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Improving Literacy Skills and Learning Outcomes of Grade 7 Students on Acid-Base Material Through a Scientific Approach

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ABSTRACT

The initial observation was conducted by the author from October 24–26, 2024, at MTs Al-Ma'arij Bojonggenteng, especially in class VII B, shows that the literacy ability of students in science learning is still classified as low, and, in a general way, the results of the study are under the minimum completion criteria. Findings indicate the need for increased skills literacy in science learning through a more interactive and in-depth approach, enabling students to stimulate both interest and understanding of the material taught. This study aims to assess improvements in literacy skills and learning outcomes of students through learning science in class VI IB MTs Al-Ma'arij Bojonggenteng. This research is a Classroom Action Research (CAR) project, comprising two cycles. Each cycle comprises planning, action, observation, and reflection. The technique employed for data collection was a descriptive qualitative method, which aims to objectively describe existing conditions without any treatment or manipulation of the variables studied. The study's results show that learning science can enhance literacy and learning outcomes for students in Class VII B MTs at Al-Maarij Bojonggenteng. The number of students who were actively engaged in learning increased during the study, specifically by 50% in cycle 1 and 73.3% in cycle 2. In cycle one, the average student score is 68.3 and the minimum completion criteria completion rate has increased by 56.67%. In cycle 2, the average student score was 78, and the minimum completion criteria was 86.67%.

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INTRODUCTION

Literacy is a vital and integral part of the educational landscape. Education and literacy skills are closely related in our lives. Literacy is a means by which students can learn, understand, and apply the knowledge they gain in school. The progress of a country directly depends on the level of literacy in that country. Traditionally, literacy is seen as the ability to read and write. In this view, literate individuals are those who can read and write, or are free from illiteracy. However, the understanding of literacy has developed even with the development of technology; literacy is also associated with scientific, information, and technological literacy. In a book issued by Badan

Pusat Statistik Indonesia in 2022, data stated that the level of reading interest of the Indonesian people as a whole is at 59.52, with a reading duration of 4-5 hours per week and 4-5 books per quarter.

Science education in Indonesia faces significant challenges in improving students' literacy skills and learning outcomes, particularly with more complex materials, such as acids and bases, at the junior high school level. Research indicates that Indonesian students' scientific literacy skills remain relatively low, as evidenced by the results of the PISA assessment, which revealed a science literacy score below the average of other participating countries (Yusmar & Fadilah, 2023). This suggests the need for a more effective and innovative learning approach to enhance students' literacy skills and deepen their understanding of science concepts.

The scientific approach, which emphasizes observation, data collection, and experimentation as integral components of the learning process, has been demonstrated to enhance students' scientific literacy. Based on research conducted by Purba (2023), the application of a scientific approach through an interactive learning model can significantly improve students' digital literacy skills, with a significant difference between pre-test and post-test scores in learning with this approach. Another study by Megarahayu et al. (2023) also demonstrated that applying a scientific approach to the Problem-Based Learning (PBL) model can enhance students' scientific literacy skills. However, the results fall into the moderate category.

One of the factors that influences low student learning outcomes and literacy is the lack of direct practice in the real world that connects science concepts with everyday life. According to Hastini et al. (2020), more direct practice and the use of technology are needed to access actual information, thereby increasing the effectiveness of the learning model applied. Research conducted by Syofyan et al. (2020) proves that the use of environmental literacy-based modules with a scientific approach can improve student learning outcomes by an average of 28%. This demonstrates that the scientific approach is not only effective in improving literacy but also in enhancing student learning outcomes.

The scientific approach has also been shown to be effective in increasing student activity and involvement in the learning process. Haryani et al. (2020) demonstrated that scientific learning methods can encourage students to be more active in making observations, thinking critically, and presenting their learning outcomes, thereby increasing student engagement. In addition, technology-based learning media, as noted by Ramdani et al. (2020), can also enhance the accessibility and effectiveness of learning, both within and outside the classroom.

