

SELF-EFFICACY AND THINK-PAIR-SHARE MODEL AS DETERMINANTS OF MATHEMATICS LEARNING OUTCOMES IN ELEMENTARY SCHOOLS

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Abstract

This study aims to analyze the effect of the Think Pair Share (TPS) learning model on the mathematics learning outcomes and self-efficacy of fifth-grade students at SDN 109/II Manggis, as well as to examine the relationship between these two variables. The background of this study is based on the low mathematics learning outcomes of students, most of whom have not yet achieved the Achievement Level Criteria (KKTP), with an average score of only 54.01. In addition, psychological factors such as low self-efficacy among students also contribute to weak motivation and self-confidence in facing mathematics learning. The research subjects were all fifth-grade students, with a cluster sampling technique used for data collection. Class VB, consisting of 27 students, was designated as the experimental class. The research design employed a quantitative approach using a pre-experimental method and a pretest-posttest control group design. The instruments used included a multiple-choice test of mathematics learning outcomes and a Likert-scale self-efficacy questionnaire, both of which had been validated for validity and reliability. Data analysis techniques included normality and homogeneity tests, the Wilcoxon Signed Rank Test, the Paired Sample t-Test, and Spearman's correlation using SPSS 25. The results showed that the application of the TPS model significantly improved students' mathematics learning outcomes and self-efficacy. Additionally, there was a strong positive correlation between self-efficacy and learning outcomes ($r = 0.709$; $p < 0.05$), indicating that the higher the students' self-confidence, the better their academic achievements. Therefore, TPS is recommended as an alternative strategy for mathematics learning in elementary schools.

Keywords: Think Pair Share, mathematics learning outcomes, self-efficacy

Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh model pembelajaran Think Pair Share (TPS) terhadap hasil belajar matematika dan self-efficacy siswa kelas V SDN 109/II Manggis, serta melihat hubungan antara kedua variabel tersebut. Latar belakang penelitian ini didasari oleh rendahnya hasil belajar matematika siswa yang sebagian besar belum mencapai Kriteria Ketuntasan Tingkat Pencapaian (KKTP), dengan rata-rata nilai hanya 54,01. Selain itu, faktor psikologis berupa rendahnya self-efficacy siswa turut menjadi penyebab lemahnya motivasi dan kepercayaan diri dalam menghadapi pembelajaran matematika. Subjek penelitian adalah seluruh siswa kelas V dengan teknik pengambilan sampel menggunakan cluster sampling, di mana kelas VB berjumlah 27 siswa ditetapkan sebagai kelas eksperimen. Desain penelitian menggunakan pendekatan kuantitatif dengan metode pre-experimental dan rancangan pretest-posttest control group design. Instrumen yang digunakan berupa tes pilihan ganda hasil belajar matematika dan angket self-efficacy skala Likert yang telah diuji validitas dan reliabilitasnya. Teknik analisis data meliputi uji normalitas, homogenitas, Wilcoxon Signed Rank Test, Paired Sample t-Test, serta korelasi Spearman menggunakan SPSS 25. Hasil penelitian menunjukkan bahwa penerapan model TPS secara signifikan meningkatkan hasil belajar matematika dan self-efficacy siswa. Selain itu, terdapat korelasi positif yang kuat antara self-efficacy dengan hasil belajar ($r = 0,709$; $p < 0,05$), yang mengindikasikan bahwa semakin tinggi keyakinan diri siswa, semakin baik pula capaian akademiknya. Dengan demikian, TPS direkomendasikan sebagai alternatif strategi pembelajaran matematika di sekolah dasar.

Kata kunci: Think Pair Share, hasil belajar matematika, self-efficacy

INTRODUCTION

Effective education is able to deliver students from natural conditions to a better civilization, forming individuals who are faithful, pious, noble, healthy, intelligent, and have adequate social and cultural abilities (Agusti 2022). Currently, Indonesia is implementing the Merdeka Curriculum, which is designed to provide greater flexibility to teachers and students, and encourage contextual, inclusive, and learner-centered learning (Jafar Dahlan, Safri Tinamba 2024). The role of the teacher encompasses various functions, including those of an administrator, evaluator, and counselor, among others. These diverse responsibilities are fulfilled in accordance with the teacher ten competencies. One of the subjects that is very relevant to the development of these competencies is mathematics. Mathematics plays an important role in training the ability to think logically, analytically, systematically, and critically which is very necessary in everyday life (Kurniani Ningsih et al. 2021).

