



## The Influence of Flipped Based Learning on Students' Social Thinking Skills at Muhammadiyah Schools

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### Abstract

The increasing emphasis on 21st-century competencies has highlighted the critical need for instructional approaches that extend beyond cognitive achievement to include the development of students' social thinking skills. Despite this demand, conventional teacher-centered practices continue to restrict meaningful interaction, limiting students' ability to develop essential social competencies. This study investigates the effect of flipped-based learning on students' social thinking skills in elementary education. A quasi-experimental design with a pretest-posttest non-equivalent control group was employed, involving 64 sixth-grade students divided into experimental and control groups. Data were collected using a validated Likert-scale questionnaire and scenario-based tasks measuring five dimensions: social awareness, cooperation, empathy, interpersonal communication, and social problem-solving. The data were analyzed using Multivariate Analysis of Covariance, followed by univariate ANCOVA and paired t-tests. The results indicate a statistically significant and substantial effect of flipped-based learning across all dimensions of social thinking skills (Wilks' Lambda = 0.154,  $p < 0.001$ ). The experimental group demonstrated a markedly higher improvement (14.38%) compared to the control group (4.92%), with large effect sizes observed in cooperation, interpersonal communication, and social problem-solving. These findings suggest that flipped-based learning fosters an interactive learning environment that enhances students' social reasoning and collaborative capacities. This study contributes theoretically by extending flipped learning research into the social domain and integrating social constructivist and social cognitive perspectives. Practically, it provides a robust framework for designing student-centered learning environments that support holistic development. Overall, flipped-based learning is positioned as a transformative pedagogical model for advancing social thinking skills in contemporary education.

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## INTRODUCTION

The evolving demands of 21st-century education have fundamentally redefined the scope of learning outcomes, shifting from a sole emphasis on cognitive mastery toward the integration of social, emotional, and interpersonal competencies. Contemporary educational discourse increasingly highlights that students must be equipped with the ability to communicate effectively, collaborate across diverse contexts, and navigate complex social situations (González-Salamanca et al., 2020; Oluwagbohunmi & Alonge, 2023). In elementary education, these competencies are not peripheral but foundational, as early social experiences shape long-term academic trajectories and behavioral development. Recent empirical evidence suggests that students' success is strongly influenced by their capacity to engage in meaningful social interactions and develop adaptive social reasoning (Ma et al., 2025; Schäfer et al., 2024). However, despite this recognition, the integration of social thinking skills into formal instructional design remains inconsistent. This discrepancy signals a critical misalignment between educational expectations and classroom realities. Consequently, there is a pressing need to reconceptualize instructional approaches that deliberately cultivate students' social thinking capacities.

In practice, instructional delivery in many elementary classrooms continues to be dominated by teacher-centered paradigms that prioritize content transmission over interactive engagement. Within this framework, students are frequently positioned as passive recipients of knowledge, with

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limited opportunities to negotiate meaning, exchange perspectives, or engage in collaborative problem-solving (Otara et al., 2019; Škugor et al., 2024). While such approaches may offer procedural efficiency, they inadvertently constrain the development of higher-order social competencies. Empirical studies indicate that reduced interactional intensity within classrooms correlates with lower levels of empathy, cooperation, and interpersonal communication skills (Hsiao et al., 2022). This structural limitation restricts students' exposure to authentic social learning experiences, thereby weakening their ability to interpret and respond to complex social contexts. As a result, students may demonstrate adequate cognitive performance while lacking essential social reasoning abilities. This imbalance raises critical concerns regarding the holistic effectiveness of current pedagogical practices. Addressing this issue requires a paradigm shift toward learning environments that prioritize active participation and social engagement.

The urgency of this transformation is further intensified by the increasingly interconnected and dynamic nature of contemporary society. Students are expected to function in environments that demand adaptability, collaborative intelligence, and ethical decision-making. Social thinking skills, therefore, extend beyond classroom relevance and become essential competencies for lifelong learning and civic participation. However, conventional instructional models often fail to create conditions that foster such competencies in a sustained and meaningful manner (Porubin, 2024). The persistence of passive learning structures limits students' ability to internalize social values and apply them in real-life situations. Consequently, there is a growing recognition that educational innovation must move beyond content delivery toward the facilitation of social cognition and interaction. This shift necessitates the adoption of pedagogical models that actively engage learners in constructing knowledge through social processes. Without such transformation, the gap between educational outcomes and societal demands will continue to widen.

