

# THE IMPLEMENTATION OF THE THINK PAIR SHARE LEARNING MODEL TO IMPROVE UNDERSTANDING OF EXPONENTS

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**Abstrak:** Pembelajaran matematika, khususnya pada materi eksponen, merupakan bagian penting dalam mengembangkan kemampuan berpikir logis dan pemecahan masalah peserta didik. Namun, dalam praktiknya, materi ini sering menimbulkan kesulitan bagi siswa kelas VIII MTsN 1 Probolinggo. Kesulitan tersebut terlihat dari rendahnya hasil belajar serta kurangnya kemampuan siswa dalam memahami dan menerapkan konsep eksponen secara tepat. Salah satu faktor yang memengaruhi kondisi tersebut adalah rendahnya keterlibatan aktif siswa dalam proses pembelajaran, di mana kegiatan belajar masih cenderung berpusat pada guru dan kurang memberikan kesempatan kepada siswa untuk berpikir, berdiskusi, dan bekerja sama. Apabila kondisi ini dibiarkan, pemahaman konsep siswa akan tetap rendah dan dapat berdampak pada penguasaan materi matematika selanjutnya. Oleh karena itu, diperlukan penerapan model pembelajaran yang inovatif dan mampu meningkatkan keaktifan serta pemahaman konsep siswa. Penelitian ini bertujuan untuk meningkatkan pemahaman konsep eksponen melalui penerapan model pembelajaran kooperatif Think Pair Share (TPS) dengan metode Penelitian Tindakan Kelas (PTK). Penelitian dilaksanakan dalam dua siklus dengan subjek sebanyak 15 siswa. Instrumen penelitian yang digunakan berupa tes pemahaman konsep dan lembar observasi aktivitas siswa. Hasil penelitian menunjukkan adanya peningkatan yang signifikan pada nilai rata-rata dan ketuntasan belajar siswa, yaitu dari nilai rata-rata 50 pada tahap pra-siklus menjadi 90 pada siklus II, serta persentase ketuntasan belajar meningkat dari 46,7% menjadi 100%. Selain itu, aktivitas diskusi dan kerja sama antar siswa juga mengalami peningkatan, yang menunjukkan keterlibatan siswa dalam pembelajaran menjadi lebih optimal. Temuan ini menunjukkan bahwa model pembelajaran Think Pair Share efektif dalam meningkatkan pemahaman konsep eksponen siswa kelas VIII MTsN 1 Probolinggo.

**Keywords:** *Think Pair Share, Eksponen, Penelitian Tindakan Kelas*

**Abstract.** Mathematics learning, especially on the topic of exponents, is a fundamental component that supports students' logical thinking and problem-solving skills. However, in practice, this topic often poses significant difficulties for eighth grade students of MTsN 1 Probolinggo. These difficulties are indicated by low learning outcomes and students' limited ability to apply exponent concepts correctly. One of the main contributing factors is the low level of active student involvement during the learning process, where learning activities tend to be teacher-centered and provide limited opportunities for students to think, discuss, and collaborate. If this condition is not addressed, it may hinder students' conceptual understanding and negatively impact subsequent mathematics learning. Therefore, it is necessary to implement an innovative learning model that can actively engage students and improve their conceptual understanding. This study aims to improve the understanding of the concept of exponents through the application of the Think Pair Share (TPS) cooperative learning model using the Classroom Action Research (CAR) method. The study was conducted in two cycles with 15 students as subjects. The research instruments consisted of a concept understanding test and student activity observation sheets. The results showed a significant increase in the average score and student learning completeness, from an average score of 50 in the pre-cycle to 90 in the second cycle, while the percentage of learning completeness increased from 46.7% to 100%. In addition, discussion and collaboration activities among students also improved, indicating more optimal student involvement during the learning process. These findings indicate that the Think Pair Share learning model is effective in improving the understanding of the concept of exponents among eighth grade students of MTsN 1 Probolinggo.

