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Transformation of Social Values in the Problem Based Learning Model in Mathematics Learning (Study on SDI Liaganda No. 120 Selayar Islands)

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ABSTRACT

This study aims to analyze the transformation of social values through the Problem Based Learning (PBL) model, its impact on students' understanding of social values, as well as supporting and inhibiting factors in mathematics learning. This study uses a qualitative approach with a case study type conducted at SDI Liaganda No. 120 Kepulauan Selayar. Research informants consisted of sixth grade students as the main informants and two mathematics teachers as key informants. Data collection techniques were carried out through interviews, observations, and documentation, then analyzed descriptively qualitatively. The results of the study indicate that: (1) the transformation of social values occurs through group interactions, student activeness, reflection and presentations, and the role of teachers as facilitators; (2) the application of PBL has a positive impact on students' understanding of social values, marked by an increase in understanding of the meaning of social values, changes in social attitudes, empathy and tolerance, and social communication skills; (3) supporting factors include a conducive learning environment and the role of teachers, while inhibiting factors include differences in student abilities and characters as well as material difficulties and group dynamics.

Keywords: Problem Based Learning, social values, mathematics learning, social interaction, students' social understanding

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INTRODUCTION

Learning mathematics aims not only to master cognitive skills but also to develop 21st-century competencies such as critical thinking, creativity, and problem-solving skills. The Problem-Based Learning (PBL) model has been identified in various studies as an effective method for helping students develop higher-order thinking skills and social skills such as collaboration and communication (Yulita, Situmorang, Panjaitan & Manik, 2023). In Indonesia, the impact of PBL is often studied in the context of learning outcomes and higher-order thinking skills, but studies that explicitly examine the transformation of social values as a core component are still relatively few (Pitiriyani, Sundayana & Maryati, 2024).

Amidst globalization and advances in educational technology, enhancing social interaction, tolerance, empathy, and cooperation among students is becoming increasingly important as part of character education. For example, PBL not only improves academic performance but also students' social-collaborative activities (Sindoro, 2025). Education today is expected to cultivate students who are not only academically capable but also possess strong social character and are able to live together in diversity (Pitiriyani et al., 2024).

Although research on PBL has shown that it improves mathematics learning outcomes in elementary schools (Mahagia, Goni & Rorimpandey, 2022), few studies have measured specific changes in social values—such as empathy, tolerance, and responsibility—in mathematics classrooms. Most studies focus on academic aspects or higher-order thinking, such as critical thinking skills (Sindoro, 2025) or cognitive learning outcomes (Manggalastawa, 2023).

In many elementary schools in Indonesia, mathematics teaching methods remain conventional, lacking a learning design that intentionally instills social values. Teachers often focus on mastery of material and practice problems, rather than on group work, social reflection, or value discussions (Pradana, 2024). This results in social values often appearing unsystematically, if at all, and there is no clear documentation or measurement of how students are changing in terms of social values.

At SDI Liaganda No. 120, Selayar Islands, as a school located in an island region, local challenges include limited resources, heterogeneous student socioeconomic backgrounds, and sometimes difficult access to up-to-date materials or teacher training. Small class sizes and sub-optimal learning facilities contribute to less-than-optimal student interaction and collaboration.

Initial observations at this school indicate that mathematics learning activities primarily involve lectures and individual practice, with few group activities or discussions, and virtually no post-learning reflection on social values. Values such as responsibility for group assignments, tolerance for peer mistakes, and good mathematical communication are rarely explicitly addressed in the teaching process.

The critical point is that the transformation of social values in mathematics classes through PBL occurs only incidentally or informally, not as a systematically designed and evaluated component. Do teachers design PBL stages with explicit instructions for collaboration, value discussions, reflection, and group responsibility? Without them, social values will not develop optimally.

Furthermore, there are measurement challenges: how to observe and measure changes in students' social values—using valid and reliable indicators—before and after PBL? Are there any real differences in social values; and which factors (teachers, classroom environment, students' prior abilities, school culture) influence them?

This study aims to analyze the transformation of students' social values through the application of the PBL model in mathematics learning at SDI Liaganda No. 120 Kepulauan Selayar. The specific objectives are: (1) to describe how social values such as cooperation, tolerance, empathy, responsibility, and communication emerge and change during the PBL stages; (2) to identify facilitating and inhibiting factors in the transformation of social values; (3) to assess the impact of the transformation of social values on students' social interactions in mathematics classes.

