IMPROVING STUDENT ACTIVITIES, SCIENTIFIC LITERACY SKILLS, AND LEARNING OUTCOMES IN FIFTH GRADE USING THE TERAPUNG MODEL: INTEGRATING PBL, TTW, AND MIND MAPPING

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ABSTRACT

The problem in this study is the low level of student activity, scientific literacy skills, and learning outcomes in science content, which is attributed to one-way learning, less meaningful and abstract learning, also teaching methods that don't adequately develop students' scientific literacy. This study aims to analyze the improvement of activities, scientific literacy skills, and student learning outcomes using the TERAPUNG model. In this study, the subjects were VD students of SDN Semangat Dalam 2 and the CAR method with a qualitative approach was used which was carried out 4 meetings. The instruments used were multiple-choice questions and observation sheets. This study shows that students' activities significantly improved, achieving almost entirely active criteria. Students' scientific literacy skills also saw a substantial increase in the high category, while student learning outcomes approached almost entirely complete criteria. Therefore, it can be concluded that the use of the TERAPUNG model is effective in improving student activities, scientific literacy skills, and learning outcomes.

Keywords: Student Activities, Learning Outcomes, Scientific Literacy, TERAPUNG

ABSTRAK

Permasalahan penelitian ini rendahnya aktivitas, keterampilan literasi sains, dan hasil belajar siswa muatan IPA yang disebabkan pembelajaran bersifat satu arah, kurang bermakna, masih bersifat abstrak, serta kurang melatih literasis sains siswa. Penelitian ini bertujuan menganalisis peningkatan aktivitas, keterampilan literasi sains, dan hasil belajar siswa menggunakan model TERAPUNG. Pada penelitian ini menggunakan subjek siswa kelas VD SDN Semangat Dalam 2 dan metode PTK dengan pendekatan kualitatif yang dilakukan sebanyak 4 kali pertemuan. Instrumen yang digunakan adalah soal pilihan ganda dan lembar observasi. Hasil penelitian menunjukkan bahwa aktivitas siswa secara klasikal meningkat dengan peningkatan signifikan mencapai kriteria hampir seluruhnya tuntas. Keterampilan literasi sains siswa juga mengalami peningkatan yang signifikan dengan kategori tinggi, sementara hasil belajar siswa mencapai kriteria hampir seluruhnya tuntas. Dapat disimpulkan bahwa penggunaan model TERAPUNG efektif dalam meningkatkan aktivitas, keterampilan literasi sains, dan hasil belajar siswa.

Kata Kunci: Aktivitas Siswa, Hasil Belajar, Literasi Sains, TERAPUNG

A. Introduction

The rapid development of information and communication technology in the 21st century is marked by the emergence of the era of the industrial revolution 4.0 and

society 5.0 has changed almost all aspects of human life (Aslamiah et al., 2021). One of the things faced with these changes is education. Education plays an important role in preparing human beings by equipping them with basic skills to face the challenges that will come. Quality education is the main foundation for the development and progress of society and is an important indicator in assessing the progress of a nation (Noorhapizah et al., 2022).

Through education, human resources can continue to be improved to always survive and adapt to the flow of globalization. In line with education in Indonesia which is regulated in the Constitution of the Republic of Indonesia in 1945 and recorded in the Law of the Republic of Indonesia concerning the national education system number 20 of 2003, it aims to educate the nation's life and develop students' potential optimally so that they can become responsible human beings.

Developing 21st century skills through education to be able to keep pace with globalization and the demands of the global world, one of which is by practicing scientific literacy skills (Howell & Brossard, 2021).

Scientific literacy is a skill that supports the achievement of mastery of science learning which refers to the skills and abilities of students in understanding, applying, and communicating science and their knowledge to solve problems so that they can make decisions based on information dominated by science and technology (Irsan, 2021).

This shows that scientific literacy is not only for someone who has a need or career in the field of science, but also refers to the skill to participate in decision-making and use it wisely related to socio-economic issues and other fields. It is very important to cultivate science literacy from an early age so that they can form a mindset, behavior, and character that cares and is responsible for themselves and their environment, including not easily believing in issues that are circulating without empirical evidence (Noor, 2020).

