Role-Playing Method Using Peer Tutors as A Model of Mathematics Learning for Grade XII Science Program Students of SMA Negeri 7 Kota Bengkulu in the Odd Semester of the Academic Year 2023/2024

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Abstract

Implementation of mathematics learning needs to be done with various methods that can motivate and encourage students to facilitate their understanding of mathematical concepts. In accordance with the demands of the 2013 curriculum and government programs regarding teacher-learner roles, where teachers learn together with students, meaning that teachers are not the sole source of learning in the classroom, researchers attempted to practice students playing the role of peer tutors as one of the methods of mathematics learning in the classroom. The objectives of this research are: (1) to determine whether through role-playing method using peer tutors can improve the learning outcomes of mathematics subjects for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the odd semester of the academic year 2023/2024; (2) to determine whether through role-playing method involving peer tutors can improve students' skills in mathematics learning for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the odd semester of the academic year 2023/2024; (3) to determine whether through role-playing method involving peer tutors can improve students' discipline in mathematics learning for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the odd semester of the academic year 2023/2024. The results achieved in learning through role-playing method can: (1) improve students' learning outcomes in mathematics subjects, specifically statistics, for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the academic year 2023/2024; (2) enhance students' skills in mathematics subjects, specifically statistics, for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the academic year 2023/2024; (3) increase students' discipline in mathematics learning, specifically statistics, for XII MIPA 1 students at SMA Negeri 7 Bengkulu in the academic year 2023/2024.

Introduction

Most of the students of XII MIPA 1 at SMA Negeri 7 Bengkulu have a low level of mastery of mathematics subjects, particularly statistics competence. This is indicated by the results of daily quizzes where the majority of students scored below the minimum passing criteria. From the results of daily quizzes on statistics competence in the first semester of the academic year 2023/2024, which amounted to 34 students, 28 or 82.35% were unable to achieve a score of 80 as the passing grade. This is presumably due to the mathematics learning process not being student-centered, causing students to feel afraid or embarrassed to ask questions to the teacher or their peers in class, thus making the learning process in the classroom uninteresting and unpleasant for students. Therefore, an approach like this should no longer be used in the mathematics learning process in class, in line with the demands of the 2013 curriculum and government programs regarding teacher-learner roles.

In implementing the mathematics learning process, various methods that can motivate and encourage students to facilitate their understanding of mathematical concepts are needed. For high school students in XII grade, this should be done through a contextual teaching and learning (CTL) approach, which is an approach to support learning strategies that align with competency-based curriculum. Suprihatiningrum (2013) and Trianto (2015), as cited in Astati et al. (2024), stated that "a teaching method is a conceptual framework that systematically describes the learning procedure to manage students' learning experiences so that the desired specific learning objectives can be achieved." Teaching methods in a plan or pattern are used as guidelines for implementing classroom teaching or tutorial learning.

A contextual learning concept chooses a learning concept reference that helps teachers connect subjects with real situations and can motivate students to connect knowledge and apply it in daily life. Contextual learning is a learning process closely related to real experiences, providing opportunities for students to solve problems in a real context, allowing students to complete tasks with pleasure and without burden.

To ensure that mathematics learning takes place actively, creatively, innovatively, effectively, and enjoyably, the learning process must be built on the joy of students and teachers. In accordance with the demands of the 2013 curriculum and government programs regarding teacher-learner roles, where teachers learn together with students, meaning that teachers are not the sole source of learning in the classroom, researchers objectively attempted to conduct a simple experiment in the classroom based on the suggestion of the school principal, which is the role-playing method involving peer tutors as one of the methods of mathematics learning in the classroom. This was felt to be suitable and relevant to the CTL (contextual teaching and learning) approach concept because through the role-playing method with peer tutors in the classroom, students receive many positive aspects, including: (1) The learning process through role-playing method using peer tutors provides direct experience for students to solve real problems they face, (2) Through role-playing activities using peer tutors, students are given the opportunity to practice cooperation among groups, which ultimately strengthens socialization experiences among peers, (3) Through the role-playing method using peer tutors, students can discover the meanings of life from social environments that are beneficial to them, (4) Training students to become teachers and uphold democratic values while being individually and collectively responsible and implementing those values.

According to Suyatno (2009) as cited by Ramadhani and Hermansyah (2023), the use of peer tutoring is highly effective in achieving full participation from each student, both collectively and individually. This method provides each student with the opportunity to act as a teacher for their peers. As a result, students who were previously not actively engaged in learning become more motivated and participate actively. According to Sri Hidayati (2015), cited by Arrahim and Ratnasari (2023), the Peer Teaching Method is a learning method carried out by a group of students of nearly the same age, who have already mastered the subject matter and help other students in the same class, either one or more, who are having difficulty understanding the material.

