



Teacher Training to Address Difficulties in Using Problem-Based Learning Models in Mathematics Instruction for Fifth-Grade Students at SD N 1 Wonogiri

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ABSTRACT

This study examines teacher training to overcome obstacles in implementing Problem-Based Learning in fifth-grade mathematics at SD Negeri 1 Wonogiri, with an initial average score of 70 and teaching still based on lectures. The purpose of this study is to describe teacher readiness, training implementation, and the results of PBL implementation in fifth-grade mathematics at SD Negeri 1 Wonogiri. This study used a descriptive qualitative approach, with data collected through interviews and observations of teachers and the principal. The findings showed that before the training, teachers were highly motivated but limited in PBL syntax, contextual problem design, and facilitating group discussions. After the training, teachers showed concrete behavioral changes, such as consistently applying the PBL stages, asking provoking questions, and using contextual problems relevant to the local environment. Structured and practice-based PBL training resulted in noticeable improvements in teachers' readiness and confidence. Post-training PBL implementation followed a more systematic pattern from problem orientation to reflection, which was associated with increased student participation, active engagement in group discussions, and understanding of mathematical concepts through problem solving. However, time constraints and differences in student abilities remained challenges.

1. Introduction

Education is one of the most important aspects of human life, especially in supporting harmonious and sustainable community life throughout the ages. In line with the spirit of continuously improving the quality of national education, learning by applying the Problem Based Learning model has become one of the strategic choices to improve the overall quality of learning (Sari, 2020). PBL is defined as learning that focuses on real-life questions that are discussed intensively by

students, where the teacher acts as a facilitator who facilitates discussion and explains the material needed to solve problems effectively (Utami & Puspitasari, 2022). This model also facilitates collaboration among students and encourages active knowledge construction by the learners themselves (Chen et al., 2021). The implementation of PBL in mathematics learning in elementary schools, especially in Indonesia, still faces various serious challenges that require in-depth study. These challenges mainly come from the perspective of teachers as the spearhead of learning implementation in the classroom (Hartati et al., 2023).

According to current national education policy, teachers' attitudes in the classroom must reflect pedagogical principles that are entirely student-oriented, as clearly stipulated in Peraturan Menteri Pendidikan Dan Kebudayaan Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar Dan Menengah about Teacher Competency Standards, which serve as the main reference for all educators. This policy explicitly emphasizes that teachers must have a professional attitude that supports interactive, inclusive, and value-based learning, including avoiding monotonous approaches such as passive, one-way lectures. This approach not only improves the quality of academic learning but also builds students' moral character through the integration of ethical values in the learning process on an ongoing basis Peraturan Menteri Pendidikan Dan Kebudayaan Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar Dan Menengah. The development of teacher competencies is key to the successful implementation of learning innovations. This policy provides a strong foundation for the application of student-centered learning models such as PBL (Novitasari & Fathoni, 2026). Thus, teachers are no longer the center of learning but facilitators of student potential development.

Problem-Based Learning is an innovative learning approach that focuses on solving real-world problems in a contextual manner. In the context of elementary school mathematics education, this provides students with the opportunity to connect mathematical theory with real-world problems that need to be solved practically (Istiqori et al., 2022). The application of PBL requires students to interact intensively with the material being studied, conduct in-depth analysis of problems, evaluate existing solutions, and ultimately find the most appropriate optimal solution (Munawaroh et al., 2024). This is because mathematics is a means of gaining understanding and knowledge about logical thinking processes, as well as how to apply mathematics in real life (Imran et al., 2022). This learning model enables students not only to memorize formulas but also to understand the practical application of mathematical concepts. This aligns with the characteristics of SD N 1 Wonogiri, which promotes student-centered learning in line with the school's vision of creating active, meaningful, modern educational learning that emphasizes critical thinking skills.

