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The Effectiveness of Project-Based Learning in Enhancing Social Competence among Elementary School Students

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Abstract

Social skills are essential to 21st-century education, but many elementary school students in Indonesia still demonstrate low social skills due to the dominance of conventional teacher-centered learning approaches. This study aims to analyze the effect of Project-Based Learning (PjBL) on improving elementary school students' social skills and identify the dimensions of social skills that are most influenced by this approach. The study used a quasi-experimental design involving 80 fifth-grade students divided into an experimental group (PjBL) and a control group (conventional learning). The measurement instrument was a social skills test covering six dimensions: cooperation, communication, conflict resolution, empathy, decision-making, and leadership. Data analysis was conducted using t-tests after validity, reliability, normality, and homogeneity were confirmed. The results showed statistically significant differences ($p < 0.05$) between the two groups in all social skill dimensions, with the experimental group showing higher average scores. The dimensions of empathy and leadership showed the highest increases. These findings support social constructivist theory and strengthen the argument that collaborative, contextual learning can effectively develop students' social competencies. The implications of this study include the need for systematic adoption of PjBL in elementary schools as a strategy to support character-building and holistic learning in line with national curriculum requirements and 21st-century social needs.

INTRODUCTION

In the 21st century, the global education system no longer focuses solely on academic achievement but is also required to develop non-cognitive competencies, such as collaboration, communication, empathy, and leadership (Kalla et al., 2022; Molyneux et al., 2023). These social skills are essential for supporting students' holistic development and long-term success in academic, professional, and social life (Delle-Vergini et al., 2024). At the primary education level, the formation of social skills from an early age is the foundation for character education, emotional well-being, and readiness for lifelong learning. However, despite curriculum reforms and the growing global discourse on comprehensive education, learning practices in many developing countries, including Indonesia, remain teacher-centered and emphasize cognitive aspects alone (Diego-Mantecón et al., 2021; Sáez-López et al., 2022).

Various national surveys have shown an increase in the number of elementary school students experiencing difficulties in basic social skills, such as cooperation, conflict resolution, and empathy. Data from the Ministry of Education and Culture (2023) show that in that year, approximately 39% of elementary school students experienced difficulties in social-emotional aspects, a significant increase from 28% in 2019. This indicates a gap between competency-based curriculum demands and classroom learning realities, which are still dominated by traditional teacher-centered approaches (Hardiansyah et al., 2024). If not addressed seriously, this condition could result in a generation that excels academically but lacks the social skills essential for democratic life, collaborative work, and long-term mental health (Varley et al., 2019).

The urgency of this research lies in the pressing need to respond to the ongoing social skills crisis at the primary education level, which not only impacts the quality of student interactions in the classroom but also has long-term implications for their readiness to face the social dynamics of the 21st century. Despite the growing global attention to the importance of character education and 21st-century competencies, most elementary schools in Indonesia still apply conventional pedagogical approaches that emphasize one-way knowledge transfer without providing sufficient space for meaningful social interaction. However, in an increasingly complex digital society, empathy, collaboration, and conflict resolution are no longer complementary but core competencies that every individual must possess (Al-Jbouri et al., 2023). Furthermore, the increasing number of students facing challenges in social skills over the past five years indicates that current learning strategies are ineffective in addressing children's social-emotional development (Hardiansyah & Mas'odi, 2022).

One pedagogical approach with great potential to bridge this gap is Project-Based Learning (PjBL). This model allows students to learn through direct experience, collaboratively solve real-world problems, and engage in social

interactions in authentic contexts (Hsin & Wu, 2023; Rubtsov & Ulanovskaya, 2020). Within the framework of social constructivism developed by Vygotsky, social interaction in collaborative projects is considered crucial for building children's social competencies. Although PjBL is believed to promote the development of social skills, strong empirical evidence, particularly in the form of quantitative data at the elementary school level in developing countries such as Indonesia, is limited (Ortega-Sánchez & Jiménez-Eguizábal, 2019).

