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# Improving Student Learning Outcomes through Implementation Diorama Media Based on Problem Based Learning

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**ABSTRACT**

This study examines the effectiveness of Problem-Based Learning (PBL)-based diorama media in improving student learning outcomes on the material of ASEAN agricultural products in grade VI of SDN Pasrujambe 08. The method used is Classroom Action Research (CAR), which is implemented in two cycles, each consisting of planning, action implementation, observation, and reflection. Data were obtained through learning outcome tests, observation, and documentation. The results of the study showed a significant increase in student learning outcomes. Classical completeness increased from 40% in the pre-cycle to 60% in cycle I and finally reached 80% in cycle II, meeting the established classical completeness standards. Applying PBL-based dioramas has proven effective in helping students understand the types of ASEAN agricultural products while developing critical thinking, problem-solving, and collaborative skills. In addition, this method increases students' active involvement in the learning process, making the learning experience more interactive and contextual. This study contributes to the educational literature by offering innovative learning strategies that teachers can apply to create a more interesting learning atmosphere. These results can also be a reference for developing a PBL-based curriculum at the elementary school level to improve the quality of learning.



## INTRODUCTION

The main problem in improving student learning outcomes is using conventional learning methods that are less varied and limited to worksheet books and routine assignments (Darling-Hammond et al., 2019; Maruyama, 2022). This causes students to be less active in the learning process and impacts average scores that do not meet the Minimum Completion Criteria (Kwangmuang et al., 2021; Tong et al., 2022). Rationally, a more innovative approach is needed to improve student understanding and participation in learning (Ovbiagbonhia et al., 2019; Usher et al., 2021). One method that can be applied is diorama media based on Problem-Based Learning (PBL), which allows students to be more active in solving problems and developing critical thinking skills (Hmelo-Silver, 2004; Elaine & Goh, 2016). Based on research data, using dioramas as a learning aid has proven effective in converting abstract concepts into more concrete ones so students can more easily understand the material (Barrows, 1996). In addition, a study by Thomas (2000) showed that applying PBL significantly improved learning outcomes, especially in the practical application of concepts. Thus, the use of PBL-based diorama media can be an effective solution to improve student learning outcomes through more interactive and engaging methods.

Several previous studies, including those conducted by Almulla (2020) and Ye and Xu (2023), have explored the effectiveness of media-supported Problem-Based Learning (PBL) in improving the quality of student learning. As a learning method that focuses on students and emphasizes problem-

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solving, PBL has been shown to improve learning outcomes, especially when combined with audio-visual media (Guo et al., 2020; Karan & Brown, 2022; Mat & Jamaludin, 2024). Other studies have shown that PBL has a positive impact on student's academic achievement (Ambarita et al., 2018; Yu, 2024), strengthens understanding in learning (Erikson & Erikson, 2018), and is effective when supported by animated videos (Kiong, 2022) and other interactive tools (MacNab & Kamath, 1991; Young & Register, 2018). The use of animation in PBL has also been shown to increase student engagement and understanding (Imbaquingo & Cárdenas, 2023; Chang et al., 2024) and promote scientific literacy and critical thinking (Vieira & Tenreiro-Vieira, 2016). This study uses dioramas as an interactive learning medium to enhance contextual understanding. Hmelo-Silver (2004) emphasized that interactive media deepens students' cognitive engagement, while Osman et al. (2023) highlighted the importance of media in building collaboration in learning. However, limited resources and teacher readiness are still obstacles (Rothman & Page, 2002; Jonassen & Hung, 2012; Lu et al., 2014). Therefore, this study offers practical solutions to optimize PBL in improving cognitive, affective, and psychomotor learning outcomes (Gogus, 2012).

This study examines the effectiveness of problem-based learning (PBL) assisted by diorama media in improving elementary school students' learning outcomes, especially regarding ASEAN agricultural products. This study explores how combining PBL and diorama deepens students' understanding through concrete visualization, improves critical thinking skills, and encourages problem-solving in real-world contexts. This study will also compare the effectiveness of this method with traditional learning in cognitive, affective, and psychomotor aspects and identify its implementation challenges, including limited resources and teacher readiness. The benefits of this study include theoretical contributions in enriching the literature on the effectiveness of PBL and practical benefits for teachers in developing more interactive and contextual learning. The study results can be a reference for policymakers in designing problem-based curricula and for developers of learning media in creating more effective tools to improve the quality of education in elementary schools.

