International Journal of
Education, Management, and Technology

e-ISSN : 3026-5444
p-ISSN : 3026-4200
Index: Harvard, Boston, Sydney University, Copernicus, Lens, Scilit, Semantic, Dimensions, etc

https://doi.org/10.58578/IJEMT.v3i3.8209

The Think–Pair–Share Cooperative Learning Model in Enhancing Self-Efficacy and Mathematics Learning Outcomes of Fifth-Grade Elementary Students: A Systematic Literature Review

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Article Info:

Submitted:	**Revised:**	**Accepted:**	**Published:**
Oct 20, 2025	Nov 28, 2025	Dec 2, 2025	Dec 7, 2025

Abstract

Although cooperative learning strategies have received increasing attention in prior research, studies specifically examining how the Think–Pair–Share (TPS) model simultaneously improves both self-efficacy and mathematics learning outcomes among Grade 5 elementary students remain limited. This study aims to systematically analyze the effectiveness of TPS in enhancing students' confidence and academic performance in mathematics. A qualitative descriptive approach was employed using a systematic literature review design, involving ten empirical studies selected through purposive sampling based on relevance, methodological rigor, and publication quality. Data were collected through structured extraction of research findings from previous studies and analyzed using thematic synthesis to identify consistent patterns, underlying mechanisms, and moderating factors. The findings indicate that TPS leads to substantial improvements in students' self-efficacy, characterized by increased confidence, reduced anxiety, and greater willingness to engage in problem-solving, alongside significant gains in mathematics achievement across topics such as geometry, number operations, and problem-solving tasks. These results contribute to the theoretical development of social constructivism and self-efficacy theory by

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demonstrating how structured peer interaction can strengthen both cognitive and affective learning outcomes. The study concludes that TPS plays a crucial role in supporting effective mathematics learning in elementary classrooms and recommends that teachers integrate TPS consistently with appropriate scaffolding and instructional media. The implications of this research include theoretical contributions to the cooperative learning literature and practical recommendations for schools and policymakers seeking to improve mathematics performance, while highlighting opportunities for future research on the long-term impacts of TPS, its adaptation for diverse learner profiles, and its implementation in digital or hybrid learning environments.

Keywords: Think–Pair–Share; Self-Efficacy; Mathematics Learning Outcomes; Elementary Education; Cooperative Learning

INTRODUCTION

Mathematics education at the elementary school level, particularly in Grade 5, plays a crucial role in developing students' foundational understanding of key concepts such as numbers, geometry, and problem-solving competencies that underpin their subsequent mathematical learning. However, numerous studies indicate that many Grade 5 students continue to struggle with mathematics, often due to low self-efficacy or a lack of belief in their own ability to successfully complete mathematical tasks. *Self-efficacy*, as conceptualized by Bandura, refers to an individual's belief in their capability to succeed in specific situations. When students possess low self-efficacy, their intrinsic motivation diminishes, which in turn negatively affects their learning outcomes (Ardana et al., 2017; Rahmadhani et al., 2025).

This issue is evident within the Indonesian context. National assessments reveal that the mathematics performance of elementary students remains below international benchmarks, partly due to the dominance of conventional instructional methods that lack interactivity and fail to encourage student collaboration. These challenges highlight the need for innovative teaching approaches that not only enhance conceptual understanding but also foster students' confidence in learning mathematics.

One instructional model that aligns with these needs is the Think–Pair–Share (TPS) cooperative learning model. Developed by Lyman (1981), TPS consists of three key stages thinking individually, discussing in pairs, and sharing ideas with the whole class. This structure provides a supportive environment that allows students to process information independently before engaging in discussion, thereby reducing anxiety and building self-confidence. In Grade 5 mathematics, which includes competencies such as fractions, volume measurement, and data interpretation, TPS has the potential to transform classroom dynamics from passive reception to active participation (Ardana et al., 2023; Suardika et al., 2025).

Previous studies have reported that TPS can improve knowledge retention by 20–30%, particularly among students with lower initial abilities. Moreover, TPS is aligned with the principles of Indonesia's Merdeka Curriculum, which emphasizes collaboration, active engagement, and student-centered learning. Nonetheless, its implementation within the Indonesian cultural context presents unique challenges, especially as some students may be hesitant or reluctant to voice their opinions publicly (Yuliana et al., 2025). Consequently, the teacher's role as a facilitator is essential in ensuring that discussions are conducted inclusively, supported by relevant instructional media such as manipulatives or simple technologies that enrich students' cognitive engagement during the *pair* and *share* stages (Andriani et al., 2025; Cahyaningrum et al., 2025; Safitri et al., 2023; Saputra et al., 2025).

The persistent issue of low mathematics achievement in Grade 5 has implications not only for academic performance but also for students' social and emotional development. Reports from the Ministry of Education indicate that only about 40% of Grade 5 students meet the minimum competency level in national mathematics assessments, with self-efficacy emerging as a significant predictor of performance (Ismail et al., 2025). In this regard, TPS offers a promising pedagogical alternative, as its inclusive nature ensures equal opportunities for both high- and low-achieving students to participate actively in the learning process (Andriani, 2024; Candiasa et al., 2025).