Project-based learning (PjBL) is a potential approach to address these problems. PjBL provides opportunities for students to actively engage in the learning process through collaborative activities, real-world problem-solving, and intensive social interaction (Anugrah et al., 2025; Peng et al., 2022). In this model, students are required to complete projects independently and collaborate with classmates, discuss ideas, receive feedback, and make collective decisions (Siregar et al., 2025; Sormunen et al., 2020). Interactions during this process provide natural stimuli for the development of students' social skills. Thus, implementing PjBL in elementary schools is not only relevant but also strategic in creating a learning environment that supports students' holistic growth (Llorent et al., 2023; Slattery et al., 2023). Although PjBL is theoretically considered capable of promoting social skills, the reality in the field shows that many elementary school students experience difficulties in having healthy and productive social interactions.

This study addresses how the PjBL model can be used as a practical approach to improve elementary school students' social skills. More specifically, this study focused on the following questions: (1) Does PjBL significantly affect elementary school students' social skills? (2) Which dimensions of social skills are most affected by the implementation of PjBL? (3) How do students' social skill levels differ before and after implementing the PjBL model? This study aimed to empirically analyze the effect of Project-Based Learning on elementary school students' social skills. This study also aims to identify the dimensions of social skills (such as communication, cooperation, and empathy) that have undergone significant changes after implementing this learning model in the learning process. Thus, the results of this study are expected to contribute to the development of more effective learning models for fostering students' social competence from the elementary education level.

Previous studies have highlighted the effectiveness of PjBL in improving learning outcomes, student engagement, and conceptual understanding. For example, Hardiansyah and AR (2022) stated that PjBL encourages active student engagement and results in more meaningful learning. Research conducted by Kylliäinen et al. (2020) also confirmed that PjBL provides opportunities to build 21st-century skills, such as collaboration and communication. At the elementary school level, de Mooij et al. (2020) found that implementing PjBL contributed to increased students' social involvement and learning motivation. However, most of

these studies focused on academic outcomes or did not explicitly and structurally measure social skills. A study by Granado-Alcón et al. (2020) mentioned that although PjBL can shape interpersonal skills, quantitative data supporting this are still limited, especially at the elementary school level and in non-Western contexts.

Considering previous findings, gaps in the existing literature can be identified. First, few quantitative studies have specifically measured the effect of PjBL on elementary school students' social skills using experimental or quasi-experimental approaches. Second, existing empirical studies have primarily been conducted at the secondary and higher education levels and in developed countries, thus not fully reflecting the learning dynamics in developing countries such as Indonesia. Third, there are limitations in using standardized instruments to measure social skills, especially in studies linking PjBL to indicators such as empathy, assertiveness, and cooperation. This study aims to address these gaps by presenting a quantitative analysis based on field data from elementary schools using a quasi-experimental approach. In addition, the instruments used in this study were developed based on an internationally validated social skills model, thereby adding value to the measurement accuracy and validity.

The novelty of this study lies in its explicit focus on social skills in the context of elementary schools and the application of PjBL in a local context that has not been widely explored in the global literature. The academic justification for this study is also strengthened by its thematic relevance to national education policies that emphasize the importance of character building and the need for teachers to obtain empirically proven learning models. In addition, the Indonesian local context used in this study contributes significantly to the expansion of the external validity of PjBL, considering that studies from developed countries with different sociocultural contexts still dominate most of the current literature. The empirical findings in this study indicate that PjBL is not merely an alternative learning strategy but a pedagogical approach that significantly impacts the social development of children in elementary school. The implications of this research are far-reaching—for teachers seeking to create collaborative and empathetic classrooms, for policymakers in developing more humanistic curricula, and for researchers aiming to deepen their understanding of data-driven character education.