Flipped-based learning has emerged as a pedagogical innovation that offers a structural reconfiguration of the learning process, with the potential to address these limitations. By relocating initial content acquisition to pre-class activities, this model liberates classroom time for higher-order engagement, including discussion, collaboration, and problem-solving (F. Liu et al., 2023; Matiso, 2024). This inversion of the traditional instructional sequence transforms the classroom from a site of passive reception into an interactive learning ecosystem. Students enter the classroom with prior exposure to content, enabling them to participate more actively in knowledge construction processes (Abdel-Al Ibrahim et al., 2022; Balakrishna, 2023; Hung & Yeh, 2023). Furthermore, flipped-based learning aligns with student-centered pedagogical principles, encouraging autonomy, responsibility, and reflective learning. This restructuring is not merely procedural but epistemological, as it redefines how knowledge is accessed, interpreted, and negotiated. As such, flipped-based learning holds significant promise in fostering both cognitive and social dimensions of learning. However, its effectiveness in cultivating social thinking skills remains underexplored in specific educational contexts.

From a theoretical standpoint, flipped-based learning is grounded in social constructivism, which posits that knowledge is co-constructed through interaction, dialogue, and shared experiences. This perspective is further reinforced by social cognitive theory, which emphasizes the role of observational learning, social modeling, and reciprocal interaction in shaping behavior (Firmansyah & Saepuloh, 2022; Lee et al., 2023). A growing body of literature has demonstrated that flipped learning enhances academic performance, motivation, and critical thinking (Bagiani et al., 2025; Hasibuan & Ponidi, 2025; Liu et al., 2023). Additionally, recent studies highlight its potential to improve soft skills such as communication and teamwork (Elkhalladi et al., 2025). Other findings suggest that flipped learning promotes learner autonomy and active engagement (Afsaneh, 2022; Kwong et al., 2024; Nata et al., 2025). Despite these advances, the dominant focus of prior research remains centered on cognitive and affective outcomes. The social dimension of learning, particularly social thinking skills, has not been examined with equivalent depth or methodological rigor. This imbalance reveals a critical limitation in the existing literature.

More importantly, existing studies exhibit several unresolved tensions that necessitate further investigation. First, while flipped learning is frequently associated with increased interaction, there is limited empirical evidence demonstrating how such interaction translates into measurable social thinking competencies. Second, prior research tends to generalize findings across educational contexts without accounting for the influence of institutional values and cultural frameworks. In

particular, the role of value-based educational environments, such as Muhammadiyah schools, remains largely unexplored. Third, most studies employ unidimensional outcome measures, thereby neglecting the multidimensional nature of social thinking skills, which encompass awareness, empathy, communication, and problem-solving. These gaps indicate that the current understanding of flipped-based learning is conceptually incomplete and empirically underdeveloped. Addressing these limitations requires a more context-sensitive and multidimensional analytical approach. Therefore, a critical re-examination of flipped-based learning through the lens of social thinking development is both timely and necessary.

Responding to these gaps, this study aims to examine the effect of flipped-based learning on students' social thinking skills within the context of Muhammadiyah elementary education. Specifically, this research investigates five key dimensions: social awareness, cooperation, empathy, interpersonal communication, and social problem-solving. This study advances the literature by providing empirical evidence on the social impact of flipped-based learning, extending beyond its traditionally examined cognitive outcomes. It also contributes theoretically by integrating social constructivist and social cognitive perspectives in explaining the mechanisms through which social skills are developed. Practically, the findings offer actionable insights for educators in designing learning environments that balance academic achievement with social character formation. Furthermore, by situating the study within a value-based educational context, this research introduces a nuanced understanding of how pedagogical innovation interacts with institutional identity. Ultimately, this study positions flipped-based learning not only as an instructional strategy but as a transformative framework for holistic student development.

## METHOD

This study adopted a quantitative approach employing a quasi-experimental design to rigorously examine the causal effect of flipped-based learning on students' social thinking skills. Specifically, a pretest-posttest non-equivalent control group design was implemented, which is widely recognized as appropriate for educational settings where random assignment is not feasible (Kohan et al., 2024; Lindstromberg, 2025). The selection of this design was grounded in the need to preserve the natural classroom structure while still enabling causal inference through controlled comparison. To enhance internal validity, pretest scores were incorporated as covariates, thereby minimizing baseline differences between groups and reducing selection bias (Renzetti et al., 2021). In addition, the use of a multivariate analytical framework allowed simultaneous examination of multiple dependent variables, reflecting the multidimensional nature of social thinking skills. This design is particularly advantageous in educational research as it balances ecological validity with statistical rigor. Consequently, the methodological framework ensures both authenticity of context and robustness of inference.

