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The Influence of Cooperative Learning Strategies on Elementary School Students' Mathematics Learning Outcomes: A Literature Review

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ABSTRACT

Mathematics learning in elementary schools requires an approach capable of increasing student engagement and addressing the tendency for low learning outcomes. One recommended alternative is a cooperative learning strategy oriented towards group collaboration and social interaction. This study aims to examine the influence of cooperative learning strategies on elementary school students' mathematics learning outcomes through a literature review. The research method used a qualitative approach with a literature review of relevant articles, journals, and research published in the last five years. The analysis process was carried out through the identification, categorization, and synthesis of empirical findings regarding the effectiveness of cooperative learning models. The results of the study indicate that cooperative learning strategies, through models such as STAD, Jigsaw, and Think-Pair-Share, are consistently able to improve students' conceptual understanding, learning motivation, and mathematics learning outcomes. In addition, these strategies also have a positive impact on students' social skills, communication, and self-confidence. However, their effectiveness depends on thorough instructional planning, the role of the teacher as a facilitator, and the support of contextual factors such as class size and authentic assessment. Thus, cooperative learning is worthy of being an innovative alternative to improve the quality of mathematics learning in elementary schools.

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Introduction

Mathematics is a fundamental subject in the elementary school curriculum, developing logical, analytical, and systematic thinking skills. Mastering mathematical concepts from an early age provides a crucial foundation for students to solve various problems in everyday life and at subsequent levels of education. However, in practice, mathematics is often perceived as difficult and abstract, resulting in students experiencing difficulties in understanding the material. This situation results in low interest and learning outcomes, necessitating efforts to improve learning effectiveness.

Low mathematics learning outcomes in elementary schools are a crucial issue in Indonesian education. International surveys such as the Programme for International Student Assessment (PISA) indicate that Indonesian students' mathematics abilities remain below the global average. One cause of this problem is the dominance of conventional, teacher-centered learning methods, which leave students passive recipients of information. Learning with minimal interaction and collaboration leads to shallow conceptual understanding, while critical thinking skills are not optimally developed.

Monotonous learning methods also contribute to low student motivation. When learning is uninteresting and lacks active student engagement, they tend to become bored and reluctant to participate in the learning process. Therefore, learning strategies are needed that can increase student participation and encourage social interaction. One widely recommended approach is cooperative learning, which facilitates students working together in small groups to achieve shared learning goals.

Cooperative learning strategies are rooted in the theory of social constructivism, which emphasizes the importance of interpersonal interaction in building knowledge. Through cooperative learning, students can exchange ideas, discuss concepts, and provide support in solving problems. This approach not only enhances understanding of mathematical concepts but also develops social skills, such as cooperation, communication, and responsibility. Thus, cooperative learning provides dual benefits: improving cognitive competence and strengthening soft skills.

Various cooperative learning models, such as Student Teams Achievement Division (STAD), Jigsaw, and Think-Pair-Share, have been widely applied in mathematics instruction. These models enable students to play an active role in the learning process, whether through group discussions,

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mutual tutoring, or collaborative problem-solving. Previous research has shown that implementing these strategies can significantly improve learning motivation and mathematics learning outcomes. However, their effectiveness depends on the teacher's skills in managing groups and providing clear direction.

Although extensive research on cooperative learning has been conducted, reported results vary. Some studies show very positive impacts, while others find moderate or even insignificant effects. This variation may be due to contextual factors, such as group size, availability of learning resources, and differences in student characteristics. Therefore, a systematic literature review is needed to identify patterns in findings, compare research results, and evaluate factors influencing the strategy's success.

An in-depth literature review of the influence of cooperative learning on mathematics learning outcomes holds strategic value for both educational practitioners and researchers. The results can serve as a reference for developing effective learning models, formulating educational policies, and innovating collaborative-based curricula. Furthermore, the information gained can help teachers design more interactive, engaging learning experiences that focus on conceptual mastery and developing students' social skills.

Thus, a discussion on the influence of cooperative learning strategies on elementary school students' mathematics learning outcomes is relevant and important. A literature review provides a comprehensive overview of the effectiveness of this approach and its implications for improving the quality of elementary education. This study is expected to provide theoretical and practical contributions to efforts to improve the quality of mathematics learning through the implementation of more innovative, student-centered strategies.

