Elementary Science Literacy: Implementing and Enhancing Student Skills and Outcomes

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Abstract:

The purpose of this study is to describe the implementation of science literacy through the one student one video program and the impact of science literacy learning on students' science literacy skill and science learning outcome. The research subjects were fifth grade students of Madrasah Ibtidaiyah Muhammadiyah Purwodadi, Tembarak, Temanggung, Central Java. This research is action research with data collection of observation, interview, documentation, and test question. Data analysis technique is descriptive quantitative. The result showed an increase in students' science literacy skill and science learning outcome. Sawa Sado Program notably enhanced students' science literacy skills. Group 1 achieved a maximum improvement of 100% across all measured aspects, followed by Group 2 and 3, which also displayed substantial advancements. However, Group 4 showed greater variability in results, with varying improvements across different aspects. The Sawa Sado Program has generally succeeded in boosting students' science literacy skills. Nonetheless, the varied outcomes among the groups suggest different extents and patterns of improvement. This indicates the program's effectiveness but also underscores the need for a deeper understanding of the differing outcomes.

Key Words: *Literacy, Video, Learning Outcomes*

INTRODUCTION

The Industrial Revolution 4.0 era requires elementary school students to master the skills of science literacy, critical thinking, utilizing information and Communication Technology (ICT) in learning, and producing something through learning (Nasution, 2021). Literacy skills of Primary school student not only stop at Reading and writing activities, but must arrive at the ability to produce something, correlate, interpret and find solution to scientific problem (Nurul et. al., 2022; Hamidulloh et. al., 2022). Science literacy is the ability to understand the core concept, principle of science and knowledge, the ability to reason scientifically in order to achieve personal and community goal (Visintainer, T. 2020). Science literacy deals with the environment, technology, and society that can be integrated into learning. Some research says science literacy has an impact on students ' problem-solving skills (Islami et al., 2020),

concern for the environment (Arfiani et al., 2021) and solving ability in life through scientific sources (Škėrienė et al., 2020).

In learning, science literacy skill can be improved through the application of relevant learning model, strategy and method. Educator must provide access to learning resource from various literature, including information searches via the internet. Learner in science literacy are trained to be literate, communicate well, hone creative, critical and skillful thinking when making decisions to solve problems (Saraswati et al., 2021). In improving science literacy, PISA 2018 mention three competencies, namely (1) describing symptom scientifically, (2) interpreting data and evidence of science literacy, and (3) evaluating and designing science literacy. These three aspects require science literacy knowledge (content, procedural, and epistemic) (Singgih et al., 2022). The component of scientific literacy are the ability to reason scientifically, think critically about science, understand science and its application, the ability to understand the substance of science and non-science problem, and the ability to recognize the risk and impact of science in life (Pietrocola et al., 2021).

Technically in elementary school learning, science literacy in the research refer to the scientific thinking skill in the 2013 curriculum, namely observing, questioning, trying/exploring, reasoning/associating, and communicating/ networking (Zaini et al., 2022). Science literacy is very effectively applied in learning through literacy program or movement (Cencelj et al., 2019; Nuryana, et al., 2020). One form of program to implement science literacy is through a video-making program for student (Nur, 2020; Sözeri et al., 2021). This prove that previous study has presented evidence that science literacy can be applied through video-making program in elementary school.

This study departed from the low student learning outcomes in science at Madrasah Ibtidaiyah Muhammadiyah Purwodadi, Tembarak District, Central Java, Indonesia in the 2019-2020 academic year. Based on the result of observation and interviews on March 4, 2021 with the principal and fifth grade teacher of Madrasah Ibtidaiyah Muhammadiyah Purwodadi, Tembarak District, Temanggung Regency, Central Java, Indonesia it is known that students' science literacy skill is still low. Learning outcome is still low in the even semester midterm exam, the average score of the science subject class is 61.8 with a minimum completeness criterion of 70. From this data, we can know that student learning outcome is still below the minimum completeness criteria set in class V Madrasah Ibtidaiyah Muhammadiyah Purwodadi, Temanggung, Indonesia. The fifth-grade teacher of Madrasah Ibtidaiyah Muhammadiyah Purwodadi, Mr. Arqom, explained that student still have difficulty in understanding science concept, beside that the learning applied is still traditional/conventional learning. At this time, learning has not been running optimally because the covid-19 outbreak disrupted learning. As a result, face-to-face learning is still not running optimally because the learning time is shortened from the time that is usually done in normal learning. As for online learning, teacher have not made learning

innovation that make student enthusiastic about learning science at home (Debbag & Fidan, 2020).

Research also mentioned that science literacy is influenced by the social and economic factor of a school (Ozden, 2020). This is also experienced in Madrasah Ibtidaiyah Muhammadiyah Purwodadi, according to the result of interview obtained in online learning activity carried out, namely providing subject matter through WhatsApp Group and asking student to study the material. Teacher only accompanies the learning process through WhatsApp Group, so the key to student understanding of the material depends on the personal ability of student and parent who accompany student. This has an impact on students' understanding of the material provided.