The study was conducted at Muhammadiyah 1 Paiton Elementary School, Probolinggo Regency, Indonesia, during the even semester of the 2025/2026 academic year. This site was purposively selected due to its strong emphasis on integrating academic learning with social and moral development, making it an appropriate context for investigating social thinking skills. The intervention was implemented over an eight-week period, with two sessions per week, allowing sufficient exposure to the instructional treatment while maintaining alignment with the institutional academic schedule. To control contextual variability, both experimental and control groups were taught within the same institutional environment, using equivalent curricular content and instructional duration. This approach minimizes external confounding variables related to institutional differences. Furthermore, the relatively extended duration of the intervention strengthens the likelihood of capturing meaningful developmental changes in students' social competencies. Thus, the research setting provides both contextual relevance and methodological stability.

The population of this study comprised all sixth-grade students enrolled in the selected school. A total of 64 students participated, divided into two intact classes, each consisting of 32 students. One class was designated as the experimental group, while the other served as the control group. The sampling technique employed was group random sampling, in which intact classes were randomly assigned to experimental conditions. This approach was chosen to maintain classroom

integrity while reducing selection bias. All participants met inclusion criteria, including regular attendance and active participation during the intervention period. No exclusion criteria were applied, as all students fulfilled the research requirements. To further reduce potential bias, both groups were taught by the same teacher, ensuring consistency in instructional delivery and minimizing teacher-related variability. This strategy strengthens the internal validity of the study by controlling for instructor effects.

Data were collected using two complementary instruments designed to capture both perceived and applied dimensions of social thinking skills. The first instrument was a 25-item Likert-scale questionnaire, developed to assess students' self-reported social competencies. The second instrument consisted of 15 scenario-based tasks, designed to evaluate students' ability to respond to realistic social situations. The development of these instruments was theoretically grounded in established frameworks of social skills and social cognition (Islam et al., 2023; Z. Liu et al., 2023). Item construction followed a deductive approach, where each item was mapped explicitly to one of five core indicators: social awareness, cooperation, empathy, interpersonal communication, and social problem-solving. This dual-instrument strategy was employed to strengthen construct representation by integrating subjective perception and objective performance measures. The operationalization of these indicators is presented in Table 1.

**Table 1.** Social Thinking Skills Indicators and Measurement Instruments

Indicator	Operational Description	Number of Items	Data Source
Social Awareness	Ability to understand social situations, contextual norms, and interactional rules	5	Questionnaire and scenarios
Cooperation	Ability to collaborate effectively and fulfill group responsibilities	5	Questionnaire and scenarios
Empathy	Ability to interpret and respond to others' emotions and perspectives	5	Questionnaire and scenarios
Interpersonal Communication	Ability to articulate ideas, listen actively, and respond appropriately	5	Questionnaire and scenarios
Social Problem Solving	Ability to analyze and resolve everyday social situations effectively	5	Questionnaire and scenarios

Table 1 demonstrates that each dimension of social thinking skills was systematically operationalized through both perceptual and contextual measures. This dual approach enhances construct validity by ensuring that the instruments capture not only students' internal understanding but also their applied social reasoning. The balanced distribution of items across indicators reduces measurement bias and ensures comprehensive coverage of the construct. Furthermore, the inclusion of scenario-based tasks enables contextualized assessment, reflecting real-life social interactions rather than abstract responses. This design aligns with contemporary methodological standards in social competence research, where multidimensional assessment is strongly recommended. Therefore, the instrument framework provides a robust foundation for measuring complex social constructs.

To ensure measurement rigor, the instruments underwent comprehensive validity and reliability testing prior to implementation. Content validity was established through expert judgment involving specialists in educational psychology and instructional design. Construct validity was assessed using item-total correlation analysis, with all items exceeding the minimum threshold of 0.30, indicating adequate discrimination power. Reliability testing was conducted using Cronbach's alpha, yielding coefficients above 0.80 for both instruments, which indicates high internal consistency. These results confirm that the instruments produce stable and consistent measurements. In addition, the combination of questionnaire and scenario-based tasks reduces mono-method bias and enhances measurement robustness. Consequently, the instruments are considered both valid and reliable for capturing social thinking skills in elementary students.

