.03%, inference of 0.03%, analysis of 0.06%, evaluation of 0.28%, explanation of 0.66%, and self-regulation of 0.91%. Supported by research from Novita Sari et al., (2022) that the application of the Learning Cycle 7E learning model has a significant effect on students' collaboration skills and critical thinking skills. This model is also considered appropriate to be applied in the learning process with a scientific approach because the learning activities are more student-centered and systematic activity stages organized to assist students in acquiring concepts to master established competencies (Ibrahim et al., 2022; Istuningsih et al., 2018). The 7E learning cycle model is a powerful strategy that offers a glimmer of hope that the problem of lack of understanding of concepts can be solved (Adam et al., 2022), with the 7E LCM with CA showing better results in improving conceptual understanding and minimizing misconceptions (Mekonnen et al., 2024). This study supported by other studies, shows that the Learning Cycle 7E learning model has a good impact on various activities such as scientific literacy, critical thinking skills, collaboration, independence, and many more.

CONCLUSION

The implementation of learning according to the stages of Learning Cycle 7E, namely elicit (bringing out students' initial understanding), engage (involving students in that understanding), explore (investigating concepts or objects), explain (explaining the results of the investigation), elaborate (describing the results of the investigation), evaluate (the teacher provides an assessment of the performance results) and extend (expanding new knowledge that has been obtained by students). Each stage is carried out in cycles I and II, reflection is carried out in cycle I and gets notes on improvements that must be fixed in cycle II, namely sources of learning materials and division of group members. Based on the results of this study, shows an increase in the average results of participants' scientific literacy in the three indicators of scientific literacy, namely identifying scientific issues, explaining scientific phenomena, and using scientific evidence. The average results of scientific literacy scores on the three indicators in the pre-cycle reached 39%, in cycle I increased to 74.5%, and in cycle II reaching 88%. In cycle II, the results of students' scientific literacy scores met the research performance indicators, namely reaching >75% so the study was stopped in cycle II. So this study shows an increase in Science Literacy using the 7E learning cycle model at SDN 148 Palembang. Researchers suggest further research to implement learning using the 7E learning cycle model in the latest curriculum and at higher class levels.

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