



## Implementation of Project-Based Learning Model in Lisadanur Program to Improve Elementary School Students' Literacy and Numeracy

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### ABSTRACT

This study aims to analyze the effectiveness of project-based learning implementation through the Lisadanur program in improving elementary school students' literacy and numeracy skills. The study used a quantitative approach with a descriptive-comparative design on student learning outcomes before and after the program implementation. The subjects were elementary school students involved in contextual project-based learning activities that integrated reading, writing, data processing, and numerical problem solving. Data were collected through literacy and numeracy tests and documentation of learning outcomes, then analyzed using descriptive statistical techniques to compare changes in score achievement. The results showed a significant increase in both aspects, namely literacy increased from an average score of 55 to 88.89 and numeracy from 35 to 77.78. These findings indicate that project-based learning can increase student engagement, conceptual understanding, and the ability to apply knowledge in real contexts. In addition, collaborative interactions and the role of teachers as facilitators also support the creation of a meaningful learning environment. Thus, the implementation of the project-based learning model in school programs can be a strategic alternative to strengthen literacy and numeracy competencies in elementary education and support the development of sustainable innovative learning practices.

**Keywords:** *lisadanur, PjBL, literacy, numeracy*

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### INTRODUCTION

The transformation of 21st-century education requires students to not only master conceptual knowledge, but also have literacy and numeracy skills as basic competencies in facing the complexity of social life and technological developments. Literacy is understood as an individual's ability to access, understand, evaluate, and use information in various life contexts, not just reading and writing skills [1]. Meanwhile, numeracy refers to the ability to use mathematical concepts to interpret quantitative information, make decisions, and solve problems in real situations [2]. These two competencies are indicators of the quality of basic education because they play a role in shaping students' critical, analytical, and reflective thinking skills.

Despite their importance, various findings indicate that the literacy and numeracy skills of elementary school students in Indonesia still face serious challenges. A low reading culture in schools and families, limited access to quality reading materials, and suboptimal implementation of literacy programs are factors that influence students' literacy skills [3]. In addition, learning practices that are still oriented towards solving practice questions without strengthening conceptual understanding also limit the

development of higher-order thinking skills. In the context of numeracy, difficulty understanding basic mathematical concepts and anxiety about mathematics subjects are often the main obstacles in the student learning process [4], [5]. This condition shows that literacy and numeracy issues are not only related to academic achievement, but are also influenced by the learning approach used in the classroom.

Initial findings at the research site revealed similar conditions. Students struggled to understand basic arithmetic operations, exhibited low learning motivation, and viewed mathematics as a daunting subject. Learning tended to be teacher-centered, with student worksheets predominating as the primary learning resource. This situation resulted in low literacy and numeracy indicators, according to school report cards. This phenomenon underscores the need for learning innovations that not only improve academic skills but also build meaningful, contextual, and participatory learning experiences.

One learning approach that is considered relevant to address these challenges is Project Based Learning (PjBL). This model positions students as the main actors in learning through active involvement in planning, implementing, and evaluating real-world

problem-based projects. PjBL has been shown to improve students' critical thinking skills, creativity, collaboration, and conceptual understanding because it provides space for exploration and reflection on learning experiences [2]. Other research shows that project-based learning encourages students to work together in completing complex tasks and develop learning independence [6]. In addition, the integration of PjBL with an interdisciplinary approach also has the potential to improve students' problem-solving abilities and collective creativity [7].

Although various studies have examined the effectiveness of PjBL in improving critical thinking skills or learning outcomes, studies that systematically integrate this model into school-based numeracy literacy programs are still limited. Most studies tend to focus on the application of PjBL in specific subjects or in the context of science and STEM learning [8], so there has not been much exploration of its implementation in numeracy literacy strengthening programs at the elementary school level. This gap opens up research opportunities to examine how PjBL can be integrated into structured and sustainable school programs.

In this context, the Lisadanur (Saturday Literacy and Numeracy) program is a learning innovation designed to strengthen literacy culture while improving students' numeracy skills through contextual project activities. This program combines reading, writing, and mathematical problem-solving activities in a product-based learning experience so that students not only understand the concept but also apply it in real life. The implementation of an authentic activity-based program is believed to create a conducive learning environment and increase student engagement in learning [9]. Thus, the integration of PjBL in the Lisadanur program has the potential to strengthen the meaningful learning process and develop numeracy literacy skills holistically.