The data collection procedure was conducted in a structured and sequential manner to ensure procedural consistency and treatment fidelity. Initially, a pretest was administered to both groups to establish baseline equivalence. Subsequently, the experimental group received flipped-based learning, while the control group was instructed using conventional teacher-centered methods. In the experimental condition, students engaged with instructional materials prior to class

through videos and structured learning resources, enabling initial content acquisition. Classroom sessions were then devoted to collaborative activities such as discussion, group problem-solving, and reflective tasks. In contrast, the control group received direct instruction followed by individual exercises, with minimal collaborative engagement. To ensure treatment fidelity, instructional procedures were standardized and monitored throughout the intervention period. Additionally, both groups were exposed to equivalent content and learning objectives, thereby isolating the instructional model as the primary variable. This procedural control strengthens the causal interpretation of the findings.

Data analysis was performed using a combination of descriptive and advanced inferential statistical techniques. Descriptive statistics were used to summarize central tendencies and variability across variables. Inferential analysis was conducted using Multivariate Analysis of Covariance (MANCOVA), which allows simultaneous examination of multiple dependent variables while controlling for covariates. The selection of MANCOVA is methodologically justified, as social thinking skills consist of interrelated dimensions that should not be analyzed in isolation. Prior to analysis, assumption tests were conducted, including normality (Shapiro-Wilk), homogeneity of variance (Levene's test), and equality of covariance matrices (Box's M test). Following the multivariate analysis, univariate ANCOVA was conducted to identify the contribution of each indicator. Effect size was assessed using partial eta squared to determine the magnitude of the treatment effect, providing a more substantive interpretation beyond statistical significance. Paired t-tests were also conducted to examine within-group changes over time. All analyses were performed using SPSS software, with a significance threshold of  $p < 0.05$ . This analytical strategy ensures both statistical rigor and interpretative depth.

This study adhered strictly to ethical standards in educational research. Informed consent was obtained from all participants and their guardians prior to data collection. Participants were assured of confidentiality, and all data were anonymized to protect their identities. Participation was voluntary, and students were informed of their right to withdraw at any time without penalty. The study also ensured that no harm, either psychological or academic, was imposed on participants. All procedures were conducted in accordance with institutional ethical guidelines. These measures ensure the ethical integrity and credibility of the research process.

## RESULTS AND DISCUSSION

### Results

The results are presented in a structured and integrative manner, encompassing instrument quality testing, descriptive statistics, assumption testing, multivariate analysis, univariate analysis, and composite score evaluation. Across all analytical stages, a consistent pattern emerges, demonstrating that the experimental group substantially outperformed the control group. The observed differences are not only statistically significant but also exhibit strong practical relevance, indicating a meaningful impact of the flipped-based learning intervention. The convergence of multiple analytical approaches strengthens the robustness of the findings. Furthermore, the results reveal a marked divergence between groups following the intervention, suggesting a systematic and multidimensional effect. Each analytical component is presented in Tables 2–7 and supported by Figure 1 to enhance interpretability and clarity.

**Table 2.** Results of Instrument Validity and Reliability Tests

Instrument	Number of Items	r-value (Min–Max)	Cronbach's Alpha	Decision
Social thinking questionnaire	25	0.412 – 0.781	0.893	Valid and reliable
Scenario-based tasks	15	0.401 – 0.744	0.861	Valid and reliable

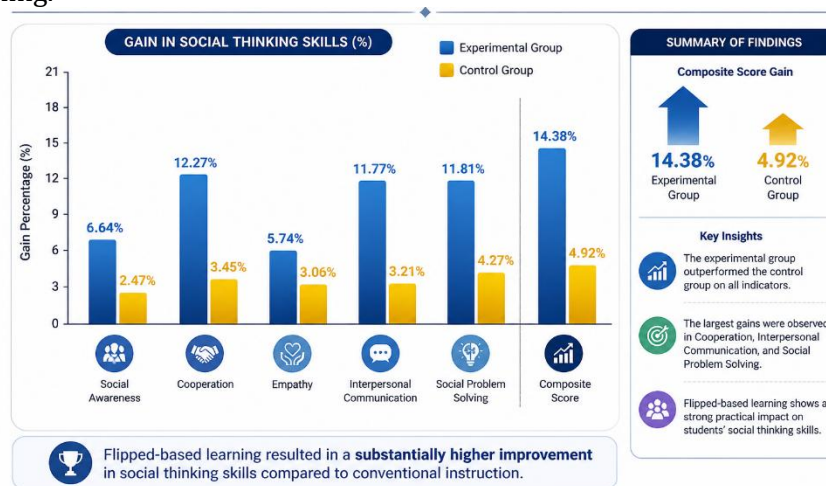
Table 2 confirms that all items demonstrate acceptable item-total correlations exceeding the threshold of 0.30, indicating strong discriminatory capacity. The distribution of correlation values suggests that each item contributes uniquely to the measurement of the construct. Additionally, the high Cronbach's alpha coefficients indicate strong internal consistency, ensuring reliability across measurements. The consistency between the two instruments further minimizes mono-method bias.