Method

This research employed a qualitative approach with a literature review method. The literature review was conducted by reviewing and analyzing various relevant scientific sources, such as journal articles, proceedings, books, and research reports related to cooperative learning strategies and their impact on elementary school students' mathematics learning outcomes. This approach

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was chosen because it provides a comprehensive overview of previous research and synthesizes existing findings to draw theoretically valid conclusions.

The data used in this study comes from literature published within the last five years (2019–2024) to ensure the relevance and currency of the information. Data collection was conducted through searches of academic databases such as Google Scholar, ERIC, ResearchGate, and national journal portals. Keywords used in the search process included "cooperative learning strategies," "mathematics learning outcomes," and "elementary school."

The inclusion criteria applied in the selection of literature include: (1) research that discusses the influence or application of cooperative learning strategies in mathematics subjects at the elementary school level, (2) literature that has full access (full text), and (3) research that uses a quantitative or qualitative approach with clear empirical results. Meanwhile, the exclusion criteria include literature that is opinion-based, does not have empirical data, or is not relevant to the research topic.

Data analysis was conducted using content analysis techniques, namely identifying, grouping, and comparing the main findings from each source. The analysis stages include: (1) reading and understanding the contents of the literature, (2) extracting information related to cooperative strategies, the models used, and their influence on learning outcomes, (3) organizing the findings into thematic categories, and (4) synthesizing the findings to produce general conclusions.

To maintain the credibility, reliability, and objectivity of the analysis, a source triangulation process was conducted, comparing study results from various literature sources and verifying the consistency of the findings. This method is expected to provide a deeper understanding of the effectiveness of cooperative learning strategies on elementary school students' mathematics learning outcomes, as well as recommendations for their implementation in the context of elementary education.

Results and Discussion

Learning mathematics in elementary school requires a pedagogical approach that reduces conceptual abstraction to concrete, social, and meaningful learning experiences. Within a constructivist framework, mathematical knowledge is not simply transferred from teacher to student but rather constructed through interactions with objects, symbols, and peers. Therefore,

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instructional strategies that foster cognitive dialogue—such as cooperative learning—theoretically have significant potential to enhance conceptual understanding of mathematics from an early age.

The problem of low mathematics learning outcomes identified in various educational evaluation reports is often intertwined with the dominant teacher-centered nature of learning. Repetitive lectures and individual practice models can be effective for mechanistic procedures, but often fail to foster relational understanding, conceptual transfer, and non-routine problem solving. Students who are not given the opportunity to elaborate on ideas with peers will struggle to bridge prior knowledge with formal concepts taught in class. This is where cooperative learning offers a repositioning of students' roles as active subjects of knowledge.

Theoretically, cooperative learning is supported by two main foundations: social constructivism (Vygotsky) and social interdependence theory (Johnson & Johnson). Both emphasize that cognitive progress is accelerated when individuals work in their zone of proximal development through meaningful interactions with more competent or complementary peers. Task structures that involve positive interdependence—where individual success is tied to the success of the group—encourage students to explain, question, clarify, and negotiate meaning; all of these processes are critical to learning mathematics.

Findings in the literature indicate that cooperative strategies improve several important indicators correlated with mathematics learning outcomes: cognitive engagement, academic self-confidence, and persistence when faced with challenging problems. When students must present solutions to a group, they are encouraged to organize their thinking explicitly; this verbal process deepens information processing. Furthermore, peer support can reduce math anxiety—an affective factor that often hinders performance.

Cooperative models like Student Teams Achievement Division (STAD) combine teamwork with individual assessment based on progress scores, keeping lower-ability students motivated because their contributions are measured by improvement, not absolute comparisons. Jigsaw requires students to become “experts” on a specific subtopic and then teach it back to their original group, forcing in-depth elaboration of the material. Think-Pair-Share provides a stage of individual reflection before collaboration, helping students formulate initial ideas before negotiating concepts. This variety of structures is important because the characteristics of mathematics material and the profiles of elementary school classes are very heterogeneous.