The novelty of this research lies in the integration of the PjBL model into a systematically designed elementary school-based numeracy literacy program, not merely as a classroom learning strategy. Previous research has focused more on improving critical thinking skills or learning outcomes through PjBL, while this study focuses on the model's contribution to improving numeracy literacy through institutional school programs. This approach is expected to provide new perspectives on how learning innovations can be developed contextually and sustainably within elementary education practices.

Based on the above description, this study aims to describe the improvement of students' numeracy literacy skills through the implementation of project-based learning in the Lisadanur program and analyze its impact on the completion of elementary school students' learning outcomes. This research is expected to provide theoretical contributions to the development of mathematics and literacy education studies and practical contributions for teachers in designing innovative learning that supports improving the quality of elementary education.

## RESEARCH METHODS

This study uses a qualitative approach with an exploratory design to deeply understand the phenomenon of mathematics learning in a natural context. The qualitative approach was chosen because the research aims to reveal the meaning, experience, and dynamics of the learning process contextually, not to generalize the findings to a wider population [10], [11]. In educational research, this approach allows researchers to gain new insights and develop a conceptual understanding of practices occurring in the field through direct interaction with research subjects. Data collection, analysis, and interpretation take place simultaneously until a comprehensive understanding of the phenomenon being studied is achieved [12].

The research design positions the researcher as the primary instrument responsible for determining the research focus, selecting informants, collecting data, and interpreting findings. The research process is conducted flexibly and iteratively so that data analysis can guide subsequent data collection until no significant new information is found or data saturation is reached. The concept of data saturation is an important methodological principle in qualitative research, indicating that additional data no longer yields new insights into the phenomenon being studied [13]. Reporting the achievement of saturation is important to ensure transparency and credibility of sample size justification in qualitative research [14].

The research subjects were determined using a purposive sampling technique, considering the relevance of the informants' experiences to the research focus. The subjects were 23 fifth-grade students and a teacher at a public elementary school in Kebumen Regency, Central Java Province. Purposive participant selection enabled the researcher to obtain rich data relevant to the mathematics learning context being studied. In a qualitative approach, sample size is not determined statistically but based on the adequacy of information obtained during the research process until saturation is reached.

Data collection was conducted through participant observation, semi-structured interviews, and documentation to obtain rich data and enable source triangulation. Observations were used to record student learning activities and interactions during the implementation of project-based learning, while interviews aimed to explore student and teacher perceptions of the learning process and outcomes. Documentation in the form of worksheets, project results, and learning notes were used as supporting data for the analysis. The use of multiple data collection techniques is important to increase the credibility and depth of interpretation in educational research [15], [16].

Data analysis was conducted interactively through the stages of data reduction, data presentation, and conclusion drawing, which took place cyclically from the start of the data collection process. This procedure allowed researchers to systematically and reflectively identify patterns, themes, and relationships

between categories. This iterative analysis model is common practice in contemporary qualitative research to produce transparent and academically accountable interpretations [17]. Data validity was maintained through triangulation of techniques and sources, member checking, and an audit trail to ensure the consistency and credibility of research findings.

The implementation of project-based learning in this study was designed by emphasizing the active involvement of students in solving contextual problems related to numeracy. The project-based learning model has been recognized as a pedagogical approach capable of enhancing authentic learning experiences, critical thinking skills, and readiness to face the challenges of 21st-century learning [18]. In addition, this approach provides broad exploration space for students in building conceptual understanding through collaborative and reflective activities [19]. Thus, this research method is expected to be able to produce an in-depth description of the dynamics of learning and its contribution to strengthening students' numeracy skills.

## RESULT AND DISCUSSION

Based on data analysis obtained through observation, in-depth interviews, and documentation, several main themes were identified that illustrate the dynamics of mathematics learning in the research context, including students' understanding of mathematical concepts, learning strategies used, student engagement in the learning process, and their implications for learning outcomes. The analysis was conducted iteratively using a thematic approach so that the interpretation of the results not only describes field phenomena but is also linked to theoretical frameworks and current research findings.

