

## Problem Based Learning Model with TaRL Approach on Reflection Material to Increase High School Students' Learning Motivation

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### ABSTRACT

This study aims to improve students' learning motivation through the application of the Problem-Based Learning (PBL) learning model with the Teaching at the Right Level (TaRL) approach on reflection material. This study is a Classroom Action Research (CAR), which was carried out in two cycles in class XI.G of High School 4 Palu, with 35 students participating. The main instrument used in this study was a learning motivation questionnaire consisting of five indicators: interest in learning, enthusiasm for learning, responsibility, sincerity in responding to teacher questions, and reactions to stimuli given by the teacher. The results of the study showed an increase in students' learning motivation after the application of the PBL model with the TaRL technique. In Cycle I, the learning motivation of the majority of students was still in the low (57.14%) and moderate (42.86%) categories, with an average motivation score of 47. After the observed improvement in Cycle II, a significant increase occurred, with 54.29% of students reaching the strong motivation category and 45.71% in the moderate category, while the average score increased to 68. The findings indicate that the combination of the PBL model with the TaRL method effectively increases students' learning motivation, particularly through grouping techniques based on cognitive ability levels. Consequently, education tailored to students' needs and abilities can foster a more significant and inspiring learning experience.

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## 1. INTRODUCTION

Education is a deliberate and methodical endeavor aimed at comprehensively developing human potential, both individually and collectively, across society (Singh, 2025). The role of education is to enhance human resource potential, enabling individuals to deeply understand learning materials and contribute effectively to society. The education system often neglects student diversity by using learning techniques that fail to consider individual characteristics (Goyibova et al., 2025). Implementing tactics that consider students' interests and talents is vital to maximizing their potential in alignment with their unique tendencies and abilities (Zamiri & Esmaeili, 2024).

Throughout the educational process, it is crucial for educators to recognize that each student has unique individuality, characteristics, and abilities (Kasirer & Shnitzer-Meirovich, 2021).

Education must recognize and accommodate the diversity of interests, abilities, learning styles, readiness, and backgrounds in allocating educational resources (Alam & Mohanty, 2023). In this context, each student has different learning needs, necessitating individualized educational solutions (Hurwitz et al., 2020). Differentiated learning is a pedagogical approach that tailors educational activities to meet individual needs, including learning profiles and interests, thereby significantly increasing motivation (Bondie et al., 2019; Gheysens et al., 2022). In implementing personalized learning, educators must continuously observe and understand students holistically, including identifying their strengths and weaknesses (Bernacki et al., 2021). This requires ongoing evaluation of students' learning readiness, interests, and preferences to provide a pedagogical approach tailored to individual needs. One of the models or approaches that can be used for the sustainability of this evaluation is by applying the PBL model.

Problem-Based Learning (PBL) is a preferred learning model that helps increase learning motivation (Simbolon & Koeswanti, 2020; Satriani et al., 2021). Problem-Based Learning (PBL) is an educational framework that prioritizes authentic problem-solving in everyday life contexts (Saad & Zainudin, 2022; Muzaini et al., 2022; Hasbi & Fitri, 2023). PBL serves as an efficient instrument for enhancing understanding of these differences in the realm of reflective content (Ghani et al., 2021; Anggraeni et al., 2023). Through Problem-Based Learning (PBL), students gain knowledge about diversity and apply it to address specific social problems related to diversity.

Furthermore, PBL encourages collaborative learning, including diverse perspectives and experiences from diverse backgrounds and cultures (Smith et al., 2022). This fosters the development of an inclusive educational environment where every student is valued and recognized for their diversity. PBL not only teaches students about diversity but also fosters tolerance, respect, and cooperation, which are fundamental pillars of a diverse society. This methodology aligns with the student-centered learning concept in the Merdeka curriculum and emphasizes the development of social skills essential for success in a diverse society (Mulyono & Sulistyani, 2022). Apart from the PBL model which can be used for the sustainability of learning evaluation, one approach can also be used, namely TaRL. Teaching at the Right Level (TaRL) is an educational methodology that focuses on individual learning requirements and is designed to adapt instruction to students' cognitive abilities by organizing discussion groups according to low, medium, and high proficiency levels, rather than by grade or age (Muammar et al., 2023; Amalia et al., 2024).