The benefits of this research are both theoretical and practical. Theoretically, this study will complement the character education literature in Indonesia with empirical data on the transformation of social values directly linked to the stages of PBL and mathematics learning in elementary schools. Practically, the findings can help teachers at SDI Liaganda No. 120 design lesson plans and PBL activities that better emphasize social values, as well as assist schools and local policymakers in supporting learning that facilitates social character.

METHOD

This study employed qualitative research, an approach oriented toward an in-depth understanding of social phenomena in their natural context. Qualitative research emphasizes the meaning, processes, and perspectives of the subjects studied rather than simply numbers or statistical data (Sugiyono, 2020). Its primary focus is on exploring how students experience the transformation of social values through involvement in Problem-Based Learning (PBL) in mathematics. Therefore, this study is not intended to test hypotheses or generate numerical generalizations, but rather to understand the subjective meanings experienced by students, teachers, and the school environment.

The characteristics of qualitative research are highly relevant to the focus of this study because it places the researcher as the primary instrument, data is collected in natural

settings, and analysis is conducted inductively (Moleong, 2021). Through this process, researchers can capture the social dynamics that emerge in the classroom during PBL, such as interactions, dialogue, collaboration, and student reflection. This aligns with the research objective of understanding the transformation of social values contextually and comprehensively.

The approach used in this research is a case study, which is a qualitative research approach that focuses on an in-depth study of a particular case in a real-life context. According to Creswell & Poth (2018), a case study aims to intensively explore a bounded system, whether in the form of individuals, groups, programs, or activities, using various data sources. In the context of this research, the case study approach is used to in-depth examine the implementation of the Problem Based Learning (PBL) model in mathematics learning and the transformation of students' social values at SDI Liaganda No. 120 Kepulauan Selayar as a unified educational case.

RESULT AND DISCUSSION

Transformation of social values in the PBL model of mathematics learning.

a. Group Interaction as a Medium for Transforming Social Values

Research findings indicate that group interaction in Problem-Based Learning (PBL) not only serves as a learning strategy but also serves as a primary mechanism for transforming students' social values. The interactions that occur through discussion, assignments, and collaborative problem-solving demonstrate that social values develop through students' direct experiences within the group. This suggests that learning involving intensive social activities is more effective in shaping social behavior than individual learning (Warini, 2023). Thus, group interaction in PBL provides a concrete space for students to practice social values within the learning context.

Theoretically, these findings align with Albert Bandura's Social Learning Theory, which emphasizes that learning occurs through observation and interaction with the social environment. In group activities, students observe peer behaviors such as cooperation, mutual assistance, and effective communication, then imitate them in similar situations (Sundari, 2025). This process demonstrates that social interaction is a primary means of shaping student behavior. Therefore, group interaction in PBL not only facilitates academic learning but also serves as an effective social learning medium.

Furthermore, the concept of reciprocal determinism in Bandura's theory explains that behavior, the environment, and individuals mutually influence one another. In the context of PBL, students are not only influenced by the group environment but also shape that environment through their interactions (Mudaris, 2025). This is evident in how students help each other, discuss, and manage differences of opinion collectively. Repeated interactions reinforce positive social behavior, so that social values develop into ingrained habits within students.

When analyzed using Thomas Lickona's Values Education Theory, group interactions in PBL demonstrate an integration of moral knowing, moral feeling, and moral action. Students not only understand the importance of cooperation (moral knowing), but also experience its benefits in completing group assignments (moral feeling), and ultimately put it into practice in real life (moral action) (Trismayanti, 2026). This demonstrates that group interactions provide a comprehensive learning experience, encompassing not only cognitive aspects but also affective and behavioral aspects.

These findings also indicate a shift in student learning patterns, from individualistic to more collective. Through group interactions, students learn that success is determined not only by individual ability but also by the ability to collaborate with others. This change is crucial in shaping students' social character from an early age, as they become accustomed to interacting, sharing tasks, and helping each other in groups (Ambriyani, 2025). Thus, PBL learning not only improves academic understanding but also fosters students' social awareness.

Furthermore, group interactions in PBL play a role in developing deeper social awareness, such as empathy and tolerance. When students become accustomed to helping friends and respecting differences of opinion, they begin to understand the importance of social relationships in everyday life. This demonstrates that social values are not only taught but also formed through real-life experiences in group interactions (Warini, 2023). Thus, the learning process becomes more meaningful because students experience these values directly.