**Keywords:** *Think Pair Share, Exponential Numbers, Classroom Action Research*



## A. Introduction

Mathematics is a fundamental science that is crucial to the development of science and technology in the modern era, playing a vital role in various disciplines and advancing human thought (Permatasari and Nuraeni 2021). Mathematics, as a field of study, serves as a tool for thinking, communication, and solving various practical problems. Its elements include logic and intuition, analysis and construction, generality and individuality, and its branches include arithmetic, algebra, geometry, and analysis (Anwar and Anis 2020). Therefore, mathematics should be taught to all students, starting from elementary school, to equip them with logical, analytical, systematic, critical, and creative thinking skills, as well as the ability to collaborate (Rahayu and Afriansyah 2021).

One of the important skills to be mastered in mathematics learning is the ability to understand mathematical concepts (Hartati, Abdullah, and Haji 2017; Luritawaty 2018; Program and Mathematics 2017). Patria (2007) states that conceptual understanding is a student's ability in the form of mastery of a number of subject materials, where students do not just know or remember a number of concepts learned, but are able to express them again in another form that is easy to understand, provide data interpretation and are able to classify concepts that are in accordance with their cognitive structure.

Conceptual understanding is the primary foundation in mathematics learning and is crucial for students to master. According to Aledya (2019: 1), understanding mathematical concepts is one of the mathematical skills or competencies expected in mathematics learning. If students lack a grasp of mathematical concepts, they will have difficulty applying mathematics in everyday life (Arifin, 2020: 998).

One of the most important mathematical concepts is exponents. Exponential numbers are prerequisites for understanding before studying subsequent topics. However, students' understanding of exponents remains a serious problem in many schools, including MTsN 1 Probolinggo. Many students struggle to grasp the material, resulting in poor learning outcomes and low participation in the learning process. This low conceptual understanding can be caused by several factors, one of which is learning strategies that do not provide optimal opportunities for students to actively participate in the learning process.

Currently, many problems are still found related to students' ability to understand mathematical concepts. The problem in mathematics learning is that students don't understand the concepts taught because they are only motivated to memorize the formulas from the material presented (Rahmawati & Roesdiana, 2022: 18). When given questions that differ from the examples, students experience doubt and confusion in how to answer them, resulting in difficulties in solving math problems.

Efforts to improve students' understanding of mathematical concepts are necessary. This includes finding approaches to mathematics learning that engage students actively. Furthermore, learning models should emphasize teachers' efforts to nurture and develop students' interest and readiness to learn (Luritawaty, 2018). One learning model that can improve students' understanding of mathematical concepts is the Think Pair Share (TPS) cooperative learning model.

TPS is a type of cooperative learning designed to influence student interaction patterns (Andika et al., 2016). According to Slavin (2008), it explains that Think Pair Share has explicitly established procedures to give students more time to think, answer and help each other. The Think Pair Share learning model makes students actively participate in the learning process and can improve student learning outcomes (Mariana & Sejarahi, 2016). The Think Pair Share type of cooperative learning model that focuses more on thinking in pairs can make it easier for students to interact with others, respect any differences that exist and students can be responsible for learning (Maryoto, 2018). According to Kurniawan et al., (2018), the Think

Pair Share learning model is an effective cooperative learning model for creating variations in the atmosphere of discussion patterns.

Many previous studies have shown that the implementation of the TPS model effectively improves students' mathematics learning outcomes and social skills. One such study, conducted by Wuntikaratri (2009), showed that the TPS cooperative learning model can improve the learning achievement of seventh-grade students at SMP Darul Mustofa Bangkalan on the topic of integer operations. According to Nurnawati in Fitra (2015: 2), TPS can also increase student participation, is suitable for simple assignments, is easier and faster in forming groups, and can be used for all subjects and all levels of students. According to Meilana et al. (2021: 220), the Think Pair Share learning model is a cooperative learning model designed to influence student interaction poles in school. This model is very suitable for application to the topic of exponents, because it allows students to deepen the concept gradually through discussion and reflection with friends. At MTsN 1 Probolinggo itself, not many teachers have implemented this learning model systematically on this material, so classroom action research is needed to test the effectiveness of the TPS model in this context.