METHODS

This study used a quantitative approach with a quasi-experimental design to assess the impact of Project-Based Learning (PjBL) on the development of students' social competencies in elementary education. This approach was chosen because it allows researchers to measure the effects of PjBL on an experimental group that receives special treatment (PjBL) and compare it with a control group that does not receive such treatment (Dogara et al., 2020). The population in this study was fifth-grade elementary school students in Pekanbaru. The research sample consisted of

80 students divided into two groups: an experimental group that received project-based learning and a control group that followed conventional learning. The sample selection in this study used a random sampling technique of fifth-grade students in one elementary school in Pekanbaru, with 80 participants divided evenly into experimental and control groups. Although using random sampling internally strengthens inferential validity and reduces the possibility of individual selection bias, several important methodological aspects need to be analyzed further to support the claims of generalization and credibility of the findings of this study. Although the sample was drawn using a random technique, the study was conducted in only one elementary school, and all research activities strictly adhered to ethical standards. Before data collection, informed consent was obtained from the school authorities, classroom teachers, and students' guardians. Participants were informed about the purpose of the study, the voluntary nature of their involvement, and their right to withdraw at any time without any consequences. All student data were anonymized and handled according to research ethics protocols to ensure confidentiality.

To measure students' social skills, this study employed a structured questionnaire (self-assessment instrument) explicitly developed to capture behavioral indicators aligned with key domains of social competence relevant to Project-Based Learning (Granado-Alcón et al., 2020). The questionnaire comprised 25 items representing six core dimensions: cooperation, communication, conflict resolution, empathy, decision-making, and leadership skills. Each item was formulated as a declarative statement (e.g., "I often help my group solve disagreements peacefully") and rated on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). This scale was chosen to avoid central tendency bias and encourage participants to take a clear position in self-evaluating their behaviors. The following table shows the test instruments used to measure students' social skills in the context of project-based learning:

Table 1: Indicators of Social Skills Measured in the Study

Measured Social Skills	**Question Indicator**
Cooperation	Ability to work in a group
Communication	Ability to express ideas and listen actively
Conflict Resolution	Ability to resolve conflicts within a group
Empathy	Ability to understand the feelings of others
Decision Making	Ability to make collective decisions in a group
Leadership	Ability to lead and motivate a group

Before the primary analysis, a social skills questionnaire consisting of 25 statements was validated and tested for reliability. The content and construct validity tests were conducted through assessments by experts in the fields of education and psychology, who gave an average score of > 4.5 (scale of 1–5) across all dimensions, with the highest score on the empathy indicator (4.9), indicating that

the instrument adequately represented essential aspects of social skills. Furthermore, the reliability test using Cronbach's alpha coefficient produced values between 0.80 and 0.88 for all dimensions, indicating excellent internal consistency.

The pre- and post-test data were analyzed in several stages. First, a normality test (Kolmogorov-Smirnov) and a homogeneity of variance test (Levene's test) were conducted to ensure the fulfillment of the assumptions for using parametric tests. All variables had a significance value of > 0.05, indicating that the data were normally distributed and homogeneous. Therefore, hypothesis testing was conducted using an independent sample t-test to compare the differences in mean scores between the experimental (PjBL) and control (conventional learning) groups. This test was chosen because it is appropriate for a quasi-experimental design and aims to test significant differences in social skill improvement between the treatment groups.

RESULTS

The research findings are presented in several sections, comparing the experimental group participating in project-based learning and the control group using a conventional approach. Further analysis will reveal whether there are significant differences in the improvement of social competencies between the two groups.

Table 2. Mean Scores of Student' Social Skills

Dimensions	Pre-Test		Post-Test	
	Experiment	Control	Experiment	Control
Cooperation	64.80	65.20	76.50	69.20
Communication	65.90	66.10	78.20	70.80
Conflict Resolution	63.70	63.90	74.60	67.80
Empathy	66.10	66.50	80.40	72.10
Decision Making	64.00	64.30	75.80	68.50
Leadership	65.40	65.80	79.10	71.20
Mean	65.32	65.63	77.43	69.60

The comparative results presented in Table 1 indicate that implementing Project-Based Learning (PjBL) substantially and positively affected the development of elementary students' social skills across all measured dimensions. While the pre-test scores between the experimental and control groups were relatively balanced, demonstrating baseline equivalency, the post-test outcomes revealed statistically and pedagogically meaningful differences in favor of the experimental group.