These findings establish a solid psychometric foundation for subsequent analysis. Therefore, the measurement instruments are deemed robust and suitable for evaluating social thinking skills.

**Table 3.** Descriptive Statistics by Group

Indicator	Exp. Pretest	Ctrl Pretest	Exp. Posttest	Ctrl Posttest
Social Awareness	67.29 ± 5.17	67.52 ± 4.15	73.93 ± 5.88	69.99 ± 4.99
Cooperation	67.09 ± 4.29	66.68 ± 5.90	79.36 ± 5.41	70.13 ± 7.71
Empathy	69.05 ± 4.72	68.70 ± 4.27	74.79 ± 5.76	71.76 ± 6.01
Interpersonal Communication	66.51 ± 5.25	67.16 ± 5.24	78.26 ± 6.41	70.38 ± 5.31
Social Problem Solving	65.40 ± 5.79	65.67 ± 4.07	77.22 ± 6.52	69.97 ± 5.25
Composite Score	67.07 ± 2.47	67.15 ± 2.20	76.71 ± 2.72	70.45 ± 3.00

The descriptive results indicate that both groups began from nearly identical baseline conditions, confirming initial equivalence. Following the intervention, the experimental group exhibited substantially higher gains across all indicators, revealing a consistent pattern of improvement. The most pronounced increases occurred in cooperation, interpersonal communication, and social problem solving, suggesting that these dimensions are highly responsive to interactive instructional environments. In contrast, the control group demonstrated only moderate improvements, indicating limited impact of conventional instruction. The magnitude of difference between groups reflects a marked divergence in learning outcomes. This pattern suggests that the intervention produces not only incremental but transformative changes in social thinking skills. These descriptive findings provide a strong preliminary indication of the effectiveness of flipped-based learning.



**Figure 1.** Comparative Gain in Social Thinking Skills Between Experimental and Control Groups

Figure 1 visually demonstrates a pronounced divergence in gain scores between the experimental and control groups. The experimental group achieved a 14.38% improvement, which is substantially higher than the 4.92% observed in the control group. This marked difference indicates that the intervention produces not only statistically significant results but also strong practical effects. The steep upward trajectory in the experimental group suggests accelerated development of social thinking skills. In contrast, the gradual increase in the control group reflects the limited capacity of conventional instruction to stimulate social competencies. The visual representation reinforces the magnitude of the treatment effect in an intuitive manner. Overall, the figure strengthens the argument that flipped-based learning yields meaningful educational impact.

**Table 4.** Results of the Analysis Prerequisite Test

Test Type	Variable	Statistic	p-value
Shapiro-Wilk	Social Awareness	0.989	0.819
Shapiro-Wilk	Cooperation	0.989	0.838
Shapiro-Wilk	Empathy	0.982	0.493

Test Type	Variable	Statistic	p-value
Shapiro-Wilk	Interpersonal Communication	0.985	0.654
Shapiro-Wilk	Problem Solving	0.992	0.943
Levene	Social Awareness	0.548	0.462
Levene	Cooperation	2.742	0.103
Levene	Empathy	0.107	0.745
Levene	Interpersonal Communication	0.890	0.349
Levene	Problem Solving	0.229	0.634

The assumption tests confirm that all statistical prerequisites for multivariate analysis were satisfied. Normality was established across all variables, as indicated by non-significant Shapiro-Wilk results. Homogeneity of variance was also confirmed through Levene's test. Additionally, the non-significant Box's M value indicates equality of covariance matrices. These results validate the appropriateness of using MANCOVA for further analysis. The fulfillment of these assumptions ensures the reliability and accuracy of the statistical findings. Therefore, subsequent inferential analyses can be interpreted with confidence.