Based on this background, this study was designed with the aim of implementing the Think Pair Share learning model in an effort to improve the understanding of the concept of exponents in grade VIII students of MTsN 1 Probolinggo. By using the classroom action research method, it is hoped that an overview of the effectiveness of this model and its impact on conceptual understanding and student activities during the learning process will be obtained. The problem formulation in this study is: Can the application of the Think Pair Share learning model improve the understanding of the concept of exponents in class VIII students of MTsN 1 Probolinggo?

This research is expected to provide theoretical benefits as an additional study in the field of mathematics education related to cooperative learning models, as well as practical benefits as an alternative learning method that teachers can use to improve the quality and outcomes of students' mathematics learning.

## **B. Research Method**

This research was conducted using the Classroom Action Research (CAR) method which was implemented in two cycles. Each cycle consists of four stages which include planning, action implementation, observation, and reflection (Arikunto, 2007: 16). The research subjects were 15 students of class VIII H MTsN 1 Probolinggo. This was because the researcher found a problem regarding students' low understanding of mathematical concepts. The object of this research was MTsN 1 Probolinggo students' understanding of mathematical concepts regarding cooperative learning of the Think Pair Share type.

The data collection techniques used in this study are: (1) Test, this test includes a pretest and posttest of students' mathematical concept understanding ability on the topic of exponents. The pretest is given to measure students' initial abilities, while the posttest is given after the learning process is carried out to determine students' mathematical concept understanding ability. (2) Observation, students' learning activities in class can be known by using a student learning activity observation sheet.

The data analysis techniques used in this study are quantitative descriptive and descriptive statistics.

### **(1) Descriptive Quantitative**

Assessment of students' understanding of mathematical concepts is done using the formula (Usman & Setiawati, 2001):



$$N = \frac{\text{Score}}{\text{Max Score}} \times 100$$

Description: N = final value

Calculation of students' understanding of mathematical concepts using the percentage formula from Sudijono (2005):

$$p = \frac{f}{N} \times 100\%$$

Information:

p = percentage number

f = frequency whose percentage is being sought

N = number of students

## (2) Descriptive Statistics

The results of this study also used an average. An average is an explanatory method based on the average value of a group. This average is obtained by adding up the data for all students in the group and then dividing it by the total number of students in the group. The formula used is (Sudjana, 2008):

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i}$$

Information:

$\bar{x}$  = average value (mean)

$\sum f_i x_i$  = the sum of the results of multiplying each data by its frequency

$\sum f_i$  = number of data or samples

## C. Research Results and Discussion

### 1. Research result

This classroom action research was conducted in two cycles with the aim of improving the understanding of the concept of exponents through the application of the *Think Pair Share* (TPS) learning model in class VIII students of MTsN 1 Probolinggo. The research data were obtained from the mathematical concept understanding test ( *pretest*, *posttest* cycle I, and *posttest* cycle II) as well as student activity observation sheets.

Based on the results of initial observations in class VIII H of mathematics subject with the material of exponents, data was obtained, of the 15 students who achieved the minimum passing grade (KKM) as many as 7 students (46.7%), with an average class grade of 50.

**Table 1. Recapitulation of pretest results**

No	Description	Pretest results
1	Average score of formative test	50
2	Number of students who completed their studies	7
3	Percentage of learning completion	46.7%

Based on Table 1, it can be concluded that the results of *the pretest* for students in the mathematics subject of exponents in class VIII H are still relatively low. The average score for the formative test only reached 50, which indicates that students' conceptual understanding of the material is still not optimal. Of the 15 students who took the test, only 7 students (46.7%) managed to achieve a score above the Minimum Completion Criteria (KKM). This indicates that most students have not been able to master the material thoroughly. This condition is the

basis for the need to implement a more effective and interactive learning model to improve student learning outcomes, especially in understanding the concept of exponents in more depth.