In the PBL learning model, students are given complex problems and then solve them using their own knowledge, so that students who are more dominant when working on the problems given (Mustofani & Hartinah, 2019). Teachers position themselves as facilitators in problem-based learning that is truly student-centered. Problem-based learning is a learning model designed and developed to develop students' ability to solve problems independently (Savery, 2006). Problem-based

learning was chosen because it provides problems that are close to real life and may occur in students' daily lives. However, in reality, mathematics learning outcomes in elementary schools are still very low nationally (Elmiwati et al., 2020). One of the problems in mathematics education in Indonesia is the consistently low level of understanding and achievement of students in this subject (Fauziah & Puspitasari, 2022). Data shows that national exam results indicate a level of mathematics comprehension that is still below international standards. This situation highlights the gap between 21st-century learning and the actual ability of elementary schools to implement innovative learning models without adequate support for teacher capacity building (Istiqomah & Imah, 2025).

Previous studies have shown that Problem-Based Learning can improve students' critical thinking, problem-solving, and conceptual understanding skills. However, most studies focus on student learning outcomes and are generally conducted in schools with adequate resources or in urban areas, while studies examining the readiness and perceptions of teachers in rural elementary schools, where facilities, learning resources, and professional development opportunities are often limited, are scarce. This gap highlights the need to explore how teachers in rural schools view and implement PBL in their teaching practices. Therefore, this study aims to: 1) describe teachers' readiness to participate in training, 2) analyze the implementation of training, and 3) evaluate the results of post-training implementation in mathematics learning in grade V of SD N 1 Wonogiri. The study focuses on SD N 1 Wonogiri, particularly grade V with 33 students, where the average mathematics score is 70 and teachers still struggle to connect mathematical concepts to real-life situations. Limited facilities, scarce resources, and inadequate pedagogical training were identified as major obstacles to learning (Auliah et al., 2023), while technology was recognized as having the potential to enrich practice and increase student engagement (Kusumawardani & Aminatun, 2024). Therefore, this study provides context-based empirical evidence regarding the perceptions and readiness of elementary school teachers in rural areas to support the transition from teacher-centered learning to student-centered learning in educational environments with limited resources.

2. Methodology

This study uses a qualitative approach with a case study design on teacher training in dealing with difficulties in using the PBL model in mathematics learning. The location of the study was determined at SD Negeri 1 Wonogiri, specifically in the fifth grade class with 33 students (18 boys and 15 girls). The research subjects consisted of three fifth-grade teachers who participated in the training, the principal, and the lead trainer. Teachers were selected because they are the ones who implement learning in the classroom, the principal as the policy maker in the school, and the trainer as the designer and facilitator of the training program, so that the researcher could obtain a comprehensive view of the implementation of training in elementary schools.

Data collection was conducted using three main techniques, namely observation, interviews, and documentation. Participatory observation was conducted during the training (3 days) and implementation in fifth-grade mathematics classes for 4 weeks, guided by an observation protocol constructed around indicators of teacher readiness, implementation of PBL phases, student activities and attitudes, management of time and learning resources, and assessment practices within PBL. The interview guide was systematically arranged in a table format, covering aspects of teacher preparation for training participation, training implementation itself, and training implementation results in classroom practice. Documentation included analysis of training modules, problem-based mathematics lesson plans before and after training, and authentic assessment instruments developed by teachers.

Prior to the main data collection, the interview guidelines and observation sheets were validated through an expert judgment procedure by education experts and research methodology lecturers to ensure the suitability of the instrument content with the research objectives. Next, a pilot interview was conducted with teachers outside the research sample to assess the clarity, sequence, and relevance of the questions. Feedback from lecturers and the results of the pilot test were used to refine the wording and structure of the questions, particularly those related to initial understanding, difficulties encountered, experiences during training, and changes in learning practices after training, so that the instruments were more focused and consistent with the established indicators.

Data analysis followed (Miles et al., 2014) interactive model, which consists of three stages: data reduction, data presentation, and conclusion drawing/verification. During the data reduction stage, open coding was performed on interview transcripts and observation data to identify initial categories. These categories were then regrouped through a process of focused coding and developed into main themes. For example, the category “teacher adaptation strategies” emerged from statements such as “I adjust PBL steps to students' abilities.” The results of the analysis were presented in narrative and tabular form through a triangulation matrix that contained the relationship between the themes and the raw data. This process demonstrated the transparency of the analysis while ensuring that conclusions were based on strong evidence, thereby enhancing the credibility and reliability of the research.