The role-playing method is one of the learning methods that make students active and creative in learning. This method presents communication problems between teachers and

students. Through these problems, students are invited to play roles to overcome them. In role-playing, students will empathize with the roles they play, involve themselves in the problems, and provide solutions according to their abilities. Role-playing will make students directly involved in problems and provide solutions.

Santoso (2011) as cited in Wahyuni (2023) stated that the role-playing model is a method of mastering learning materials through the development of students' imagination and empathy, which includes rules, objectives, and an element of enjoyment in the teaching and learning process.

Many researchers conducted the research on role-playing method, they are Saptono et al. (2020) found that role-playing significantly increased students' motivation and achievement in accounting. Kurniawan et al. (2023) discovered that peer tutoring in math led to more interaction among students, helping them tackle difficult tasks together. In essence, both studies highlight the importance of engaging students actively and collaborating with peers to enhance learning.

Methods

This research is classroom action research conducted at SMA Negeri 7 Bengkulu for mathematics subjects, specifically statistics, and consists of 2 cycles. In the first cycle, the learning process is conducted by peer tutors in learning with basic statistical competencies. The teacher observes, analyzes the results, and discusses the strengths and weaknesses of peer tutors in teaching. The results of the discussion are applied to the treatment in the second cycle. Cycle I lasts for 2 meetings, and cycle II lasts for 2 meetings as well. The variables studied are the involvement of peer tutors and improvement of learning outcomes, skills, and discipline of students. This research was conducted for 2 months, from September to October 2023. The determination of the research time refers to the school's academic calendar because classroom action research requires several cycles that require an effective teaching and learning process in the classroom. The subjects of this research are XII MIPA 1 students at SMA Negeri 7 Bengkulu, totaling 34 students, consisting of 8 male students and 26 female students. The selection of the XII MIPA 1 class aims to improve and enhance student participation and competence in mastering statistics in that class. Data were collected using: 1) Document Techniques, 2) Observation Techniques, and 3) Test Techniques. Data obtained from each observation activity in each cycle were analyzed descriptively using percentage techniques to see trends that occur in the learning process.

Result

This research aims to determine the use of peer tutoring methods in improving learning outcomes, skills, and discipline of students at SMA Negeri 7 Bengkulu, specifically in the XII MIPA 1 class.

1. Initial Test Results

From the research instrument of an initial test on Statistics material in the form of a 5-item essay test, the results are as listed in the following table.

Table 1. Initial Test Result

Score	Number of Students	Percentage
91 – 100	1	2,941
81 – 90	3	8,823
71 – 80	3	8,823
61 – 70	4	11,764
51 – 60	5	14,706
41 – 50	15	44,118
31 – 40	3	8,823
Total	34	100

From the initial test results in Table 1 above, it is evident that out of 34 students in class XII MIPA 1 at SMA Negeri 7 Bengkulu for the academic year 2023/2024, 27 students or 79.411% have not yet reached the passing limit, which is a score of 70, meaning they have not achieved the basic competence in statistics. Only 7 students, or 20.588%, have reached the passing limit, obtaining a score of 80.

2. Skills in Learning Statistics

Based on observations of the initial conditions when learning had not yet utilized the peer tutoring role-playing method, the class tended to be passive. In the initial conditions of learning statistics, students were observed to be passive during the learning process. While participating in statistics learning, most students paid little attention to the teacher's explanation; some were chatting amongst themselves, some were feeling sleepy, some were lazy, and some were daydreaming.

Table 2. Level of Student Skills Pre-Action/Initial Condition

No	Level of Student Skills	Score (x)	Number of students	FX
1.	Unskilled	1	23	23
2.	Less skilled	2	9	18
3.	Skilled	3	2	6
4.	Very skilled	4	0	0
	Jumlah		**34**	**47**

Based on Table 2, it is evident that the skills in proving statistics among students in the learning activities are far from the expected level. This is evidenced by only 2 skilled students (5.882%) and no students are very skilled (0%), while there are 9 students who are less skilled (26.47%) and 23 students who are not skilled (67.647%). Thus, it can be concluded that 94.117% of students in terms of skill level in proving statistics have not met expectations.

3. Discipline in Learning

Based on observations, the initial discipline of students in statistics learning activities is below expectations. There are students who are sleepy, chatting among themselves, being lazy, and daydreaming.