**Table 5.** Multivariate Test of the Effect of Flipped-Based Learning

Statistic	Value	df1	df2	F	p-value
Wilks' Lambda	0.154	5	57	62.587	<0.001

The multivariate analysis reveals a highly significant effect of flipped-based learning on the combined dimensions of social thinking skills. The Wilks' Lambda value indicates a substantial reduction in unexplained variance, reflecting strong model explanatory power. The large F-value further confirms the robustness of group differences. The extremely low p-value indicates that the results are not attributable to chance. Importantly, this finding demonstrates that the intervention exerts a simultaneous effect across multiple interrelated dimensions. This suggests that flipped-based learning functions as a holistic instructional approach rather than targeting isolated competencies. The strength of the multivariate effect underscores the comprehensive impact of the intervention.

**Table 6.** Univariate ANCOVA Test on Each Indicator

Indicator	Adj. Mean Exp	Adj. Mean Ctrl	F	p-value	Partial Eta <sup>2</sup>
Social Awareness	73.97	69.96	10.411	0.002	0.146
Cooperation	79.39	70.10	34.579	<0.001	0.362
Empathy	74.84	71.71	6.376	0.014	0.095
Interpersonal Communication	78.30	70.34	33.145	<0.001	0.352
Social Problem Solving	77.26	69.92	29.457	<0.001	0.326

The univariate analysis indicates that flipped-based learning significantly influences all individual indicators of social thinking skills. The effect size analysis shows that cooperation, interpersonal communication, and social problem solving fall within the large effect category, while social awareness and empathy demonstrate moderate effects. This pattern suggests differential sensitivity of social dimensions to the intervention. The strongest effects are observed in interaction-based competencies, highlighting the importance of active engagement in learning. The consistent statistical significance across all indicators confirms the broad effectiveness of the instructional model. These findings provide detailed insight into the specific areas most impacted by flipped-based learning. Overall, the results demonstrate both statistical and practical significance.

**Table 7.** Paired t-Test on Composite Scores

Group	n	Pretest	Posttest	Gain (%)	t
Experimental	32	67.07	76.71	14.38	46.726
Control	32	67.15	70.45	4.92	11.365

The paired t-test results confirm that both groups experienced statistically significant improvements. However, the experimental group exhibited a substantially higher gain compared to the control group. The magnitude of improvement reflects a strong practical effect of the intervention. The high t-value further indicates a consistent and reliable pattern of change. In contrast, the control group shows limited improvement, suggesting weaker instructional impact. The

difference in gain percentage highlights a clear superiority of flipped-based learning. These findings reinforce the effectiveness of the intervention in accelerating social thinking development.

The overall findings demonstrate a coherent and convergent pattern across all analytical stages. Baseline equivalence ensures that observed differences are attributable to the intervention. Assumption testing confirms the validity of the statistical procedures. Multivariate results indicate a comprehensive effect, while univariate analysis reveals specific dimensions of impact. Descriptive and inferential findings consistently show that the experimental group substantially outperformed the control group. The magnitude of improvement, supported by both statistical and visual evidence, demonstrates strong practical significance. Collectively, these results provide compelling evidence that flipped-based learning is a highly effective approach for enhancing students' social thinking skills.

## Discussion

The findings of this study demonstrate that flipped-based learning exerts a robust and multidimensional effect on students' social thinking skills, as evidenced by the significant multivariate and univariate outcomes. This result indicates that the intervention operates not merely as an instructional variation but as a structural reconfiguration of the learning ecology that systematically enhances social cognition. From a theoretical standpoint, this aligns with social constructivist assumptions that knowledge is co-constructed through interaction, yet the present study advances this perspective by empirically validating that such interaction translates into measurable social thinking competencies. While prior studies have largely focused on cognitive and affective gains, this research provides concrete evidence that flipped learning also reshapes the social dimension of learning outcomes (Liu et al., 2023; Matiso, 2024). Importantly, the magnitude and consistency of the observed effects suggest that the flipped model functions as a holistic pedagogical system rather than a fragmented instructional strategy. This positions the study within an emerging global discourse that calls for integrative learning models capable of addressing complex 21st-century competencies. Consequently, the findings contribute to redefining flipped-based learning as a socially transformative framework rather than a purely cognitive enhancement tool.