Empathy showed the highest increase in the experimental group (from 66.10 to 80.40), a gain of over 14 points, suggesting that sustained collaboration and reflection within project teams fostered deeper emotional awareness and

perspective-taking in students. This result is consistent with Vygotsky's social constructivist theory, which posits that empathy and interpersonal growth are cultivated through guided social interaction in the zone of proximal development (ZPD). Empathy's increase also highlights PjBL's ability to humanize the learning process by positioning students not merely as information receivers but as co-constructors of meaning in relational contexts.

Leadership also recorded a significant gain (from 65.40 to 79.10), likely due to the rotational leadership roles embedded in the project structure, where students were required to initiate group planning, negotiate responsibilities, and coordinate tasks. These findings align with those of Bassachs et al. (2020), who found that PjBL promotes autonomous role-taking and shared accountability, which are critical aspects of early leadership development.

Communication and cooperation improved markedly, reinforcing the notion that repeated peer interactions within structured collaborative tasks enhance students' ability to express ideas, listen actively, and engage in joint problem-solving. The ability to resolve conflicts also increased (63.70 to 74.60), suggesting that the project-based setting provided natural, low-stakes opportunities for students to practice negotiation and compromise—an often overlooked but essential aspect of social-emotional learning.

Although the control group experienced some improvement, the gains were modest (approximately 3–5 points per indicator) and can likely be attributed to maturation or incidental social exposure rather than any intentional instructional design. This contrast further emphasizes the value of PjBL in actively cultivating social competencies rather than relying on passive or incidental development.

Moreover, the consistency of the gains across all six dimensions underscores the holistic nature of PjBL's impact. It does not merely affect one or two areas of social development but engages the full spectrum of interpersonal skills. Pre- and post-intervention testing strengthened the internal validity of these findings, while the clear separation in post-test scores between groups lent credence to the causal role of the instructional model.

Table 3. N-Gain Score of Social Skills by Indicator

Social Skill Indicator	N-Gain Experimental	Category	N-Gain Control	Category
Cooperation	0.32	Moderate	0.11	Low
Communication	0.36	Moderate	0.14	Low
Conflict Resolution	0.30	Moderate	0.10	Low
Empathy	0.42	Moderate	0.17	Low
Decision Making	0.33	Moderate	0.12	Low
Leadership	0.39	Moderate	0.16	Low
Average	0.35	Moderate	0.13	Low

The N-Gain analysis provides a clear quantitative representation of the degree of improvement in students' social skills due to the intervention. The data

show that the experimental group, which was exposed to Project-Based Learning (PjBL), achieved a consistent moderate level of gain (average = 0.35) across all six indicators of social competence. In contrast, the control group, which received conventional instruction, remained in the low-gain category (average = 0.13), indicating minimal progress in their learning.

Among the experimental group, the highest improvement was observed in the empathy indicator (N-Gain = 0.42), followed closely by leadership (0.39), and communication (0.36). These results highlight that PjBL provides learning conditions that naturally foster emotional awareness, perspective-taking and interpersonal initiative. Through collaborative project work, students are placed in situations that require them to understand others' viewpoints, manage group dynamics, and take on rotating leadership roles—conditions rarely present in teacher-centered classrooms.

The consistently low gains in the control group suggest that conventional instructional methods may be insufficient for fostering meaningful improvements in social competence. Because such methods are typically lecture-based and limit student interaction, they offer fewer opportunities for students to actively engage in tasks that require negotiation, empathy, or collective decision-making.

These findings align with previous research (Hardiansyah et al., 2024), emphasizing that social competence does not develop in passive learning environments but requires active situated experiences, such as those offered in PjBL. The moderate gain category in the experimental group also implies that while PjBL is effective, its impact could be further optimized through longer durations, deeper scaffolding, or integration with digital collaborative tools.

Importantly, the N-Gain results confirmed the effectiveness of PjBL and demonstrated that its impact was broad-based, positively affecting all measured dimensions of social competence rather than isolated aspects. This reinforces the view that social skills should be addressed holistically through integrative pedagogical models.