This research contributes novelty by offering insights into the practical implementation of a science literacy program at the elementary level, assessing its effectiveness, and emphasizing the significance of tailored educational interventions for enhancing scientific literacy skills and improving science learning outcomes among elementary school students in a specific cultural and educational context.

RESEARCH METHODS

This research approach combines quantitative and qualitative research. This research is action research, which is a research method in order to solve problem faced by someone in their daily task including in school learning (Al-Obaydi et al., 2020). The research design carried out by researcher consisted of one cycle with 4 stages of action and observation. The method used by researcher is the action research method with technical implementation with research step including planning, implementation / action, observation, and reflection (Hennink & Kaiser, 2022).

The aim is to improve the learning process and increase students' science literacy skill and science learning outcome through the One Student One Video (Sawa Sado) program. The subject of this research was class V which amounted to 27 people with 14 female students and 13 male students. This action research was conducted at Madrasah Ibtidaiyah Muhammadiyah Purwodadi. This research was conducted in the even semester Data collection used observation, interview, documentation and test. Data analysis technique using data reduction, data display, and conclusion drawing/verification techniques (Hasanudin et al., 2020).

Assessment of content validity is conducted through a meticulous process involving expert judgment. This evaluative procedure scrutinizes the validity of several instruments utilized within the study, namely the lesson plan, teacher performance observation sheet, observation of students' science literacy skill, question grid, and the test questions administered to students. Each of these instruments undergoes a rigorous examination by experts in the field, ensuring that they adequately and accurately measure the intended constructs and align

effectively with the research objectives. The utilization of content validity testing, facilitated by expert assessment, ensures the reliability and appropriateness of the research instruments, enhancing the credibility and robustness of the study's findings and conclusions (Thompson Burdine et al., 2021).

RESULTS AND DISCUSSION
Implementation of Science Literacy Through One Student One Video Program

Science literacy applied at Madrasah Ibtidaiyah Muhammadiyah Purwodadi refers to science literacy in the 2013 curriculum through a teacher-designed program called One Student One Video (Sawa Sado). The Sawa Sado program is a program that invite student to create their own work in the form of learning video which are carried out in 4 stages, namely: script/content creation, shooting, editing, and watching and evaluating the video.

The Sawa Sado program teach student to make learning videos from the initial process of preparing content and script to the editing stage. It aims to invite student to play an active role in learning, beside that in accordance with the three pillars of literacy, namely reading, writing and archiving, through this program students are invited to make their work product that can be archived in the form of learning video.

The program challenge student to achieve meaningful learning and provide opportunity for student to discuss and work together. This program also focuses not only on cognitive aspects but also psychomotor aspect because this program is project-based, namely making learning video carried out by students. Through this program, it is able to attract students' interest in learning science and actively participate in the learning process. Researcher using the Sawa Sado program saw the interest of student who were more interested in this video media (Badariah, 2021). By making video student will be actively involved starting from the preparation of video material, the process of making video and editing video, so that student will understand the material presented and indirectly student learn in a fun way.

The Sawa Sado program is used in both online and face-to-face learning proces, so this program is very suitable considering that current learning has not implemented 100% face-to-face learning. In addition, videos can be saved and can be viewed at any time by students so that student can learn anytime and anywhere. Based on the result of the study, student not only experienced an increase in science literacy skill and learning outcome, but student also gained new knowledge in the form of making their own learning video (Zaini et al., 2022).

The Sawa Sado program is applied to elementary school-age children, therefore the implementation is adjusted to the level of student ability. Video making use a cellphone camera and for editing using the PowerDirector application, the reason for using the application is because the application is quite easy to use by elementary school age students besides that the PowerDirector

application can be used on cellphones so that it can be downloaded by all students because only a few students have laptop so it will be easier if they use cellphones for video making and editing. By implementing the Sawa Sado program, it is hoped that student will be more active in learning and enthusiastic about learning science or science so as to improve the ability of science literacy and learning outcome of Madrasah Ibtidaiyah Muhammadiyah Purwodadi student.

Figure 1. Example of A Student-Made Learning Video

The Impact of Science Literacy Learning on Students' Science Literacy Skills on Science Learning Outcome

The impact of science literacy learning on students' science literacy skills on science learning outcome is presented as data on student learning outcome, observation of students' science literacy skill, and teacher performance during the action process, namely by implementing the One Student One Video (Sawa Sado) program at Madrasah Ibtidaiyah Muhammadiyah Purwodadi.

By implementing the Sawa Sado program, student is encouraged to be active in learning. This program teach student to actively participate in learning because this program is designed so that student participate in learning. The 21st century learning design is no longer teacher-centered, but student-centered as the main character in the learning. The Sawa Sado program is able to make student achieve success in learning. In addition, this program also trains student to have good thinking skill, as well as social skill. Such as the skill to express opinions, accept suggestions and opinions of others, work together, care about others. This program trains students to be able to communicate in public, especially in front of the screen with good and correct oral communication.