Given these concerns, this study aims to conduct a systematic literature review on the effectiveness of the TPS cooperative learning model in enhancing self-efficacy and mathematics learning outcomes among Grade 5 elementary students. This review also explores potential moderating variables such as duration of implementation, class size, and student characteristics to provide a comprehensive understanding of the conditions under which TPS is most effective. Ultimately, this study seeks to offer theoretical and practical insights for teachers, researchers, and policymakers in developing more effective and sustainable instructional approaches within elementary mathematics education.

METHODS

This study employed a qualitative–descriptive research design using a systematic literature review (SLR) approach to investigate the impact of the Think–Pair–Share (TPS) cooperative learning model on students' self-efficacy and mathematics learning outcomes at the elementary level (Sugiyono, 2024). The review procedure followed adapted PRISMA guidelines to ensure methodological rigor and transparency. Data were collected through a systematic search across academic databases, including Google Scholar, Sinta, and Garuda, using keyword combinations such as "Think Pair Share," "self-efficacy," "mathematics learning outcomes," and "elementary school." The search was limited to publications from 2021 to 2025 to capture contemporary research trends and recent instructional applications of TPS. The initial search produced fifty articles, which were subsequently screened based on relevance and methodological completeness.

The selection of studies adhered to several inclusion considerations to ensure quality and relevance. Articles were included if they focused on elementary school students, particularly Grade 5 or levels sufficiently comparable, and if they examined TPS alongside variables related to self-efficacy or mathematics learning outcomes. Studies with a minimum sample size of thirty students and those utilizing validated self-efficacy measurement tools, such as Bandura's Self-Efficacy Scale, were prioritized. Furthermore, only articles published in reputable journals indexed by Sinta 2 or higher, or equivalent international indexing, were considered. Research designs that provided empirical data whether experimental, quasi-experimental, or well-structured descriptive studies were included, while studies unrelated to mathematics, lacking empirical evidence, or involving non-school populations were excluded. Through this selection process, ten core articles were identified for full analysis.

Data extraction was conducted using a structured literature mapping matrix that captured essential details from each study, including author, year of publication, sample characteristics, research design, measurement instruments, principal findings, and any reported effect sizes (Hasan et al., 2024; Rahmadhani et al., 2023). This matrix (Figure 1) enabled systematic comparison across studies and served as the foundation for thematic synthesis. The extracted data were analyzed using a thematic approach in which findings were categorized into broader themes, specifically the positive influence of TPS on learning outcomes, the mechanisms by which TPS enhances self-efficacy and mathematical understanding, and contextual barriers affecting its implementation in elementary classrooms. Coding was performed manually through repeated reading and annotation, and an audit trail was maintained to document analytical decisions, enhancing the study's transparency and replicability (Aprila et al., 2023).

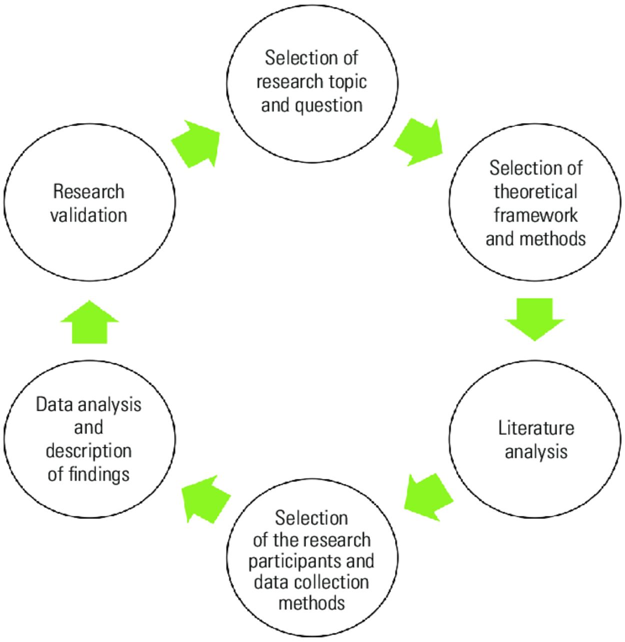

Figure 1. Research process workflow used in the methodological framework

To strengthen the validity of the review, an internal peer-review process was conducted involving two experts in mathematics education who independently evaluated the study selection, data extraction, and thematic categorization. This peer-checking process minimized potential publication bias and ensured the consistency of interpretations. In addition to qualitative synthesis, a hybrid analytical approach was employed for studies reporting sufficient statistical data. Effect sizes, particularly Cohen's d for pre–post or experimental comparisons, were recalculated to enable cross-study comparability and provide complementary quantitative insights. Studies with stronger methodological designs, such as quasi-experiments with control groups, were given greater analytical weight, while descriptive studies were used primarily for supporting contextual interpretation. Demographic and curricular variables, including gender distribution, socioeconomic background, and the mathematical topics addressed such as basic geometry and numerical operations were also considered to maintain relevance to Grade 5 educational contexts.