Table 4. Normality Test Results

Measured Social Skills	Kolmogorov-Smirnov	Sig (p-value)	Description
Cooperation	0.15	0.200	Normal
Communication	0.12	0.200	Normal
Conflict Resolution	0.13	0.200	Normal
Empathy	0.11	0.200	Normal
Decision Making	0.14	0.200	Normal
Leadership	0.16	0.200	Normal

The normality test results conducted using the Kolmogorov-Smirnov test indicated that all data collected for each social skill measured had a normal distribution. The significance values (p-values) for all social skills, such as cooperation, communication, conflict resolution, empathy, decision-making, and

leadership, were > 0.05, indicating that the data distribution for each variable was not significantly different from the normal distribution. In other words, the data for all variables followed a typical distribution pattern and did not show significant deviations that could affect the results of further analysis. With this normally distributed data, the normality test results provide a strong foundation for using further parametric statistical tests, such as the t-test, to compare experimental and control groups, which are more appropriate for normal data than non-parametric tests. Therefore, the normality test results strongly support the smooth progression of the data analysis in this study. As a result, the researcher can proceed with parametric statistical tests to test the research hypotheses, ensuring that the conclusions drawn from the analysis are valid.

Table 5. Homogeneity Test Results

Measured Social Skills	Levene's Test	Sig (p-value)	Description
Cooperation	1.02	0.315	Homogen
Communication	0.94	0.332	Homogen
Conflict Resolution	1.11	0.303	Homogen
Empathy	0.97	0.320	Homogen
Decision Making	1.05	0.310	Homogen
Leadership	1.09	0.298	Homogen

The results of the homogeneity test conducted using Levene's test indicated that the data for all social skills measured in this study had homogeneous variance between the experimental and control groups. The significance values (p-values) obtained for all social skill variables, including cooperation, communication, conflict resolution, empathy, decision-making, and leadership, were above 0.05, indicating no significant differences in variance between the two groups. More specifically, the p-values obtained ranged from 0.298 to 0.332, all greater than the 0.05 threshold used to test homogeneity. These results of the homogeneity test provide a strong basis for the use of the t-test in further data analysis, as one of the main assumptions for the t-test is that the variances between groups must be homogeneous. Thus, the homogeneity test, which indicated no significant differences in variances, supports the validity of parametric tests, specifically the t-test, to compare results between the experimental and control groups. This ensured that the comparisons made were valid and that the results obtained were statistically reliable.

Table 6. T-test Results

Measured Social Skills	Experimental Group	Control Group	Mean Difference	t-Value	df	Sig (p-value)	Decision
Cooperation	76.50	69.20	7.30	3.52	78	0.001	Significant
Communication	78.20	70.80	7.40	3.48	78	0.001	Significant
Conflict Resolution	74.60	67.80	6.80	3.25	78	0.002	Significant
Empathy	80.40	72.10	8.30	3.73	78	0.001	Significant
Decision Making	75.80	68.50	7.30	3.46	78	0.001	Significant

Measured Social Skills	Experimental Group	Control Group	Mean Difference	t-Value	df	Sig (p-value)	Decision
Leadership	79.10	71.20	7.90	3.65	78	0.001	Significant

The t-test results indicated a significant difference in social skill development between the experimental group that participated in project-based learning (PjBL) and the control group. Based on the table above, the t-value for each social skill measured, such as cooperation, communication, conflict resolution, empathy, decision-making, and leadership, was greater than the critical t-value at a p-value < 0.05. The p-values obtained for each variable were as follows: cooperation (p = 0.001), communication (p = 0.001), conflict resolution (p = 0.002), empathy (p = 0.001), decision-making (p = 0.001), and leadership (p = 0.001), all of which indicate that the differences between the experimental and control groups were statistically significant. Specifically, the Mean Difference values for each social skill showed that the experimental group participating in project-based learning had higher average scores than the control group. For example, in cooperation, the experimental group obtained an average score of 76.50, while the control group only obtained an average score of 69.20, with an average difference of 7.30, resulting in a significant comparison (t = 3.52, p = 0.001). The same applies to communication (mean difference = 7.40), conflict resolution (mean difference = 6.80), empathy (mean difference = 8.30), decision-making (mean difference = 7.30), and leadership (mean difference = 7.90), all of which showed significant improvements in the experimental group.