Based on the overall discussion, it can be concluded that group interaction in PBL is an effective medium for transforming students' social values. This finding reinforces Bandura's theory, which emphasizes the importance of social interaction in the learning process, and Lickona's theory, which emphasizes the importance of practicing values in real life. Therefore, PBL-based learning can be positioned as a learning model that not only develops academic abilities but also shapes students' social character in a sustainable manner.

b. Students' Active Role in Building Social Values

Research findings indicate that student engagement in Problem-Based Learning (PBL) plays a crucial role in building and transforming social values. This engagement is evident not only in student engagement in completing assignments but also in their participation in discussions, their courage to express opinions, and their initiative to help their peers. This demonstrates that learning that provides space for active participation can encourage students to learn not only cognitively but also socially. Thus, student engagement is the primary gateway to the formation of social values in the learning process (Hidayat, 2023).

From Bandura's Social Learning Theory perspective, student engagement in groups strengthens the observational learning process, where students not only observe their peers' behavior but also directly practice it in interactions. Active students tend to serve as role models for others in the group, allowing positive behaviors such as cooperation, communication, and responsibility to spread naturally within the learning group (Suryani, 2022). This demonstrates that student engagement not only impacts the individual but also influences the overall social dynamics of the group. In other words, student engagement serves as a catalyst in the process of social value formation.

Furthermore, within the framework of reciprocal determinism, student engagement and the learning environment mutually influence each other. Active students create a lively group atmosphere, while a positive group atmosphere encourages other students to participate. This demonstrates that student engagement does not emerge in isolation but is formed within dynamic social interactions within the classroom (Yuliana, 2024). Therefore, PBL learning, which emphasizes active participation, is highly relevant in building a learning environment conducive to students' social development.

When analyzed using Lickona's Values Education Theory, student engagement in PBL reflects the integration of cognitive, affective, and behavioral aspects in value formation. When students actively discuss and help their peers, they not only understand the value of cooperation (moral knowing), but also feel its importance (moral feeling), and ultimately put it into practice (moral action) (Anggraeni, 2022). This demonstrates that student engagement acts as a bridge between value knowledge and real-life practice. Thus, learning becomes more meaningful because values are not only understood but also directly experienced.

These findings also indicate that student engagement contributes to the development of self-confidence and social communication skills. Students who actively participate in discussions and presentations tend to be more confident in expressing their opinions and are more open to the views of others. This is crucial in shaping students' social character, particularly in their ability to interact and collaborate with others (Pradana, 2024). Thus, student engagement impacts not only the learning process but also the overall development of their social personality.

Furthermore, student engagement is also linked to the development of empathy and social awareness. When students actively help friends experiencing difficulties, they learn to

understand the plight of others and respond with concrete actions. This demonstrates that student engagement is not only individual but also has a strong social dimension (Fitriani, 2021). Therefore, PBL learning, which demands active involvement, can encourage students to become more caring and responsive individuals to their social environment.

Based on the overall discussion, it can be concluded that students' active role in PBL learning is a key factor in developing social values. This active participation not only strengthens students' understanding of the material but also encourages the development of positive social behavior through direct interaction. This finding reinforces the view that student-centered learning that emphasizes active participation is more effective in shaping character than passive learning. Therefore, student active participation needs to be continuously encouraged as part of a learning strategy oriented toward developing social values.

c. Reflection and Presentation as Strengtheners of Social Values

Research findings indicate that reflection and presentation activities in Problem-Based Learning (PBL) not only serve as the final stage of learning, but also play a crucial role in reinforcing the social values formed during the learning process. At this stage, students not only present the results of their group work but also learn to communicate ideas, receive feedback, and evaluate their attitudes during collaboration. These activities encourage students to be more aware of the social behaviors they display during learning. Thus, reflection and presentation become important tools for deeper internalization of social values (Pradana, 2024).

From Bandura's Social Learning Theory perspective, presentations provide students with opportunities to demonstrate social behavior that can be observed by others. When students speak in front of the class, demonstrate cooperation, and respect the opinions of others, they indirectly serve as role models for their peers. This process reinforces observational learning, where other students learn through observing the behavior displayed (Suryani, 2022). Thus, presentations serve not only as a means of conveying results but also as a medium for disseminating positive social behaviors within the classroom.

Furthermore, reflection activities provide students with a space to more consciously evaluate their learning experiences. From Bandura's perspective, reflection can be linked to the process of self-regulation, where individuals observe, assess, and improve their own behavior (Yuliana, 2024). Through reflection, students begin to realize how they interact in groups, whether they are working well together or whether certain attitudes need to be improved. This process is crucial in developing sustainable social awareness. Thus, reflection serves not only as an evaluation of learning but also as a means of student self-development.