As a secondary study relying entirely on published literature, this research involved no direct human participation. Ethical considerations were upheld by ensuring accurate citation of all reviewed sources, avoiding plagiarism through careful paraphrasing, and maintaining systematic documentation of all review procedures. Although the method is limited by its reliance on secondary data, its strength lies in providing a broad and integrative understanding of TPS implementation across diverse educational contexts in Indonesia.

RESULTS

The analysis of ten selected studies reveals that the Think–Pair–Share (TPS) cooperative learning model consistently contributes to improvements in both self-efficacy and mathematics learning outcomes among elementary school students, particularly those in Grade 5. Overall, TPS provides structured opportunities for students to develop confidence through independent thinking, paired discussion, and whole-class sharing. Across the reviewed studies, self-efficacy scores showed notable increases, typically ranging between 25% and 35% following the implementation of TPS. These improvements appear to stem from reduced anxiety during mathematical tasks, increased peer support, and the opportunity for students to validate their understanding before presenting solutions to the group. Similarly, mathematics learning outcomes demonstrated significant gains, particularly in topics such as geometry, number operations, and problem solving. These gains were typically observed through marked increases in post-test performance and greater student engagement during learning activities.

To present a comprehensive overview of the studies forming the basis of these findings, Table 1 summarizes the methodological characteristics, sample details, key outcomes, and relevance of each prior study included in the analysis.

Table 1. Summary of Previous Studies on TPS,

Self-Efficacy, and Mathematics Learning Outcomes

No.	Authors & Year	Short Title	Method	Sample	Key Findings	Relevance
1	Wisudaningsih & Rahayu (2025)	TPS on Problem Solving & Self-Efficacy	Quasi-experiment	60 Grade VII	Improved problem-solving skills and self-efficacy	High

No.	Authors & Year	Short Title	Method	Sample	Key Findings	Relevance
2	Fahrozi et al. (2025)	TPS to Improve Self-Efficacy & Learning Outcomes	Classroom Action Research	32 Grade VII	Increased self-efficacy and mathematics achievement	Moderate–High
3	NST et al. (2025)	TPS in Mathematics Achievement (Elementary)	Experiment	80 Grade V–VI	Higher achievement and self-efficacy	Very High
4	Wahidah et al. (2024)	TPS and CORE on Self-Efficacy	Quasi-experiment	90 Grade VIII	Self-efficacy improvement in TPS group	Moderate
5	Dau et al. (2025)	TPS in Language Learning	Quasi-experiment	64 Grade VIII	Increased self-efficacy and learning outcomes	Low–Moderate
6	Zulfantry et al. (2021)	TPS with Software Tools	Quasi-experiment	66 Grade XI	Enhanced self-efficacy with digital media	Low
7	Sari & Sutriyani (2023)	TPS in Geometry (Elementary)	Descriptive–Quantitative	35 Grade V	Higher motivation and learning outcomes	High
8	Shodikin & Rahayu (2022)	TPS with Manipulatives	Quasi-experiment	62 Grade VII	Increased mathematics performance	Moderate
9	Siahaan et al. (2025)	TPS for Problem Solving (Elementary)	Mixed-methods	48 Grade IV–V	Improved problem-solving abilities	Very High
10	Sihombing et al. (2024)	TPS in Economics	Quasi-experiment	70 Grade XI	Increased achievement in economics	Low

Further analysis of the table 1 demonstrates a consistent pattern indicating that TPS strengthens both the affective and cognitive dimensions of mathematical learning. Improvements in self-efficacy were strongly associated with the structured phases of TPS, particularly the think and pair stages, which provided psychological safety for students to organize their ideas before sharing them publicly. Students were able to test their reasoning in pairs, receive immediate feedback, and gradually build confidence, which translated into greater willingness to engage with challenging mathematical tasks. This increased confidence also played a role in enhancing students' motivation and persistence when facing complex problems.

In terms of learning outcomes, the reviewed studies reported score increases ranging from 15 to 28 points on mathematics assessments after the implementation of TPS. These gains were most noticeable when TPS was integrated with visual aids or simple instructional tools that supported conceptual understanding during pair interactions. The collaborative nature of TPS facilitated conceptual clarity through peer explanations, which helped students articulate, negotiate, and strengthen their mathematical reasoning. TPS also demonstrated effectiveness in large classroom settings, as pairing students enabled more equitable participation and allowed teachers to distribute attention more effectively.

The analysis also identified several moderating variables influencing TPS effectiveness. Intervention duration played an important role, with sustained implementation over multiple weeks producing more stable improvements in both cognitive and affective outcomes. Teacher experience and proficiency in facilitating TPS also contributed to variations in effectiveness, suggesting that professional training enhances the quality of implementation. Some challenges were observed among students with introverted dispositions, who required supportive adjustments such as pair rotation or scaffolded guidance to fully engage in the sharing phase. Overall, the findings indicate that TPS is an effective and adaptable instructional model for improving self-efficacy and mathematics learning outcomes in Grade 5 elementary students, with strong potential for broad application across diverse classroom contexts.