A closer examination reveals that cooperation represents the most significantly affected dimension, indicating that flipped-based learning creates optimal conditions for collaborative engagement. This finding can be theoretically anchored in social interdependence theory, which posits that structured group interaction fosters mutual accountability and shared goal orientation. The classroom reorganization inherent in flipped learning shifts the focus from individual task completion to collective knowledge construction, thereby intensifying cooperative dynamics. This result corroborates empirical evidence suggesting that cooperative learning environments significantly improve peer interaction and group performance (Elkhalladi et al., 2025; Kwong et al., 2024). However, the present study extends these findings by demonstrating that cooperation is not merely enhanced but becomes a dominant mode of learning behavior. The stronger effect observed in this context may be attributed to the alignment between pedagogical design and institutional values emphasizing collectivism and moral responsibility. Such contextual reinforcement amplifies the internalization of cooperative norms beyond procedural participation. Therefore, this finding not only supports existing theoretical claims but also introduces a contextualized explanation for variability in flipped learning effectiveness across educational settings.

The substantial improvement in interpersonal communication further reinforces the argument that flipped-based learning facilitates the development of socially mediated competencies. Within the framework of social cognitive theory, communication skills emerge through processes of modeling, feedback, and reciprocal interaction. The flipped classroom environment, characterized by increased dialogic engagement, provides continuous opportunities for students to articulate ideas, negotiate meaning, and respond to diverse perspectives. This is consistent with prior research highlighting the role of interactive learning in enhancing communication proficiency (Hsiao et al., 2022; Hung & Yeh, 2023). Nevertheless, this study contributes a critical extension by demonstrating that communication development is not an incidental outcome but a structured consequence of pedagogical design. The contrast between experimental and control groups underscores the insufficiency of traditional instruction in cultivating communicative competence. Moreover, the integration of pre-class preparation with in-class interaction creates a layered learning process that

strengthens both cognitive readiness and communicative expression. This dual mechanism represents a novel contribution to the literature, emphasizing the interplay between preparation and interaction in shaping communication outcomes.

The findings related to social problem-solving indicate that flipped-based learning significantly enhances students' ability to navigate complex social situations. This outcome reflects the integration of higher-order thinking processes with contextualized social reasoning, a combination that is often underexplored in educational research. Grounded in constructivist and problem-based learning theories, this result suggests that active engagement with real-life scenarios promotes deeper cognitive processing and adaptive decision-making. Previous studies have established the effectiveness of active learning in improving critical thinking (Bagiani et al., 2025; Schäfer et al., 2024), yet the present research extends this evidence by demonstrating its applicability to social problem-solving contexts. The use of scenario-based assessment in this study further strengthens the validity of this finding, as it captures students' applied competencies rather than abstract knowledge. This methodological approach addresses a significant limitation in prior research, which often relies on decontextualized measurement tools. Consequently, this study contributes to methodological advancement by integrating contextual realism into the assessment of social thinking skills. It also highlights the potential of flipped-based learning to bridge the gap between theoretical understanding and practical application.

In contrast, the moderate effects observed in social awareness and empathy suggest that these dimensions are less immediately responsive to flipped-based interventions. This finding can be interpreted through the lens of affective and socio-emotional development theories, which emphasize that such competencies require prolonged exposure and deeper reflective processes. Unlike observable behaviors such as cooperation and communication, empathy and awareness involve internal cognitive-emotional integration that evolves over time. This is consistent with existing literature indicating that socio-emotional competencies develop more gradually and are influenced by broader contextual factors (Islam et al., 2023; Liu et al., 2023). Nevertheless, the observed improvements indicate that flipped-based learning provides a supportive environment for initiating this development. The inclusion of reflective discussions and collaborative activities likely contributes to incremental growth in these areas. However, the relatively lower effect size highlights the need for sustained and targeted interventions to achieve more substantial outcomes. This finding underscores the importance of differentiating between behavioral and affective dimensions in evaluating pedagogical effectiveness.

The comparative divergence between experimental and control groups provides compelling evidence of the limitations inherent in conventional teacher-centered instruction. The minimal gains observed in the control group suggest that passive learning environments fail to generate the interactional intensity necessary for social skill development. This aligns with broader critiques of traditional pedagogy, which emphasize its inability to foster 21st-century competencies (Oluwagbohunmi & Alonge, 2023; Porubin, 2024). However, the present study advances this critique by providing empirical quantification of the disparity, thereby strengthening the argument for pedagogical transformation. The clear superiority of flipped-based learning indicates that meaningful improvement in social thinking requires structural changes rather than incremental adjustments. This finding contributes to ongoing global debates regarding the effectiveness of student-centered learning models. It also reinforces the need for educational systems to move beyond content delivery toward the facilitation of interactive and reflective learning processes. Thus, the study provides both empirical and conceptual support for a paradigm shift in instructional design.