Then the researcher conducted initial observation activities which were carried out on Monday, September 15, 2025. The results of the initial observations showed that teachers dominated learning activities and students tended to be inactive. One solution that must be developed is the use of a new cooperative learning model, namely the *Think Pair Share Type Cooperative Learning Model*. By using this learning model, it is hoped that it will create a varied and enjoyable learning atmosphere so that it can attract students' attention, increase student activity and improve student learning outcomes.

Cycle I actions were carried out on Monday, September 15, 2025 at MTsN 1 Probolinggo class VIII H. The researcher initially conducted apperception which was followed by delivering material using the cooperative learning model of the *Think Pair Share type*.

Based on the evaluation results from cycle I, there was an improvement in student learning outcomes. Twelve students achieved the minimum passing grade (KKM) of 80%, with the class average rising to 82.3.

Based on these observations, it can be seen that the learning process in the first cycle has not been maximally successful and has not achieved the expected performance indicators. Improvement in results, when compared to the pre-cycle results that reached the KKM of 7 students with a percentage of 46.7% after being given the implementation action of cycle I, students who reached the KKM were 12 students with a percentage of 80%.

**Table 2. Recapitulation of test results in cycle 1**

No	Description	Results of cycle 1
1	Average score of formative test	82.3
2	Number of students who completed their studies	12
3	Percentage of learning completion	80%

Based on table 2, it can be concluded that the learning outcomes of mathematics on the power of numbers by applying the *think pair share cooperative learning model* in the implementation of cycle I actions have increased. Students who achieved the KKM before the action or pre-cycle were 7 students, after the cycle I actions were 12 students, so an increase of 5 students.

After being evaluated together from the implementation of actions in cycle I which were used as part of the consideration of learning improvement planning for the next cycle, with improvement planning to address the shortcomings and errors made in cycle I. Cycle II class action was carried out on Tuesday, September 23, 2025. Based on overall learning in cycle II class action, there was a significant increase. Student learning outcomes of 15 students with a percentage of 100% reached the minimum completeness criteria (KKM). So that the average class value rose to 90.

**Table 3. Recapitulation of test results in cycle 2**

No	Description	Results of cycle 2
1	Average score of formative test	90
2	Number of students who completed their studies	15
3	Percentage of learning completion	100%

From table 3 above, it can be concluded that the learning outcomes of Exponential Numbers by applying the *think pair share type cooperative learning model*, during the implementation of cycle II actions experienced an increase. Students who achieved the KKM during the cycle I actions were 12 students, after the cycle II actions were 15 students, so an



increase of 3 students. Based on these results, it can be seen that the learning process up to cycle II went well and had met the expected performance indicators.

In cycles I and II with the implementation of actions using the cooperative learning model of the thin pair share type, so that students are more enthusiastic with a feeling of joy in participating in learning activities. The average value of students from before the research was conducted until after the research was conducted until cycle II experienced an increase, namely: the average value of the pre-cycle was 50, after the action of cycle I was 82.3, and after the action of cycle II was 90. So that from the initial conditions before the action / pre-cycle to the action in cycle II there was an increase of 40 points. students who achieved KKM before the action or pre-cycle were 7 students with a percentage of 46.7%, after action I were 12 students with a percentage of 80%, and after action cycle II were 15 students with a percentage of 100%, so that the cumulative increase from before the action or pre-cycle to cycle II was 53.3%. From the description above, it can be concluded that the application of *the think pair share type cooperative learning model* can improve the understanding of the concept of the material on Powers of Numbers for class VIII H MTsN 1 Probolinggo students in the first semester of the 2025/2026 academic year.