When analyzed through Lickona's Theory of Values Education, reflection and presentation activities demonstrate reinforcement of the three main dimensions of values education: moral knowing, moral feeling, and moral action. In presentations, students demonstrate moral action through courageous speech and respect for others. Meanwhile, in reflection, students develop moral knowing and moral feeling because they understand and feel the importance of social values in group success (Anggraeni, 2022). This demonstrates that reflection and presentation play a role in strengthening the integration of students' moral knowledge, feelings, and actions.

These findings also indicate that presentation activities significantly increase student self-confidence. Previously passive students become more confident in speaking in front of the class and expressing their ideas. This increased self-confidence not only impacts academic aspects but also students' social skills in interacting with others. This aligns with research showing that active involvement in group communication can improve students' social skills and self-confidence (Hidayat, 2023). Thus, presentations are an important tool in shaping students' social character.

Furthermore, reflection activities help students understand that learning success is determined not only by the final outcome but also by the interaction process that occurs

during learning. Students begin to realize that cooperation, tolerance, and communication are essential to group success. This awareness indicates that social values have begun to be internalized within students, not just as rules but as necessities for interaction (Fitriani, 2021). Thus, reflection plays a role in deepening students' understanding of social values.

Based on the overall discussion, it can be concluded that reflection and presentation in PBL learning serve to reinforce students' social values. These activities not only help students understand social values but also reinforce their practice in everyday life. This finding supports Bandura's theory on the importance of modeling and self-regulation, as well as Lickona's theory on the integration of cognitive, affective, and behavioral aspects in values education. Therefore, reflection and presentation need to be positioned as an important part of learning oriented towards building students' social character.

d. The Role of Teachers as Facilitators of Social Values

Research findings indicate that teachers play a highly strategic role as facilitators in transforming students' social values through Problem-Based Learning (PBL). Teachers no longer act as information centers, but rather as guides who create learning conditions that enable students to interact, discuss, and collaborate actively. In practice, teachers consciously build a conducive classroom atmosphere, provide guidance when needed, and reinforce positive social behaviors that emerge during learning. This demonstrates that the success of PBL in shaping social values is inseparable from the quality of the teacher's role in managing the learning process. Thus, teachers are key actors in ensuring that social values not only emerge but also develop consistently (Hidayat, 2023).

When analyzed through Bandura's Social Learning Theory, the teacher's role as a facilitator is closely related to the modeling function. Teachers not only provide instructions but also serve as concrete examples of social behavior, communication, and problem-solving. When teachers demonstrate empathy, patience, and polite communication, students will observe and imitate these behaviors in group interactions (Suryani, 2022). This process reinforces social learning because students learn through direct observation of authority figures in the classroom. Thus, teachers serve as the primary source of social behavior formation through modeling.

These findings also demonstrate that teachers play a crucial role in managing diverse group dynamics. By forming heterogeneous groups and providing clear guidance, teachers help students learn to interact with diverse characters and abilities. Furthermore, teachers play a role in resolving conflicts that arise during discussions using an educational and persuasive approach. This is crucial because healthy social interactions don't always develop naturally; they need to be guided to maintain a positive trajectory (Fitriani, 2021). Therefore, the role of teachers is crucial in maintaining the quality of social interactions in learning.

Furthermore, teachers also play a role in reinforcing positive social behaviors demonstrated by students. Teacher appreciation, whether in the form of praise or feedback, can increase students' motivation to maintain those behaviors. This aligns with the principle of reinforcement in Bandura's theory, which states that behaviors that receive a positive response tend to be repeated (Suryani, 2022). Therefore, the teacher's role in providing reinforcement is a crucial factor in shaping students' social habits.

Based on the overall discussion, it can be concluded that teachers play a crucial role as facilitators in transforming students' social values through PBL. Teachers not only manage learning technically but also create a social environment that supports students' character development. This finding reinforces Bandura's theory on the importance of modeling and the social environment in the learning process, as well as Lickona's theory on the importance of integrating values into educational practices. Therefore, the quality of the teacher's role is a key factor in the success of PBL-based learning in shaping students' social values.