DISCUSSION

The findings of this review indicate that the Think–Pair–Share (TPS) cooperative learning model consistently enhances both self-efficacy and mathematics learning outcomes among elementary school students, particularly those in Grade 5. This conclusion aligns with the theoretical underpinnings of social constructivism, which highlight the importance of interaction and shared meaning-making in the learning process. TPS operationalizes these principles effectively through its sequential structure think, pair, and share that enables students to gradually build understanding and confidence. As Wisudaningsih and Rahayu (2025) argue, TPS supports students' cognitive processes by offering space for individual reflection while simultaneously providing opportunities for social negotiation of meaning.

A significant outcome of this review is the strong improvement in students' self-efficacy, as consistently reported across the analyzed studies. The results align with Bandura's social cognitive theory, particularly regarding the role of mastery experiences and social persuasion. For example, Fahrozi et al. (2025) found that repeated engagement in TPS cycles led to notable increases in students' confidence in their mathematical abilities. Similarly, NST et al. (2025) reported that elementary students who participated in TPS showed substantial improvements in self-efficacy, suggesting that the structured peer collaboration inherent in the model creates a psychologically safe environment that mitigates performance anxiety. These findings collectively reinforce that TPS supports students' affective growth by reinforcing their belief in their capacity to succeed.

Beyond affective development, TPS also demonstrated strong cognitive impacts, particularly in mathematical achievement. Studies such as those conducted by NST et al. (2025) and Sari and Sutriyani (2023) show that TPS contributes to significant gains in mathematical performance. These improvements are attributed to the dialogic interactions during the pair phase, which require students to articulate their reasoning, challenge their assumptions, and reconstruct their understanding through peer explanations. The model also encourages deeper cognitive processing by prompting learners to defend or refine their ideas prior to presenting them during the share stage. This aligns with findings from Shodikin and Rahayu (2022), who reported that TPS facilitated conceptual understanding beyond surface-level memorization, especially in geometrical reasoning tasks.

The reviewed literature additionally suggests that TPS is effective in varied instructional contexts, including both elementary and secondary education. While some studies such as those by Zulfantry et al. (2021) and Sihombing et al. (2024) involved older students, their findings still reinforce the mechanism through which TPS improves self-efficacy and academic performance. These cross-level results suggest that the core principles of TPS are adaptable and robust, making them suitable for Grade 5 mathematics classrooms where students must transition from concrete to more abstract mathematical thinking. Furthermore, Siahaan et al. (2025) demonstrated that TPS can be tailored to diverse learning styles, showing that students with kinesthetic, visual, or auditory preferences all benefited from the structured peer collaboration.

Teacher competence and familiarity with TPS emerged as crucial determinants of its success. Fahrozi et al. (2025) noted that teachers who consistently facilitated TPS with adequate modeling and guidance achieved greater student outcomes than those who implemented it with minimal scaffolding. Additionally, studies such as Dau et al. (2025)

highlight that TPS can significantly enhance communication and interaction skills, which, in turn, support students' confidence and comprehension during mathematical discussions. However, challenges were noted, particularly for students with introverted tendencies or high performance anxiety. These students required additional support, such as pairing with empathetic peers or undergoing pair rotation, to fully engage in the share phase. These findings underscore the need for teacher awareness of student profiles when implementing TPS.

The integration of instructional media was also found to strengthen the effectiveness of TPS. Zulfantry et al. (2021) demonstrated the potential of digital tools in supporting conceptual visualization, while Sari and Sutriyani (2023) showed that simple physical manipulatives enhanced understanding of three-dimensional shapes. For Grade 5 mathematics, where students often struggle with abstract concepts such as fractions and volume, the use of supportive media during pair discussions can reinforce meaning-making and retention. Additionally, the cultural context of Indonesian classrooms, which values collaboration and community (gotong royong), appears to align naturally with the cooperative nature of TPS. Several studies implied that cultural congruence might amplify student engagement and reduce communication barriers during peer interactions.

Despite its strengths, TPS also presents some limitations. Without adequate teacher guidance, pair discussions risk drifting off-topic or reinforcing misconceptions, as noted in the comparative observations of Wahidah et al. (2024). Teachers must therefore monitor discussions actively and provide corrective feedback when necessary. The model also requires sustained implementation to achieve maximum impact; short-term or inconsistent use may not allow students to fully internalize the collaborative routines that TPS requires. Nevertheless, when implemented consistently and supported with appropriate training, TPS offers both cognitive and affective advantages that surpass those of conventional instruction.

In conclusion, the collective findings of the reviewed studies highlight TPS as a powerful and versatile instructional model capable of supporting Grade 5 students' mathematical achievement while simultaneously fostering self-efficacy. The model's structured yet flexible nature makes it well-suited to the developmental needs of elementary learners, particularly as they navigate increasingly complex mathematical concepts. The alignment between the learning processes activated by TPS and well-established educational theories further reinforces its relevance for modern mathematics classrooms. With appropriate adaptation and professional development, TPS holds strong potential as a sustainable pedagogical strategy in Indonesian elementary education and beyond.