This research hypothesizes that using Problem-Based Learning (PBL) with diorama media on ASEAN agricultural products will significantly improve elementary students' learning outcomes compared to traditional methods. Dioramas provide concrete visualization of abstract concepts, enhancing understanding and making learning more engaging. The PBL approach encourages critical and collaborative thinking, helping students solve real-world problems interactively, as noted. This combination is expected to increase students' interest and deepen their comprehension of ASEAN agriculture. While interactive methods like PBL have been proven to boost cognitive and affective learning, challenges such as resource availability and teacher readiness must be addressed for successful implementation. Overall, this approach offers a practical way to improve educational quality by fostering critical thinking, engagement, and better learning outcomes.

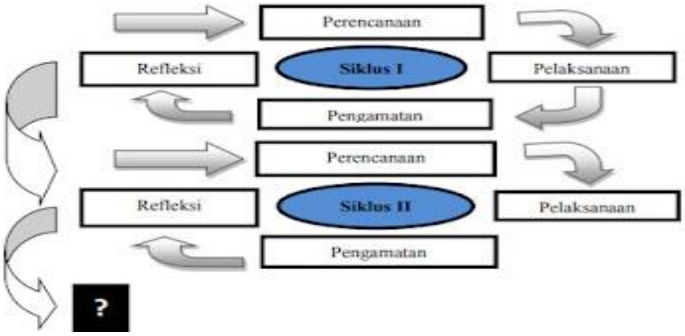
## RESEARCH METHODS

Classroom Action Research (PTK) aims to practically solve learning problems in the classroom (Slameto, 2015). The research process consists of two cycles, each including four main stages. The first stage is planning, where researchers design learning strategies, including the development of Problem-Based Learning (PBL) based diorama media for social studies learning, as well as preparing materials, preparing tools and materials, and creating a Learning Implementation Plan (RPP) (Kemmis & McTaggart, 1988). The second stage is the implementation of action, where the teacher uses PBL-based dioramas by the RPP that have been created by actively involving students in learning, material exploration, and group work (Kember, 2000). The third stage is observation, where researchers and collaborators (teachers) observe the learning process and student activities, collecting data regarding student involvement and responses to diorama media and developing their understanding of social studies material (Cohen et al., 2007). The final stage is reflection, where researchers and collaborators analyze the results of observations and evaluate the effectiveness of actions taken to identify strengths and weaknesses of learning strategies and plan

improvements in the next cycle (Schon, 1983). The results of this reflection become the basis for designing actions in the second cycle.

The scope of this research includes class VI students at Pasrujambe 08 State Elementary School academic year, with the participation of 25 students. The Classroom Action Research flow diagram can be seen in the image below.

**Figure 1. Classroom Action Research Cycle**




Source: Kunlasomboon et al., (2015)

The data collection method applied in this research is through conducting tests. Data analysis was carried out using qualitative and quantitative approaches. Quantitative data is obtained from the average results of evaluations and observations during the learning process.

**Table1. Reference for Determining Minimum Completeness Criteria**

| KKM | Classical Completeness | Completed Qualifications |
|---|---|---|
| >70 | >80% | Complete |
| <70 | <80% | Not Completed |

(Sumber: KKM Kelas VI SD Negeri Pasrujambe 08)

$$P=\frac{\sum \text{siswa yang tuntas belajar}}{\sum \text{siswa}} x100\%$$

This study's evaluation of classical completeness uses five assessment categories to measure students' success. The categories are: 1) excellent, 2) good, 3) fair, 4) poor, and 5) very poor. Each category provides a clear picture of student achievement in understanding learning material. More detailed information regarding the classification of classical completeness can be found in Table 2, which presents quantitative data in detail. The table illustrates the distribution of evaluation results based on predetermined categories, providing deeper insight into the effectiveness of the learning strategies implemented.

**Table 2. Classical Completeness Groups Quantitative Data**

| Level of success | Qualification |
|---|---|
| ≥80% | Very good |
| 60-79% | Good |
| 40-59% | Enough |
| 20-39% | Not enough |
| <20% | Very less |

Based on the data in the table, the measurement of classical completeness is divided into five categories, namely: very good level (≥80%), good level (60-79%), sufficient level (40-59%), poor level (20-39%), and very low levels (<20%). The success of implementing Problem Based Learning-based Diorama Media is measured through the achievement of student learning outcomes that meet the Minimum Completeness Criteria (KKM) in social studies material with a score of ≥70, which is included in the complete category. Apart from that, success is also measured by the percentage of classical learning completeness which reaches more than 80%. Success in the skills aspect is measured by achieving a percentage of 70% in the good category. Therefore, this research concludes

that the use of Diorama Media based on Problem Based Learning has succeeded in improving the learning outcomes of class VI students at SD Negeri Pasrujambe 08.