These results indicate that (PjBL) significantly and positively impacts the development of students' social skills at the elementary education level. All social skills measured showed significant improvement in the experimental group compared to the control group, which followed conventional learning. These findings provide strong evidence that PjBL can effectively enhance students' social competencies, which are crucial for their social and academic development. Thus, the t-test results support the research hypothesis that project-based learning significantly contributes to developing students' social skills.

DISCUSSION

Effectiveness of Project-Based Learning in Enhancing Social Skills

The results of this study indicate that the implementation of project-based learning (PjBL) significantly impacts the social skills of elementary school students. All dimensions of social skills measured, namely cooperation, communication, conflict resolution, empathy, decision-making, and leadership, showed a statistically significant increase in the experimental group compared to that in the control group. These findings provide strong evidence that PjBL is efficacious in improving cognitive learning outcomes, as has been widely reported, and plays an important

role in developing students' social-emotional aspects, which are often neglected in conventional educational practices (Akbaş & Çakmak, 2019).

Implicitly, these findings provide a strong basis for educators and policymakers to reconstruct learning practices in elementary schools, shifting from teacher-centered approaches to more participatory models oriented toward developing students' social character. The highest improvement found in the empathy and leadership dimensions confirms that PjBL is effective in building cognitive competencies and strategically strengthening social values relevant to the Pancasila Student Profile. Therefore, integrating PjBL into the elementary school curriculum is innovative and highly applicable in addressing the challenges of 21st-century education, particularly in shaping a generation that is academically competent and socially resilient.

These results align with the social constructivist framework proposed by Crespí et al. (2022), which emphasizes the importance of social interaction in the learning process. Individual cognitive and social development occurs through social mediation in the zone of proximal development (ZPD), where students learn through interactions with peers and more competent adults (Lu et al., 2022). PjBL provides space for interactions, as students work in groups, solve real-world problems collaboratively, and engage in joint discussions and reflections. These findings also confirm the results of a previous study (Bassachs et al., 2020), which showed that project-based learning increases students' active participation and creates a more meaningful learning context. Research by (Journal & Health, 2022) highlights that PjBL supports the development of 21st-century skills, including collaboration, communication, and complex problem solving. The findings of this study provide quantitative data showing significant improvements in relevant social skill indicators. Specifically, the dimensions of empathy and leadership achieved the highest score increases in the experimental group, confirming that collaborative experiences facilitated by projects profoundly affect students' social-emotional dimensions.

These findings align with those of de Mooij et al. (2020), who showed that PjBL can create a collaborative learning environment that encourages interpersonal interaction, empathy, and leadership. However, the novelty of this study lies in its explicit focus on the quantitative measurement of elementary school students' social skills in the Indonesian context, which has rarely been studied in depth in the literature. Unlike previous studies, which were primarily conducted at the secondary or higher education levels and in developed countries, this study provides critical contextual contributions to expanding the external validity of the PjBL model to the primary education setting in developing countries.

Furthermore, Fang et al.'s (2022) review of PjBL studies shows that one of the main benefits of this approach is increased student engagement and social interaction, and underscores that PjBL provides a structure that allows students to

practice teamwork, share responsibility, and build shared understanding through open discussion. This research reinforces their findings, showing that not only does engagement increase, but also measurable social skills, such as conflict resolution and collective decision-making. These aspects are important for building a democratic and inclusive classroom culture in which every student feels valued and heard. Furthermore, Li et al. (2022) made an important contribution to understanding the effectiveness of PjBL. Although Li et al.'s (2022) study is more descriptive, they emphasized that students' interpersonal skills improve through collaborative project learning experiences. However, Li et al. (2022) noted that quantitative evidence for these claims is still limited, especially at the elementary level. This study fills this gap by providing empirical data from elementary schools in Indonesia, enriching the global literature on the contexts of developed countries.