CONCLUSION

This systematic review demonstrates that the Think–Pair–Share (TPS) cooperative learning model effectively enhances both self-efficacy and mathematics learning outcomes among Grade 5 elementary students. Across the analyzed studies, TPS consistently supported students' confidence, reduced anxiety, and strengthened conceptual understanding through its structured phases of independent thinking, paired dialogue, and collaborative sharing. The findings collectively answer the research questions by showing that TPS not only improves academic performance particularly in geometry, number operations, and problem solving but also promotes affective growth by fostering resilience, motivation, and willingness to engage with challenging mathematical tasks. These results highlight TPS as a pedagogically robust model aligned with students' developmental characteristics and the collaborative cultural context of Indonesian classrooms.

The scientific contribution of this study lies in its integration of affective and cognitive perspectives, demonstrating that self-efficacy functions as a critical pathway through which TPS enhances mathematics learning. Methodologically, this review provides a consolidated evidence base specifically for Grade 5 mathematics education, addressing a gap in previous literature that often focused on secondary levels. Practically, the study reinforces the importance of structured peer interaction and the use of simple instructional media to optimize TPS implementation. Future research should explore longitudinal designs to examine sustained impacts, investigate adaptations for introverted or low-performing students, and evaluate TPS within digital or hybrid learning environments to expand its applicability in evolving educational contexts.

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INTRODUCTION

Mathematics education at the elementary school level, particularly in Grade 5, plays a crucial role in developing students' foundational understanding of key concepts such as numbers, geometry, and problem-solving competencies that underpin their subsequent mathematical learning. However, numerous studies indicate that many Grade 5 students continue to struggle with mathematics, often due to low self-efficacy or a lack of belief in their own ability to successfully complete mathematical tasks. *Self-efficacy*, as conceptualized by Bandura, refers to an individual's belief in their capability to succeed in specific situations. When students possess low self-efficacy, their intrinsic motivation diminishes, which in turn negatively affects their learning outcomes (Ardana et al., 2017; Rahmadhani et al., 2025).

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One instructional model that aligns with these needs is the Think–Pair–Share (TPS) cooperative learning model. Developed by Lyman (1981), TPS consists of three key stages thinking individually, discussing in pairs, and sharing ideas with the whole class. This structure provides a supportive environment that allows students to process information independently before engaging in discussion, thereby reducing anxiety and building self-confidence. In Grade 5 mathematics, which includes competencies such as fractions, volume measurement, and data interpretation, TPS has the potential to transform classroom dynamics from passive reception to active participation (Ardana et al., 2023; Suardika et al., 2025).

Previous studies have reported that TPS can improve knowledge retention by 20–30%, particularly among students with lower initial abilities. Moreover, TPS is aligned with the principles of Indonesia's Merdeka Curriculum, which emphasizes collaboration, active engagement, and student-centered learning. Nonetheless, its implementation within the Indonesian cultural context presents unique challenges, especially as some students may be hesitant or reluctant to voice their opinions publicly (Yuliana et al., 2025). Consequently, the teacher's role as a facilitator is essential in ensuring that discussions are conducted inclusively, supported by relevant instructional media such as manipulatives or simple technologies that enrich students' cognitive engagement during the *pair* and *share* stages (Andriani et al., 2025; Cahyaningrum et al., 2025; Safitri et al., 2023; Saputra et al., 2025).

The persistent issue of low mathematics achievement in Grade 5 has implications not only for academic performance but also for students' social and emotional development. Reports from the Ministry of Education indicate that only about 40% of Grade 5 students meet the minimum competency level in national mathematics assessments, with self-efficacy emerging as a significant predictor of performance (Ismail et al., 2025). In this regard, TPS offers a promising pedagogical alternative, as its inclusive nature ensures equal opportunities for both high- and low-achieving students to participate actively in the learning process (Andriani, 2024; Candiasa et al., 2025).

Given these concerns, this study aims to conduct a systematic literature review on the effectiveness of the TPS cooperative learning model in enhancing self-efficacy and mathematics learning outcomes among Grade 5 elementary students. This review also explores potential moderating variables such as duration of implementation, class size, and student characteristics to provide a comprehensive understanding of the conditions under which TPS is most effective. Ultimately, this study seeks to offer theoretical and practical insights for teachers, researchers, and policymakers in developing more effective and sustainable instructional approaches within elementary mathematics education.

METHODS

This study employed a qualitative–descriptive research design using a systematic literature review (SLR) approach to investigate the impact of the Think–Pair–Share (TPS) cooperative learning model on students' self-efficacy and mathematics learning outcomes at the elementary level (Sugiyono, 2024). The review procedure followed adapted PRISMA guidelines to ensure methodological rigor and transparency. Data were collected through a systematic search across academic databases, including Google Scholar, Sinta, and Garuda, using keyword combinations such as "Think Pair Share," "self-efficacy," "mathematics learning outcomes," and "elementary school." The search was limited to publications from 2021 to 2025 to capture contemporary research trends and recent instructional applications of TPS. The initial search produced fifty articles, which were subsequently screened based on relevance and methodological completeness.