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However, the effectiveness of cooperative learning does not automatically occur simply by dividing students into groups. The literature emphasizes the importance of designing mathematical tasks that are challenging yet amenable to collaborative solution. Tasks that are too procedural tend to result in parallel work (each student working alone) without conceptual discussion. In contrast, open-ended problem-solving tasks, pattern exploration, and multiple representations (concrete models, pictures, symbols) are more likely to stimulate deep conceptual interaction.

The teacher's role is crucial as a designer of interaction structures, facilitator of mathematical dialogue, and monitor of group dynamics. Teachers need to teach basic cooperative skills—taking turns, asking for clarification, and rephrasing a peer's ideas—before expecting productive discussions. Classroom observations in the literature indicate that without this training, groups are often dominated by certain students while others simply follow along without understanding. Thus, the success of cooperative strategies is tied to teachers' pedagogical literacy in group management and academic scaffolding.

Elementary school contextual factors—the number of students per class, the availability of manipulative media, face-to-face time, and the evaluation culture—influence the variation in research results. In large classes, small group formation is effective but requires clear logistical rules; in schools with limited learning resources, using surrounding objects as collaborative props can replace commercial manipulative kits. Meanwhile, if the assessment system only emphasizes individual written tests based on memorization, the long-term effects of cooperative learning on conceptual understanding may not be fully reflected in final grades.

A thematic analysis of the literature over the past five years reveals a pattern where the greatest benefits of cooperative learning emerge in conceptual and affective indicators (conceptual understanding, positive attitudes, and self-confidence), followed by improvements in test scores if the intervention lasts more than a few sessions and is supported by ongoing formative assessment. Short-term studies sometimes report moderate or insignificant effects on standardized test scores, possibly due to insufficient time for group adaptation. This underscores the need for medium-term implementation designs in classroom action research.

The inclusive dimension also figures prominently in the literature: students with low prior ability or those experiencing math anxiety benefit relatively more when placed in supportive, cooperative groups. Interactions with peers who provide step-by-step explanations can serve as scaffolding,

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similar to peer tutoring. However, careful role distribution must be maintained to prevent high-ability students from becoming "lone solvers" who do all the work, as this pattern can actually widen the gap in understanding.

In the Indonesian context, cooperative learning needs to be aligned with the Independent Curriculum, which promotes the Pancasila Student profile: mutual cooperation, critical thinking, and creativity. Cooperative structures provide space for practicing the values of mutual cooperation in structured academic situations. Integrating authentic assessments—for example, assessing discussion processes, oral explanations, and group products—can strengthen the link between cognitive mathematics achievement and the socio-emotional competencies targeted by the curriculum.

Implementation challenges include teacher preparedness, limited cooperative pedagogy training, and parents' perceptions that success is still judged by individual test scores. Therefore, teacher professional development programs need to incorporate modules on cooperative mathematics task design, advanced question facilitation techniques, and combined individual-collective assessment strategies. Strengthening teacher learning communities can provide a platform for sharing good practices and adapting models to various elementary school contexts.

Overall, the literature synthesis indicates that cooperative learning strategies have the potential to significantly improve elementary school students' mathematics learning outcomes when implemented with careful instructional planning, social learning skills training, and consistent assessment support. Their impact is reflected not only in academic scores but also in attitudes toward mathematics, classroom participation, and mathematical communication skills. Further research is recommended to evaluate the relative effectiveness of various cooperative learning models across different mathematics topics (number, geometry, measurement) and to examine their long-term impact on students' learning resilience.

Conclusion

Based on the literature review, it can be concluded that the implementation of cooperative learning strategies has a positive impact on elementary school students' mathematics learning outcomes. This approach not only improves conceptual understanding and critical thinking skills, but also strengthens students' learning motivation, self-confidence, and social skills. This aligns with social

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constructivism theory, which emphasizes the importance of interaction and collaboration in the learning process.