The results of the study indicate that students' understanding of mathematical concepts is still dominated by a procedural approach. Students tend to solve problems based on memorized algorithmic steps without being able to explain the mathematical reasons behind the procedure. This phenomenon indicates limitations in constructing conceptual meaning, which theoretically is the main foundation in meaningful mathematics learning. Previous studies have shown that low conceptual understanding often arises when learning is too oriented towards the end result rather than conceptual exploration, so that students have difficulty linking mathematical ideas to new situations [20]. In addition, similar difficulties were found in understanding the concept of functions, where less interactive teaching methods caused students to experience misconceptions and symbolic interpretation errors [21].

Other findings show that the learning strategies implemented are still dominated by an expository approach, with the teacher as the center of information delivery. This pattern limits students' opportunities to actively participate in the knowledge construction process. From a contemporary mathematics education perspective, a one-way approach has the potential to hinder the development of mathematical reasoning

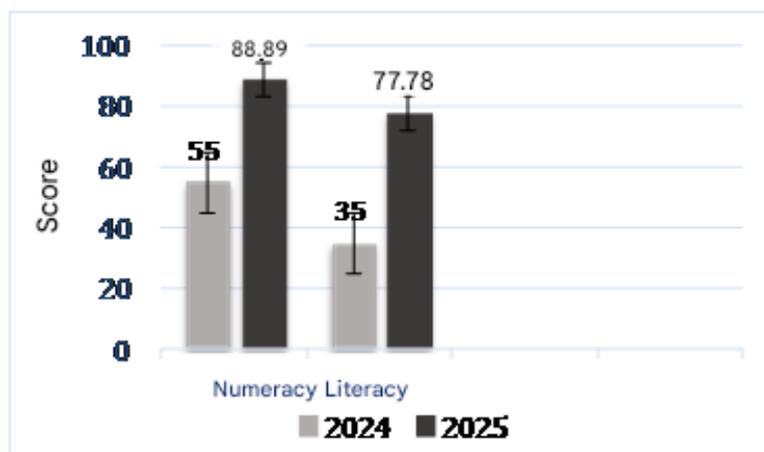
because students are not involved in the process of conceptual exploration and reflection. Previous research confirms that innovative learning such as problem-based learning can improve the quality of mathematical understanding because students are faced with contextual situations that require independent problem-solving [22].

In addition, the application of differentiated learning has been proven to have a positive impact on the achievement of mathematics learning objectives by adapting the approach to students' learning needs [23]. This is in line with research [24] which shows that variations in teaching strategies allow for increased student engagement and expand opportunities for the formation of conceptual understanding.

Student engagement was one of the key findings of this study. The results showed increased student participation when learning involved group discussions and activities explaining concepts to peers. These activities helped students clarify understanding and identify thinking errors. Theoretically, student explanation practices act as a generative learning mechanism that strengthens cognitive processing and conceptual understanding. Recent research has shown that self-explanation and peer explanation activities can improve the quality of mathematical understanding while supporting the development of academic social skills [25].

The implications of these learning dynamics are evident in the varying student learning outcomes. Documentation analysis shows that students who actively participate in discussions tend to have better understanding than those who are passive. This demonstrates a close relationship between cognitive engagement and academic performance in mathematics learning. Previous research confirms that mathematics learning outcomes are influenced not only by individual abilities but also by the quality of the learning environment that supports active interaction. [26]. In addition, difficulties in learning mathematics that are not intervened through appropriate learning strategies can have an impact on students' overall low academic achievement [27].

The educational report card achievements in 2024 and 2025 in the literacy and numeracy aspects are explained in the following figure:



**Figure 1.** Literacy and Numeracy Skills

Based on Figure 1, literacy and numeracy skills in 2025 have increased compared to 2024 with the literacy aspect scoring from 55 to 88.89 and numeracy from 35 to 77.78. This increase indicates that the implementation of project-based learning through the Lisadanur program has a positive impact on strengthening students' basic competencies. Conceptually, project-based learning allows students to build knowledge through authentic experiences, thereby improving conceptual understanding and problem-solving skills. This finding is in line with research [28] showing that project-based learning can have a real impact on the development of literacy and numeracy through fun and contextual learning experiences. In addition, this approach has also proven effective in improving numeracy literacy skills through the integration of project-based mathematics learning in geometry material, which encourages students to use mathematical reasoning in the context of everyday life [29].