Table 3. Level of Student Discipline Pre-Action/Initial Condition

No	The level of students' discipline	Score (x)	Number of students	FX
1.	Not disciplined	1	11	11
2.	Less Disciplined	2	18	36
3.	Disciplined	3	4	12
4.	Very disciplined	4	1	4
	Total		**34**	**63**

Based on Table 3, the level of student discipline does not yet meet expectations, with 29 students still not disciplined, which is 85.294%.

Research Results Cycle I

Results of Student Learning Cycle I

After participating in the Statistics learning process using the role-playing method with peer tutoring in Cycle I, the results of daily quizzes are as follows. Students who have not mastered the Basic Competencies or have not completed them amounted to 5 students or 14.706%. While students who have achieved learning completeness, namely 29 students or 85.294%. Thus, in

terms of learning completeness, there has been an increase from 20.588% to 85.294%.

Observation Results of Student Skills Cycle I
Based on observations of student skills in Cycle I, it can be seen that after learning using the role-playing method with peer tutoring, students' skills have increased from skilled students, which were initially 2 students (5.882%) to 27 students (79.412%), and those who are very skilled, which initially were none (0%), became 5 students (14.706%) or increased by 73.53%.

Observation Results of Student Discipline Cycle I
The results of student discipline in Cycle I show that students' discipline after participating in learning activities using the role-playing method has increased, with disciplined students initially being 5 students (14.706%) now becoming 31 students (91.176%) or an increase of (76.47%).

Cycle II Research Results

Description of Cycle II Results Student Learning Cycle II

After participating in the Statistics learning process using the role-playing method in Cycle II, the results of daily quizzes are as follows. Students who have not mastered the Basic Competencies or have not completed them amounted to 2 students or 5.882%. While students who have achieved learning completeness, namely 32 students or 94.117%. Thus, in terms of learning completeness, there has been an increase from Cycle I to Cycle II.

Observation Results of Student Skills Cycle II
The learning condition using the role-playing method in observing skills after learning using the role-playing method in the second cycle shows an increase in student skills from skilled students who were initially in Cycle I, there were 27 students (79.412%) in Cycle II became 33 students (97.059%).

Observation Results of Student Discipline Cycle II
The observation results of student discipline in Cycle II show that students' discipline after participating in learning activities using peer tutoring in Cycle II becomes 100%.

Student Learning Results at Initial Conditions, Cycle I, and Cycle II

Student learning results show an increase of 64.706% from the initial condition to Cycle I, and 8.823% from Cycle I to Cycle II. Thus, there is a significant increase after learning activities using the role-playing method in student learning outcomes.

Student Skills at Initial Conditions, Cycle I, and Cycle II

In terms of student skills, it is found that there is an increase of 73.53% in student skills from the initial condition to Cycle I and 17.647% from Cycle I to Cycle II. It can be concluded that after using the role-playing method involving peer tutoring in learning activities, student discipline significantly increases.

Student Discipline at Initial Conditions, Cycle I, and Cycle II

Regarding discipline, it is found that there is an increase of 73.53% in student discipline from the initial condition to Cycle I and 17.647% from Cycle I to Cycle II. It can be concluded that after using the role-playing method involving peer tutoring in learning activities, student discipline significantly increases.
Observation Results of Student Learning Outcomes, Skills, and Discipline in Initial Conditions, Cycle I, and Cycle II

Discussion

Based on the research findings that have been conducted, the student learning outcomes, skills, and discipline in the initial conditions, Cycle I, and Cycle II can be described as follows:

Student Learning Outcomes

From the findings obtained for student learning outcomes, it can be explained that the use of role-playing methods in learning activities has a significant impact on student learning outcomes. An increase of 64.706% from the initial condition to Cycle I indicates that the method is effective in improving students' understanding and skills from the beginning of learning to the end of the first cycle.

Furthermore, an increase of 8.823% from Cycle I to Cycle II indicates that the role-playing method also succeeds in maintaining and even improving student learning outcomes after they have become accustomed to the learning approach. This demonstrates the success of the method in reinforcing student understanding and encouraging them to continue improving their knowledge and skills.

This significant improvement can be attributed to several factors. First, role-playing methods naturally involve students actively in the learning process, allowing them to learn in a more engaging manner and interact directly with the subject matter. Second, this approach allows students to understand learning content through direct experience and simulation of real-life situations, which can enhance their retention and understanding.

Moreover, the success of the role-playing method may also be influenced by the teacher's involvement in facilitating learning. Skilled teachers in implementing this method can ensure that students are optimally engaged and receive the necessary support to understand the concepts being taught.