The importance of scientific literacy can also be seen from the global scope where scientific literacy is one of the benchmarks in assessing the quality of education. However, the challenge in improving the quality of Indonesian education, especially in scientific literacy, is still great. Based

on the results of the Programme for International Student Assessment (PISA), scientific literacy skills in Indonesia since joining in 2000 to 2022 are often ranked almost at the bottom (OECD, 2023a).

This shows that the ability of Indonesian students to understand, apply, and evaluate science knowledge is still inadequate. Low scientific literacy has an impact on the lack of students' ability to contribute effectively to society both in solving problems, making decisions, and not being responsive to problems and developments around them. On the other hand, low scientific literacy has a significant influence on science or science learning in schools (Ma'ruf & Rafianti, 2023).

From the data shown by the OECD, the low scientific literacy skills of Indonesian students in general are due to learning activities that are not oriented towards scientific literacy. Other factors that also affect the development of scientific literacy are human resources, the selection of teaching methods and models by teachers, and non-contextual learning (Ardianto & Rubini, 2016; Suparya et al., 2022). This is in line with the results of research conducted by

Suyanti (2023), namely teachers as facilitators are still oriented towards the target of mastering the material and lack of problem-based learning management and don't use model variations in learning. So that learning is based on teacher-centered, students are finally less involved in finding concepts.

Based on the results of interviews and observations in the field, the researcher found that science learning in the VD class of SDN Semangat Dalam 2 which amounted to 25 students was not in accordance with the expected conditions. Some of the problems identified include: the low learning activity of students can be seen from the overall number of students where 44% of students aren't actively involved in learning such as not listening, not expressing opinions or asking questions and less interested in learning.

Furthermore, the problem that can be seen is that 52% of students are still in the low category of science literacy skills, it shows that students experience limited conceptual knowledge, lack of understanding and interpretation of the material provided, low critical and analytical thinking

skills, and there are still many students who show a lack of awareness of environmental issues. Then the problem that also occurs is that 60% of students have low learning outcomes. This happens because several things such as one-way, meaningless, and less interactive learning are the main factors causing these problems. In addition, non-contextual learning and lack of technology integration in learning also affect low activities, scientific literacy skills, and student learning outcomes (Agusta et al., 2022; Aulia & Cinantya, 2023).

Leaving the issue above unresolved will have fatal consequences on students, resulting students not developing and experiencing difficulties in understanding learning (Izhar et al., 2021). Then Arnisyah et al., (2022) also explained that this has a bad impact on students to continue to the next level. In this context, innovation in learning is needed, namely by using learning models and media that are in accordance with the above problems.

The results of a study conducted by Ardianto & Rubini (2016) show that the use of the Problem Based Learning (PBL) model can improve students' scientific literacy. Supported by Dewanti et al., (2022) the results were obtained in the form of a good and significant influence between the Problem Based Learning (PBL) model accompanied by Mind Mapping on students' scientific literacy in science learning. Furthermore, (Juhaeri'ah et al., (2021) also stated that the application of the Think Talk Write (TTW) model is quite effective in improving students' scientific literacy skills.

Therefore, the researcher chose the TERAPUNG learning model (**T**hinking mastery, **E**xplore, **R**eflective learning, **A**pplication proficiency, **P**roblem solving, **U**nderstanding enhancement **N**urturing collaboration, **G**enerate insights) which is an innovative model that combines several learning models, namely, Problem Based Learning (PBL), Think Talk Write (TTW), and Mind Mapping. This study aims to analyze the increase in student activities, scientific literacy skills, and student learning outcomes in the VD class of SDN Semangat Dalam 2 using the TERAPUNG model. Thus, this research is expected to provide an alternative solution to improve the

quality of science education in elementary schools.

B. Method

The research method used in this study is qualitative research with the type of Classroom Action Research (CAR) which focuses on a comprehensive description of the learning process in the classroom which is presented in words which aims to solve problems that occur in the classroom and improve the quality of learning (Ningrum et al., 2021). This class action was carried out as many as 4 meetings on the science learning content of the material of Changes in the Appearance of Nature in the VD class of SDN Semangat Dalam 2 totaling 25 students consisting of 13 male students and 12 female students. The flow of CAR activities starts from planning, action, observation, and reflection (Arikunto et al., 2021).