## RESULTS AND DISCUSSION

### Results

### Planning

Classroom Action Research was conducted in two cycles, each with two meetings. Cycle I will occur on 3 and 4 November 2023, while Cycle II will happen on 6 and 7 November 2023. Each cycle involves planning, implementing actions, observing, and reflecting. Before starting the research action, the researcher carried out a pre-cycle to evaluate the initial condition of the students before the action was carried out. Pre-cycle data was obtained from mid-semester scores with an average social studies score of 63, class score of 68, and classical completeness of 40%. The results of interviews and pre-cycle observations show low student learning outcomes, which indicates the need for action to overcome this problem. Actions taken include the application of Problem-Based Learning (PBL) based diorama media in Cycles I and II.

### Implementation of Actions

In Cycle I, learning was carried out in 2 meetings by applying Problem-Based Learning (PBL) based diorama media for social studies subjects. The results in Cycle I showed an average class of 68 with a classical completeness of 60% (good category). However, because it has not reached the specified completeness (≤ 80%), improvements are needed in Cycle II. The learning implementation in Cycle II consists of 2 meetings with a time location of 2 × 35 minutes. The results of Cycle II showed an increase in the class average to 77, and classical completeness reached 80%. This shows the suitability of the research with the classical completeness requirement of 80%. The increase in student learning outcomes in Pre-Cycle, Cycle I, and II can be seen in Table 3.

**Table 2. Improvement in Student Learning Outcomes in Pre-Cycle, Cycle I and II**

| Cycle | Student | Classical Completeness | | |
|---|---|---|---|---|
| | | Complete | No Complete | Persentase |
| Pra | 25 | 10 | 15 | 40% |
| Cycle I | 25 | 15 | 10 | 60% |
| Cycle II | 25 | 20 | 5 | 80% |

Based on the data in the table, there has been an increase in the learning process from pre-cycle cycle I to cycle II. At the pre-cycle stage, of the 25 students, only 10 achieved completeness, while 15 students still needed to achieve completeness with a completion percentage of 40%. Therefore, improvements are required in the learning process to improve the learning outcomes of class VI students at SD Negeri Pasrujambe 08.

### Improving Student Learning Outcomes through Diorama-Based PBL

This study confirms that Problem-Based Learning (PBL) based on dioramas in social studies significantly enhances student learning outcomes. The classical completion rate increased from 60% in cycle I to 80% in cycle II, meeting the required standard. Additionally, the number of students scoring above KKM rose from 15 to 20. This approach also fosters active student engagement in investigation, problem-solving, and material analysis.

**Table 3. Comparison of Student Learning Outcomes before and after Implementing PBL**

| No | Result | Explanation |
|---|---|---|
| 1 | Classical Completion Improvement | In cycle I, classical completion reached 60%, included in the very good category. The research was continued to cycle II because the classical completion standard set was ≥ 80%. |
| 2 | Student Learning | Cycle I: Of the 25 sixth grade students of Pasrujambe 08 Public Elementary |

| | | |
|---|---|---|
| | Outcomes | School, 15 students obtained scores above the KKM (70), while 10 students were still below the KKM. Cycle II: 20 students achieved scores above the KKM, while 5 students were still below the standard. |
| 3 | Learning Completion Standards | Individual completion at SD Negeri Pasrujambe 08 was set at KKM 70. Classical completion in this study was targeted to reach ≥ 80%. |
| 4 | Improving Learning Outcomes | Student learning outcome data is recorded in Table 4, covering the pre-cycle stage, cycle I, and cycle II. There is a significant increase in learning outcomes after the implementation of diorama-based PBL in social studies learning. |

The results of this study confirm that diorama-based PBL is a practical approach to improving students' understanding of the concepts taught, especially in visual context-based learning. The increased learning completeness shows that this method can help students analyze, understand, and relate theory to actual practice. However, implementing this method still requires support from resources and educators' readiness so the results can be optimized and applied widely in various other subjects.