Mathematics is a systematic discipline that studies patterns, algorithms, art, and language. These fields are approached using logical and deductive methods. It is evident that, as a fundamental discipline, mathematics serves as a foundational framework for the study of various scientific disciplines. The vast majority of scientific disciplines are predicated on the utilization of mathematical concepts in the examination of their respective domains of study. Therefore, it is imperative to possess a fundamental understanding of mathematics (Fahrurroz et al. 2017). Since its inception, mathematics has undergone a dynamic evolution in accordance with the progression of time. The development of mathematics is an ongoing process, as its applications are ubiquitous and perpetually being investigated. The multifaceted nature of the roles and responsibilities of a professional educator is well-documented. The scope of these roles extends beyond the immediate context of the classroom, which is commonly referred to as the learning process (Fitriani, et al. 2021).

The challenges encountered in mathematics education can be attributed to a multitude of factors. One of the personal factors that influence low math learning outcomes is low self-efficacy or students' confidence in their ability to understand and master the material (Aunillah et al. 2025). Rahman, Abd., et al. (2022), students frequently demonstrate an absence of fundamental concept comprehension, execute erroneous arithmetic operations, misinterpret symbol significance, and inaccurately determine problem-solving procedures. Sujana (2019), the challenge in educating individuals is rooted in the unique challenges faced

by teachers, which are influenced by the distinct characteristics of their students. This phenomenon was also observed in the students of class V at SDN 109/II Manggis, where preliminary studies indicated substandard academic performance. A total of 27 students attempted the examination; however, only 10 of them demonstrated sufficient proficiency to surpass the Kriteria Ketuntasan Minimal (KKM), with an average score of 54.01.

In this study, the mediating variables that influenced the academic achievement in mathematics included the low level of self-efficacy, defined as the cognitive ability of the individual. Self-efficacy is defined as an individual's belief in their ability to comprehend and master a given subject matter. (Tuerah, R. M. S., & Tuerah, 2023). The term "Self Efficacy" can be defined as the confidence an individual has in their abilities to complete a task or achieve a goal. A previous study indicated that self-efficacy exerts a significant influence on academic success (Ahmad, A., & Triantoro, 2013). In accordance with the principles established by Bandura within the framework of the social cognitive theory, the concept is defined as the degree of confidence an individual holds in their capabilities to plan and execute the actions necessary to achieve a specific objective (Wasiah, 2021). Self-efficacy does not merely reflect actual ability, but an individual's perception of his or her ability (Awaliyah et al. 2025). Risnanosanti (2016), students who possess high self-efficacy are more likely to set ambitious goals, persevere in the face of challenges, and perceive difficulties as opportunities for growth.

Conversely, self-efficacy has been demonstrated to elicit behaviors of evasion, anxiety, and diminished motivation to learn (Yeni, 2015). Students who ranked highest in terms of self-efficacy averaged the lowest in math. (Siswanti, D., & Djalal, 2018). In essence, self-efficacy does not directly reflect an individual's mastery of a particular skill, but rather, it is influenced by their self-perception regarding their abilities in various contexts. It is this conviction that will serve as the driving force behind the student's pursuit of success in mathematics (Hanifah, et al. 2020). The ability to effectively engage with daily life activities is of paramount importance. Individuals who possess this capability will be able to maximize their potential, provided that they have the self-efficacy to support it. One of the factors that influences the

quality of life is self-efficacy. As stated by Bandura (1997), self-efficacy exerts a significant influence on academic performance in mathematics and writing (Rustika, 2012).

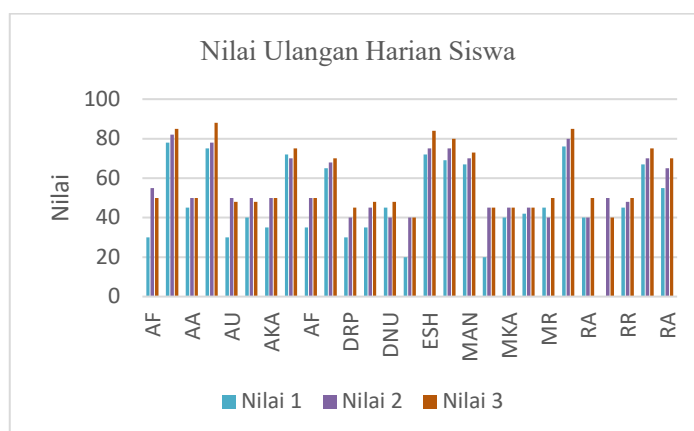


Image 1. Table of the student's weekly grades.