The planning stage is a stage carried out before carrying out activities, including preparing administration, materials, and instruments as well as detailed action steps needed to teach so that the activity runs optimally. Which is preparing the syntax of the

TERAPUNG model that a combination of PBL, TTW, and Mind Mapping models. The first syntax is the first step in the core activities carried out by teachers, namely orienting problems to students using learning videos, organizing students to learn which contains dividing students differently, monitor and guide students in investigation, direct students to make investigation report and mind map, ask the group to present investigation report results, and lastly guide students to reflect, draw conclusions, and evaluate.

The next stage is the action stage in the form of the implementation of the plan that is made and prepared. During this activity, there was also a third stage, namely the observation stage, which is the stage where the teacher also makes observations of the learning process. After the action stage is completed, a reflection stage is carried out as a consideration and comparison between the things that must be mastered and the results of observations so that a complete conclusion can be drawn.

There are 2 types of data presented in this study, namely qualitative data which is individual

data on student activities and science literacy skills. Then quantitative data is in the form of classical data from student activities, scientific literacy test results, and student learning outcomes. This method of data collection is carried out through observation and test techniques, including observations that are carried out using observation sheets and applied to take student activities during the learning process. Technical tests are used to collect data on scientific literacy and student learning outcomes by providing an evaluation sheet at the end of each lesson. The data analysis uses descriptive analysis and cross tabulation analysis techniques.

The success indicators of this study are divided into 3 according to the factors studied in this study, namely student activities are said to be successful if they classically reach a percentage of ≥82% with almost all of them active. Furthermore, scientific literacy has a classical success indicator of at least ≥76% and is in the high category. The learning outcome is declared successful if the criteria for achieving the learning objectives are ≥70 and classically complete by ≥82% (Arikunto et al., 2021; Purwanto, 2009)

C. Result and Discussion

Based on the results of data analysis obtained in the field conducted on students of class VD SDN Semangat Dalam 2 regarding the learning of science content of the material Changes in the Appearance of Nature using the TERAPUNG model during 4 meetings, the results of student activities, scientific literacy, and learning outcomes have improved as seen in the following figure:
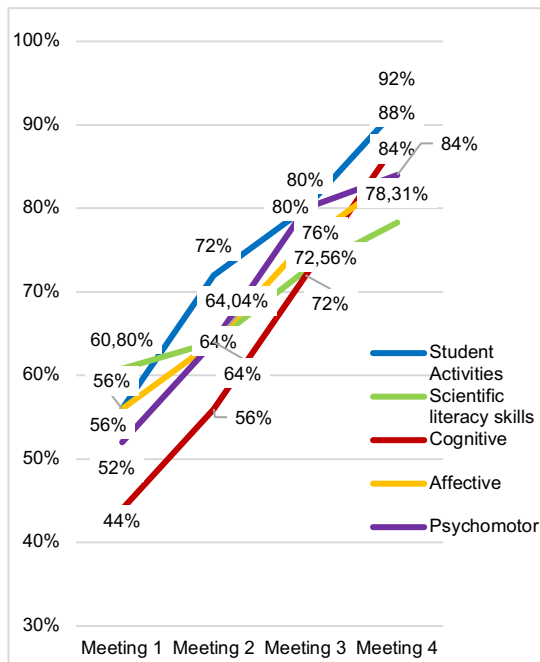
Figure 1. Trends in All Aspects

Student activities in learning using the TERAPUNG model have achieved an increasing percentage at each meeting. In meeting 1, students who were in the criteria of "Active" and "Very Active" amounted to 14 students or had a percentage of 56%. In meeting 2, the percentage of student activity classically increased with students who reached the criteria of "Active" and "Very Active" to 18 students with a percentage of 72%. Then the meeting of 3 student activities on the criteria of "Active" and "Very Active" classically increased to 20 students with a percentage of 80%. Furthermore, in meeting 4, there was also an increase in the percentage classically with students whose criteria were "Active" and "Very Active"

amounting to 23 people with a percentage of 92%. So that it has managed to achieve the criteria of almost all of them are active at the fourth meeting.