3. Results and Discussion

Based on observations and interviews conducted at SD Negeri 1 Wonogiri in September 2025. The data shows that there are 33 students in grade V, consisting of 18 male students and 15 female students, with diverse backgrounds ranging from upper, middle, to lower classes, some of whom are farmers' and small traders' children. Prior to the study, mathematics was taught using the independent curriculum book with lectures and weekly tests. Initial observation data shows that the average math score of students is only 70, with some students having difficulty understanding the concept of real-world applications. The traditional approach

resulted in low student motivation due to a lack of real-world context, thereby hindering the development of critical thinking.

Mathematics lessons last for 6 x 35 minutes each week and there are weekly tests, with the lesson structure as follows: 15 minutes of teacher explanation, 10 minutes of problem solving, and 10 minutes of checking answers. The teacher revealed that 65% of students had difficulty with abstract story problems that were not related to their daily lives in Wonogiri, such as examples of activities in traditional markets and local culture, which could actually be linked to mathematics learning. This caused students' motivation to learn to decline and their grades to drop because the problems seemed far removed from rural life in Wonogiri. An interview with a fifth-grade teacher revealed the initial situation: "Before the training, I knew that PBL was learning through problems, but I didn't understand the complete steps or how to apply it in mathematics" (Teacher A). The principal stated, "65% of students had difficulty with story problems that were not relevant to the Wonogiri market or the lives of local farmers." This reflects the gap between the national curriculum and the reality of rural Wonogiri, where students need math problems based on traditional markets, rice harvests, or distances between villages.

This research was conducted over a period of one month. Interviews were conducted with fifth-grade teachers and school principals to discuss the teachers' initial readiness before training, the training process, and the implementation of training, while students were asked to share their experiences in working on questions related to daily life compared to regular questions. All interviews were recorded and transcribed for analysis. Observations were made by researchers who recorded the level of success of the teacher training. The collected observation data were then analyzed using a descriptive qualitative approach to identify recurring patterns and the degree of improvement in teacher competence after training. The interview guidelines for teachers and principals are attached as shown in Table 1.

Table 1. Interview Guidelines for Teachers And Principals

No.	Question Categories	Interview Questions
1.	Initial understanding of PBL	What was your understanding of PBL before attending the training?
2.	Difficulties	What obstacles did you encounter when trying to implement PBL?
3.	Motivation	What motivated you to attend the Problem Based Learning training?
4.	Preparation	How did you prepare yourself before participating in the PBL training, both in terms of learning tools and personal readiness?
5.	Support	Dukungan apa saja yang diberikan pihak sekolah dalam memfasilitasi Bapak/Ibu mengikuti pelatihan PBL?
6.	Quality	What support did the school provide to facilitate your participation in the PBL training?
7.	Experience	What activities helped you the most in understanding and practicing PBL during the training?
8.	Implementation	How did you implement each stage of PBL in the classroom after the training?
9.	Impact	What changes have you observed in students' activities, participation, and understanding after implementing PBL?

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| 10. Post-training challenges | What challenges are you still facing after implementing PBL, and what support do you need to ensure the sustainability of its implementation? |
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This has encouraged SD Negeri 1 Wonogiri to commit to improving the quality of the school through a problem-based learning model. To achieve this, the school has developed teacher professionalism by conducting teacher training related to the problem-based learning model so that they are able to provide the best educational services for students. This initiative aims not only to improve pedagogical competence, but also to strengthen teachers' ability to design contextual learning that is relevant to the daily lives of students in rural areas. The school views improving teacher capacity as the key to transforming learning to be student-oriented, creative, and collaborative. In improving the quality of learning through teacher training programs, it is evident that the success in realizing the school's vision and mission cannot be separated from the following stages:

Teacher Preparation for Problem-Based Learning Training

In relation to efforts to improve the quality of mathematics learning, the initial step that is the focus of this study is teacher preparation before they participate in Problem-Based Learning training. Before participating in the training, teachers' understanding of the Problem-Based Learning model was still at the conceptual stage. Teachers already knew about Problem-Based Learning as a learning model that focuses on problems, but did not yet fully understand the implementation steps and how to apply it in mathematics learning for elementary schools. This situation shows that teachers' initial preparation is still limited to theoretical knowledge. An overview of the initial readiness of teachers prior to training can be seen more clearly in Figure 1.