Research conducted by Indriani et al. (2024) showed that implementing the TaRL approach combined with the problem-based learning paradigm can increase student learning motivation, as demonstrated by an increase from Cycle I to Cycle II. This study concludes that integrating the Problem-Based Learning model with the Teaching at the Right Level (TaRL) method can increase student participation in learning activities.

This study seeks to improve understanding of the steps implemented to increase student learning motivation using the Problem-Based Learning model combined with the Teaching at the Right Level approach.

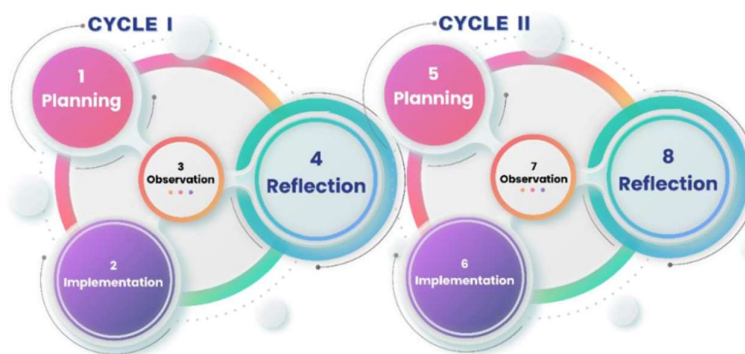
Based on the problem description mentioned above in this study, a possible solution is to use the Problem-Based Learning (PBL) model with the Teaching at the Right Level (TaRL) approach. TaRL is an educational methodology that adapts instruction to the unique abilities of each student (Abidin et al., 2024). This methodology emphasizes individual student capacity rather than grade level.

In this study, researchers conducted an experiment by implementing instruction tailored to students' abilities, utilizing the Problem-Based Learning (PBL) model along with TaRL techniques. Combining Problem-Based Learning (PBL) with TaRL methodology in mathematics can produce relevant instructional experiences for students. This addresses educational deficiencies and prepares students to become well-rounded citizens capable of facing complex challenges in a more diverse environment. Consequently, the integration of PBL and TaRL into the curriculum is an important strategy for achieving national education goals that emphasize the importance of diversity. This study aims to improve students' learning motivation through the application of the Problem-Based Learning (PBL) learning model with the Teaching at the Right Level (TaRL) approach on reflection material at high school.

## 2. METHOD

This research falls into the Classroom Action Research (CAR) category. CAR is a systematic effort aimed at improving the quality of learning through an iterative collaborative cycle, encompassing planning, implementation, observation, and reflection on the actions taken. This CAR research employed a collaborative methodology, in which the researcher and co-workers actively participated in the research process. The researcher was responsible for creating and implementing the learning process, while the co-workers acted as peers and observers.

The research participants were 11th-grade students at High School 4 Palu. The class consisted of 35 students, including 22 boys and 13 girls. The research design used a model for classroom action research, encompassing the stages of design, implementation, observation, and feedback, as shown in Figure 1 below.



**Figure 1.** Classroom Action Research Cycle

Classroom action research involves observing learning activities that emerge and occur within the classroom environment. Various data collection methodologies were used to gather information for this research. (1) Field practice observations were conducted to evaluate the implementation of learning and assess student motivation through their learning activities; (2) Documentation, including questionnaires, was used to support the research findings. The analytical method used was descriptive analysis, utilizing data from student learning motivation questionnaires to evaluate motivation related to reflective material through the application of the Problem-Based Learning model along with the TaRL approach. Characteristics identified included student engagement in learning, enthusiasm for learning, accountability, satisfaction with teacher-given tasks, and reactions to instructor-given stimuli. The following items are markers of motivation presented in Table 1.