**Table 4. Recapitulation of Improvement in Student Learning Outcomes**

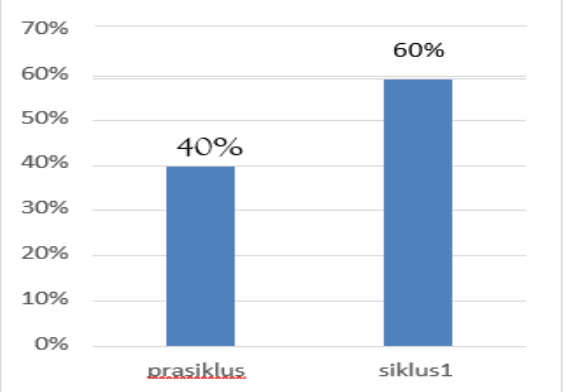
| No | Mark | Pre cycle | Cycle I | Cycle II |
|---|---|---|---|---|
| 1. | Class average | 63 | 68 | 77 |
| 2. | Highest | 85 | 90 | 100 |
| 3. | Lowest | 51 | 40 | 50 |
| 4. | Students complete | 10 | 15 | 20 |
| 5. | Students do not complete | 15 | 10 | 5 |
| 6. | Completed students (%) | 40% | 60% | 80% |
| 7. | Incomplete (%) | 60% | 40% | 20% |
| 8. | Criteria for Completion of Classical Learning (≥75%) | Not finished | Not finished | finished |

The table summarizes how implementing problem-based learning (PBL) based diorama media in social studies learning improved learning outcomes for class VI students at Pasrujambe 08 Public Elementary School.

## Reflection

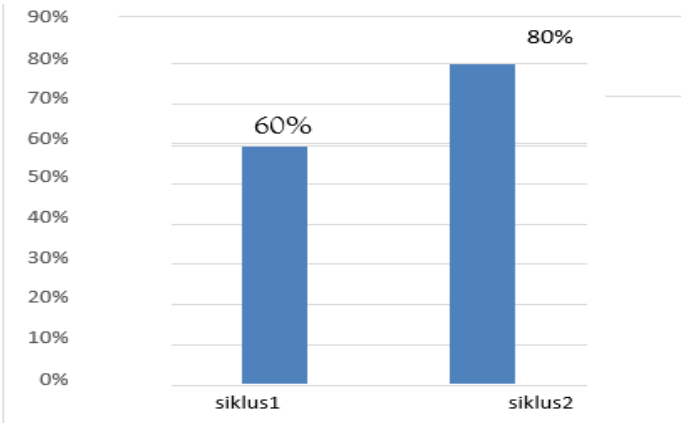
The study shows a progressive improvement in student learning outcomes through targeted interventions over two cycles. Pre-cycle data revealed a low class average of 63, with 40% completion and 60% non-completion, failing to meet the ≥80% classical completeness standard. Cycle I showed improvement, with an average of 68, 60% completion, and 40% non-completion, but further enhancements were needed. Cycle II saw significant progress, with an average of 77, 80% completion, and 20% non-completion, meeting the required standard. As a result, the cycles were concluded. The data confirms the effectiveness of learning improvements, demonstrating that strategic interventions successfully addressed student learning challenges.

**Figure 2. Pre-Cycle and Cycle I Completeness Improvement Diagram**



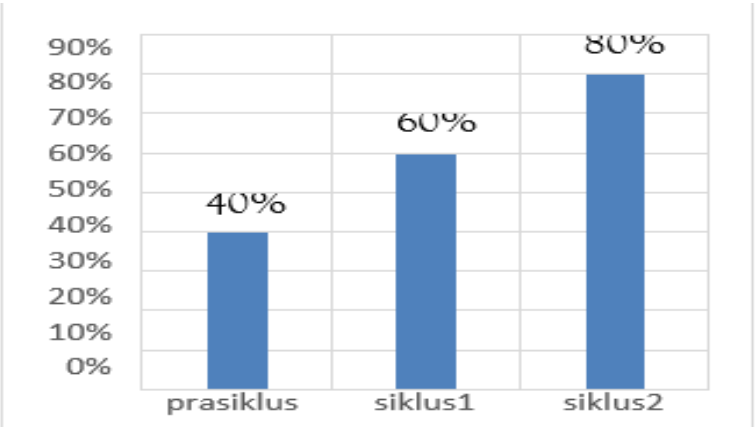
The diagram shows an increase in classical completion levels from Cycle I to Cycle II. In Cycle I, the completion rate was 60%, which increased to 80% in Cycle II. Initially, only 40% of students met the minimum passing criteria, highlighting ineffective initial teaching methods. Despite improvements in Cycle I (average score of 68 and a completion rate of 60%), a significant score gap persisted. In Cycle II, the average score rose to 77, and the completion rate reached 80%, with the highest score at 100 and the lowest at 50. This improvement suggests effective post-Cycle I adjustments, but 20% of students still did not meet the criteria, indicating issues such as individual learning difficulties and lack of engagement. Future strategies should include formative assessments and personalized support to address these gaps. While the data shows clear progression, addressing lower-performing students' needs remains crucial for achieving equitable learning outcomes.

