

## THE EFFECT OF THE PEER TUTORING METHOD ON STUDENTS' LEARNING OUTCOMES IN MATHEMATICS

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### Abstrak

#### Keywords:

Peer Tutors,  
Student Learning Outcomes,  
Mathematics,  
Learning Methods

*This research examines the influence of peer tutoring methods on student learning outcomes. Peer tutoring is a learning method where students learn together with their peers. The method used in this research is a Literature Review. Data collection was conducted by documenting all articles with similar research in the research report. This study utilized 8 national journal articles obtained from the Google Scholar database. Based on this research, the peer tutoring method is a learning method that can motivate students to learn, which in turn can improve their learning outcomes.*

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### INTRODUCTION

Mathematics is a subject that is always applied in daily life. It cannot be denied that human daily life is inseparable from mathematical concepts. This can be demonstrated when shopping for daily necessities at the market; such activities involve the use of mathematical concepts for buying and selling. Mathematics is a universal science that underpins the development of modern technology. It plays a crucial role across various academic disciplines and in advancing human cognitive abilities. Therefore, mastering mathematical concepts correctly from an early age is essential to being able to master and create technology in the future.

Teachers, as educators, serve as sources of learning, facilitators, mentors, and motivators. A teacher requires more teaching skills than someone who is not a teacher. Teachers must be well-versed in various teaching models. In the learning process, teachers naturally employ diverse models. These learning models encourage students to become more active learners. Every student possesses distinct characteristics and varying potential. Given the differences in students' personalities and potential, teachers must innovate and be creative to ensure all students can develop their potential. Current learning focuses on student activities, where the learning process is student-centered. In

other words, students learn by doing (through hands-on experience). During the teaching and learning process, it is not uncommon to encounter various challenges, whether from the students themselves or from the educators. One of the most common challenges is the learning difficulties experienced by students.

Education is a conscious and planned effort to create a learning environment and learning process so that students actively develop their potential to possess spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills required by themselves, society, the nation, and the state (Constitution, 2003). For this reason, to ensure the learning process runs effectively, appropriate teaching methods must be employed, as the primary purpose of the learning process is to achieve learning objectives. These objectives primarily focus on students' success in learning, whether within a specific subject or in education generally (Krismanto, 2003).

Teaching and learning activities should focus more on the students who are learning rather than on the overly dominant role of the instructor or teacher. Both parties—teachers and students—should recognize this: the teacher acts solely as a facilitator in the teaching and learning process, whose task is to design the learning activities, while the students, as the primary agents of learning, must be genuinely active and fully engaged in the teaching and learning activities. Teaching and learning activities must involve three elements: the teacher, the students, and the realities of the world (Suyatno, 2009:5). However, in reality, observing current classroom settings—or, more broadly, what occurs in learning environments whether in schools or other educational settings—teachers often limit themselves to the role of instructors who merely deliver instructional materials, prepare lesson plans, and present the content through lectures, occasionally conducting Q&A sessions that conclude with the assignment of exercises or problems for students. This suggests that many educators do not fully understand or take seriously the three elements mentioned above. Many teachers also conclude that if students do not ask many questions in class, it means they have understood the lesson taught by the teacher, and the teacher feels secure by drawing this conclusion. Therefore, teaching and learning activities like these make students less sensitive in processing what is in their minds through how they apply their behavior in daily life. Students know a great deal about the knowledge taught through various subjects in the school curriculum, yet they are confused about how to apply it in real life (Fathul Mujib, 2012:48-49).

In fact, there are many approaches teachers—acting as facilitators in the learning process—can adopt, such as utilizing various learning media, selecting appropriate teaching methods, and developing effective strategies for instruction. A teacher serving as a facilitator creates an environment conducive to effective learning (Uno & Mohamad, 2011:15). This is supported by Ministry of Education and Culture Regulation No. 65 of 2013, which states that the learning process in educational institutions must be conducted in an interactive, inspiring, enjoyable, and challenging manner, motivating students to actively participate, and providing sufficient space for initiative, creativity, and independence in accordance with students' talents, interests, and physical and psychological development. Currently, there are also many learning methods that teachers can use to teach and create an effective, conducive, and enjoyable atmosphere for students. A pleasant teaching and learning atmosphere motivates both teachers and students; teachers are motivated to always strive to provide enjoyable learning experiences for students and also to design instructional management, assess learning outcomes, and guide students through the learning process.