The results of the initial survey observations conducted by the author on October 24-26, 2024, at MTs Al-Ma'arij Bojonggenteng, especially in class VII, show that students' literacy skills in science learning in class 7B are still relatively low. This is evident in the large number of passive students, with fewer actively participating in question-and-answer sessions. Only a few students can do assignments to summarize the material, and their learning outcomes are generally below the minimum completion criteria. Kartina et al. (2022) noted that students' low literacy skills can be observed in their activities during the learning process, for example, when they immediately fill in without further thought, and when they struggle to answer questions, even if the questions are slightly modified.

Based on this background, this study aims to test the application of a scientific approach in improving students' literacy skills and learning outcomes in acid-base material in grade 7 of MTs Al-Ma'arij Bojonggenteng. It is expected that by implementing a scientific approach tailored to the learning context and supported by relevant media, students' learning outcomes can improve, and their scientific literacy skills can develop effectively.

METHODS

The research method employed in this study is Classroom Action Research (CAR), which involves two cycles. CAR is a research approach that focuses on actions taken in the classroom to improve the learning process directly. According to Azizah (2021), CAR consists of a series of steps or cycles, including planning, implementation, observation, and reflection. This process occurs continuously, generating new cycles until the research is completed.

The following are the main steps taken in this classroom action research:

1. Identifying Problems: At this stage, the researcher identifies problems that occur in the learning process that need to be fixed.
2. Analyzing and Formulating the Problem: Once the problem has been identified, the next step is to analyze it more thoroughly to formulate it clearly and specifically.
3. Planning Improvements: Based on the analysis results, the next step is to plan the actions to address existing problems and enhance the learning process.
4. Implementing CAR: At this stage, the plan that has been prepared is implemented in learning actions designed according to the objectives that have been set. In implementing this research, the CAR model proposed by Kurt Lewin was employed, which consists of four main stages: planning, action, observation, and reflection. These four stages form a continuous cycle, with each iteration aiming to improve learning practices based on findings from the previous cycle.

This classroom action research was conducted in the odd semester of the 2024/2025 academic year, precisely from November 2, 2024, to November 17, 2024. The research was conducted at MTs Al-Ma'arij Bojonggenteng, Sukabumi Regency. The subjects of this study were students in class VII, specifically class 7B at MTs Al-Ma'arij Bojonggenteng, Bojonggenteng District, Sukabumi Regency, during the 2024/2025 academic year, comprising a total of 30 students, with 13 boys and 17 girls. To analyze the data, a qualitative descriptive technique was employed, which aims to objectively describe the existing conditions without altering or manipulating the variables being studied. With this approach, the data obtained can provide a real picture of the learning conditions and developments that occur during the research cycle.

Syaifudin (2021) argues that there are at least three functions of CAR, namely: 1) For teachers, classroom action research (CAR) serves as a tool for improvement, a strategy for developing professionalism, increasing self-confidence, and enhancing teacher knowledge and skills. 2) For students, CAR helps improve learning outcomes

and correct deficiencies in the teaching process. 3) For schools or educational institutions, CAR can enhance the quality of education and make these institutions an example for others. Overall, this study aims to enhance the quality of learning by implementing actions that are continually analyzed and refined through existing cycles, while also contributing to the development of teacher professionalism and improving student learning outcomes.

RESULT AND DISCUSSION

Based on CAR research conducted over two cycles, the data produced show an increase in student learning outcomes and literacy, with a notable improvement in each cycle. The first cycle of the scientific approach is carried out through learning using video media and discussion methods, followed by group presentations, and concluded with individual assessments using LKS books. The second cycle of the scientific approach is carried out through group practicum methods, followed by presentations of the group practicum results, where it is deliberately required that those presenting in this second cycle be different from those in the first cycle. The learning concludes with individual assessments using LKS/LKPD. The percentage of students who actively ask or answer questions increases when compared to the number before the research was conducted. This shows that students' literacy skills have also increased, namely, students' ability to read, gather information, understand material, think critically, and communicate. This increase is shown in Table 1.