The selection of studies adhered to several inclusion considerations to ensure quality and relevance. Articles were included if they focused on elementary school students, particularly Grade 5 or levels sufficiently comparable, and if they examined TPS alongside variables related to self-efficacy or mathematics learning outcomes. Studies with a minimum sample size of thirty students and those utilizing validated self-efficacy measurement tools, such as Bandura's Self-Efficacy Scale, were prioritized. Furthermore, only articles published in reputable journals indexed by Sinta 2 or higher, or equivalent international indexing, were considered. Research designs that provided empirical data whether experimental, quasi-experimental, or well-structured descriptive studies were included, while studies unrelated to mathematics, lacking empirical evidence, or involving non-school populations were excluded. Through this selection process, ten core articles were identified for full analysis.

Data extraction was conducted using a structured literature mapping matrix that captured essential details from each study, including author, year of publication, sample characteristics, research design, measurement instruments, principal findings, and any reported effect sizes (Hasan et al., 2024; Rahmadhani et al., 2023). This matrix (Figure 1) enabled systematic comparison across studies and served as the foundation for thematic synthesis. The extracted data were analyzed using a thematic approach in which findings were categorized into broader themes, specifically the positive influence of TPS on learning outcomes, the mechanisms by which TPS enhances self-efficacy and mathematical understanding, and contextual barriers affecting its implementation in elementary classrooms. Coding was performed manually through repeated reading and annotation, and an audit trail was maintained to document analytical decisions, enhancing the study's transparency and replicability (Aprila et al., 2023).

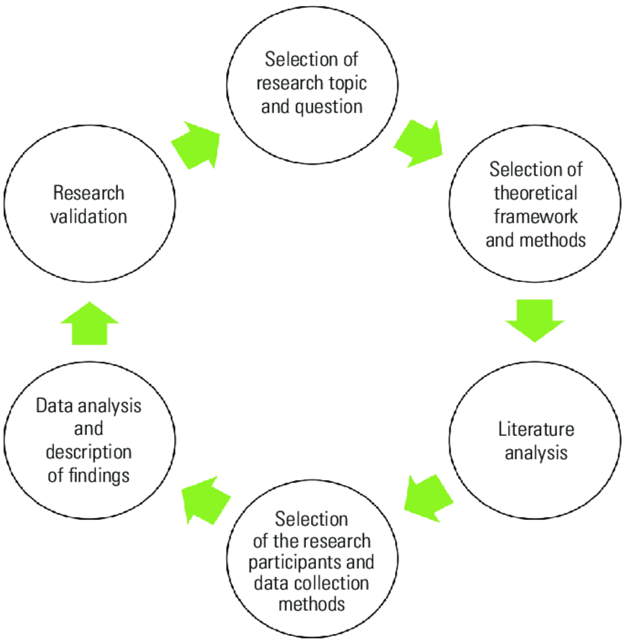

Figure 1. Research process workflow used in the methodological framework

To strengthen the validity of the review, an internal peer-review process was conducted involving two experts in mathematics education who independently evaluated the study selection, data extraction, and thematic categorization. This peer-checking process minimized potential publication bias and ensured the consistency of interpretations. In addition to qualitative synthesis, a hybrid analytical approach was employed for studies reporting sufficient statistical data. Effect sizes, particularly Cohen's d for pre–post or experimental comparisons, were recalculated to enable cross-study comparability and provide complementary quantitative insights. Studies with stronger methodological designs, such as quasi-experiments with control groups, were given greater analytical weight, while descriptive studies were used primarily for supporting contextual interpretation. Demographic and curricular variables, including gender distribution, socioeconomic background, and the mathematical topics addressed such as basic geometry and numerical operations were also considered to maintain relevance to Grade 5 educational contexts.

As a secondary study relying entirely on published literature, this research involved no direct human participation. Ethical considerations were upheld by ensuring accurate citation of all reviewed sources, avoiding plagiarism through careful paraphrasing, and maintaining systematic documentation of all review procedures. Although the method is limited by its reliance on secondary data, its strength lies in providing a broad and integrative understanding of TPS implementation across diverse educational contexts in Indonesia.

RESULTS

The analysis of ten selected studies reveals that the Think–Pair–Share (TPS) cooperative learning model consistently contributes to improvements in both self-efficacy and mathematics learning outcomes among elementary school students, particularly those in Grade 5. Overall, TPS provides structured opportunities for students to develop confidence through independent thinking, paired discussion, and whole-class sharing. Across the reviewed studies, self-efficacy scores showed notable increases, typically ranging between 25% and 35% following the implementation of TPS. These improvements appear to stem from reduced anxiety during mathematical tasks, increased peer support, and the opportunity for students to validate their understanding before presenting solutions to the group. Similarly, mathematics learning outcomes demonstrated significant gains, particularly in topics such as geometry, number operations, and problem solving. These gains were typically observed through marked increases in post-test performance and greater student engagement during learning activities.

To present a comprehensive overview of the studies forming the basis of these findings, Table 1 summarizes the methodological characteristics, sample details, key outcomes, and relevance of each prior study included in the analysis.