Increasing self-efficacy requires learning interventions that not only deliver material, but also provide opportunities for students to actively participate, interact, and build confidence (Zaskiya, et al. 2025). TPS a cooperative teaching model, was created to encourage students to participate cooperatively. The following three steps are recommended: first, think individually; second, pair off and discuss in pairs; and third, share the results of the discussion with the larger group (Nidya, A. P., & Hadi, 2024). The primary advantage of TPS lies in its capacity to facilitate interactive and collaborative learning environments. At this stage, the learner is expected to formulate responses or solutions independently, thereby cultivating the capacity for critical thinking. The second stage of the process involves the exchange of ideas with one's partner, thereby broadening one's perspective and honing one's communication skills. The advantage of TPS lies in its ability to create an interactive and collaborative learning atmosphere. In the think stage, students are given time to respond to questions or problems independently, which trains critical thinking skills. The pair stage encourages students to exchange ideas with a partner, enriching viewpoints and honing communication skills (Marsela et al. 2024). While the share stage expands the range of discussion to a larger group, so that the ideas that emerge can be validated, improved, or enriched through joint contributions.

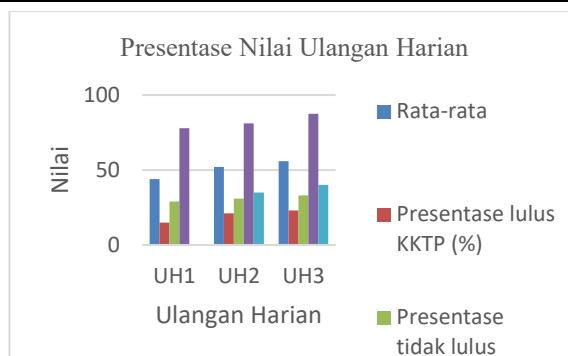


Image 2. Graph of Accumulated KKTP Class V Graduation

The efficacy of TPS has been demonstrated in a number of studies. Students who possess a strong sense of self-efficacy and participate in TPS-based instruction demonstrate superior academic performance compared to their counterparts with a weaker sense of self-efficacy. Providing mathematics teaching materials using the TPS (Problem-Based Learning) and Problem-Based Learning (PBLM) teaching models produces significant and meaningful achievements, where these achievements are relatively directly proportional to the achievements in the conventional model (Fitriani, et al, 2021). In addition, the TPS has been demonstrated to enhance self-efficacy to a greater extent than traditional approaches (Istiqomah, A., et al. 2024).

A substantial body of research has previously been conducted on the TPS model. This study integrates the cooperative learning approach with the affective aspects of self-efficacy (self-efficacy) into a comprehensive analysis. In addition, this study is conducted in a specific local context, namely at SDN 109/II Manggis, which has not previously been selected as a site for similar research. Therefore, the objective of this study is to address this lacuna by examining the impact of the TPS learning model and self-efficacy on the mathematics achievement of fifth-grade students at SDN 109/II Manggis.

It is hypothesized that this research will contribute to the theoretical foundation of the relationship between the learning model, psychological factors, and academic achievement. In essence, the findings of this study can serve as a practical reference for educators and school administrators in designing effective instructional strategies. These strategies should

not only focus on improving student math performance but also cultivate their self-efficacy in challenging subjects that have historically been perceived as difficult.

METHODS

This research uses a quantitative approach with pre experimental methods and pretest-posttest control group design (Eni amalia 2022). This design was chosen because it allows researchers to compare student learning outcomes and self-efficacy before and after treatment, both in the experimental and control groups, so that it can be measured the effect of the Think Pair Share learning model on the variables studied.

Before	Treatment	After
X1	O	X2

The study population was all grade V students at SDN 109/II Manggis. Sampling was conducted using cluster sampling technique based on consideration of students' ability and availability of learning time. Class VB was designated as the experimental class with 27 students. In its implementation before starting learning activities, students are given pretest questions after filling out the pretest followed by learning activities using the Think Pair Share learning model and followed by giving a posttest.