Figure 1. Linital Learning Conditions

In addition to a lack of conceptual understanding, teachers also face many challenges when trying to implement Problem Based Learning before they undergo training. The main challenges they face are how to develop story problems or issues that are relevant to mathematics, organize group discussions, and also the limited time available for learning. This situation shows that even though teachers are enthusiastic about using new learning methods, their lack of teaching skills is an obstacle to implementing PBL to its full potential. This is reflected in one teacher's statement that *"before the training I knew PBL was learning using problems, but I did not yet understand the complete steps or how to apply it in mathematics"*, which illustrates that their understanding was still conceptual and not yet procedural. This quotation supports the initial understanding category at a conceptual level and underlies the theme of shifting teachers' understanding from merely knowing PBL as a concept to mastering its implementation steps.

The initial condition of teachers who only understood PBL at a conceptual level showed that practical and simulation-based training was highly relevant to the needs of teachers at the school. This is in line with the characteristics of SD N 1 Wonogiri, which is developing student-centered learning in accordance with the school's vision of creating active and meaningful learning. With the support of the principal in the form of permission, facilities, and mentoring programs, the implementation of PBL can run more optimally. In line with this increased motivation, the preparation stage for teachers before participating in training appears to be more focused and directed. After participating in the training, Teacher stated: "Now I can create math problems about the distance from the market to the rice fields or crop yields, which are relevant to the lives of Wonogiri students" (Teacher B). This change is specific to the local context of SD N 1 Wonogiri, where 70% of students come from farming families who are familiar with market and agricultural activities.

The implementation of teacher training in implementing the PBL learning model at SD Negeri 1 Wonogiri showed positive results in increasing teachers' knowledge related to learning with the PBL model. This is consistent with national education policy, which emphasizes the importance of student-centered learning, as stated in the (Peraturan Menteri Pendidikan Dan Kebudayaan Nomor 22 Tahun 2016 Tentang Standar Proses Pendidikan Dasar Dan Menengah, 2016) about standards for Primary and Secondary Education Processes, which affirm that the learning process must be interactive, inspiring, enjoyable, challenging, and motivate students to participate actively and think critically. The teachers revealed that before participating in the training, they felt highly motivated, but their understanding of Problem Based Learning (PBL) was still lacking. These findings are in line with research conducted by (Zamzuri & Surpiah, 2025), *"Teachers' readiness to implement Problem Based Learning is greatly influenced by their initial understanding of learning syntax and their previous experience in using innovative learning models."* The level of teacher readiness in using the model still varies. This statement confirms that teacher motivation alone is not enough without adequate pedagogical support.

In addition, other studies also show that teachers' difficulties in creating real problems that are relevant to everyday life are a hindering factor in the implementation of PBL. This is confirmed by the findings that *“Teachers tend to have difficulty developing authentic problems that are appropriate to the characteristics of the material and the abilities of the students.”* (Avisenna et al., 2024) It is not easy for teachers to design story problems that relate to everyday life, and this also makes students less active in learning. This has encouraged teachers to participate in training so that mathematics learning can be more active and meaningful. This training not only improves teachers' technical skills, but also helps them feel more confident in facing various challenges in classroom learning. Research by (Hmelo-Silver & Barrows, 2006) *“Teacher preparation through Problem-Based Learning simulations can reduce competency gaps, making classroom implementation more effective.”* Therefore, teacher preparation is important and must be done through regular training before implementing Problem Based Learning in the classroom, especially in mathematics learning in elementary schools to ensure sustainability and a positive impact on students.

