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Improving Student Learning Activity Through the Application of Problem-Based Learning and Culturally Responsive Teaching Approaches

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ABSTRACT

Student engagement is a crucial indicator of the success of the learning process. Engagement is demonstrated not only through physical involvement, such as participating in discussions, asking questions, or answering questions, but also through mental engagement in understanding and reflecting on the material. However, in practice, many students still exhibit low levels of engagement, resulting in learning that tends to be one-way and suboptimal. This low engagement can result in a lack of learning motivation, weak critical thinking skills, and poor overall learning outcomes. This study aims to improve student engagement through the application of the Problem-Based Learning (PBL) model combined with the Culturally Responsive Teaching (CRT) approach. The method used was Classroom Action Research (CAR), conducted over two cycles, with students of grade X-C at SMANOR Tadulako Palu as subjects. The research instrument was an engagement observation sheet, while data analysis was descriptive to describe the level of student engagement from cycle to cycle. The results showed an increase in student engagement. In cycle I, the average student engagement rate was only 58.71%, which is considered moderate. After improvements were made to the learning process in cycle II, the engagement rate increased to 75.75%, which is considered good. This improvement occurred because the PBL model enabled students to be more active in problem-solving, while the CRT approach made learning more relevant to their cultural context. Thus, it can be concluded that the combination of PBL and CRT has proven effective in creating a contextual, collaborative, and student-centered learning environment. This model is able to increase student motivation, self-confidence, and engagement in Biology learning.

Keywords: *Problem Based Learning (PBL); Culturally Responsive Teaching (CRT); activity*

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INTRODUCTION

21st-century education demands that students possess a variety of skills, including critical thinking, creativity, collaboration, and communication. To support this, teachers need to implement learning models that not only emphasize knowledge transfer but also stimulate active student engagement. Active learning is a crucial aspect that can be an indicator of learning success. Active students demonstrate participation in the learning process, both cognitively, affectively, and psychomotorically. However, in reality, many schools in Indonesia, including SMANOR Tadulako Palu, face challenges in increasing student engagement. Initial observations at SMANOR Tadulako Palu indicate that many students still lack active participation during learning, particularly in Biology. They tend to be passive,

rarely ask questions, and are less involved in discussions.

Tadulako Senior High School, Palu, as a school that focuses on developing sports talent, has unique student characteristics. In addition to academic learning, students also participate in intensive sports training, dividing their study time. This can impact motivation and concentration. Furthermore, the classroom learning culture, which tends to be one-way and lacks variety, makes students feel that learning is irrelevant to their daily lives. This aligns with the findings of Siswanto et al. (2025), who stated that the burden of non-academic activities can affect students' learning motivation and make them less active in the learning process.

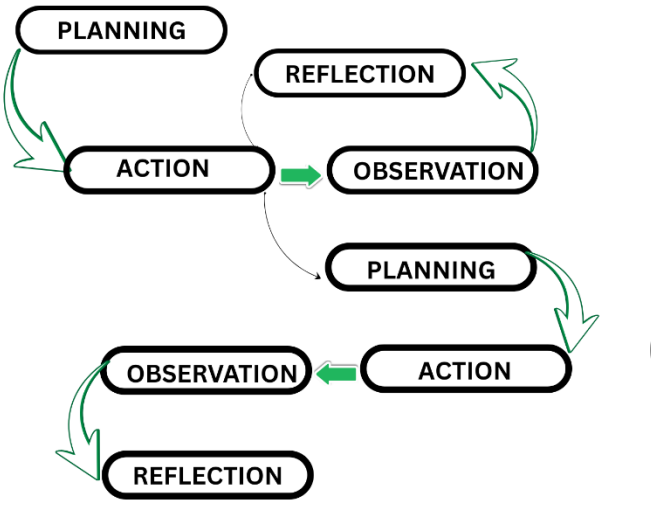
The Problem-Based Learning (PBL) model is an innovative approach that is effective in increasing student engagement. PBL focuses on using real-life problems relevant to students' daily lives as learning triggers. Through the application of this model, students are trained to develop independence in seeking information, collaborate in problem-solving, and improve critical thinking skills. Research by Safira and Agustina (2024) demonstrated that PBL can strengthen scientific literacy while increasing student participation through contextual problems. Findings by Mustaqfiroh et al. (2024) also confirmed that problem-based learning can encourage students to be more active because the challenge of finding solutions triggers their optimal engagement.