Project-based learning in the Lisadanur program provides space for students to learn through real-life activities relevant to everyday life. Project activities encourage students to read instructions, understand information, and process simple data independently, thereby strengthening ongoing literacy practices. Learning experiences that involve planning through to presenting results also improve students' critical and reflective thinking skills. This is consistent with findings [30] that the use of numeracy literacy-based teaching materials with the PjBL model effectively improves elementary school students' critical thinking skills through learner-centered activities. Strengthening literacy and numeracy in learning is also seen as an important strategy for building basic competencies relevant to 21st-century needs. [31].

The implementation of PjBL in this study places students as the main actors in the learning process, while the teacher functions as a facilitator who directs the exploration of knowledge. A learning environment that supports discussion and collaboration has been shown to increase students' motivation and confidence in conveying ideas. This finding is in line with the results of research [32] showing that the Project Based Learning model has an influence on improving students'

numeracy skills through active and exploratory learning designs. Approaches that emphasize active student participation have also been proven in various innovative learning models to increase engagement and the development of basic academic skills, including numeracy [33].

The improvement in literacy skills in this study was evident in students' involvement in reading, writing, and interpreting information during the project stages. Reading activities were not only mechanical, but also interpretive because students had to connect information to completing tasks. A project-based approach that integrates contextual teaching materials has also been shown to improve students' bilingual literacy and numeracy skills through the development of project-based integrative teaching materials [34]. Thus, literacy does not only develop as the ability to read text, but as the competence to understand information in real contexts.

Meanwhile, the improvement in students' numeracy is reflected in their involvement in counting, measuring, and data processing activities during the project process. The experience of using mathematical concepts to solve practical problems helps students understand the relevance of mathematics in everyday life. This strengthens the view that numeracy literacy is an important ability to analyze information and use mathematical reasoning in real situations [29]. In addition, the application of innovative learning models oriented towards problem solving has been proven to significantly improve elementary school students' numeracy skills [33].

Collaboration between students during project implementation is also an important factor in improving learning outcomes. Group interaction allows for the exchange of ideas, the division of tasks, and the strengthening of conceptual understanding through discussion. Project-based learning is designed to develop both social and academic skills, so that communication and collective responsibility also support literacy and numeracy achievement. In general, current research trends also indicate that PjBL is a promising pedagogical approach in developing multidimensional learning experiences and student

readiness to face the challenges of 21st-century learning [18].

Overall, the results of this study show that the implementation of project-based learning in the Lisadanur program not only improves literacy and numeracy scores, but also develops students' learning motivation, collaborative skills, and conceptual understanding. In addition, the results of this study emphasize the importance of pedagogical transformation in mathematics learning towards a more reflective and participatory approach. The integration of innovative learning strategies, increased academic social interaction, and teacher professional reflection are important factors in improving the quality of learning. The perspective of modern mathematics education also highlights the ethical dimension in teaching practices, where teachers have a responsibility to create an inclusive and meaningful learning environment for all students [35].

Thus, the findings of this study demonstrate that improving the quality of mathematics learning cannot be achieved through partial changes in methods, but rather requires a holistic approach encompassing pedagogical strategies, student engagement, and teacher professional reflection. Integrating these three aspects is key to fostering deep and sustainable mathematical understanding.

## CONCLUSION

Based on data analysis and discussion, it can be concluded that the implementation of project-based learning through the Lisadanur program has a positive contribution to strengthening the literacy and numeracy skills of elementary school students. The integration of contextual project activities into learning not only improves academic achievement but also improves the quality of student learning engagement, conceptual understanding, and collaborative interactions. Through authentic learning experiences, students are able to construct deeper meanings of knowledge, so that literacy develops as the ability to understand and interpret information, while numeracy develops as the ability to apply mathematical concepts in real situations.

The findings of this study emphasize the importance of transforming pedagogical approaches from teacher-centered learning to participatory learning that positions students as active subjects. Student engagement in discussions, idea exploration, and group work contributes to a more meaningful understanding of concepts than procedural learning. In this regard, the teacher's role as a facilitator is key to creating a learning environment that supports student reflection, collaboration, and academic courage.

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