**Figure 3: Improvement of student learning outcomes in cycle I and cycle II**




The diagram illustrates an increase in the level of classical completion in each cycle, namely cycle I and cycle II. In cycle I, a classical completion level of 60% was achieved, while in cycle II, there was an increase with an achievement of 80%.

**Figure 4. Presents The Improvement In Learning Outcomes**




Based on this picture, the social studies learning process has increased from pre-cycle activities to cycle II. In the pre-cycle, the classical completeness level reached 40%, so improvement efforts were needed in cycle I. The classical completeness level in cycle I increased to 60% (good category). However, cycle II still needs learning improvements because the classical completeness target set is 80%. Therefore, a classical completion level of 80% was achieved in cycle II.

## Discussion

### Increasing Learning Achievement Through PBL Assessed Using Written Exams

The exploration of Problem-Based Learning (PBL) as a method to improve learning achievement offers compelling insights into its effectiveness, especially in comparison to traditional Lecture-Based Learning (LBL). Zheng et al.'s (2023) meta-analysis underscores a nuanced understanding of PBL's impact. While PBL may not significantly increase theoretical understanding

compared to LBL, its strengths lie in developing clinical competency and enhancing problem-solving abilities. This finding is crucial, particularly in fields like medical education, where analytical skills and clinical application are paramount. However, the question arises whether the same results would be observed in other disciplines, where theoretical knowledge might be prioritized over practical application. The limited impact on theoretical understanding could be a concern in more knowledge-based fields, raising the issue of whether PBL needs to be supplemented with more structured content delivery for certain subjects (Baran & AlZoubi, 2023).

Furthermore, the improvement in clinical competence associated with PBL (Zheng et al., 2023; Tan et al., 2023) suggests that the hands-on, collaborative nature of PBL better prepares students for real-world scenarios. This aligns with the broader educational shift toward experiential learning, where practical skills are increasingly valued. However, there remains a potential challenge in assessing PBL's effectiveness across various contexts (Chen et al., 2020; Alsmadi et al., 2024). The demands of PBL, such as smaller class sizes and more resources, might limit its scalability in larger, resource-constrained institutions. Thus, while the advantages are clear in specialized, high-investment areas like medical education, it's important to question whether PBL can be equally effective in larger or more diverse educational settings without adjustments to its implementation.

In terms of student satisfaction, Hmelo-Silver (2004) and Chernikova et al., (2020) highlight that PBL promotes greater satisfaction due to increased collaboration, motivation, and interaction. While this is a notable advantage, the increase in satisfaction does not always directly translate to better academic outcomes. While collaboration and motivation are essential for deeper engagement, there is also the risk that some students may struggle with the self-directed nature of PBL, particularly if they lack foundational skills or intrinsic motivation (Scott, 2017; LaForce et al., 2017; Hussein, 2021). This poses the critical question of how PBL can be effectively balanced with direct instruction to ensure all students benefit equally from the approach. While the collaborative nature of PBL fosters a more dynamic learning environment, the extent to which it supports or challenges students with different learning styles and abilities should be carefully considered.