Practical Implications and Policy Recommendations

The findings of this study have powerful and actionable implications for both practitioners and policymakers in elementary education. Project-Based Learning (PjBL) has been empirically demonstrated to foster the development of students' social skills, such as empathy, leadership, and collaboration, while enhancing their cognitive engagement. This dual impact positions PjBL not merely as a methodological innovation but as a strategic pedagogical shift aligned with global educational goals and national frameworks such as the Pancasila Student Profile, which emphasizes character values such as cooperation, empathy, and independence (Hardiansyah et al., 2024). For classroom teachers, this means reimagining instruction as content delivery and as a platform for building socio-emotional competence in students. By designing authentic, real-world projects, teachers can turn the classroom into a laboratory for democratic learning, where students learn to listen, negotiate, and lead—skills essential for 21st-century citizenship (Peng et al., 2022).

At the institutional and policy levels, these results call for a more systematic integration of PjBL into the national curriculum and teacher training programs. First, social skills assessment should be formalized using validated instruments and embedded into learning evaluation frameworks, ensuring that socio-emotional development is tracked alongside academic achievement (De Mooij et al., 2020). Second, teacher professional development must include training to facilitate group dynamics, mediate student conflict, and scaffold collaborative problem solving — core features of effective PjBL (Kylliäinen et al., 2020). Third, policy support should be reflected in curriculum flexibility, resource allocation for project materials, and institutional encouragement for school-wide innovation. By implementing these measures, PjBL can move beyond the classroom to become a systemic approach that cognitively and socially empowers learners. Thus, this study confirms the theoretical relevance of PjBL and provides a practical roadmap for its adoption in primary education systems.

Limitations and Future Research Directions

This study has several limitations in interpreting the results. First, the research design was quasi-experimental, without complete randomization of participants. This may open up the possibility of external variables influencing the results, although the sample was randomly selected to minimize bias. Therefore, further research should use a pure experimental design (randomized controlled trial) to increase internal validity and reduce the potential influence of confounding factors. Second, this study was only conducted in one elementary school in Pekanbaru; therefore, the results cannot be generalized to the entire population of elementary school students in Indonesia, which has cultural, social, and economic diversity. Replication studies in different geographical areas and demographic contexts are needed to test the consistency of the findings and expand the external validity of the PjBL model. Third, this quantitative research approach relied on questionnaires to measure social skills. This approach does not fully capture the dynamics of the social interactions that emerge during project-based learning. Therefore, the use of a mixed-method approach—by adding classroom observations, in-depth interviews, or student reflections —is needed in subsequent studies to gain a more comprehensive understanding of the process and experiences of students. Fourth, the duration of the treatment in this study was limited to three face-to-face meetings, which may not be sufficient to bring about a profound or sustainable social change. Therefore, further research with a longer and more structured intervention period is needed to assess the stability and sustainability of the impact of PjBL on students' social skill development in the medium and long term. Fifth, this study did not explore the potential use of digital technology in implementing PjBL, even though online collaborative platforms such as Google Workspace and Padlet have been proven to expand opportunities for social interaction in the post-pandemic educational context. Therefore, future research should examine the integration of PjBL with digital media more systematically to address the needs of hybrid learning and overcome physical access limitations in schools.

CONCLUSION

This study provides an important lesson that *Project-Based Learning* (PjBL) is effective in increasing student engagement in learning and significantly develops the social skills of elementary school students as a whole. Through project-based learning, students gain hands-on experience in collaborating, communicating, resolving conflicts, demonstrating empathy, making decisions collectively, and leading groups—essential social dimensions for character development and 21st-century readiness. The implications of these findings are quite broad. Theoretically, the results of this study reinforce the social constructivism approach, which emphasizes that learning is a social process and not merely an individual activity.

From a policy perspective, these results strongly justify the importance of integrating PjBL into the elementary school curriculum to support the implementation of the Pancasila Student Profile (PSP). In terms of teaching practice, this study encourages teachers to design collaborative, contextual, and reflective learning experiences to achieve academic goals and foster sustainable social competence. Thus, PjBL can be positioned as a strategic pedagogical approach to achieve a more humane, relevant, and transformative elementary education.

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