From a critical and contextual perspective, the effectiveness of flipped-based learning in this study appears to be influenced by the unique characteristics of the Muhammadiyah educational environment. The integration of moral and social values within the institutional culture likely enhances the receptivity of students to collaborative and socially oriented learning practices. This raises important considerations regarding the transferability of the findings to different educational contexts. While the results are consistent with global literature, the magnitude of the effects may be contingent upon cultural alignment between pedagogy and institutional values. This contextual sensitivity represents both a strength and a limitation of the study. On one hand, it highlights the importance of embedding pedagogical innovation within local cultural frameworks. On the other

hand, it suggests that the effectiveness of flipped-based learning may vary across contexts. Therefore, future research should explore cross-cultural applications to validate and extend these findings. Such investigations would contribute to a more nuanced understanding of how pedagogical models interact with socio-cultural environments.

Overall, this study offers a significant theoretical and practical contribution by positioning flipped-based learning as a multidimensional framework for social thinking development. The integration of social constructivist and social cognitive theories provides a comprehensive explanation of the mechanisms underlying the observed effects. More importantly, the study addresses a critical gap in the literature by shifting the focus from cognitive outcomes to social competencies, thereby expanding the scope of flipped learning research. This repositioning aligns with global educational priorities that emphasize holistic student development. Practically, the findings provide actionable insights for educators seeking to design learning environments that foster both academic and social growth. Conceptually, the study introduces a novel perspective that redefines flipped-based learning as a socially transformative pedagogical model. In the broader landscape of international research, this work contributes to advancing the discourse on integrative learning approaches. Consequently, it establishes a strong foundation for future investigations into the social dimensions of educational innovation.

## CONCLUSION

This study provides compelling empirical evidence that flipped-based learning constitutes a highly effective pedagogical framework for enhancing students' social thinking skills in elementary education. The findings consistently demonstrate that the intervention produces statistically significant and practically meaningful improvements across all dimensions of social thinking, including social awareness, cooperation, empathy, interpersonal communication, and social problem-solving. Importantly, the multivariate and univariate analyses confirm that the observed effects are not isolated but operate in a coordinated and multidimensional manner, indicating that flipped-based learning functions as an integrated instructional system. The substantial divergence between the experimental and control groups further reinforces the causal influence of the intervention, highlighting the limitations of conventional teacher-centered approaches in fostering socially oriented competencies. These results affirm that the restructuring of learning processes—particularly the redistribution of instructional time toward collaborative and interactive engagement—plays a critical role in shaping students' social cognitive development. Consequently, this study substantiates the argument that meaningful improvement in social thinking requires not incremental adjustments but a fundamental transformation of instructional design.

Beyond its empirical contribution, this study advances the theoretical understanding of flipped-based learning by positioning it as a socially transformative pedagogical model grounded in the integration of social constructivist and social cognitive principles. The findings extend existing literature by demonstrating that flipped learning not only enhances cognitive and affective outcomes but also systematically develops students' capacity for social reasoning and interaction. Moreover, the differential impact across dimensions—where interaction-based competencies exhibit stronger effects than affective ones—provides important insight into the nuanced mechanisms of social skill development. In practical terms, the study offers a robust framework for educators to design learning environments that balance academic achievement with the cultivation of social competencies essential for 21st-century contexts. However, the context-specific nature of the findings suggests that the effectiveness of such interventions may be influenced by institutional culture and value systems, thereby calling for cautious generalization. Future research is therefore recommended to explore longitudinal effects, cross-cultural applicability, and the integration of complementary strategies to strengthen affective

dimensions such as empathy and social awareness. Ultimately, this study contributes to redefining the role of pedagogical innovation in education, emphasizing that the future of learning lies in models that holistically integrate cognitive, social, and contextual dimensions into a coherent and sustainable framework.

### AUTHOR CONTRIBUTIONS STATEMENT

Samsul Huda conceptualized the study, developed the research design, conducted data collection and formal analysis, and drafted the original manuscript. Chusnul Muali contributed to the theoretical framework development, supervised the research process, validated the analytical procedures, and critically reviewed and refined the manuscript for important intellectual content. Both authors jointly interpreted the findings, contributed to the discussion, and approved the final version of the manuscript for publication.

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