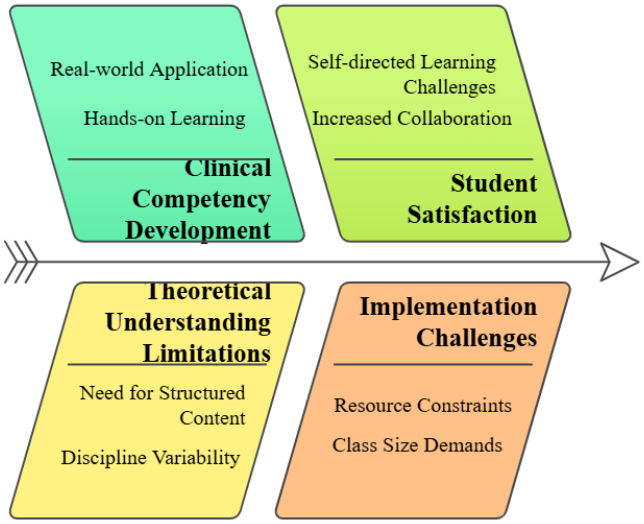



**Figure 5. Analyzing PBL's Effectiveness in Education**

The study by Smith et al. (2023) highlights the potential of Problem-Based Learning (PBL) to contribute positively to educational equality by narrowing achievement gaps, especially among students from various socioeconomic backgrounds. This is particularly important as students from low-income families, often disadvantaged in traditional learning environments, tend to experience significant gains when engaged with PBL (Ferguson et al., 2017; Braun & Clarke, 2019). By connecting academic concepts to real-life experiences, PBL fosters higher engagement and interest, as shown by Smith et al. (2023). This finding underscores the inclusivity of PBL, as it offers a more equitable learning environment for students of diverse backgrounds. However, critics argue that PBL heavily depends on students' independent learning skills, which may pose challenges for those with

weaker foundational knowledge. Johnson (2023) suggests that a hybrid approach combining PBL with direct teacher instruction could address this concern. By integrating guided learning with independent problem-solving, students who struggle with self-directed learning can still benefit from the method, thereby maximizing its effectiveness (Tong et al., 2022; Harini et al., 2023; Dahal & Bhat, 2023).

The criticism points to a need for structured teacher involvement, particularly in the early stages of student learning, to ensure that all students—regardless of their skill levels—can navigate PBL successfully. This aligns with the idea that while PBL is highly beneficial in developing analytical and problem-solving skills, its success depends on proper implementation, sufficient teacher support, and adaptation to individual student needs. In conclusion, while PBL is an effective strategy for promoting both academic achievement and engagement, it is most successful when combined with teacher-led instruction, offering students a balance between guidance and independent learning opportunities (Keiler, 2018; Almulla, 2020; Markula & Aksela, 2022). Thus, the challenge lies in providing adequate support, particularly for students with less experience, to ensure all learners benefit fully from the PBL approach.

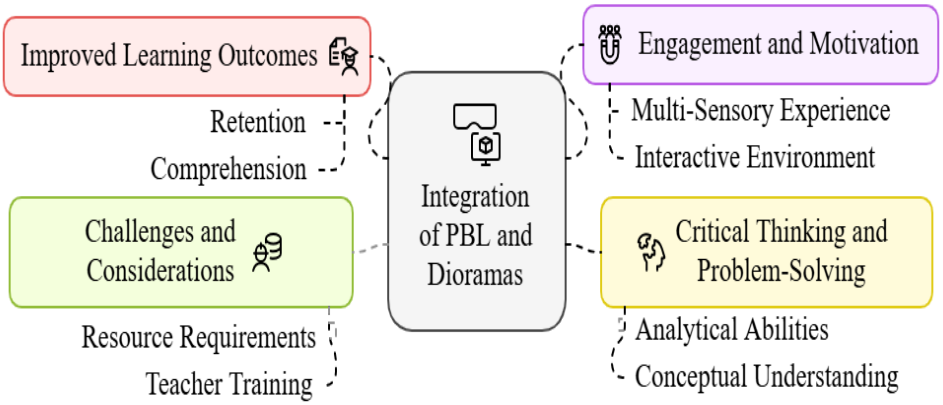
**Evaluation of Increasing Student Learning Achievement Through PBL-Based Diorama Media**

Using Problem-Based Learning (PBL)-based diorama media has proven to be an effective strategy for enhancing student learning outcomes. Research by Jensen et al. (2023) demonstrates that dioramas help increase student focus and engagement by offering concrete visual representations of abstract concepts. This method enables students to better understand the material and fosters a greater interest in learning. The ability to interact with tangible models makes the learning experience more immersive and meaningful, leading to improved retention and comprehension of the subject matter (Bhattacharjee et al., 2018). In addition, Hmelo-Silver (2004) and Chernikova et al., (2020) found that diorama media can significantly boost students' learning motivation. By providing an interactive and visually stimulating environment, dioramas reduce feelings of boredom and increase engagement with the material being taught. Observations revealed that students became more enthusiastic and motivated when they could manipulate objects related to the lesson, making the learning process more dynamic and participatory (Pozzi et al., 2014; Yan et al., 2023).