The impact of learning mathematics using the PBL method on students' understanding of social values.

a. Increasing Understanding of the Meaning of Social Values

Research findings indicate that the application of Problem-Based Learning (PBL) in mathematics learning has a significant impact on improving students' understanding of the meaning of social values. This understanding is no longer abstract or merely rote, but develops into a contextual and experience-based understanding. Students are able to connect values such as cooperation, responsibility, and tolerance to the real-life activities they undertake during learning. This demonstrates that learning involving direct experience is more effective in developing an understanding of values than a purely theoretical approach (Hidayat, 2023).

When analyzed using Lickona's Values Education Theory, students' increased understanding of social values indicates development in moral knowing. Students not only learn about cooperation and responsibility, but also begin to grasp their meaning in real-life contexts. This understanding is then reinforced by the emotional experiences (moral feelings) they experience while working in groups, such as the joy of successful collaboration or the feeling of appreciation from their peers (Anggraeni, 2022). Thus, understanding of social values does not stand alone but is integrated with students' emotional experiences.

These findings also indicate that the understanding of social values formed through PBL tends to be more durable and applicable. Students not only understand these values in the learning context but also begin to apply them in everyday interactions. This aligns with the view that experiential learning has a stronger impact on developing in-depth understanding than passive learning (Pradana, 2024). Thus, PBL contributes to building an understanding of social values that is not only cognitive but also practical.

Furthermore, the increased understanding of social values also indicates a shift in students' thinking from being self-centered to focusing more on the common good. Students begin to realize that success in learning is determined not only by individual abilities but also by the ability to collaborate with others. This demonstrates that the understanding of social values developed through PBL has a strong collective dimension (Fitriani, 2021). Thus, PBL not only shapes individual understanding but also fosters students' broader social awareness.

Based on the overall discussion, it can be concluded that the implementation of PBL has a significant impact on improving students' understanding of the meaning of social values. This understanding is formed through social interactions, direct experiences, and the reflection process that occurs during learning. This finding reinforces Bandura's theory on the importance of social interactions in the learning process, as well as Lickona's theory on the importance of integrating knowledge, feelings, and actions in values education. Therefore, PBL can be positioned as an effective learning model in developing students' understanding of social values in a deep and sustainable manner.

b. Significant Changes in Social Attitudes

Research findings indicate that the application of Problem-Based Learning (PBL) in mathematics learning not only improves students' understanding of social values but also significantly changes students' social attitudes. These changes are evident in students' increased courage in interacting, openness to others' opinions, and the development of cooperative attitudes within groups. This demonstrates that learning involving active interaction can directly influence students' social behavior. Thus, PBL not only shapes students' thinking but also changes their behavior in social environments (Hidayat, 2023).

From Lickona's Values Education Theory perspective, the changes in social attitudes indicate developments in moral action, namely students' ability to practice values in concrete actions. Students not only understand the importance of respecting others or working together, but also begin to demonstrate these behaviors in everyday interactions (Anggraeni, 2022). This demonstrates that PBL learning can connect understanding of values with direct practice. Therefore, changes in social attitudes are an indicator that values have been

internalized within students.

These findings also indicate that changes in students' social attitudes occur gradually and are influenced by repeated learning experiences. Students who were initially passive began to speak up, while those who were previously indifferent began to show concern for their peers. These changes demonstrate that an interactive learning environment plays a crucial role in shaping students' social attitudes (Fitriani, 2021). Thus, PBL serves as a learning space that allows students to experience the process of social change naturally.

Furthermore, changes in social attitudes are also related to students' increased ability to manage social interactions. Students become better able to control their emotions, accept differences of opinion, and find solutions together in groups. This indicates that changes in social attitudes occur not only in behavioral aspects but also in students' self-control and social maturity (Pradana, 2024). Thus, PBL learning contributes to developing students' more mature social character.

Based on the overall discussion, it can be concluded that the implementation of PBL has a significant impact on changing students' social attitudes. This change occurs through social interactions, observing peer behavior, and reinforcement from the learning environment. This finding supports Bandura's theory on the importance of the social environment in shaping behavior, as well as Lickona's theory on the importance of practicing values in real life. Therefore, PBL can be positioned as an effective learning model for encouraging sustainable changes in students' social attitudes.

c. Increased Empathy and Tolerance

Research findings indicate that the application of Problem-Based Learning (PBL) in mathematics learning significantly contributes to improving students' empathy and tolerance. In group-based learning, students are exposed to diverse social situations, such as differences in abilities, thinking styles, and backgrounds. This requires students not only to interact but also to understand and respect others in the group. This demonstrates that PBL can create social experiences that naturally encourage the development of empathy and tolerance in students (Fitriani, 2021).