Among the many teaching methods available to teachers, one that is particularly effective is peer teaching. Peer teaching is not a new method; it is an older approach that has been used but was previously less effective because it was teacher-centered. Since modern education should be student-centered, this method can be effectively utilized in teaching and learning activities. Peer teaching is a learning method in which students teach other students; the students who teach are, of course, those who are more advanced or can grasp the material quickly. Typically, these advanced students are those who are better at understanding the core concepts of a particular subject compared to their peers. A student serving as a tutor may also be one who was previously assigned the task of researching and gathering information that will later serve as material or topics for the lesson in a specific subject. Thus, during the teaching and learning activity, the student can act as a tutor for their classmates. Any student can become a tutor as long as they have a solid grasp of the topic or subject matter to be covered during the learning process.

The most important aspect of using the peer tutoring learning method is the benefit of the learning method itself. Teachers who use the peer-tutoring method can help students become more confident and active in the learning process. Additionally, the benefit students gain is practicing their speaking skills, even if they are only speaking in front of their peers; however, this can boost their self-confidence in speaking in public later on because the technique involved in this peer-tutoring method is students teaching their peers. Not only that, but students can also experience enjoyment and comfort during the learning process. This is because the peer-tutoring method allows students greater freedom to ask questions or critique concepts that may be difficult for them to grasp, which naturally makes the classroom atmosphere more active during learning activities. As for teachers, the benefit is that implementing this peer-tutoring method can lighten the teacher's workload. This does not mean the teacher is shirking their responsibilities as an educator; rather, through this approach, the teacher can identify which materials students still struggle to understand and alleviate the burnout often felt by teachers.

## LITERATURE REVIEW

### 1. Mathematics Education

Mathematics is a discipline that plays a vital role in daily life and serves as the foundation for the development of science and technology. Mathematics education focuses not only on computational skills but also on developing logical, critical, and systematic thinking. Therefore, appropriate teaching strategies are essential to ensure students can grasp mathematical concepts effectively.

### 2. Teaching Methods in Education

Teaching methods are the approaches teachers use to present material to students in order to achieve learning objectives. In modern teaching, the approach tends to be *student-centered*, where students are expected to be active participants in the learning process. In this context, teachers act as facilitators who guide and direct the learning process.

Selecting the appropriate teaching method significantly impacts students' success in understanding the material and improving learning outcomes.

### 3. Definition of Peer Tutoring

*The peer teaching* method is a learning method in which students who have a better understanding of the material help other students who are struggling. In this method, students act as tutors and tutees.

According to learning concepts, peer teaching allows for more relaxed and communicative interaction because it takes place among peers. This makes students more comfortable asking questions and expressing their opinions.

### 4. Characteristics of Peer Tutoring

The peer teaching method has several characteristics, namely:

- The presence of students acting as tutors
- Direct interaction occurs between students
- Learning takes place in small groups
- The teacher acts as a facilitator and supervisor

With these characteristics, the peer tutoring method is able to create an active and participatory learning atmosphere.

### 5. Advantages and Disadvantages of Peer Tutoring

#### Advantages:

- Increases student engagement in learning
- Helps students understand the material more easily
- Boosts self-confidence and communication skills
- Creates a more comfortable and enjoyable learning environment
- Increases student motivation to learn

#### Disadvantages:

- Not all students are capable of being good tutors
- Potential errors in presenting the material
- Differences in social relationships among students can affect the learning process

However, these drawbacks can be minimized through teacher supervision and guidance.