Implementation of Problem-Based Learning Training

After learning about the teachers' initial situation, the next focus of the research was directed at the implementation of Problem Based Learning training organized by the school. The implementation of this training aimed to improve teachers' understanding and skills in applying PBL in a practical manner. The PBL training was carried out well. The material taught was delivered clearly, systematically, and in accordance with the mathematics learning context. Teachers stated that *“the material was presented clearly and was easy to understand, with many examples that matched the conditions of the class”*, indicating that the training content was directly relevant to their daily teaching practice. This quotation supports the category *“clarity and relevance of training materials”* and forms the basis of the theme *“contextualized PBL training that aligns with classroom realities”*. The teachers said that the examples given by the presenters were relevant to what they encountered in the classroom, making it easier for them to understand and use PBL in teaching.

The most effective training method for teachers to understand PBL is through hands-on practice and learning simulations. In this way, teachers not only learn theory, but also gain real experience in developing PBL-based learning tools, such as lesson plans, worksheets, and problem-based questions. The experience of creating worksheets and questions related to real-life situations is one of the most memorable and useful parts of the training for teachers. One teacher highlighted that *“practice and learning simulations were the most helpful because they provided direct experience in applying the PBL steps”*, while another emphasized that *“designing problem-based worksheets that fit the mathematics material”* was the most meaningful activity during the training. These quotations reinforce the categories *“effectiveness of practice and simulation methods”* and *“strengthening teachers' skills in designing contextual problems”*, which are then developed into the theme *“transformation of teachers abilities in planning and implementing PBL-*

based lessons". To present authentic qualitative evidence and display excerpts from teacher interviews regarding the implementation of training as shown in Table 2.

Table 2. Teachers' Responses to the Implementation of PBL Training

No	Aspect	Excerpt from Informants
1.	Clarity of training materials	The material was delivered clearly and in sequence, and it matched the mathematics learning conditions in grade V.
2.	Training method	Practice and simulation helped me understand how to apply PBL in real teaching.
3.	Relevance to classroom needs	The examples were the same as the problems we face when teaching mathematics.
4.	Collaborative learning experience	Group discussions made it easier to share difficulties and find solutions together.
5.	Training constraint	The time for practice was limited because many things needed to be implemented.
6.	Readiness after training	After the training I became more confident because I already understood the steps of PBL.

Not only through theory and practice, the presenters also facilitated group discussions and question-and-answer sessions. These interactive activities created a collaborative learning environment in which teachers were encouraged to openly express the challenges and obstacles they encountered while implementing the Problem-Based Learning model in their classrooms. Through these discussions, participants were able to exchange ideas, share best practices, and reflect on their own teaching experiences alongside fellow educators. Additionally, the interactive and supportive training atmosphere, combined with the expertise and professionalism of the presenters, significantly enhanced teachers' understanding of the PBL approach. This positive environment also fostered teachers' motivation and enthusiasm to actively participate in the training as part of their efforts to continuously improve the quality and effectiveness of classroom learning.

The three-day training included intensive simulations of Problem-Based Learning linked to authentic local contexts. Trainers facilitated exercises in designing contextual questions such as "With Rp100.000, how many 15 kg sacks of rice can be bought at Wonogiri Market if the price is Rp 7.000/kg?", which participants rated as most useful because it was directly relevant to students' daily economic activities. Observations showed significant changes in teachers' practices after the training: from a 15 minute lecture approach to the systematic implementation of a 6 step PBL system, namely problem orientation, student organization into groups, presentation of results, solution analysis, and reflection, which enhanced active learning among students. An overview of the dynamics of the training process and interactions between participants can be seen in Figure 2.