This increase is due to the use of the TERAPUNG model can encourage students to actively participate in learning such as learning in groups, communicating the results of thoughts orally, conducting experiments and explorations, practicing students' writing and drawing skills through mind maps, and working together in learning. In line with Harmain (2021) who explained that if students are given the opportunity to participate in the learning process, it will help them to gain knowledge and meaningful learning. So that in the learning process, teachers must create an atmosphere that supports all students to be actively involved, enthusiastic, and prevent students from feeling bored during learning (Aulia & Cinantya, 2023).

In the first syntax, students are trained to perform activities that require them to listen, observe, and ask questions in a fun and engaging way. So that it allows students to more easily remember and understand a

lesson better and increase enthusiasm for learning (Aliyyah et al., 2021). In the second syntax, it provides an active role for students to collaborate and be able to socialize and learning is also easier because they can learn from each other between peers. In accordance with Vygotsky's opinion in (Amahorseya & Mardliyah, 2023), social interaction between students helps form new ideas, improve cognitive abilities, and encourage their development, especially when interacting with students who have a better understanding.

The third syntax, students learn to identify and formulate problems, make hypotheses, and collect relevant data according to the problem being studied. These activities will have an impact on students' ability to think critically, analytically, and the ability to conduct research or investigations systematically and scientifically. In line with the results of research by Ardianto & Rubini (2016) which states that in this process students are given the opportunity to participate in collecting knowledge either deductively or inductively which can eventually build their thinking skills and cognitive abilities.

The fourth syntax is that students take responsibility for completing the assigned tasks well, sharing tasks/roles, and honing creativity when making mind maps. So that in this activity students work together to present solutions and arguments that are adequate and relevant for these solutions (Davidi et al., 2021). And the fifth syntax is trained to communicate reports effectively and well, be confident, be able to listen to and add information from friends who are presenting, and practice their nonverbal communication skills. This activity has an impact and is beneficial for students to learn from each other, observe effective presentation techniques, and develop communication skills through social interaction (Yanuardianto, 2019).

Then the last syntax, develops the ability to think critically to organize facts and information into structured and coherent conclusions, and trains their level of understanding in conducting evaluations. This is in line with (Zakiah & Lestari (2019) which states that this activity allows students to be able to reassess decisions or solutions as well as solutions that have been taken to problems so that

students can develop critical thinking skills.

Based on the figure above, it can be seen that students' science literacy in the learning process by conducting 4 meetings using the TERAPUNG model always increases at each meeting. At meeting 1, the average percentage of students' science literacy skills was 60.80% with the criteria of "Medium. In meeting 2, the average percentage of science literacy skills was obtained at 64.04% and was in the "Medium" criteria. Then at meeting 3, the criteria obtained were also still the "Medium" criteria, but there was an increase in the percentage to 72.56%. Furthermore, in meeting 4, the average percentage of students' literacy skills increased to 78.31% and was in the "High" criteria.

This happens because student activities that have increased have a positive impact on scientific literacy results in learning. In addition, teachers pay special attention to instill the importance of scientific literacy in students with efforts such as contextualization in learning, the use of technology, and the use of models and methods that encourage students to be able to implement these skill indicators. So, at the fourth meeting,

the score of the students' scientific literacy skills can be said to have been successful.

The results of increased scientific literacy allow students to learn more deeply and meaningfully by associating scientific theories with real practice and applications. Dianti et al., (2023) explained that this skill is not only limited to understanding scientific concepts, but also the ability to analyze and evaluate information and make decisions based on existing information. It's intended for everyone, not just people who have a career in science, but it is absolutely necessary for this skill to reason in the social context of living daily life (Robbia & Fuadi, 2020). Scientific literacy skills in students involve critical thinking processes, collaboration, developing creativity, and innovation to create solutions to scientific problems (Dianti dkk., 2023; Parinduri dkk., 2023; Sinyanyuri dkk., 2022).

According to the OECD (2023b), the aspects contained in scientific literacy are divided into three, namely the content, process, and context aspects of science. Overall, learning that can develop scientific literacy skills in students is learning that is in accordance with the essence of

science. Because it not only consists of knowledge of scientific facts and concepts (content aspect), but also involves the ability to apply scientific methods and high-level thinking (process aspect), as well as the application of scientific knowledge in real contexts relevant to daily life (context aspect).