**Table 1.** Aspects of the observed motivation indicators

No	Indicator	Aspect
1	Student learning interest	Pay attention to the instructor's explanations Make careful observations Document important concepts explained by the instructor Minimize class absences
2	Eager to learn	Ask the instructor about any unclear material. Consult the instructor or a peer if the assignment is unclear. Remain diligent in completing assignments. Avoid joking with acquaintances.
3	Responsibility	Complete assigned tasks promptly Participate in study groups Tetap menyelesaikan tugas Melaksanakan tugas tepat waktu Responding to questions from the instructor
4	The level of student involvement in responding to teacher questions	Responding to questions from the instructor Responding to questions from the instructor promptly Students' sincerity in responding to teacher questions
5	The response shown to the stimulus given by the instructor	Students' enjoyment in completing assignments given by the instructor Avoid expressing dissatisfaction when the instructor gives assignments Be involved in completing assignments Collaborate diligently in a team

### 3. RESULTS AND DISCUSSION

#### Results

Prior to conducting the Classroom Action Research (CAR), the researcher conducted initial observations during the pre-cycle to identify problems in the mathematics learning process in class XI G of High School 4 Palu. Observations were conducted by

assessing instructor learning and student engagement, in addition to administering a questionnaire. Initial observations indicated a lack of student motivation in learning the mathematical reflection content. This could be caused by several factors, including learning methods that are not appropriate to students' needs, inadequate understanding of the subject matter, or a lack of motivation to engage in learning. After identifying the causes of the problems, the researcher formulated a refinement approach to be implemented in the Classroom Action Research using the Problem-Based Learning (PBL) model and the Teaching at the Right Level (TaRL) technique. These stages must be clear, measurable, actionable, relevant to current issues, and include a specified implementation timeframe.

## **Cycle I**

### **1. Planning**

After assessing the learning challenges identified through observations with the supervising teacher, the next step was to discuss with the Mathematics supervising teacher to formulate an action plan, which included: (1) grouping students according to their initial cognitive abilities; (2) developing learning modules using the Problem-Based Learning (PBL) model with the TaRL approach; (3) creating student worksheets tailored to various ability levels: highly capable, capable, and requiring assistance; (4) providing the necessary tools and materials for the learning process; (5) establishing observation guidelines.

### **2. Implementation**

Implementation of Cycle I included three phases of learning activities: introduction, core activities, and conclusion. In the introduction phase, educators engaged in activities including: (1) starting the session with greetings, prayer, attendance checks, and motivational remarks; (2) enabling students to understand the material to be presented; and (3) explaining the learning objectives and expected outcomes to students. The main steps began with allocating instructional resources, followed by grouping students into groups according to their proficiency levels, namely the advanced group and the developing group, as previously determined. After concluding the group discussion exercises tailored to their cognitive abilities, each group will present their responses, allowing the teacher to assess them, followed by reinforcement. After concluding the core activities, the process continues with closing activities, which include reflection, drawing conclusions, and ending with a prayer and farewell remarks from the teacher.

### **3. Observation**

Observation results from the student learning motivation questionnaire completed at the end of the learning process indicate an improvement from the initial conditions before the cycle, after the implementation of the first cycle learning activities using the Problem-Based Learning (PBL) model with the TaRL approach.

**Table 2.** Student Learning Motivation in Cycle 1

<b>No</b>	<b>Motivation Indicators</b>	<b>Minimum Score</b>	<b>Maximum Score</b>
1	Student interest in learning	38	100
2	Learning enthusiasm	40	100

No	Motivation Indicators	Minimum Score	Maximum Score
3	Responsibility	42	100
4	Student seriousness in answering teacher questions	60	100
5	Reactions shown to teacher-provided stimuli	54	100

Table 2 shows that students' enthusiasm for learning had the lowest score (38 out of 100) and their sincerity in answering teacher questions had the highest score (60, indicating moderate motivation). Overall, students' learning motivation was in the moderate range, with an average score of 47.