### 6. Student Learning Outcomes

Learning outcomes are the changes that occur in students after participating in the learning process. These changes include the following aspects:

- Cognitive (knowledge)
- Affective (attitudes)
- Psychomotor (skills)

Learning outcomes serve as an indicator of the success of a learning process. The better the methods used, the higher the likelihood of improved student learning outcomes.

### 7. The Effect of Peer Tutoring on Learning Outcomes

Based on various studies reviewed in this journal, the peer tutoring method has a positive influence on student learning outcomes, particularly in mathematics.

The research results show that:

- Students become more active in the learning process
- There is an increase in understanding of mathematical concepts
- Student learning outcomes show a significant improvement
- Students are more motivated to participate in learning

The peer tutoring method also helps reduce students' learning difficulties due to direct interaction with peers, which is easier to understand.

## 8. Framework

Based on the theoretical review outlined above, it can be concluded that the peer tutoring method is closely related to improvements in student learning outcomes. The use of methods that involve student engagement and positive social interaction can create effective and enjoyable learning experiences.

## RESEARCH METHOD

In investigating this matter, we as researchers employed the *Literature Review* research method. A *Literature Review* is the process of identifying or analyzing relevant literature sources on a specific topic; the references used in this study were drawn from journals available on *Google Scholar*. The purpose of this Literature Review method is to collect, analyze, and synthesize information from various written sources. This research consists of several stages, namely formulating research questions, conducting a literature search, reading and analyzing sources, noting key points, organizing information, presenting the results of the literature review, and drawing conclusions.

First, the research questions are: How does a teacher think about or seek the appropriate learning method to improve student learning outcomes? (RQ1) What makes the peer-tutoring learning method effective in improving student learning outcomes? (RQ2). Second, the literature search was conducted in the Google Scholar database using the keywords "Peer Tutoring" and "Learning Outcomes." Third, the inclusion criteria used in the literature search included studies related to "Peer Tutoring Methods" and "Improvement of Student Learning Outcomes." Fourth, the retrieved literature was selected and analyzed based on inclusion and exclusion criteria. A total of 8 articles were identified using the keywords. These articles were selected based on the inclusion criteria. In the next stage, the researcher compiled the articles into a table. The researcher then reviewed and examined these articles in detail, particularly the research results section. In the final stage of the study, the researcher compared the findings from these articles and drew conclusions.

## RESULTS AND DISCUSSION

Researchers and Years	Jurnal	Results
(Rizky Kurniawan, Nana Hendracipta, Reksa Adya Pribadi, 2023)	Implementation of Peer Tutoring Method in Mathematics Learning	The results of the study show that the implementation of the peer tutoring method by the researchers at SDN Kalideres 07 yielded positive results, particularly in mathematics learning. Previously, students struggled to complete their mathematics assignments on

		their own; however, with the peer tutoring method—where students were organized into groups—they were able to complete their assignments more quickly.
(Petrus Abineneo, Yohana Rina Rowa, Yohanes Ovaritus Jagom, 2019)	The Influence of Peer Tutoring Learning Model on Students' Mathematics Learning Achievement	The results of the study indicate that the peer tutoring learning model implemented at SMPN 20 Kupang, specifically in 7th grade with a focus on the factorization of algebraic terms, yielded excellent results. Students experienced an improvement in their academic performance, which was influenced by the implementation of the peer tutoring learning model.
(Almira Amir, 2019)	Implementation of the Peer Tutoring Method to Improve Students' Critical Thinking in Mathematics Learning (Case Study in Class XI MIA-3 MAN Sapirok South Tapanuli)	The results of this study show that by implementing the peer tutoring method at MAN Sapirok Tapanuli in the 11th-grade class, with a focus on trigonometric functions ( ), the students' learning outcomes improved, as evidenced by an increase from 51.35% to 62.16% in Cycle I, Session I, and from 75.68% to 86.48% in Cycle I, Session II, and Cycle II, Session I. Therefore, the critical thinking skills of students in 11th-grade MIA-3 using the peer tutoring method have reached the expected percentage of 86.48%.
(Khusnul Khotimah, Rita Yuliasuti, 2019)	Implementation of the Complete Learning Model with the Peer Tutoring Method to Improve Junior High School Students' Mathematics Learning Outcomes	The results of this study show that students' positive response to learning using the peer-tutoring method reached 96%. This is evident from the average learning outcomes of 8th-grade Class E students at SMPN 7 Tuban in the second semester: 88 in Cycle I, 89 in Cycle II, and 97 in Cycle III. Thus, there was an increase in