## 2. Discussion

The results of the research from the initial conditions up to cycle II obtained the following data:

**Table 4. Class Profile Before and After Research Action**

No	Student Results	Initial Conditions	Cycle I	Cycle II
1.	Average value	50	82.3	90
2.	Students who have completed the KKM	7 students (46.7%)	12 students (80%)	15 students (100%)

The graph of the average increase in conceptual understanding and percentage of completion can be presented in the following image;

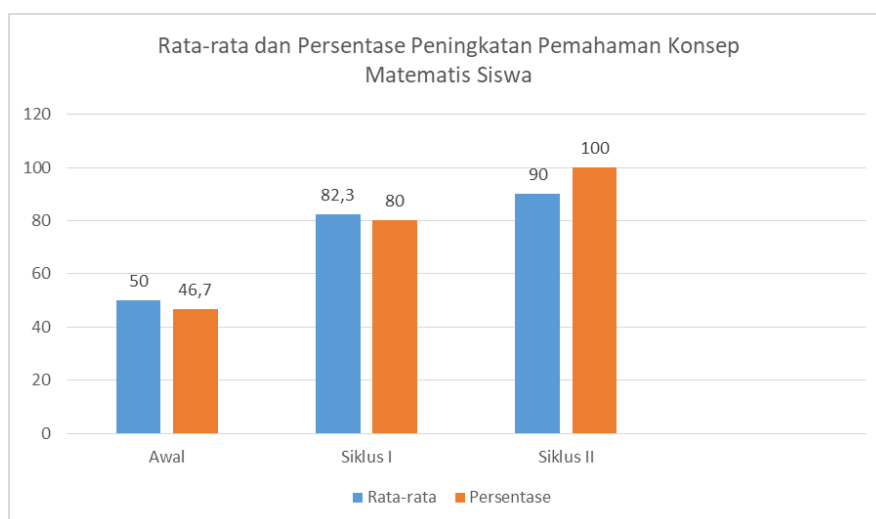


Figure 1. Graph of students' increase in understanding of mathematical concepts

Based on Figure 1, students' understanding of mathematical concepts showed a significant improvement after the implementation of the Think Pair Share (TPS) cooperative learning model. In the initial condition before the action, the average student score was 50 with a learning completion percentage of 46.7%. After the implementation of Cycle I, the average score increased to 82.3 and learning completion reached 80%. Furthermore, in Cycle II, the average score increased to 90 with a completion percentage of 100%, indicating that the predetermined success criteria had been achieved. This finding confirms that the TPS learning



model is effective in improving students' understanding of mathematical concepts, particularly in the topic of exponents. These results are consistent with previous studies which reported that TPS can significantly enhance students' mathematical conceptual understanding by encouraging active participation and collaborative learning (Sari & Putra, 2019; Lestari et al., 2019; Hidayat et al., 2020). Through the stages of think, pair, and share, students are given opportunities to think independently, exchange ideas with peers, and communicate their understanding in group discussions, which strengthens conceptual construction and deepens understanding (Rahmawati et al., 2021; Nugroho & Setiawan, 2022). Therefore, the successful achievement of full learning completion in Cycle II indicates that the implementation of the Think Pair Share learning model effectively improves students' mathematical conceptual understanding.

#### **D. Conclusion**

Based on the research results, it can be concluded that the implementation of the Think Pair Share learning model has proven effective in improving the understanding of the concept of exponents in grade VIII students of MTsN 1 Probolinggo. The results showed a significant increase in average scores and learning completeness from before the action to the second cycle. In addition, student discussion and collaboration activities also increased, indicating more optimal student active involvement in learning. Therefore, the Think Pair Share learning model is worthy of being an alternative mathematics learning that can improve conceptual understanding and student interaction in the classroom.

Based on these findings, it is recommended for teachers and education practitioners to: (1) implement the Think Pair Share learning model, especially on the topic of exponents. (2) develop learning variations based on Think Pair Share that suit student characteristics to encourage better learning activities and collaboration. (3) strive to enrich media and learning resources that support this model so that students' understanding of concepts can be more optimal. (4) for further research, it is recommended to conduct research with larger samples and diverse materials, and use additional instruments to explore students' affective aspects more comprehensively.

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