These findings suggest that combining PBL with diorama media not only deepens students' understanding but also enhances their motivation to learn. The interactive nature of dioramas provides a multi-sensory experience that helps maintain student interest, particularly when dealing with challenging or abstract topics. Furthermore, this approach supports the development of critical thinking and problem-solving skills, key competencies in modern education. Overall, the integration of PBL-based diorama media represents a powerful tool in creating a more engaging, effective, and student-centered learning environment (Johannesson et al., 2013; Sawyer, 2014; Mashud et al., 2023).

The research by Smith et al. (2023) highlights the transformative impact that Problem-Based Learning (PBL) with dioramas can have on student behavior in the classroom, particularly in terms of increasing focus and engagement. This finding is important as it addresses one of the major challenges in education—maintaining student interest and reducing negative behaviors, such as disengagement or distraction. By offering a tangible, interactive medium like dioramas, students can better connect with abstract concepts, making the learning process more enjoyable and meaningful. However, while these results are promising, they also raise critical questions regarding the sustainability of such behavior changes. Are these positive behavioral shifts maintained over time, or are they dependent on the novelty of the diorama medium? Longitudinal studies would be needed to assess the durability of these improvements. Furthermore, Johnson's (2023) findings on the improvement of students' conceptual understanding and analytical abilities through PBL with dioramas suggest that visual aids play a crucial role in supporting deeper learning. The visual and hands-on nature of dioramas reinforces PBL's emphasis on contextual and collaborative learning,

which is more likely to result in lasting cognitive gains compared to passive learning methods. However, one critical concern is the extent to which this approach is scalable. Implementing diorama-based PBL requires resources, such as time for preparation, materials, and teacher training. In underfunded or resource-limited schools, replicating this model might be challenging, limiting its accessibility (Carreon et al., 2023; Cole et al., 2023).




**Fugure 6. Enhancing Student Learning with PBL and Dioramas**

Additionally, the findings by Ghani et al., (2021) and Bilgin et al., (2015) affirm that PBL-based dioramas not only improve academic achievement, as seen through written exam results, but also enhance students' motivation and positive behavior. While this suggests a dual benefit of cognitive and behavioral improvements, it is worth questioning whether all students benefit equally from this approach. For students with learning disabilities or those who struggle with self-directed learning, PBL might pose additional challenges. Thus, while dioramas offer valuable benefits in promoting engagement and understanding, their implementation should be carefully adapted to meet the diverse needs of students (Almusaed et al., 2023; Anyichie & Butler, 2023). In conclusion, while PBL-based dioramas demonstrate significant potential for improving both academic and behavioral outcomes, critical factors such as long-term sustainability, scalability, and adaptability to diverse learners should be addressed to maximize its effectiveness in varied educational settings.

## CONCLUSIONS

Research at Pasrujambe 08 State Elementary School shows that using Problem-Based Learning (PBL) dioramas improves social studies learning achievement. In the pre-cycle, students' learning completeness was only 40%, but this increased to 60% in cycle I and 80% in cycle II. Using dioramas makes students more interested, motivated, and active in learning and helps them understand the material and solve problems more effectively. The PBL strategy with dioramas has proven effective in improving student learning outcomes.

This research carries significant implications for the field of education. It provides theoretical support for constructivist learning theory and learning motivation by demonstrating that learning through diorama media can enhance students' understanding and motivation. The practical implications are far-reaching, including the integration of PBL-based dioramas into school curricula, teacher training in their use, development of visual learning resources, and most importantly, ongoing evaluation to gauge the effectiveness of this strategy. By continually assessing and refining the use of PBL-based dioramas, we can ensure that the learning process remains engaging, meaningful, and significantly improves student learning outcomes.

Further research is recommended to explore the application of PBL-based dioramas in various other subjects, such as science and mathematics, as well as at different levels of education, to assess the consistency of their effects. Additionally, research can compare the effectiveness of other visual media in PBL, such as videos and infographics. Identifying success factors such as teacher training, infrastructure support, and parent participation is also essential. This further research can help find

learning strategies that are more effective and can be implemented widely to improve the quality of education.

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