		the average mathematics learning outcomes from Cycle I to Cycle II of 1 point and from Cycle II to Cycle III of 8 points. Additionally, the percentage of students meeting the minimum proficiency standard in Cycles I, II, and III reached 100%.
(Munaisah, 2023)	Improving mathematics learning activities and outcomes with the peer tutoring method	The results of this study indicate the significant benefits of the peer tutoring method in mathematics instruction for Grade 12 IIS at MAN 2 Bojonegoro. By employing this peer tutoring method, student learning outcomes in mathematics improved, as evidenced by the fact that students were more actively engaged in learning through the peer tutoring method compared to previous instruction that did not utilize the peer tutoring method. This is evidenced by the number of students who passed Cycle I, which increased from 20 students to 27 students. The average class score in Cycle II was 76.51, which improved to 79.51.
(Abdul Razzaq, M.Arsyad Ambo Tuo, 2022)	Improving Mathematics Learning Outcomes Through Peer Tutoring Learning Models	The results of this study indicate that the peer-tutoring approach in a cooperative learning setting yielded improved outcomes for 8th-grade students at SMPN 3 Duampanua. The researcher reported that in Cycle I, the average mathematics score of 77.75 fell into the “sufficient” category, showing an increase of 11.8 points; in Cycle II, the average mathematics score of 89.55 fell into the “good” category. The number of students who mastered the material increased by 20%; in Cycle I, only 14 students

		(70%) mastered the material, increasing to 18 students (90%) in Cycle II.
(Putri Anugrah, Ni Putu Dessy, 2021)	The influence of the peer tutor learning model using the pointing technique on students' mathematical problem-solving abilities at SMPN 1 Singaraja	The results of this study indicate that the peer-tutoring learning model influences students' mathematical problem-solving skills. The researchers demonstrated this through the difference in students' mathematical problem-solving skills between the demonstration technique and conventional learning. The peer-tutoring learning model using the demonstration technique is more effective than conventional learning.
Febriyanti, B., Suarjana, I. M., & Bayu, G. W. (2023).	The Effect of the Project Based Learning Model Assisted by Peer Tutors on Mathematics Learning Outcomes of Class V Elementary School Cluster VII, Buleleng District	The data collected consisted of students' mathematics achievement, measured through a test comprising 10 open-ended questions. The average mathematics achievement of students using the project-based learning model with peer tutoring was 7.5, which was higher than the average achievement of students using the conventional learning model, which was 3.02. Hypothesis testing showed that the calculated t-value was 5.03, while the critical t-value at a 5% significance level and 56 degrees of freedom (df) was 1.673. Since the calculated t-value is greater than the critical t-value (calculated $t >$ critical $t$ ), $H_0$ is rejected and $H_1$ is accepted. Thus, it can be concluded that there is a significant effect of the use of the project-based learning model with peer tutor assistance on mathematics learning outcomes in Grade 5 at SD Gugus VII, Buleleng District, for the 2022/2023