In addition to implementing innovative learning models, culture-based approaches such as Culturally Responsive Teaching (CRT) play a crucial role in ensuring the learning process is relevant to students' lives. CRT focuses on integrating students' experiences, values, and cultural backgrounds into the subject matter, enabling them to feel valued and more emotionally engaged. Research by Indarwati et al. (2024) demonstrated that CRT can improve students' questioning skills and self-confidence because their cultural experiences are incorporated into the learning process. The findings of Kurniasari et al. (2024) also reinforce the idea that the CRT approach can develop students' reflective thinking skills through the presentation of material relevant to their culture and environment.

The integration of PBL and CRT is believed to have a positive impact on student engagement. By integrating real-life problems and their cultural context, learning can be more meaningful, inclusive, and empower students to actively participate in the learning process. This effort aligns with the demands of the Independent Curriculum, which emphasizes student-centered learning, strengthening core competencies, and character development. Therefore, this research was conducted to design and implement PBL and CRT-based learning to improve student engagement in grade X-C of SMANOR Tadulako Palu.

METHOD

This study uses a Classroom Action Research (CAR) design that refers to the Kemmis and McTaggart spiral model and is implemented in two cycles (Hidayati, Junaidi, & Martini, 2024). In each cycle, activities begin with the preparation of learning plans, implementation of actions, observation of the implementation of learning, and reflection of the results to design improvements in the next cycle. The study was conducted in class X-C SMANOR Tadulako Palu in the even semester of the 2024/2025 academic year with a total of 24 students, such an action research procedure can be described as follows:



The planning stage includes the development of a Teaching Module using the Problem-Based Learning (PBL) model combined with the Culturally Responsive Teaching (CRT) approach. Furthermore, researchers prepared Student Worksheets (LKPD) designed using the CRT-based PBL syntax, as well as observation instruments for student activity to obtain systematic data on their engagement during the learning process.

The action stage is the implementation of the learning process based on the previously designed Teaching Module. In this stage, teachers carry out learning activities following the Problem-Based Learning (PBL) syntax combined with the Culturally Responsive Teaching (CRT) approach. The implementation of both approaches aims to create a contextual learning environment that is culturally relevant to students and encourages their active involvement in the learning process.

The observation phase was conducted by two observers: a subject teacher and a peer, who carefully monitored the learning process from the opening to the closing activities. This observation aimed to collect data on the level of student engagement and activeness during the implementation of the Problem-Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach. Findings from this phase served as the basis for assessing the effectiveness of the learning strategy and identifying any improvements in student active participation in the learning process.

The reflection phase was conducted to comprehensively evaluate the implementation of actions in each cycle. At this stage, the researcher and observer analyzed and interpreted the observation results and field notes to understand the effectiveness of the implemented learning strategy. The reflection results were used as the basis for formulating improvements and developments in the next cycle, thus minimizing weaknesses identified in Cycle I and optimally achieving the goal of increasing student engagement.

This study used an observation sheet to measure student learning activity as an instrument. Data collection was conducted through direct observation during the Biology learning process to monitor student engagement. The data obtained were analyzed descriptively to describe the level of student engagement and evaluate the improvement in learning outcomes from cycle I to cycle II.

The research instrument is in the form of an observation sheet of student learning activity, with the following indicators of student activity:

Table 1. Student Activity Indicators

No.	Aspect	Item No.	Indicator
1	Visul Activities	1	Students pay attention to the teacher's explanation in class
2	Oral Activities	2	The teacher asks questions and the students answer them.
		3	Students ask the teacher about the material being taught
		4	Students express their opinions in discussions
		5	Students ask their friends during discussions
3	Listening Activities	6	Students listen to the teacher's explanation in class
		7	Students listen to other groups presenting
4	Writing Activities	8	Students summarize the reinforcement given by the teacher
5	Mental Activities	9	Students engage in problem solving during discussions

6	Emotional Activities	10	Students respond to the material being studied
		11	Students receive criticism from other students' opinions

Source: Adaptation by Suharsimi, 2015.

To determine student engagement, use the observation assessment sheet. The scores for each statement are summed and divided by the maximum score across all statements. To obtain the percentage engagement score, use the following formula:

$$P = \frac{\Sigma \text{ indicators that appear}}{\Sigma \text{ maximum indicator}} \times 100\%$$

Note:

To obtain the maximum score above, the calculation is as follows:

Maximum indicator = Number of students X Number of indicators.