The instruments used include a multiple choice math learning outcomes test and a self-efficacy questionnaire with a Likert scale. The learning outcomes test serves to measure students' understanding of mathematical concepts, while the self-efficacy questionnaire is used to determine the level of students' self-confidence in completing math tasks . Before being used, both instruments have gone through validity and reliability tests to ensure their feasibility and accuracy.

The research procedure was carried out in three stages, namely preparation, implementation, and measurement (Maisarah et al. 2022). The preparation stage includes the preparation of learning devices, making test instruments and questionnaires, and coordination with the school. The implementation stage is carried out by giving pretest questions and self efficacy questionnaires then applying the Think Pair Share model and continuing by giving posttest questions and self efficacy questionnaires.

Prerequisite tests in the form of normality and homogeneity tests were used to ensure that the data met the assumptions of parametric statistics. Furthermore, hypothesis testing was carried out with an independent t test to determine differences in learning outcomes and self-efficacy before and after treatment (Alpi Zaidah 2024) .

RESULTS AND DISCUSSION

A. RESULTS

1. Analysis Prerequisite Test

Before hypothesis analysis is carried out, first the analysis prerequisite test is carried out which includes normality and homogeneity tests. Normality test is used to determine whether the data obtained is normally distributed or not. The test was carried out using the Shapiro-Wilk method because the number of samples was less than 50 respondents. The decision-making criteria are:

(a) Data is normally distributed if the significance value (Sig.) > 0.05 .

(b) Data is not normally distributed if the significance value (Sig.) < 0.05 .

The results of normality testing on self-efficacy questionnaire data show a Sig. value on Shapiro-Wilk of 0.234 for data after treatment (posttest), which means greater than 0.05. This indicates that the self-efficacy data is normally distributed. Meanwhile, the results of normality testing on learning outcomes showed a Sig. value of 0.000, which is smaller than 0.05. Thus, the learning outcomes data are not normally distributed. This finding provides the basis that hypothesis analysis for learning outcome variables uses non-parametric tests, while for self-efficacy variables can use parametric tests.

Tabel 2. Tests of Normality Angket

		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Results	Before	.115	27	.200*	.967	27	.517
	Treatment						
	After Treatment	.130	27	.200*	.952	27	.234

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Tabel 3. Normality Test of Learning Outcomes

Tests of Normality Hasil Belajar

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	Group	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Results	Pretest	.306	27	.000	.752	27	.000
	Posttest	.223	27	.001	.813	27	.000
a. Lilliefors Significance Correction							

2. Test the first hypothesis

The first hypothesis testing was conducted to determine the difference in students' mathematics learning outcomes before and after treatment using the Think Pair Share (TPS) learning model. Based on the results of the Wilcoxon Signed Rank Test, the Sig. (2-tailed) of 0.000, which is smaller than 0.05. This means that H_{01} is rejected and H_{a1} is accepted. Thus, there is a significant difference between the pretest and posttest results of students in the experimental class. This difference indicates that the application of the TPS model is able to significantly improve math learning outcomes on the material taught.

3. Second hypothesis test

The second hypothesis testing aims to determine the difference in students' self-efficacy levels before and after learning using the TPS model. Based on the results of the Paired Sample t-Test test, the Sig. (2-tailed) of 0.000, which is smaller than 0.05. Referring to the decision-making criteria, H_{02} is rejected and H_{a2} is accepted. That is, there is a significant difference between the level of self-efficacy before and after treatment. These results confirm that the TPS model not only improves mastery of mathematical materials, but also has a positive impact on students' confidence in solving mathematical problems.

4. Test the third hypothesis

The third hypothesis testing was conducted with the Spearman correlation test to determine the relationship between self-efficacy and math learning outcomes. The analysis results showed a correlation coefficient value of 0.709 with a Sig. (2-tailed) of 0.000, which is smaller than 0.05. This indicates that H_{03} is rejected and H_{a3} is accepted. Thus, there is a significant and positive relationship between self-efficacy and students' math learning outcomes. That is, the higher the students' self-efficacy, the higher the mathematics learning outcomes achieved. This finding reinforces the view that academic self-efficacy is an important psychological factor that can support students' academic achievement, especially in learning mathematics (Gusteti et al. 2024).