		academic year.
Ermiami, L., Zuhriawan, M. Q., & Roziqin, M. K. (2024).	The Influence of Peer Tutoring Learning on Student Learning Outcomes in Class VII of SMPN 2 Sumobito	The results of the analysis using the independent simple t-test were used to determine whether there was a difference in learning outcomes from between the experimental class and the control class . Based on the results of the independent simple t-test, it was found that there was a difference in learning outcomes between the two classes , specifically the experimental class achieved an average score of 83, 52, whereas for the control class yielded an average score of 73.36, meaning the difference in average scores between the experimental and control classes was 10.16, with peer-tutored learning resulting in better student learning outcomes.
Wali, G. N. K., Winarko, W., & Murniasih, T. R. (2020).	Improving student activity and learning outcomes by implementing the peer tutoring method	The results of this study indicate that the implementation of the peer tutoring method can improve student engagement and learning outcomes in Grade VIII G at SMP Negeri 1 Wagir. The improvement in student learning outcomes is evident from the percentages obtained: in Cycle I, the percentage of student learning engagement was 71.67%, while in Cycle II it increased to 83.33%; and student learning outcomes in Cycle I were 60.71%, while in Cycle II they increased to 78.57%.
Yuliana, T., & Muhammad, A. F. N. (2023)	The Effectiveness of the Peer Tutoring Method in Improving Learning Achievement in Addition and Subtraction of Mixed Fractions	The results of the study indicate that there was a significant improvement in academic achievement among the group of students who received peer tutoring. The

		average academic achievement score in the experimental group increased significantly following the peer tutoring intervention. In contrast, the control group showed no significant improvement in academic achievement following the conventional teaching intervention. This method provides students with the opportunity to learn collaboratively, help one another, and build mutual understanding.
Revita, R., Irma, A., Fitriani, D., & Nurhidayah, S (2025)	Peer Tutoring in Complex Function Learning	Based on the results of the data analysis conducted, it was concluded that there is a difference in student learning outcomes in the course " " on complex functions between students who learned using the peer tutoring method and those who did not.
Pratiwi, N. M. F., Sari, N. M. A. T., & Langgi, N. R. (2025)	Application of peer tutoring learning methods to improve learning outcomes in the mathematics economics course.	The results of this study indicate that the peer tutoring method is effective in improving learning outcomes and student engagement in the economic mathematics course. This is evidenced by an increase in the average score from 32.63 on the pre-test to 94.2 on the post-test, as well as a significant increase in learning achievement from 26.32% to 100%. Additionally, student engagement increased by 20.79%, from 73.95% to 94.74%, indicating that the peer tutoring method successfully created a more interactive, collaborative, and student-centered learning environment.
Astuti, N. (2022)	The influence of the peer tutor learning method on the mathematics learning outcomes of class III students	This study demonstrates a significant effect of the peer tutoring learning method on the mathematics learning

	at Simpang Warga 1 Elementary School, Aluh-Aluh District	outcomes of third-grade students at SDN Simpang Warga 1, Aluh-Aluh District, as evidenced by an increase in the average score from 66.00 on the pre-test (sufficient category) to 76.40 on the post-test (good category). The distribution of post-test learning outcomes shows that 52% of students achieved the "very good" category, 28% "good," 8% "satisfactory," and 12% "below average," with a 16.0% contribution of the peer-tutor method to student learning outcomes.
Hapipah, Ahmad, H., & Reskiah. (2021)	The influence of the peer tutor learning model on students' motivation and mathematics learning achievement	This study concludes that the peer-tutoring learning model has a significant effect on the motivation and mathematics achievement of seventh-grade students at SMP Negeri Padang Mawalle in the subject of Social Arithmetic. This is evidenced by the average pre-test score for the experimental class being 58.87, while that for the control class was 58.12. After the intervention, the post-test scores for the experimental class showed a significant increase to 82.90, while the control class only reached 60.16. The average motivation of students who gave positive responses was recorded at 93.39% in the experimental class and an average of 64.51% in the control class.

