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Implementation of Problem Based Learning Model to Improve Student Learning Outcomes State Elementary School 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency

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Abstract: The underlying problem in this study is the low learning outcomes of students, so a learning model that supports student learning outcomes is needed. The learning model used in this study is the Problem Based Learning learning model. The purpose of this study was to see the effect of the Problem Based Learning learning model on improving student learning outcomes and the effect of providing variations in learning media on learning outcomes in biotechnology material in class VI of SD Negeri 0703 Hutaraja Tinggi. This type of research is Classroom Action Research with data collection methods in the form of interviews, observations, and multiple choice questions as instruments. The data obtained were then analyzed using data presentation and descriptions related to drawing conclusions. The results of this study indicate that the PBL learning model and the provision of variations in learning media can improve student learning outcomes in biotechnology material in class VI of SD Negeri 0703 Hutaraja Tinggi.
Keywords: learning model, problem based learning, learning outcomes, secondary school

INTODUCTION

Education is a process of interaction between teachers and students that aims to improve mental development so that students become independent and well-rounded individuals. In general, education can be seen as an action that allows learning to occur. According to Dimyati and Mudjiono (2013), the learning process happens when students obtain something from their surrounding environment. The environment studied by students can consist of natural conditions, objects, animals, plants, humans, or materials used for learning.

Education takes place in three environments: the family, school, and society, often referred to as the Tri Pusat Pendidikan. Among these, the school environment is the only formal learning setting (M & Qamaria, 2021). Educating is primarily the responsibility of parents. However, not all educational tasks can be carried out by parents, especially when it comes to knowledge and skills. Therefore, parents entrust some responsibilities to the school for the education of their children.

Based on experiences and interviews with several fourth-grade students from SD Negeri 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency, many expressed that biotechnology material, particularly in the production of biotechnology products, is difficult to understand due to the need for modern equipment, which is not easily accessible for high school students. In reality, biotechnology material includes both conventional and modern biotechnology, both of which can be applied in various fields of life, requiring students to understand and create products based on this knowledge. Additionally, students' learning outcomes in biotechnology are still low, with scores below the Minimum Completion Criteria (KKM) of 75 in the basic competency of understanding the principles of biotechnology. Of the 36 students, only 9 achieved scores above the KKM, with a learning completion rate of 25%.

One factor contributing to low learning outcomes in biotechnology is the learning model chosen by teachers, which is not engaging enough to help students understand the fundamental principles of biotechnology. The choice of an appropriate learning model plays a crucial role in the success of student learning. Teachers need to select models that encourage student participation and engagement in the learning process. One such model is Problem Based Learning (PBL). PBL is a model where problems serve as the foundation for student learning (Widjajanti, 2011). Fauzan (2014) emphasized that PBL is part of problem-solving teaching methods, where biology content is learned through inquiry-based problems. These problems are drawn from everyday life and stimulate students to approach these problems with their prior knowledge and experiences, which lead to new learning outcomes (Syamsurizal et al., 2011; Taufik, 2012).

Taufik (2012) explained that the key to PBL lies in the use of problems to guide and direct the learning process. PBL is implemented in small groups (7-10 people) with a facilitator acting as a guide. PBL is grounded in constructivism theory, where learning is a process of creating new knowledge based on prior knowledge. Learning achievement is influenced by both internal and external factors. Internal factors include motivation, interest, talent, and intelligence, while external factors involve influences from the family, school, and community environments. Both factors must work together to achieve satisfactory learning outcomes (Mushtaq and Khan, 2012).

Based on the above, this issue presents an interesting opportunity for classroom action research (CAR). The goal is to improve student learning outcomes in biotechnology through the application of the Problem Based Learning (PBL) model in biology subjects at SD Negeri 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency.

METHODS

This research was conducted from December 2024 to February 2025 (Odd Semester) at SD Negeri 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency, as the school was a partner during the implementation of PPL. The study employed the Classroom Action Research (CAR) method with the Problem Based Learning (PBL) model. Classroom Action Research (CAR) is a type of research developed to address problems in learning activities with the aim of improving and enhancing the teaching and learning process in the classroom. The research followed the basic principles of action research, as commonly practiced (Arikunto, 2007).

The population of this research comprised all students from SD Negeri 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency, totaling 231 students. The sample refers to a subset of the population that will be the focus of the research (Sugiyono, 2011). For this study, the sample consisted of 36 students from grade VI at SD Negeri 0703 Hutaraja Tinggi. The subjects of this research were the 36 students, including 13 male students and 23 female students.