Tabel 4. hypothesis test

Correlations Spearman			
		Self efficacy	hasil belajar
Self efficacy	Correlation Coefficient	1.000	.709**
	Sig. (2-tailed)		.000
	N	27	27
hasil belajar	Correlation Coefficient	.709**	1.000
	Sig. (2-tailed)	.000	
	N	27	27
Correlation is significant at the 0.01 level (2-tailed).			

B. DISCUSSION

The findings of the present study demonstrate that the implementation of the Think Pair Share (TPS) model exerts a substantial impact on the enhancement of academic performance and the development of students' self-efficacy. The enhancement in academic performance is evident from the substantial statistical significance observed in the post-test results in comparison to the pre-test results. This finding aligns with the conclusions of the study conducted Fitriani, et al. (2021), which posits that the TPS model has the capacity to enhance comprehension of mathematical concepts and academic performance through three distinct phases: individual thinking, collaborative problem-solving, and the dissemination of solutions.

According to Hamalik (2001), the outcome of learning can be defined as a shift in behavior. This shift is characterized by the transition of an individual from a state of ignorance to one of comprehension, and from a state of misunderstanding to one of enlightenment. The concept of "active learning" can be defined as a process of engaging in various activities related to the acquisition of knowledge. When compared with the term "active learning," it can be interpreted as a process of engaging in learning activities. Active learning is imperative for optimal academic performance. Inactive learning, characterized by minimal student engagement, is associated with suboptimal learning conditions, often resulting in a one-sided approach where students rely excessively on a single source of instruction.

The presence of activity in learning is indicative of potential for learning, which can be actualized when presented with ample opportunities for independent learning. According to Julianto (2011), the "Think Pair Share" method is a structural approach employed in cooperative learning. The implementation of pair-based learning in educational settings is a strategic approach aimed at enhancing the efficacy of the learning process. The overarching objective of this instructional model is twofold: first, to enhance academic proficiency, and second, to instill social skills. In addition, the findings revealed a significant increase in self-efficacy among students following the implementation of TPS. A higher sense of self-efficacy has been demonstrated to promote self-confidence, encourage boldness in taking risks, and cultivate perseverance in overcoming challenges. This finding aligns with Bandura's (1997) theoretical framework, which posits that individuals with high self-efficacy exhibit greater motivation and perseverance in overcoming learning obstacles.

The findings of this study demonstrate a positive correlation between self-efficacy and mathematics achievement scores. These results further substantiate the notion that psychological factors play a pivotal role in the learning process. Students who possess a strong sense of self-assurance in their academic abilities tend to exhibit higher levels of engagement in learning activities, demonstrate superior comprehension of the subject matter, and frequently attain commendable academic achievements. In light of the aforementioned, it is evident that the present study has not only furnished empirical evidence regarding the efficacy of the TPS model in the context of mathematics instruction in primary schools, but has also underscored the necessity of considering psychological factors, such as self-efficacy, as a component of instructional quality enhancement strategies.

CONCLUSION

The findings of this study indicate that the implementation of the Think Pair Share (TPS) model has a significant impact on the academic performance of fifth-grade students in SDN 109/II Manggis. The experimental group demonstrated a significant increase in mathematics comprehension skills, as evidenced by the results of the pretest and posttest. This finding indicates that the TPS method is more effective than conventional teaching methods in enhancing students' mathematical understanding. In addition, the impact of TPS on the

enhancement of students' self-efficacy has been demonstrated. Following the implementation of this pedagogical approach, students have demonstrated a notable enhancement in their self-efficacy, as evidenced by their increased confidence in problem-solving, active participation in collaborative learning activities, and a propensity to take initiative during the learning process.

The present study identified a positive and significant relationship between self-efficacy and mathematics achievement. This finding suggests that students with a strong academic self-concept tend to exhibit high levels of motivation, perseverance in the face of challenges, and academic achievements that are similarly high. In light of the aforementioned points, the TPS model is posited as a viable alternative strategy for the instruction of mathematics in primary schools. The efficacy of this model is twofold: first, it has been demonstrated to enhance academic achievement; second, it has been shown to engender a sense of self-efficacy in students.

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