This is used to determine whether student activity has increased or not. Because the average value of student activity percentage (P) is known as a percentage, it needs to be converted to the criteria for student activity level, whether it is high, sufficient, or low. The following are the criteria for student activity level, whether it is high, sufficient, or low. The following criteria for success of student activity can be determined as follows:

Table 2. Percentage of Student Activity

Percentage rate	Criteria
Figure of 80%-100%	Very good
Figure of 70%-79%	Good
Figure of 60%-69%	Pretty good
Figure of 50%-59%	Not enough
Figure of 0%-49%	Very less

Source: Suharsimi, 2015.

RESULTS AND DISCUSSION
Results

Pre-Cycle Implementation

The initial stage before implementing classroom action is to identify the characteristics and level of student learning activity in the classroom. Researchers conducted observations and collected data on the initial learning conditions in class X-C of SMANOR Tadulako Palu before the action was given. This observation aimed to obtain a real picture of the classroom situation while assessing the level of student activity. In the pre-cycle stage, researchers carried out direct learning and administered diagnostic tests as initial study material. Pre-cycle data was obtained through observations adapted to the student learning activity observation sheet instrument. This step was intended to make it easier for researchers to map the initial conditions of learning activity and serve as a basis for seeing improvements that occurred after the implementation of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach.

The pre-cycle phase was conducted in the first week of the study. Observations indicated that student learning engagement was still low, evident in their lack of participation in paying attention to teacher explanations, engaging in discussions, and responding to material. Data from the pre-cycle observations are presented in the following table.

Table 3. Before the cycle

No	Student Name	Number of Indicators Appearing	Number of Indicators Not Showing Up
1	ABIZHARD M. NUR	3	8
2	AMIRA REGITA CAHYANI	4	7
3	ANDI AJENG RAHMAWATI	4	7
4	ARIZA SATIFAH	3	8
5	CHANTIKA PUTRI MAHARANI	3	8

6	CHRISTOVORUS HADI S.	2	9
7	DEDE HIDAYATULLAH	3	8
8	DIMAS ADRIANO	4	7
9	DIMAS RADITYA	2	9
10	GINA AFRILIAN HOPO	3	8
11	HULIO ABEDNEGO BAGILIS	2	9
12	JIMMY ALBERT J. MASOARA	2	9
13	KOMANG FERDI	3	8
14	LEO ABEDNEGO P	1	10
15	LIONEL CHOKY PASARIBU	4	7
16	RADIT	3	8
17	RAHMA S. BATALIPU	3	8
18	REHANALDO	2	9
19	SITI NURUL FADILLAH TUMIRAN	5	6
20	TRIVENA SULUNG	5	6
21	VANESYA TARABU	5	6
22	VRENDY	2	9
23	EKA TERISKA I.M RONTI	3	8
24	JAMAL	2	9
Amount		**73**	**191**

To make it easier for researchers to analyze and interpret the data obtained, this can be done using the following formula or calculation:

$$P = \frac{73}{264}\ x\ 100\% = 27,65\%$$

Based on the results of the researcher's observations through the activity observation sheet, it is known that the level of student learning activity is still low. Students tend to be less focused on learning, pay less attention to teacher explanations, are passive in discussions, rarely provide responses or questions, and have not shown optimal responsibility for the tasks given. This condition indicates that student learning activity is relatively low. Therefore, the researcher feels the need to conduct Classroom Action Research (CAR) to address this problem. The planned action is to implement the Problem Based Learning (PBL) model combined with the Culturally Responsive Teaching (CRT) approach in the hope of increasing student activity in participating in Biology learning.

Implementation of Cycle I

The implementation of Cycle I in Classroom Action Research (CAR) in class X-C of SMANOR Tadulako Palu began with the planning stage, which took place in the second week of the research.In the first cycle, observations showed an increase in student learning activity compared to pre-cycle conditions. Students began to show better engagement in paying

attention to teacher explanations, discussing, and expressing opinions. Thus, it can be concluded that the implementation of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach has had a positive impact on increasing learning activity, although it is still in the less than ideal category. The results of observations of student learning activity in the first cycle are presented in the following table.