Table 1. Percentage increase in the number of students who are active in learning

No.	Learning Session	Number of active students	Percentage (%)
1	Before the research	<10	<33.3
2	Cycle 1	15	50
3	Cycle 2	22	73.3

$$\text{Before research} = \frac{active\ students}{total\ number\ of\ students} = \frac{10}{30} \times 100\% = 33.3\%$$

$$\text{Cycle 1} = \frac{active\ students}{total\ number\ of\ students} = \frac{15}{30} \times 100\% = 50\%$$

$$\text{Cycle 2} = \frac{active\ students}{total\ number\ of\ students} = \frac{22}{30} \times 100\% = 73.3\%$$

As shown in Table 1, the proportion of students who were active in learning decreased from before the research to 33.3%, then increased to 50% in the first cycle and further increased to 73.3% in the second cycle. The increase in the number of students actively engaged in learning is also shown in Figure 1**.**

In addition to improving students' literacy skills, the study's results also demonstrate that a scientific approach to learning can enhance student learning outcomes, as evidenced by the increase in the number of students who meet the minimum completion criteria, specifically those who achieve scores above 70. This increase in student scores also contributes to an overall rise in the average student score. The following data on student scores in Cycle 1 are presented in Table 2, and data on student scores in Cycle 2 are presented in Table 3.

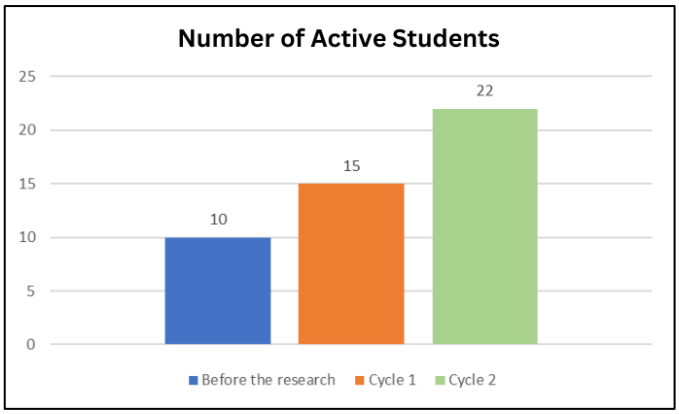

Figure 1. Diagram of active students

Table 2. List of student grades in Cycle I

No.	Student Name	Mark	Completed/Not Completed
1	US	60	NC
2	AZ	80	C
3	AN	75	NC
4	AR	80	C
5	AD	75	C
6	DA	75	C
7	DZ	60	NC
8	FA	60	NC
9	HA	80	C
10	LA	80	C
11	MS	65	NC
12	MR	75	C
13	MA	60	NC
14	MF	70	C
15	NA	70	C
16	NS	75	C
17	NF	60	NC
18	PS	55	NC
19	RE	65	NC
20	RA	50	NC
21	RS	70	C
22	SA	70	C
23	SO	75	C
24	SP	65	NC
25	SH	70	C
26	SM	60	NC
27	TW	55	NC
28	YS	75	C
29	WH	65	NC
30	ZN	75	C

- Average student score = $\frac{total\ amount\ of\ value}{total\ number\ of\ students} = \frac{2050}{30} = 68.3$
- Percentage of completion of the minimum completion criteria = $\frac{completed\ students}{total\ number\ of\ students}$ x 100% = $\frac{17}{30}$ x 100% = 56.67%

Table 3. List of student grades in Cycle II

No.	Student Name	Value	Completed/Not Completed
1	US	70	C
2	AZ	90	C
3	AN	100	C
4	AR	90	C
5	AD	85	C
6	DA	85	C
7	DZ	65	NC
8	FA	65	NC
9	HA	80	C
10	LA	80	C
11	MS	75	C
12	MR	85	C
13	MA	75	C
14	MF	70	C
15	NA	80	C
16	NS	80	C
17	NF	75	NC
18	PS	65	NC
19	RE	80	C
20	RA	70	C
21	RS	85	C
22	SA	85	C
23	SO	80	C
24	SP	80	C
25	SH	70	V
26	SM	65	NC
27	TW	75	C
28	YS	75	C
29	WH	75	C
30	ZN	85	C