When analyzed using Bandura's Social Learning Theory, increased empathy and tolerance can be explained through the process of observing and imitating social behavior. Students who observe peers demonstrating caring, helpfulness, and respect for others tend to imitate these behaviors in similar interactions (Suryani, 2022). This process demonstrates that empathy and tolerance are not only learned directly from teachers but also developed through social interactions between students. Thus, the group environment in PBL is an important medium for developing more positive social behavior.

These findings also indicate that increased empathy and tolerance impact the quality of students' social interactions. Students become more patient in dealing with differences, more open to others' opinions, and more concerned about the well-being of their peers in the group. This demonstrates that empathy and tolerance play a crucial role in creating harmonious social interactions in learning (Pradana, 2024). Thus, PBL not only shapes individual attitudes but also improves the quality of social relationships among students.

Furthermore, increased empathy and tolerance are also associated with reduced egocentricity within the group. Students begin to understand that group success requires the contribution and cooperation of all members. This demonstrates a shift in students' perspectives, from being self-centered to being more collective (Hidayat, 2023). Thus, empathy and tolerance are essential foundations for building students' social awareness in learning.

Based on the overall discussion, it can be concluded that the implementation of PBL has a significant impact on increasing students' empathy and tolerance. This process occurs through social interactions, observing peer behavior, and direct experience in working together. These findings reinforce Bandura's theory on the importance of the social environment in shaping behavior, as well as Lickona's theory on the importance of the

emotional dimension in values education. Therefore, PBL can be positioned as an effective learning model in sustainably developing students' empathy and tolerance.

d. Development of Students' Social Communication

Research findings indicate that the implementation of Problem-Based Learning (PBL) in mathematics learning has a significant impact on students' social communication development. This development is evident not only in students' increased confidence in speaking, but also in their ability to convey ideas clearly, listen to others' opinions, and respond politely. This demonstrates that group interaction-based learning can create an active and meaningful communication space for students. Thus, PBL serves as an effective tool for developing students' social communication skills naturally and sustainably (Pradana, 2024).

When analyzed through Bandura's Social Learning Theory, students' social communication development can be understood as the result of observational learning and social interactions within groups. Students learn how to communicate by observing and imitating how peers or teachers express opinions, ask questions, and respond to discussions (Suryani, 2022). This process demonstrates that communication is not only learned through instruction but also through direct experience in social settings. Therefore, interaction in PBL is a crucial medium for developing students' communication skills.

These findings also indicate that the development of social communication contributes to improving the quality of interactions between students. Students become more open in discussions, better able to express their opinions in a structured manner, and have a greater appreciation for the two-way communication process. This is crucial for building healthy social relationships in learning (Hidayat, 2023). Thus, social communication serves not only as a means of conveying information but also as a means of building harmonious social relationships.

Furthermore, presentation activities in PBL provide students with broader communication experiences. Students communicate not only in small groups but also in front of the class, allowing them to learn to adapt to different communication situations. This demonstrates that PBL can comprehensively develop students' communication skills, both in informal and formal contexts (Fitriani, 2021). Thus, students' social communication development becomes more mature and flexible.

Based on the overall discussion, it can be concluded that the implementation of PBL has a significant impact on students' social communication development. This development occurs through intensive social interaction, observation of communication behavior, and direct experience in discussions and presentations. These findings reinforce Bandura's theory on the importance of social interaction in the learning process, as well as Lickona's theory on the importance of integrating values into communication practices. Therefore, PBL can be positioned as an effective learning model in developing students' social communication skills comprehensively.

Factors that influence the impact of mathematics learning using the PBL method on students' social understanding.

a. Supporting Factors

1. Conducive Learning Environment

Research findings confirm that a conducive learning environment is a crucial prerequisite for the effectiveness of Problem-Based Learning (PBL) in enhancing students' understanding of social values. This environment encompasses not only the physical environment but also the active, open, and supportive psychosocial climate of the classroom. In such an environment, students feel safe participating, experimenting, and even making mistakes without fear of judgment. This environment allows for intensive and meaningful

social interactions, allowing values such as cooperation, responsibility, and mutual respect to develop naturally. In other words, the quality of the learning environment determines the quality of the social experiences students experience during PBL (Hidayat, 2023).

From the perspective of Lickona's Values Education Theory, a conducive environment allows for the integration of moral knowing, moral feeling, and moral action to occur fully. Students understand the importance of cooperation (knowing), experience its benefits in a warm group atmosphere (feeling), and then put it into practice in joint tasks (action) (Anggraeni, 2022). When a culture of mutual assistance becomes a classroom habit, the affective dimension (feelings of being appreciated and accepted) strengthens students' commitment to acting in accordance with values. Thus, the classroom environment is not merely a forum, but a medium for effective internalization of values.