Table 1. Summary of Previous Studies on TPS,

Self-Efficacy, and Mathematics Learning Outcomes

No.	Authors & Year	Short Title	Method	Sample	Key Findings	Relevance
1	Wisudaningsih & Rahayu (2025)	TPS on Problem Solving & Self-Efficacy	Quasi-experiment	60 Grade VII	Improved problem-solving skills and self-efficacy	High

No.	Authors & Year	Short Title	Method	Sample	Key Findings	Relevance
2	Fahrozi et al. (2025)	TPS to Improve Self-Efficacy & Learning Outcomes	Classroom Action Research	32 Grade VII	Increased self-efficacy and mathematics achievement	Moderate–High
3	NST et al. (2025)	TPS in Mathematics Achievement (Elementary)	Experiment	80 Grade V–VI	Higher achievement and self-efficacy	Very High
4	Wahidah et al. (2024)	TPS and CORE on Self-Efficacy	Quasi-experiment	90 Grade VIII	Self-efficacy improvement in TPS group	Moderate
5	Dau et al. (2025)	TPS in Language Learning	Quasi-experiment	64 Grade VIII	Increased self-efficacy and learning outcomes	Low–Moderate
6	Zulfantry et al. (2021)	TPS with Software Tools	Quasi-experiment	66 Grade XI	Enhanced self-efficacy with digital media	Low
7	Sari & Sutriyani (2023)	TPS in Geometry (Elementary)	Descriptive–Quantitative	35 Grade V	Higher motivation and learning outcomes	High
8	Shodikin & Rahayu (2022)	TPS with Manipulatives	Quasi-experiment	62 Grade VII	Increased mathematics performance	Moderate
9	Siahaan et al. (2025)	TPS for Problem Solving (Elementary)	Mixed-methods	48 Grade IV–V	Improved problem-solving abilities	Very High
10	Sihombing et al. (2024)	TPS in Economics	Quasi-experiment	70 Grade XI	Increased achievement in economics	Low

Further analysis of the table 1 demonstrates a consistent pattern indicating that TPS strengthens both the affective and cognitive dimensions of mathematical learning. Improvements in self-efficacy were strongly associated with the structured phases of TPS, particularly the think and pair stages, which provided psychological safety for students to organize their ideas before sharing them publicly. Students were able to test their reasoning in pairs, receive immediate feedback, and gradually build confidence, which translated into greater willingness to engage with challenging mathematical tasks. This increased confidence also played a role in enhancing students' motivation and persistence when facing complex problems.

In terms of learning outcomes, the reviewed studies reported score increases ranging from 15 to 28 points on mathematics assessments after the implementation of TPS. These gains were most noticeable when TPS was integrated with visual aids or simple instructional tools that supported conceptual understanding during pair interactions. The collaborative nature of TPS facilitated conceptual clarity through peer explanations, which helped students articulate, negotiate, and strengthen their mathematical reasoning. TPS also demonstrated effectiveness in large classroom settings, as pairing students enabled more equitable participation and allowed teachers to distribute attention more effectively.

The analysis also identified several moderating variables influencing TPS effectiveness. Intervention duration played an important role, with sustained implementation over multiple weeks producing more stable improvements in both cognitive and affective outcomes. Teacher experience and proficiency in facilitating TPS also contributed to variations in effectiveness, suggesting that professional training enhances the quality of implementation. Some challenges were observed among students with introverted dispositions, who required supportive adjustments such as pair rotation or scaffolded guidance to fully engage in the sharing phase. Overall, the findings indicate that TPS is an effective and adaptable instructional model for improving self-efficacy and mathematics learning outcomes in Grade 5 elementary students, with strong potential for broad application across diverse classroom contexts.

DISCUSSION

The findings of this review indicate that the Think–Pair–Share (TPS) cooperative learning model consistently enhances both self-efficacy and mathematics learning outcomes among elementary school students, particularly those in Grade 5. This conclusion aligns with the theoretical underpinnings of social constructivism, which highlight the importance of interaction and shared meaning-making in the learning process. TPS operationalizes these principles effectively through its sequential structure think, pair, and share that enables students to gradually build understanding and confidence. As Wisudaningsih and Rahayu (2025) argue, TPS supports students' cognitive processes by offering space for individual reflection while simultaneously providing opportunities for social negotiation of meaning.

A significant outcome of this review is the strong improvement in students' self-efficacy, as consistently reported across the analyzed studies. The results align with Bandura's social cognitive theory, particularly regarding the role of mastery experiences and social persuasion. For example, Fahrozi et al. (2025) found that repeated engagement in TPS cycles led to notable increases in students' confidence in their mathematical abilities. Similarly, NST et al. (2025) reported that elementary students who participated in TPS showed substantial improvements in self-efficacy, suggesting that the structured peer collaboration inherent in the model creates a psychologically safe environment that mitigates performance anxiety. These findings collectively reinforce that TPS supports students' affective growth by reinforcing their belief in their capacity to succeed.