- Average student score = $\frac{total\ amount\ of\ value}{total\ number\ of\ students} = \frac{2340}{30} = 78$
- Percentage of completion of minimum completion criteria = $\frac{completed students}{total\ number\ of\ students}$ x 100% = $\frac{26}{30}$ x 100% = 86.67%

According to Juniawan (2020), scientific learning steps emphasize literacy activities, such as reading and writing optimally. Literacy activities begin with apperception, when students listen to fairy tales read by the teacher or read them independently. Then students make small notes about information they consider

interesting and important that is relevant to the reading in their reading journal. The notes in the journal also function as a reminder that they have read or listened to the reading. This process trains students to understand reading more deeply. This literacy process continues to the next stage, such as observing, asking, and gathering information. According to Nabillah & Abadi (2020), learning outcomes play a crucial role in the learning process, as they provide teachers with information about students' progress in achieving learning goals through teaching and learning activities.

From the data generated in this CAR, it is evident that the scientific approach can enhance the literacy skills and learning outcomes of grade 7 students at MTs Al-Maarij Bojonggenteng, particularly in the context of acids and bases. This finding aligns with research conducted by Megarahayu et al. (2023), which demonstrates that learning that incorporates a scientific approach using the Problem-Based Learning (PBL) model can enhance students' scientific literacy skills, particularly in the Context of Plantae material, in terms of explaining phenomena scientifically. This can be seen from the results of the Z-test calculation, where Zcount is 4.67 and Ztable is 1.65, which indicates that the application of this approach has a positive effect on the literacy of grade X IPS 1 students at SMA Negeri 1 Baregbeg.

Also in line with the results of research conducted by Setiawan (2019), the application of a scientific approach in biology learning oriented to scientific literacy has an effectiveness in the moderate category, with a value of 0.548. This suggests that the scientific approach can be utilized to develop scientific literacy competencies, despite no significant differences being found between the learning models employed. Data analysis conducted by Haryani et al. (2022) also showed that the scientific learning method was more effective in increasing student activity in physical education.

This can be observed when students make observations and think critically about healthy socializing material, as outlined in teaching and learning activities (KBM), as well as when they present learning outcomes and respond to questions or ideas, thereby demonstrating active student engagement. Strengthened by the conclusion of a study conducted by Ikhlas (2020) that the application of a scientific learning approach in the Mathematics learning process provides a better contribution to the experimental class compared to the control class using a conventional learning approach. This can be seen from the results of the analysis, which show that the post-test score in the experimental class is higher than the control class.

In line with Khoiroh et al. (2020), their research found that the improvement in learning outcomes for class VII students who used a scientific approach with the discovery learning model (Experimental class) resulted in an average of 75% with high criteria. However, class VII using conventional methods (control class) obtained an average of 55% with low criteria. In her research, Rizawati (2022) stated that the scientific learning process using infographic media showed significant progress, as evidenced by the increase in communication skills and student learning outcomes. The implementation of this learning process was recorded at 78% in Cycle I, with the category 'Sufficient' (C), increasing to 88% with the category 'Good' (B) in Cycle II, and reaching 95% with the category 'Very Good' (B+) in Cycle III.

CONCLUSION

The application of the scientific approach to the material of acids and bases of grade 7 MTs Almaarij Bojonggenteng can improve students' literacy skills and learning outcomes. The increase in students' literacy skills is reflected in the rise in the number of students who are actively engaged in learning during the study, which is 50% in Cycle 1 and 73.3% in Cycle 2. The increase in students' learning outcomes is reflected in the rise in the average value of students and the number of minimum completion criteria completions, namely In cycle 1 the average value of students was 68.3 and the minimum completion criteria completion was 56.67% increasing in Cycle 2, the average value of students became 78 and the minimum completion criteria completion became 86.67%.

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