**Table 3.** Criteria for Student Learning Motivation in Cycle 1

Category	Score	Frequency	Percentage %
Very High	81-100	0	0
High	61-80	0	0
Medium	41-60	15	42,86
Low	21-40	20	57,14
Very Low	0-20	0	0
Total		35	100

Based on the statistical data in Table 3, the total number of students was 35. The questionnaire results showed that no respondents fell into the very high learning motivation (0%) or high learning motivation (0%). Conversely, 42.86% of students had moderate learning motivation, while 57.14% had low learning motivation, and no participants fell into the very low learning motivation (0%) category.

#### 4. Reflection

An analysis was conducted to discuss the collected data after evaluating the observation and questionnaire results. Students were more motivated to learn in the first cycle when the Problem-Based Learning (PBL) paradigm and TaRL technique were used. There was a significant improvement from the pre-cycle conditions, according to observational data from the survey. A score of 60 indicates moderate motivation, indicating students' seriousness in answering instructor questions, while a score of 38 indicates the lowest level of learning enthusiasm. Student learning motivation was considered moderate with an average score of 47. This result demonstrates that the learning paradigm successfully increased intrinsic motivation to learn. Furthermore, the majority of students (57.14%) were found to have low motivation, while the remaining 42.86% were found to have very moderate motivation. No one in the class was characterized as highly motivated or highly unmotivated. The evaluation results reinforced the program's ability to increase student interest in learning and demonstrated an improvement in the program's overall efficacy in increasing student motivation to learn.

The second cycle of using the TaRL technique and the Problem-Based Learning (PBL) model was crucial because it built on and refined the findings from the first cycle. After the first cycle, students were more motivated, and teachers could build on that in

later cycles. Educators identified opportunities for improvement and made necessary adjustments by reviewing the results of the last cycle. The second cycle also evaluated the long-term impact of the learning model. By tracking student motivation over a longer period, teachers were able to gauge whether gains were stable and sustained. As a result, teachers were able to refine the learning model and implement further adjustments based on the assessment results of the previous cycle. In the second cycle, teachers discovered the best ways to motivate their students. Therefore, to maintain success in strengthening student motivation and the overall educational process, a second cycle that integrates the TaRL approach and the Problem-Based Learning (PBL) model is crucial.

## **Cycle II**

### ***1. Planning***

Based on the results of the reflection activities in Cycle 1, the researcher continued by creating a learning plan. In Cycle 2, several tasks were carried out as planned: (1) creating a TaRL learning module using the Problem-Based Learning (PBL) model; (2) creating media and student worksheets tailored to three groups: highly proficient, proficient, and those requiring guidance; (3) providing the tools and materials necessary for the learning process; (4) formulating observation guidelines.

### ***2. Implementation***

Learning activities in Cycle 2 were divided into three parts: introduction, main activity, and closing. In the first orientation phase, students actively participated by responding to the instructor's greeting, then praying together with the basmalah (recitation of the name of God), and finally, the teacher took attendance. Afterward, the researcher and students discussed the previous material on the topic. The instructor then explained the learning objectives and what motivates students to learn. The apperception phase also included a 5-minute period during which students interacted with visuals and answered the teacher's questions. There were several stages within the core activity phase. During the first half of class, known as "student orientation," students use their own pocket money to complete calculations while listening to the instructor discuss personal finance topics such as income, savings, and investments. The second step involves dividing the class into small groups based on their needs. Each group is then given a Student Worksheet (LKPD) and instructions on how to complete it. In the third phase, students work in groups to complete the LKPD, discuss any challenges they face with the instructor, and access online learning resources. Students collaborate to complete the LKPD activities after being assigned to groups based on their skill level.

To strengthen their understanding of the reflection material, in the fourth phase, students plan and present the results of group discussions, which are then assessed by the instructor. Together, students and the teacher reflect on their learning, conduct formative assessments, and draw conclusions from the learning activities in the closing phase. Before concluding the session with greetings, the instructor distributes learning materials for the next meeting.

### 3. Observation

The use of the Problem-Based Learning (PBL) paradigm in cycle 2 for learning purposes was broader than in cycle 1. This finding is supported by observations made from the learning motivation assessment questionnaire completed by students at the end of the learning process.