The learning process should be carried out by supporting the development of this aspect of skills. The accuracy of teachers in choosing strategies and models in an effort to create an appropriate learning environment is very decisive in achieving the expected learning goals. The Problem Based Learning model provides students with the opportunity to develop the knowledge and skills necessary to solve these problems by honing critical thinking, analytical, and problem-solving skills that are essential in science literacy. This is in line with the research of Alatas & Fauziah (2020) which explains that PBL can help and train the domain of scientific literacy which comprehensively includes scientific knowledge, scientific skills, and contextual understanding. Where the use of PBL can increase critical thinking, gain knowledge, and be able

to make decisions independently for students (Suhaimi & Rahayu, 2023).

Then it is supported by the use of the Think Talk Write (TTW) model which has three important cores in its stages that help students to increase their involvement in learning by integrating critical thinking skills, verbal and nonverbal communication, and written expression (Suparya, 2018). According to Maharani et al., (2019) the TTW model, which contains scientific literacy skills, can involve students to actively participate in the learning process and grow and develop problem-solving skills.

In addition to the PBL and TTW models, which are also effective for fostering scientific literacy skills, is the Mind Mapping learning model which can encourage students to be more specific in assessing and analyzing the relationship between existing ideas (Dewanti et al., 2022). According to Wiraputra et al., (2023) Mind Mapping is effective in improving students' memory and creativity during the learning process. Mind Mapping uses a graphical technique also known as mind mapping that allows students to explore their overall cognitive capacity and take notes

containing the main topics learned during the learning process.

Then for student learning outcomes, it is known that by using the TERAPUNG model in learning, student learning outcomes increase significantly at each meeting. The cognitive aspect of meeting 1 students who completed reached 44%, in meeting 2 it increased to 56%, in meeting 3 it reached 72%, and in meeting 4 it reached 88%. Furthermore, the affective aspect in meeting 1 the percentage of students who completed was 56%, in meeting 2 it reached 64%, in meeting 3 it could reach 76%, and in meeting 4 this aspect reached a completion percentage of 84%.

Then in the psychomotor aspect in meeting 1 the completeness of the students was 52%, in meeting 2 the completeness reached 64%, in meeting 3 it could reach 80%, and in meeting 4 the completeness of the students reached 84%. So that all aspects of learning outcomes at meeting 4 have been successful and were within the criteria for almost all student to complete.

This increase in learning outcomes cannot be separated from the role of teachers who make students more actively involved in learning and increase students' understanding of concepts because learning is contextual and relevant to life, and of course students' scientific literacy skills using the TERAPUNG model have also improved. Thus, it has a positive impact on student learning outcomes and even achieves the specified success indicators. In addition, the use of a combination of Problem Base Learning (PBL), Think Talk Write (TTW), and Mind Mapping models turned out to be effective in triggering student involvement to be more active in the learning process because the model used can cover various aspects that are in accordance with the level of development of elementary school children.

Learning outcomes have an important role in the learning process because they will provide information to teachers about the progress of students or be used to measure the level of understanding and ability of students in the learning that has been carried out (Y. S. Utami, 2020). In research conducted by Suyanti (2023), the use of the Problem Based Learning (PBL) model can effectively improve student learning outcomes and this model also improves

teachers' ability to carry out teaching and learning activities. Then it is also supported by research by Utami et al., (2022) using the Think Talk Write (TTW) model, the results of this study show that student learning outcomes in science learning are significantly complete.

Furthermore, Diandita et al., (2023) in their research using the Mind Mapping learning model show that this model can improve student learning outcomes. Based on the above explanation, the results of the study prove that the use of the TERAPUNG model can improve student learning outcomes.

E. Conclusion

Based on the presentation of the results and discussion of the research, it can be concluded that the learning of the material on Changes in the Appearance of Nature carried out in the classroom in student activity has increased with the criteria of almost all active students. Students' science literacy skills succeed by experiencing an increase in high criteria and learning outcomes increase and achieve completeness both indidual and classically.

This research used multiple-choice tests. Therefore, if you intend to conduct similar research you may consider using essay tests for further research. This way, you can gain a more comprehensive understanding of students' scientific literacy and support the development of broader skills.

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