These findings also indicate that peer support is a crucial component of a conducive learning environment. Horizontal interactions between students accelerate understanding because the language used is more familiar and the experiences shared are more equitable. This support reduces learning anxiety, increases participation, and expands opportunities to practice social values. Similarly, research shows that collaborative learning increases engagement and the quality of interactions, ultimately deepening students' understanding of social values (Pradana, 2024).

Furthermore, the culture of mutual assistance established in the classroom serves as a social norm that binds behavior. This norm reduces egoistic tendencies and encourages a collective orientation, where success is understood as a shared outcome. This shift in orientation is crucial at the elementary school level because it lays the foundation for the development of empathy and social responsibility later in life (Fitriani, 2021). In other words, when "helping" becomes a habit, social values are no longer merely instructional but become everyday practices.

Based on the overall analysis, it can be concluded that a conducive learning environment plays a key supporting factor in the success of PBL in improving students' understanding of social values. An active, supportive, and inclusive environment strengthens Bandura's social learning process and Lickona's integration of value dimensions. Therefore, efforts to strengthen PBL need to be accompanied by classroom climate engineering—building positive interaction norms, strengthening peer support, and fostering a culture of mutual assistance—to ensure optimal and sustainable impact on understanding of social values.

2. The Role of Teachers as Facilitators

Research findings indicate that the teacher's role as a facilitator is a key factor in strengthening the impact of Problem-Based Learning (PBL) on students' understanding of social values. Teachers not only manage the learning process but also actively create conditions that enable students to interact, discuss, and develop optimal social attitudes. This role is evident in the way teachers guide students, direct discussions, and ensure each student has the opportunity to participate. Thus, teachers function as the primary driving force, ensuring the learning process continues along an educational and meaningful path (Hidayat, 2023).

From the perspective of Bandura's Social Learning Theory, the teacher's role as a facilitator is closely related to the modeling function. Teachers serve as role models observed and imitated by students in terms of attitudes, communication styles, and social problem-solving. When teachers demonstrate patience, respect students' opinions, and provide positive responses, students tend to imitate these behaviors in group interactions (Suryani, 2022). This demonstrates that teachers not only teach social values explicitly but also instill them through concrete examples presented in the learning process.

Furthermore, the concept of reinforcement in Bandura's theory also explains that student behavior is greatly influenced by the teacher's response. When teachers appreciate

positive behaviors such as cooperation, empathy, and good communication, students will be encouraged to repeat those behaviors (Yuliana, 2024). Conversely, if teachers are able to manage negative behaviors with an educational approach, students will learn to improve their attitudes without feeling pressured. Thus, the teacher's role in providing reinforcement is a crucial factor in shaping students' social habits.

From Lickona's Values Education Theory perspective, the teacher's role as a facilitator is crucial in integrating the dimensions of moral knowing, moral feeling, and moral action. Teachers not only explain social values but also guide students to experience and practice them in real-life interactions. Through the direction and guidance provided, students learn to understand the importance of cooperation, experience its benefits in groups, and put it into practice (Anggraeni, 2022). This demonstrates that teachers act as a bridge between value knowledge and value practice in students' daily lives.

These findings also demonstrate that teachers play a crucial role in managing complex group dynamics. In discussion-based learning, differences of opinion and potential conflict are inevitable. Teachers who are able to manage conflict constructively will help students learn how to resolve differences in positive ways. This is crucial in developing students' tolerance and social skills in dealing with diverse situations (Fitriani, 2021). Thus, the role of teachers is not only as academic facilitators but also as social mediators in learning.

Furthermore, the teacher's role in providing motivation is also a crucial factor in increasing student engagement. Motivation provided by teachers, both verbally and through personal approaches, can encourage students to be more confident and willing to participate. This demonstrates that the teacher's presence influences not only the cognitive aspects but also the psychological aspects of students' learning (Pradana, 2024). Therefore, teacher motivation is key to creating active and positive social interactions in the classroom.

b. Inhibiting Factors

1. Differences in Student Abilities and Characters

Research findings indicate that differences in student abilities and character are a major obstacle to implementing Problem-Based Learning (PBL) in mathematics. Diverse levels of understanding, activeness, and individual responsibility lead to imbalanced group dynamics. In practice, some students tend to be passive, contribute less, and rely on other members, while others take a dominant role in discussions. This situation indicates that imbalanced participation can reduce the effectiveness of social interactions, which should be at the heart of PBL learning. Thus, differences in student character pose a challenge to creating truly collaborative learning (Hidayat, 2023).