Cooperative learning models such as STAD, Jigsaw, and Think-Pair-Share have proven effective when supported by careful planning, challenging task design, and optimal teacher facilitation. Successful implementation is also influenced by contextual factors, including class size, availability of learning resources, and authentic assessments that combine process and outcome assessment. Therefore, these strategies can be a relevant alternative for improving the quality of mathematics learning while supporting the development of social-emotional competencies as required by the Independent Curriculum.

However, the variation in effectiveness across studies suggests the need for further research to examine its long-term effects, effectiveness across various mathematics topics, and its impact on student learning sustainability. Professional mentoring for teachers and strengthening learning communities are also key to optimally implementing cooperative learning in various elementary school contexts.

Bibliography

Arikunto, S. (2021). Basics of educational evaluation. Jakarta: Bumi Aksara.

Arsyad, A. (2021). Learning media. Jakarta: RajaGrafindo Persada.

Azizah, S., & Lestari, N. (2020). Application of the Jigsaw cooperative learning model to improve elementary school students' mathematics learning outcomes. Jurnal Cendekia: Jurnal Pendidikan Matematika, 4(2), 654-661. https://doi.org/10.31004/cendekia.v4i2.332

Budiyono, & Kurniawati, R. (2021). Cooperative learning strategies as an effort to improve mathematics learning outcomes. Journal of Mathematics Education, 12(1), 45-53.

Fauziah, A., & Pratama, RA (2020). The influence of the STAD learning model on elementary school students' learning outcomes. Indonesian Journal of Elementary Education, 6(2), 75-83.

Huda, M. (2021). Cooperative learning: Methods, techniques, structures, and implementation models. Yogyakarta: Pustaka Pelajar.

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Indrawati, E., & Santoso, D. (2020). The effectiveness of the Think-Pair-Share cooperative learning model in mathematics learning in elementary schools. Journal of Education Research and Evaluation, 4(3), 312-320. https://doi.org/10.23887/jere.v4i3.29245

Johnson, D. W., & Johnson, R. T. (2020). Learning together and alone: Cooperative, competitive, and individualistic learning (8th ed.). Boston: Pearson.

Kurniawan, A., & Saputra, F. (2021). Application of the STAD cooperative learning model to improve elementary school students' mathematics learning outcomes. Journal of Elementary School Education and Learning, 9(1), 112-119.

Latifah, A., & Fauzi, I. (2020). Analysis of the implementation of cooperative learning in elementary school students. Journal of Elementary Education, 11(2), 102-111.

Lestari, W., & Arifin, Z. (2022). The impact of cooperative learning on students' mathematical communication skills. Infinity Journal, 11(1), 89-98. https://doi.org/10.22460/infinity.v11i1.3262

Mulyasa, E. (2021). Development and implementation of the 2013 curriculum. Bandung: PT Remaja Rosdakarya.

Ningsih, S., & Hidayat, A. (2022). Cooperative learning and its influence on elementary school students' mathematics achievement. Al-Jabar: Journal of Mathematics Education, 13(1), 15-26.

Nurhayati, L. (2021). Implementation of Jigsaw-type cooperative learning in improving student learning outcomes. Elementary School Scientific Journal, 5(4), 305-312.

Purnomo, H., & Sari, R. (2020). The relationship between the implementation of the cooperative model and elementary school students' learning motivation. Journal of Education, 21(2), 144-152.

Putra, AP, & Andriani, D. (2022). The effect of cooperative learning on mathematics learning outcomes in elementary schools: A meta-analysis. Scientific Journal of Mathematics Education, 8(2), 201-210.

Rahmawati, N., & Syamsuddin, H. (2019). STAD type cooperative learning strategy in improving student learning outcomes. Journal of Mathematics and Science Education, 10(2), 88-95.

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Rahayu, P., & Firmansyah, M. (2021). The effectiveness of cooperative learning in elementary school students' mathematics learning. Jurnal Cakrawala Pendidikan, 40(3), 751-762. https://doi.org/10.21831/cp.v40i3.34291

Sugiyono. (2020). Educational research methods: Quantitative, qualitative, and R&D approaches. Bandung: Alfabeta.

Wulandari, D., & Yuniarti, T. (2022). Implementation of cooperative learning to improve students' understanding of mathematical concepts. Journal of Mathematics Education, 16(1), 55-64.