Figure 2. Training Implementation

However, during the training, teachers also encountered obstacles, namely limited time. These results are in line with research (Ginting et al., 2024) which states that *“Training accompanied by hands-on practice can improve teachers' understanding of the Problem-Based Learning model and increase their readiness to apply it in the classroom.”* This quote emphasizes that the effectiveness of training is not only determined by the material, but also by applicable training strategies. In addition, studies by (Alreshidi & Lally, 2024) also revealed that *“Teachers who participated in structured training demonstrated higher levels of confidence and teaching competence compared to those who did not participate in training.”* These findings are consistent with the results of this study, which show that teacher training in the application of Problem-Based Learning has a positive impact on the learning process in the classroom and, in particular, can improve teachers' ability to facilitate discussions and develop learning problems. This training can also help address issues such as a lack of resources in elementary schools by encouraging cooperation among teachers. Research by (Hmelo-Silver, 2004) also revealed that *“Inclusive training can increase teacher knowledge retention by up to 30%, especially through a collaborative approach.”* Thus, the implementation of Problem Based Learning training, which emphasizes practice and active mentoring, has proven to be an important factor in improving teacher competence.

Results of the Implementation of Problem-Based Learning Training

The final stage of this study was to observe the results of the training implementation in classroom teaching practices. This stage aimed to examine the extent to which the training influenced learning practices. After participating in the training, teachers showed improvements in their ability to apply problem-based instructional strategies in mathematics teaching. Teachers reported that their understanding of the instructional stages had increased, along with greater confidence in managing learning activities. One teacher explained, *“I better*

understand the stages and how to guide students without being too dominant” while another teacher stated, “After the training, I am more confident because I understand the learning process better.” These statements support the category of improved understanding of instructional syntax and increased teaching confidence, forming the theme of teacher transformation from knowledge transmitters to learning facilitators.

In practice, teachers implemented the learning stages systematically, starting from introducing problems, organizing students into groups, guiding investigations, presenting results, and evaluating the problem-solving process. Teachers were able to facilitate discussions, ask guiding questions, and support presentations and reflections. One teacher stated that learning now begins “from real problems, students work in groups, discuss, present, and then reflect together,” demonstrating their mastery of the learning cycle. Teachers also designed story problems connected to local life and culture in Wonogiri, making learning more active and meaningful. This contextual approach is reflected in teachers’ statements that they now create “problem-based questions that match the mathematics material and students’ daily lives,” supporting the category of contextual problem design and reinforcing the theme of contextual learning through local wisdom integration. The implementation of these stages in classroom learning can be seen in Figure 3.



Figure 3. Teachers Implementing PBL Syntax

Positive changes are not only seen in teachers but also in students during the learning process. The impact of implementing Problem Based Learning can be seen in the increased participation of students in the learning process. Students have become more courageous in asking questions, more active in discussions, more willing to express their opinions, and more capable of working together with their groupmates. Observation data and teacher reports confirm that students are now "more active in asking questions, answering, and discussing" (Teacher observation scores), with teachers noting improved scores in student engagement (3-4 on a 1-4

scale). This has shifted the learning process from being teacher-centered or lecture-based to student-centered. These findings support the category increased student activeness and collaboration and underpin the theme PBL's role in transforming passive learning to active, student-centered mathematics instruction.

The increase in student activity during learning indicates that the use of contextual problems related to students' daily lives at SD N 1 Wonogiri can encourage their involvement in the learning process. The local context used by teachers in presenting problems makes mathematics learning easier to understand because it connects abstract concepts with students' real experiences. This differs from previous learning conditions, which were dominated by lecture methods and tended to make students passive. Teachers observed that students now demonstrate “better cooperation in groups and independence in finding information” (Teacher 2 & 3 observation notes), which contrasts with their previous passive behavior. These findings show that contextual, problem-oriented learning can help students relate mathematical concepts to real-life situations. The consistent pattern found in teacher testimonies, observation data, and changes in student behavior forms the theme that this learning approach bridges abstract mathematical concepts and students' concrete experiences, providing evidence of the training's impact on both teaching practices and student participation. An overview of the increase in student activity during the implementation of this learning approach is shown in Figure 4.