**Table 4.** Student Learning Motivation in Cycle 2

No	Motivation Indicators	Minimum Score	Maximum Score
1	Student interest in learning	64	100
2	Spirit of learning	58	100
3	Responsibility	70	100
4	Student seriousness in answering teacher questions	76	100
5	Reactions shown to stimuli provided by the teacher	72	100

Table 4 shows that students' learning interest had the lowest score, at 58 (moderate category), and students' sincerity in answering teacher questions had the highest score, at 76 (high category), on the motivation indicator. A score of 68 places students' learning motivation in the high motivation group.

**Table 5.** Criteria for Student Learning Motivation in Cycle 2

Category	Score	Frequency	Percentage %
Very High	81-100	0	0
High	61-80	19	54,29
Medium	41-60	16	45,71
Low	21-40	0	0
Very Low	0-20	0	0
Total		35	100

The results of 35 students are shown in Table 5, which includes statistical information. Very low learning motivation (0%), moderate learning motivation (45.71%), high learning motivation (54.29%), and very low learning motivation (0%) are the distribution of learning motivation indicated by the questionnaire responses.

### Discussion

The research results showed that in cycle 1, the aggregate number of students was 35. The questionnaire results indicated that no respondents exhibited extremely high learning motivation (0%) or high learning motivation (0%). In contrast, 42.86% of students exhibited moderate learning drive, and 57.14% demonstrated low learning motivation, with no participants classified in the very low learning motivation (0%) category. Concurrently, Cycle 2 encompasses the outcomes of 35 pupils, providing statistical data. The distribution of learning motivation as shown by the questionnaire responses is as follows: very low learning motivation (0%), moderate learning motivation (45.71%), strong learning motivation (54.29%), and very low learning motivation (0%). The results of this study indicate that the problem-based learning model with the TaRL approach can improve high school students' learning motivation



in reflection material. The results of this study are relevant and are supported by previous research indicating that the PBL model with the TaRL approach can increase students' learning motivation across various educational levels (Indriani et al., 2024; Mustafa et al., 2024; Sukmawati et al., 2025).

The implementation of the learning model results in an increase in students' learning motivation scores, demonstrating this benefit. The problem-based learning model can help students develop critical thinking and problem-solving skills in reflection material. The TaRL approach can increase the effectiveness of the problem-based learning model by increasing student learning motivation (Santoso, 2024; Widodo et al., 2025).

This study can identify the advantages and disadvantages of the problem-based learning model with the TaRL approach in increasing high school students' learning motivation. The advantages of this learning model can be used as a reference for developing more effective learning models. The results of this study can provide implications for teachers and schools in developing more effective learning models to increase high school students' learning motivation. Teachers can use the problem-based learning model with the TaRL approach as an alternative to increase student learning motivation (Kartika & Rosida, 2024; Budiana et al., 2025). Future research can develop more specific learning models for reflection material and improve high school students' learning motivation. Furthermore, further research can apply the problem-based learning model with the TaRL approach on a broader scale to increase high school students' learning motivation.

#### **4. CONCLUSION**

Building upon the results of the research data analysis, it was revealed that in class XI.G at High School 4 Palu, a combination of the Problem-Based Learning (PBL) model and the Teaching at the Right Level (TaRL) approach was used. Students were more motivated to learn. Students' desire to learn increased significantly after implementing pre-cycle learning, Cycle 1, and Cycle 2. Motivation to learn mathematical reflection content became a problem in the pre-cycle. This change occurred because students lacked intrinsic motivation to participate in class. Of the 35 students in the first cycle, 15 showed a moderate level of learning motivation (42.86%), while 20 showed a low level of motivation (57.14%). In the group of 47 students, their learning motivation remained moderate on average. In Cycle 2, there was a significant increase after data analysis. The range of students' learning motivation levels was as follows: 19 students (54.29%) had sufficient motivation, and 16 students (45.71%) had very high motivation.

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