Data collection methods included interviews, observations, documentation, and multiple-choice questions. Data analysis was employed to describe the obtained data so that it could be understood not only by the researcher but also by others who wish to learn the research outcomes. The data, collected in the form of sentences and activities of teachers and

students, were transformed into meaningful and scientific sentences. Data analysis was conducted during data collection, considering the learning discussions for further action.

If the implementation of the Problem Based Learning (PBL) model in biology lessons on biotechnology improves student learning outcomes by more than 70%, the research will be stopped. This 70% threshold is based on the pre-test results from previous research. In this classroom action research, four series of activities are carried out in repeated cycles, and two cycles were used in this study. The research procedure consisted of four stages in each cycle: planning, acting, observing, and reflecting (Arikunto, 2010). The four stages of activity are illustrated in Figure 1.

In Cycle I, before implementing the CAR, the teacher prepares the teaching design or plan. Planning involves determining what to do and how to do it. It includes visualizing and formulating proposed activities to achieve the best results. The steps taken in this activity include preparing a learning plan, preparing necessary learning tools such as teaching modules, LKPD (student worksheets), and others, and preparing evaluation tools. After planning, corrective actions are implemented in real situations. During the observation phase, the observation sheet created in the planning stage is implemented. Observations are carried out by other individuals such as mentor teachers, other PPL colleagues, and the teachers conducting the learning activities (CAR). Reflection aims to evaluate the progress made and identify any shortcomings or challenges that need to be addressed in the next cycle. Researchers can adjust the design for the next cycle based on the results of this reflection. At this stage, the results obtained from the observation phase will be evaluated and analyzed. The teacher, along with the observer and students, will conduct self-reflection by reviewing the observation data to determine whether the activities carried out have improved the quality of learning, particularly the target areas, such as learning outcomes.

In Cycle II, planning is based on the issues identified from the first cycle. The steps in this activity include preparing a learning plan, preparing necessary learning tools such as teaching modules, LKPD, etc., and preparing evaluation tools. After careful planning, corrective actions are implemented in real situations. Following the learning activities in Cycle II, observations are made by designated individuals to help teachers observe. At this stage, the results obtained from the observation phase are evaluated and analyzed. The teacher, along with the observer and students, will reflect on whether the activities carried out improved learning outcomes. If the improvement is achieved, the Classroom Action Research will be considered complete and successful.

RESULTS

This classroom action research began with learning observations in class VI of SD Negeri 0703 Hutaraja Tinggi, Hutaraja Tinggi District, Padang Lawas Regency, and interviews with the biology teacher and several students from class VI. The activity was carried out from March 6 to May 30, 2023. The class consisted of 36 students, 13 male and 23 female. The study used two cycles, focusing on biotechnology material. The first cycle covered the definition of biotechnology, the working principles of conventional biotechnology, and examples of products from conventional biotechnology, conducted over one meeting of 3x45 minutes. The second cycle discussed modern biotechnology, the differences between conventional and modern biotechnology, the working principles of modern biotechnology, and examples of modern biotechnology applications.

Observations were made to assess student activities during the learning process using lecture and discussion methods, aiming to evaluate their learning outcomes in biology, specifically on biotechnology material. The results of the pre-cycle observations showed that out of the 36 students, only 9 achieved scores of 70 or higher, while 27 students scored below 70. This means only 25% of the students reached the minimum competency standard (KKM), and 75% did not, with an average score of 65.97. These results indicated that many students' learning outcomes were still low. Consequently, the researcher conducted interviews with biology teachers and students to assess the level of student engagement and the teacher's

response to the Problem Based Learning (PBL) model and to identify problems in the biology learning process.

In Cycle 1, each learning cycle included test sheets and LKPD to measure student learning outcomes using the PBL model. PBL involves students working in groups to solve problems through scientific methods, helping them learn about the problem while developing problem-solving skills. According to Arends (2008), the five steps of PBL are: 1) orienting students to the problem by setting learning objectives and motivating students; 2) organizing students to learn by helping them define and organize tasks and dividing them into groups; 3) guiding individual and group investigations to gather information and find solutions; 4) developing and presenting work results, such as reports and presentations; and 5) analyzing and evaluating the problem-solving process, reflecting on the results and guiding students in summarizing.

PBL is a student-centered learning model that uses real-world problems to build knowledge, foster independence and confidence, and develop critical thinking skills (Amir, 2008; Arends, 2008). In the second meeting of Cycle 1, educators used learning videos to improve students' understanding of the material. Videos, with their audio-visual elements, can make abstract concepts more tangible and engage students, increasing their motivation and interest in learning (Heo & Toomey, 2020; Tegeh et al., 2019). This multimedia approach stimulated student motivation and learning.