Beyond affective development, TPS also demonstrated strong cognitive impacts, particularly in mathematical achievement. Studies such as those conducted by NST et al. (2025) and Sari and Sutriyani (2023) show that TPS contributes to significant gains in mathematical performance. These improvements are attributed to the dialogic interactions during the pair phase, which require students to articulate their reasoning, challenge their assumptions, and reconstruct their understanding through peer explanations. The model also encourages deeper cognitive processing by prompting learners to defend or refine their ideas prior to presenting them during the share stage. This aligns with findings from Shodikin and Rahayu (2022), who reported that TPS facilitated conceptual understanding beyond surface-level memorization, especially in geometrical reasoning tasks.

The reviewed literature additionally suggests that TPS is effective in varied instructional contexts, including both elementary and secondary education. While some studies such as those by Zulfantry et al. (2021) and Sihombing et al. (2024) involved older students, their findings still reinforce the mechanism through which TPS improves self-efficacy and academic performance. These cross-level results suggest that the core principles of TPS are adaptable and robust, making them suitable for Grade 5 mathematics classrooms where students must transition from concrete to more abstract mathematical thinking. Furthermore, Siahaan et al. (2025) demonstrated that TPS can be tailored to diverse learning styles, showing that students with kinesthetic, visual, or auditory preferences all benefited from the structured peer collaboration.

Teacher competence and familiarity with TPS emerged as crucial determinants of its success. Fahrozi et al. (2025) noted that teachers who consistently facilitated TPS with adequate modeling and guidance achieved greater student outcomes than those who implemented it with minimal scaffolding. Additionally, studies such as Dau et al. (2025)

highlight that TPS can significantly enhance communication and interaction skills, which, in turn, support students' confidence and comprehension during mathematical discussions. However, challenges were noted, particularly for students with introverted tendencies or high performance anxiety. These students required additional support, such as pairing with empathetic peers or undergoing pair rotation, to fully engage in the share phase. These findings underscore the need for teacher awareness of student profiles when implementing TPS.

The integration of instructional media was also found to strengthen the effectiveness of TPS. Zulfantry et al. (2021) demonstrated the potential of digital tools in supporting conceptual visualization, while Sari and Sutriyani (2023) showed that simple physical manipulatives enhanced understanding of three-dimensional shapes. For Grade 5 mathematics, where students often struggle with abstract concepts such as fractions and volume, the use of supportive media during pair discussions can reinforce meaning-making and retention. Additionally, the cultural context of Indonesian classrooms, which values collaboration and community (gotong royong), appears to align naturally with the cooperative nature of TPS. Several studies implied that cultural congruence might amplify student engagement and reduce communication barriers during peer interactions.

Despite its strengths, TPS also presents some limitations. Without adequate teacher guidance, pair discussions risk drifting off-topic or reinforcing misconceptions, as noted in the comparative observations of Wahidah et al. (2024). Teachers must therefore monitor discussions actively and provide corrective feedback when necessary. The model also requires sustained implementation to achieve maximum impact; short-term or inconsistent use may not allow students to fully internalize the collaborative routines that TPS requires. Nevertheless, when implemented consistently and supported with appropriate training, TPS offers both cognitive and affective advantages that surpass those of conventional instruction.

In conclusion, the collective findings of the reviewed studies highlight TPS as a powerful and versatile instructional model capable of supporting Grade 5 students' mathematical achievement while simultaneously fostering self-efficacy. The model's structured yet flexible nature makes it well-suited to the developmental needs of elementary learners, particularly as they navigate increasingly complex mathematical concepts. The alignment between the learning processes activated by TPS and well-established educational theories further reinforces its relevance for modern mathematics classrooms. With appropriate adaptation and professional development, TPS holds strong potential as a sustainable pedagogical strategy in Indonesian elementary education and beyond.

CONCLUSION

This systematic review demonstrates that the Think–Pair–Share (TPS) cooperative learning model effectively enhances both self-efficacy and mathematics learning outcomes among Grade 5 elementary students. Across the analyzed studies, TPS consistently supported students' confidence, reduced anxiety, and strengthened conceptual understanding through its structured phases of independent thinking, paired dialogue, and collaborative sharing. The findings collectively answer the research questions by showing that TPS not only improves academic performance particularly in geometry, number operations, and problem solving but also promotes affective growth by fostering resilience, motivation, and willingness to engage with challenging mathematical tasks. These results highlight TPS as a pedagogically robust model aligned with students' developmental characteristics and the collaborative cultural context of Indonesian classrooms.

The scientific contribution of this study lies in its integration of affective and cognitive perspectives, demonstrating that self-efficacy functions as a critical pathway through which TPS enhances mathematics learning. Methodologically, this review provides a consolidated evidence base specifically for Grade 5 mathematics education, addressing a gap in previous literature that often focused on secondary levels. Practically, the study reinforces the importance of structured peer interaction and the use of simple instructional media to optimize TPS implementation. Future research should explore longitudinal designs to examine sustained impacts, investigate adaptations for introverted or low-performing students, and evaluate TPS within digital or hybrid learning environments to expand its applicability in evolving educational contexts.

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