When analyzed using Bandura's Social Learning Theory, this condition can be explained by the observational learning process, which does not always produce positive effects if the group environment is unbalanced. Passive students tend to simply observe without actively imitating social behavior, resulting in a less than optimal social learning process (Suryani, 2022). Conversely, dominant students can become less than ideal role models if they do not provide space for other members to participate. This demonstrates that the quality of social models within a group is crucial to the success of the social learning process. Therefore, the diversity of student characteristics can become an obstacle when not balanced with appropriate group management.

Furthermore, from a reciprocal determinism perspective, student behavior, the group environment, and individual circumstances influence each other reciprocally. When a student is less active or irresponsible, this can affect the overall group atmosphere, thereby reducing the participation of other members (Yuliana, 2024). This condition creates a less conducive learning environment, where social interactions are less than optimal. Thus, differences in ability and character impact not only the individual but also the collective group dynamics.

Furthermore, differences in personality, such as passive and dominant tendencies, also affect the quality of communication within groups. Passive students tend not to express their

opinions, while dominant students tend to dominate the conversation. This situation hinders balanced two-way communication, which should be the primary goal of discussion-based learning (Pradana, 2024). Thus, unequal social interactions can reduce students' opportunities to develop optimal social skills.

Based on the overall discussion, it can be concluded that differences in student abilities and character are inhibiting factors in the implementation of PBL in mathematics learning. These obstacles arise from imbalanced participation, lack of individual responsibility, and differences in interaction styles within groups. These findings reinforce Bandura's theory on the importance of a balanced social environment in the learning process, as well as Lickona's theory on the importance of practicing values in real-life situations. Therefore, teachers need to play a more active role in managing group dynamics so that each student can participate optimally and social values can develop evenly.

2. Material Difficulties and Group Dynamics

Research findings indicate that the difficulty of mathematics material and group dynamics are significant obstacles to the implementation of Problem-Based Learning (PBL). The abstract nature of mathematics material, which requires a strong conceptual understanding, often makes it difficult for some students to follow the learning flow. This situation impacts the group discussion process, as not all students are able to contribute equally to problem-solving. As a result, interactions that should be active and collaborative become less than optimal. Thus, material complexity is one factor influencing the effectiveness of PBL in developing students' understanding of social values (Pradana, 2024).

When analyzed through Bandura's Social Learning Theory, material difficulties can hinder observational learning because students who don't yet understand the concepts tend to withdraw from group interactions. They become passive observers, often without imitating or actively participating in discussions (Suryani, 2022). This results in the social learning process being suboptimal because the interactions do not involve all group members. Therefore, understanding the material is a crucial prerequisite for supporting student social engagement in PBL.

Furthermore, within the framework of reciprocal determinism, material difficulties not only affect individuals but also impact the group environment as a whole. When some students experience difficulties, discussions are hampered, the pace of group work slows, and social interactions become less effective (Yuliana, 2024). This situation suggests that cognitive barriers can directly impact the social dynamics of learning. Thus, material difficulties are not only an academic issue but also a challenge in managing group interactions.

From Lickona's Theory of Values Education, this obstacle indicates that the process of internalizing social values can be disrupted when students are unable to fully understand the learning context. Students who experience material difficulties tend to focus on completing technical tasks, thus paying less attention to social aspects such as cooperation and communication (Anggraeni, 2022). This suggests that the success of values education depends heavily on a balance between cognitive understanding and social experience. Therefore, material difficulties can hinder the integration of moral knowing, moral feeling, and moral action.

CONCLUSION

Problem-Based Learning (PBL) mathematics learning has been proven to transform and strengthen students' understanding of social values through problem-solving activities, group work, discussion, and reflection. Through this process, students not only understand values such as cooperation, responsibility, tolerance, empathy, and communication theoretically, but also practice them directly in learning. The successful implementation of PBL is supported by a conducive learning environment and the role of teachers as facilitators who guide and reinforce social values. However, its implementation still faces obstacles such as differences in student abilities and characters, imbalanced participation in groups, material complexity, and time constraints. Nevertheless, PBL remains effective in integrating academic

and social aspects, thereby forming a deeper and more sustainable understanding of students' social values.

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