The results of Cycle 1 observations showed that learning outcomes were higher when learning videos were used instead of PowerPoint media. The learning video media motivated students, increased their enthusiasm, and introduced them to a new way of learning with varied animations and visuals. Learning videos are effective in helping both group and individual learning (Hua et al., 2020; Ponza et al., 2018). Despite these improvements, only 41.7% of students achieved the KKM, and many still had scores below the minimum requirement. This indicated that the learning outcomes in Cycle 1 had not yet met the success indicators, so the process needed to continue into the next cycle with improvements based on Cycle 1 outcomes.

In Cycle 2, learning consisted of three meetings (3x45 minutes), focusing on modern biotechnology. The first meeting covered the definition of modern biotechnology, the differences from conventional biotechnology, and the working principles of modern biotechnology, using PowerPoint media. The educator also encouraged students to ask questions to ensure they understood the material. The second meeting involved examples of products from modern biotechnology (such as insulin and test tube babies), presented with PowerPoint slides and videos. In the third meeting, the educator used the discussion method based on learning style groups to increase motivation, interest, and skills.

The data from the pre-test and post-test in the experimental class (X.10) indicated that learning outcomes were significantly improved when using a discussion method based on learning style groups. The students were more focused and enthusiastic about the learning activities, resulting in a better understanding of the material. By the end of the cycle, students' learning activities had improved, meeting the success indicators. In Cycle 2, the average learning outcome was 82.5, with the lowest score being 60. This showed that student learning outcomes in Cycle 2 had reached the success indicators, as the average score was above the required KKM and only 3 students scored below the KKM.

DISCUSSION

This study aimed to improve students' learning outcomes on biotechnology material through the implementation of the Problem Based Learning (PBL) model. Based on the observations and tests conducted over two cycles, it can be concluded that the application of the PBL model positively impacted students' learning outcomes.

In the first cycle, although there was some improvement, students' learning outcomes remained low, with only 25% of students achieving the Minimum Mastery Criteria (KKM) and an average score of 65.97. This indicates that despite the use of learning media like PowerPoint

and the implementation of PBL, there were still challenges in the learning process that needed to be addressed. Interviews with teachers and students revealed several factors contributing to the low learning outcomes, including students' limited understanding of the material and insufficient student involvement in student-centered learning activities.

However, in the second cycle, the application of learning using video media and group-based learning discussions proved to be more effective. The use of videos as learning media helped clarify abstract material, making it easier for students to understand biotechnology concepts. This aligns with previous studies suggesting that video media can enhance students' interest and motivation to learn (Heo & Toomey, 2020; Tegeh et al., 2019). Additionally, the group-based discussion approach allowed students to collaborate, express their opinions, and actively engage in learning in groups tailored to their learning styles, ultimately improving their understanding of the material.

The improvement in learning outcomes in the second cycle is evident from the average score of 82.5, with only 3 students scoring below the KKM. This shows that a higher percentage of students achieved the KKM compared to the first cycle, where only 41.7% passed. These results indicate that the use of video media and group discussions was more effective in helping students understand the material and boosting their learning motivation.

Although the results obtained in the second cycle showed significant progress, this study still has some limitations. One limitation is the limited time to carry out the learning cycles. More in-depth learning and more practice in future cycles could yield even better results. Additionally, while video media and group discussions had a positive impact, not all students may have equal access to the technology used in the learning process, which could be a barrier to the implementation of such media in all situations.

Overall, this study shows that the PBL model, supported by video media and group-based learning discussions, can improve students' learning outcomes on biotechnology material. Further development is needed by applying this learning model in different contexts and considering external factors that may influence the effectiveness of learning.

CONCLUSION

The application of the Problem Based Learning (PBL) learning model can improve critical thinking skills, learning activities, curiosity, and Biology learning achievement of class VI students of SD Negeri 0703 Hutaraja Tinggi. This can be seen from the student-centered learning process, where students will form groups to discuss materials and problems related to the student worksheets (LKPD) that have been given by the teacher. From the results of learning practices, students are quite able to discuss with group members in solving problems in the LKPD. Providing variations in media and methods in learning can improve learning outcomes of class VI students of SD Negeri 0703 Hutaraja Tinggi. In cycle I, the teacher used powerpoint media, the percentage of student learning outcomes was 41.7%. This shows that learning media has a great influence on student learning outcomes. In cycle II, the teacher used learning media that is estimated to be able to increase the enthusiasm and passion of students in following the learning process. The learning media used were in the form of learning videos/podcasts, posters and snakes and ladders, the percentage of learning outcome completion increased to 91.7% of students who got a score of ≥ 70.

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