To make it easier for researchers to analyze and interpret the data obtained, this can be done using the following formula or calculation:

$$P = \frac{155}{264} \, x \, 100\% = 58{,}71\%$$

Implementation of Cycle II

In Cycle II, observations showed a more significant improvement compared to Cycle I. Students appeared more active in learning, paying attention to teacher explanations, participating in discussions, asking questions, and providing responses to the material being studied. Furthermore, students' responsibility for group and individual assignments also increased. The implementation of the Problem-Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach in Cycle II proved more effective in fostering comprehensive student engagement. Therefore, student learning engagement in Cycle II can be categorized as good and demonstrated more optimal achievement. The results of observations of student learning engagement in Cycle II are presented in the following table:

To make it easier for researchers to analyze and interpret the data obtained, this can be done using the following formula or calculation:

$$P = \frac{199}{264} \, x \, 100\% = 75{,}75$$

Discussion

As described in the research results, student learning activity in Biology through the application of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach experienced an increase from the low category in the pre-cycle stage to the good category in cycle II. The following is a summary of the research results from the pre-cycle stage to cycle II.

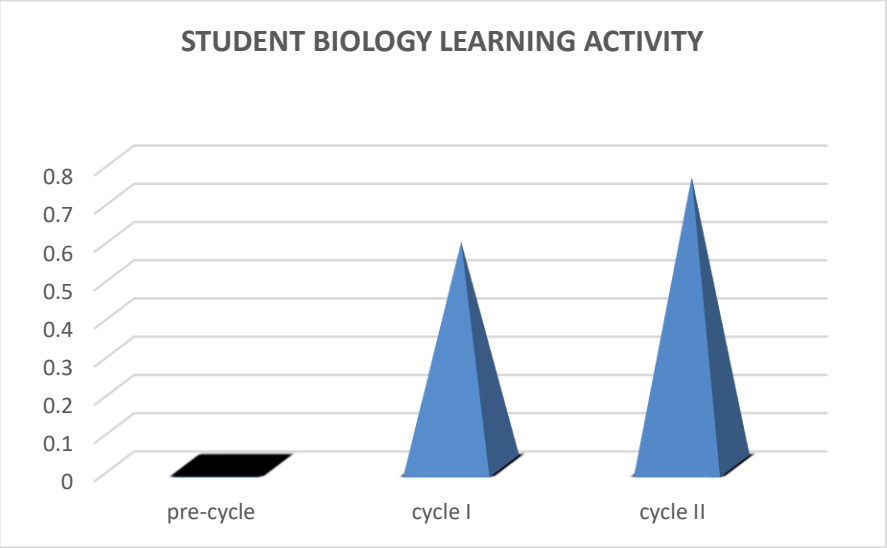


Figure 2. Graph of each cycle

The results of the study showed a significant increase in the level of student activity of class X-C SMANOR Tadulako Palu in learning Biology through the application of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach. In cycle I, the average percentage of student activity only reached 58.71%, so that most students

were in the fairly active category. The low level of student involvement in this initial stage was influenced by several factors, such as a lack of understanding of the steps of PBL learning, limited discussion time, and a learning culture that still tended to be passive (Hopkins, 2014).

Improvements were implemented in cycle II by providing clearer directions regarding students' roles in groups, enriching the problem context to make it relevant to students' cultural experiences, and providing ongoing motivation and feedback. These strategic improvements proved effective, as evidenced by the increase in average student activity to 75.75%. These results indicate that the majority of students have reached the active category, representing an increase of 16.66 percentage points compared to cycle I.

This achievement aligns with research by Hidayati, Junaidi, & Martini (2024), which demonstrated that the combination of PBL and CRT significantly increased student engagement by presenting real-world problems and accommodating students' cultural contexts. Similar research by Mustaqfiroh et al. (2024) also confirmed that the CRT-based PBL model can stimulate critical thinking skills while increasing student participation. The integration of these two approaches aligns with the principles of the Independent Curriculum, which emphasizes student-centered learning relevant to their life contexts (Kemendikbudristek, 2022).

Thus, the application of the PBL model with the CRT approach has proven effective in overcoming the problem of low student activity, increasing active participation, and encouraging more contextual and meaningful Biology learning.

CONCLUSION

The results of classroom action research in class X-C SMANOR Tadulako Palu showed that the application of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach succeeded in increasing students' learning activity in Biology subjects, from the low category in the pre-cycle, moderate in cycle I, to reaching the good category in cycle II. Thus, CRT-based PBL can be used as an alternative learning strategy to encourage active participation of students.

Teachers are advised to apply this model continuously, students are expected to be more active in the learning process, and similar research can be further developed in other subjects or levels.

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