This research was carried out with 4 stages of activities. Each stage of the meeting will be carried out test to measure student learning outcome. The learning outcome measured in this study are cognitive learning outcome. The analysis of learning outcome was carried out by mean of test using test question consisting of 10 multiple choice question and 5 fill-in question. This research was

carried out with 4 stages because in the implementation of the Sawa Sado project, where student is invited to make their own learning video. The Sawa Sado program takes quite a long time so it must be implemented with 4 stages, starting from the stages of script and content preparation, filming process, video editing, and the stage of watching the result of learning video as well as evaluating the learning video that have been made.

The student learning outcome studied are learning outcomes in the knowledge aspect of science subject assessed through tests with 10 multiple choice question and 5 fill-in questions with a minimum completeness criterion of 70. The following table shows the results of student learning completeness at each stage of the activity while implementing the Sawa Sado program.

Table 1. Results of Student Learning Completeness of Activities 1-4

No	Description	Results			
		1	2	3	4
1	Quantity of students	27	27	27	27
2	Quantity of completed students	10	11	13	17
3	Quantity of students who did not complete	17	16	14	10
4	Quantity of scores obtained	1565	1680	1690	1755
5	Class average score	57,96	62,22	62,59	65,00
6	Completion percentage	37,04%	40,74%	48,15%	62,96%
7	Percentage of non-completion	62,96%	59,26%	51,85%	37,04%

Science literacy skills in this study are scientific thinking skill contained in the 2013 curriculum. The 2013 curriculum competence are in line with the science literacy domain according to PISA. In this study, students' literacy skill was assessed through observation of science literacy skill in the aspect of observing, questioning, trying/exploring, reasoning/associating, and communicating/ networking with the results that can be seen in the following figure/diagram.
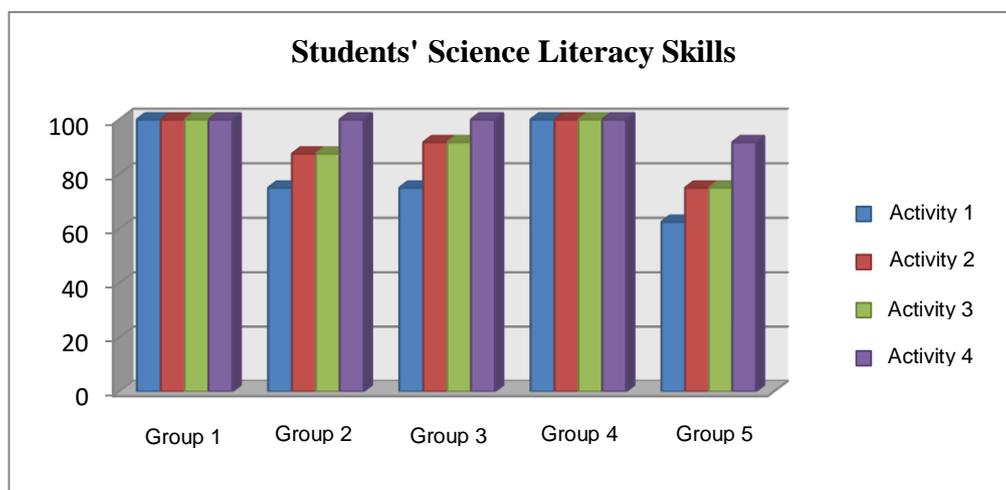
Figure 3. Students' Science Literacy Skills

Based on the diagram above, it is known that students' science literacy skills increase at each stage of the activities carried out and show very good result, this show that the sawa sado program is suitable for use in learning to improve students' science literacy skill.

Table 2. Observation of Teacher and Student Activities

Activities	1st activity	2nd activity	3nd activity	4nd activity
Teacher activities	86,66%	86,66%	88,33%	90%
Student Activities	82,50%	90,83%	90,83%	98,33%

From the Table 2 above, it can be seen that the teacher's performance while running the sawa sado program get good result and increase at each stage of the activity, it shows that the teacher is trying his best in implementing the Sawa Sado program. The data on student activities above is the result of observation data on students' science literacy skill obtained through the observation sheet of science literacy skill. from the table above it is also known that there is an increase at each stage of the activity.

This study advocate for the continuous improvement and adaptation of science literacy programs in elementary education. They call for a holistic approach to education that embraces diversity, encourages innovation, and emphasizes the enduring enhancement of students' scientific literacy skills as a foundational aspect of their academic growth and lifelong learning.

CONCLUSION

Based on research, the Sawa Sado Program significantly improves students' scientific literacy skills. Group 1 achieved a maximum improvement of 100% in all aspects measured, followed by groups 2 and 3 which also showed good improvement. However, group 4 showed greater variation in results with varying improvements in several aspects. The Sawa Sado Program was generally successful in improving students' scientific literacy skills. However, there were variations in results between groups showing different expansions and improvements. This shows the effectiveness of the program, but also shows the need to understand differences in outcomes between groups in more depth.

These research recommendations aim to further enrich the understanding and effectiveness of science literacy programs in elementary education, ensuring continuous development and refinement of educational initiatives aimed at enhancing students' scientific literacy skills.

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