Education is a process of changing human behavior. In other words, education is the process of acquiring knowledge and habits through learning or study. Education is defined as a systematic effort to enhance students' potential with the expectation that they will develop critical thinking skills, values, morals, and beliefs inherited from their society (Rahmat, 2021: 164). To address this issue, the Indonesian government's Ministry of National Education is striving to improve and reform its education system. These changes will encompass the curriculum, teacher placement, enhanced educational management, and the development of educational facilities and infrastructure. The hope is that these changes will produce innovative students who meet the



demands of the times. Ultimately, the quality of education in Indonesia will improve. The following theories underpin the peer-tutoring learning strategy:

- A. Zaini (in Suyitno, 2004: 36) states that the best way to learn is to teach others. Therefore, adopting the peer tutoring model as a learning strategy will greatly assist students in mastering the material alongside their peers.
- B. A peer tutor, according to Conny Semiawan (in Suherman et al., 2003: 276), is a student capable of assisting students who struggle with learning.
- C. Suryo and Amin (1982:51) define a peer tutor as one or more students appointed to assist students experiencing learning difficulties.

The benefits of implementing peer tutoring include the fact that students receiving instruction from a peer tutor will understand the material better than students receiving instruction from their own teacher. Since peers acknowledge the presence of a student acting as a teacher or tutor, the role of peers can foster and stimulate competition in academic achievement. The following factors must be considered when selecting peer tutors:

- A. Possessing better abilities than other students
- B. Having the ability to understand the teacher's instructions
- C. Having a willingness to help other students
- D. Being accepted and liked by students participating in the peer tutoring program, so that students are not afraid or reluctant to ask questions
- E. Not arrogant, cruel, or harsh toward peers
- F. Possesses sufficient creative ability to teach, that is, can explain lessons to peers

According to Suryo and Amin (1982:81), there are several benefits of the peer tutoring method, namely:

- a. The development of a closer and more intimate relationship between the student being helped and the student acting as a tutor
- b. For the tutors themselves, this teaching activity is an opportunity to expand their knowledge and boost their motivation to learn
- c. It is efficient, meaning they can help more students
- d. It can enhance their sense of responsibility and self-confidence.

One of the drawbacks of the peer tutoring approach is that: students selected as tutors who perform well may not necessarily have a good relationship with the students they assist, and tutors may not always be able to convey the material effectively. The following steps can help address the shortcomings of peer tutoring: selecting tutors who are not only intelligent but also polite and sociable with their peers; assigning a mentor tutor to assist tutors who struggle to convey instructional material to their peers; and having teachers continuously monitor the learning process with peer tutors.

From the discussion of the peer tutoring theory, it can be concluded that by utilizing smarter students to teach less intelligent students, the peer tutoring learning method enables a more active and effective learning process, minimizes the gap between smarter and less intelligent students, and helps students who face difficulties in understanding the material.

## CONCLUSION

Mathematics is a fundamental science that is essential in everyday life and makes a significant contribution to various fields of science and technology. Effective mathematics learning requires active student engagement, teacher creativity, and the

application of appropriate instructional models. One effective instructional model is the peer tutoring method, in which students who have mastered the material first guide their peers. This method has been proven to improve student learning outcomes, encourage speaking confidence, build self-confidence, and create a more active and enjoyable classroom atmosphere.

Education is a conscious and planned effort to create a learning environment and learning process so that students actively develop their potential to possess religious spiritual strength, self-control, personality, intelligence, noble character, and the skills required by themselves, society, the nation, and the state (Constitution, 2003). One effective learning method used is peer teaching (peer tutoring). However, since learning is currently student-centered, the use of peer tutoring as a learning method can be effectively implemented. Peer tutoring means students teach other students, or the students acting as tutors are those who have an advantage over their peers; that is, a tutor is a student who is smarter or has a better understanding of the subject matter in a particular subject compared to other students. The learning method implemented must be one that improves learning outcomes. Overall, the author concludes that the implementation of the peer tutoring method has a positive impact on improving students' grades, academic achievement, and interest. Peer tutoring is one of the most effective learning methods for the learning process carried out by students regarding their learning outcomes; furthermore, there are many benefits to be gained from using the peer tutoring method.

Through a literature review, it was found that peer tutoring has a positive impact on student learning. Teachers acting as facilitators must be able to create a learning environment that supports and encourages student creativity. Peer tutoring also offers benefits to teachers, such as ease in identifying students' difficulties and creating a dynamic learning atmosphere.

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