Figure 4. Increased Student Participation

Observations during the four weeks following the training showed a significant increase in student participation from 40% to 85%, as measured by the frequency of active responses and contributions to group discussions. Teacher A stated that students are now very enthusiastic in group discussions, especially on Wonogiri literary context questions such as “If your father harvests 25 sacks of rice and sells them for Rp5,000/kg, what is the net profit after harvesting costs of Rp300,000?”. This contextual approach effectively overcame the initial difficulty of students in

understanding abstract story questions, given that some students come from farming families who are familiar with the harvest cycle and local agricultural trade.

With learning now centered on students, the role of teachers is more as facilitators who help students solve problems. These findings are in line with previous research stating that *“Problem-Based Learning can increase student engagement and encourage critical thinking skills through collaborative problem-solving activities.”* (Mooduto, 2025) This quote reinforces the observation that the application of Problem Based Learning (PBL) in elementary school education can increase student participation, encourage students to express their opinions, and improve critical thinking and problem-solving skills. Other studies also confirm that *“The implementation of Problem-Based Learning in elementary school mathematics education can help students understand concepts through meaningful learning experiences.”* (Rahmah et al., 2024) that PBL improves conceptual understanding through meaningful experiences, but this study is unique because it applies it to the agricultural context of Wonogiri, something that previous studies have not explored. Obstacles in the form of limited time and differences in student abilities were also found. This is related to the real conditions of class V of SD N 1 Wonogiri which has heterogeneous characteristics both in terms of academic ability and student activity, as mentioned in previous findings that *“The main challenges in implementing PBL are managing learning time and the heterogeneity of student abilities.”* (Avisenna et al., 2024). This situation requires teachers to be more flexible in arranging learning strategies and adjusting the level of difficulty in creating problems. Nevertheless, it still provides benefits such as increasing students' enthusiasm and their ability to apply knowledge in everyday life.

Therefore, teachers mentioned that they needed further assistance and held discussion forums with the Teacher Working Group (KKG) to facilitate teachers in exchanging experiences in applying Problem Based Learning. Continuous support is expected to maintain the consistency of Problem Based Learning implementation so that all students can feel its benefits. Thus, the results of this study indicate that Problem Based Learning training contributes positively to improving teacher competence and the quality of mathematics learning in grade V at SD Negeri 1 Wonogiri. The PBL training conducted at SD N 1 Wonogiri proved to be effective in improving teachers' competence in designing and implementing problem-based mathematics learning. These findings not only demonstrate the overall success of the training but also illustrate the real needs of teachers at SD N 1 Wonogiri, who previously had difficulties in developing contextual problems, managing group discussions, and organizing learning time. Thus, PBL training not only has an impact on improving teachers' individual competencies, but also contributes to improving the quality of mathematics learning institutionally at SD N 1 Wonogiri.

4. Conclusion

This study shows that Problem-Based Learning training designed through a practical, simulation, and local context approach can improve teachers' readiness and competence in applying problem-based learning in mathematics lessons in

grade V at SD N 1 Wonogiri. This answers the research objectives, which are to describe teachers' readiness before training, analyze the training process, and evaluate the results of implementation after training. Before participating in the training, teachers had high motivation, but their understanding of PBL syntax, contextual problem development, and group discussion facilitation was still limited to a conceptual level. After the training, teachers showed an increase in understanding, confidence, and ability to apply the PBL stages more systematically in the learning process.

The implementation after the training also showed positive changes in mathematics learning, particularly in increasing student participation, group discussion activities, and conceptual understanding through contextual problem solving. These findings confirm that practice-based and contextual teacher training can be an effective strategy in improving the quality of mathematics learning in elementary schools, especially in schools with limited resources in rural areas of Wonogiri. However, limited learning time and differences in student abilities remain challenges in its implementation.

This study provides empirical evidence that contextual PBL training strengthens the pedagogical competence of Wonogiri elementary school teachers, with an understanding and skills in designing learning relevant to the students' environment. However, continuous support is needed for optimal implementation, given the challenges of time and the heterogeneity of student abilities. Therefore, further research is recommended to expand the study to different subjects, grade levels, and school contexts. Future research may also use a mixed methods approach to obtain a more comprehensive picture of the effects on student learning outcomes and thinking skills.

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