Thus, these findings confirm that the use of role-playing methods can be an effective strategy in improving student learning outcomes. This underscores the importance of variation in learning approaches to meet individual student needs and achieve optimal learning outcomes.

Student Skills

With findings indicating an increase in student skills by 73.53% from the initial condition to Cycle I and 17.647% from Cycle I to Cycle II after implementing role-playing methods involving peer tutors, it can be concluded that the learning method has a positive impact on improving student discipline.

The 73.53% increase in skills from the initial condition to Cycle I indicates that the role-playing method involving peer tutors has been effective in enhancing students' skills in understanding the material and applying it in role-playing situations. Then, the 17.647% increase from Cycle I to Cycle II indicates that the method also succeeds in maintaining and even enhancing the skills that were improved in the previous stage.

In the context of student discipline, this increase in skills can also be linked to improved discipline. Role-playing methods involving peer tutors not only actively and interactively teach material but also directly involve students in learning. Through the roles they play, students learn to communicate, collaborate, and respect established rules, which can in turn improve their discipline.

Additionally, the success of this method may also be due to the interaction between students and peer tutors. Peer tutors, who are students with a better understanding of the material or certain skills, can serve as good examples for other students. They may be more easily emulated and followed by fellow students, which can help improve discipline and learning motivation.

Therefore, based on these findings, it can be described that role-playing methods involving peer tutors are effective in improving student skills and also have a positive impact on increasing student discipline in the learning context.

Student Discipline

Based on the presented findings, it can be concluded that the use of role-playing methods involving peer tutors in learning activities has provided a significant positive impact on student discipline. There is a considerable increase from the initial condition to Cycle I, which is 73.53%, and there is also a significant increase from Cycle I to Cycle II by 17.647%.

The increase in student discipline by 73.53% from the initial condition to Cycle I indicates that the learning method used is effective in creating a learning environment that motivates students to become more disciplined. This can be assumed that involving aspects of play and interaction with peer tutors can increase student engagement in learning, making them more focused and compliant with established rules.

Furthermore, the 17.647% increase from Cycle I to Cycle II indicates that the positive effect of the learning method can be maintained and even enhanced over time. This may be due to students' adaptation to the new learning pattern, increased social interaction between students and peer tutors, and a deeper understanding of the importance of discipline in the learning process.

Thus, these findings indicate that role-playing methods involving peer tutors have the potential to significantly improve student discipline in the learning context. The use of this method not only creates a more enjoyable and interactive learning environment but also helps students develop positive social skills and behaviors. Therefore, it is recommended that this method continue to be implemented and developed in educational contexts to maximize students' learning potential.

The utilization of peer tutor role-playing emerges as a highly effective strategy in augmenting mathematics learning outcomes, particularly in the realm of statistics, among students of Class XII MIPA 1 at SMA Negeri 7 Bengkulu during the initial semester of the academic year 2023/2024. The significant improvements of 85.294% in the first cycle and 94.117% in the subsequent cycle underscore the efficacy of this approach. Similarly, in the academic year 2019/2020, notable enhancements in students' mathematical skills were observed, with increases of 79.412% and 97.059% in the respective cycles. Moreover, the adoption of peer tutor role-playing contributed to a marked enhancement in students' discipline within the mathematical framework, particularly in statistics, during the first semester of the academic year 2023/2024, evident through a remarkable surge of 91.176% in the initial cycle and a full 100% increase in the subsequent cycle. Previous research by Saptono et al. (2020) and Kurniawan et al. (2023) further corroborates the importance of active engagement and peer collaboration in fostering learning outcomes. Overall, these findings underscore the significance of innovative teaching methodologies in promoting student achievement and discipline in mathematics education.

Conclusion

Based on the analysis of the data from this classroom action research, it can be concluded that:
1. Learning using the peer tutor role-playing method can improve students' learning outcomes in mathematics, specifically in statistics, in class XII MIPA 1 of SMA Negeri 7 Bengkulu in the academic year 2023/2024, first semester. This is evidenced by an increase of 85.294% in the first cycle and 94.117% in the second cycle.
2. Learning using the peer tutor role-playing method can enhance students' skills in mathematics, particularly in statistics, in class XII MIPA 1 of SMA Negeri 7 Bengkulu in the academic year 2019/2020, first semester. This is demonstrated by an increase of 79.412% in the first cycle and 97.059% in the second cycle.
3. Learning using the peer tutor role-playing method can improve students' discipline in mathematics, specifically in statistics, in class XII MIPA 1 of SMA Negeri 7 Bengkulu in the academic year 2023/2024, first semester. This is indicated by an increase of 91.176% in the first cycle and 100% in the second cycle.

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