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Improving Junior High School Students' Mathematics Learning Outcomes Using the Make-A-Match Type Cooperative Learning Model

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Abstract

Penelitian ini bertujuan untuk mengetahui peningkatan hasil belajar matematika siswa SMP dengan mengunakan model pembelajaran kooperatif tipe make a match. Jenis penelitian ini adalah penelitian tindakan kelas. Subjek dalam penelitian ini adalah siswa kelas VIII B SMP Satap Negeri Nakol dengan jumlah siswa 21 orang. Teknik pengumpulan data berupa tes dan observasi. Data yang diperoleh kemudian dianalisis untuk mengetahui ketuntasan individu maupun klasikal. Dalam model pembelajaran make a match terdapat tiga dimensi utama yang dapat mendorong siswa mencapai hasil belajar yang optimal yaitu interaksi antara siswa dengan guru, interaksi siswa dengan siswa, serta adanya unsur permainan dalam proses pembelajaran. Hasil penelitian menunjukkan bahwa berdasarkan hasil analisis data pada siklus I bahwa dari jumlah siswa 21 orang yang mengikuti tes jumlah siswa yang mencapai ketuntasan adalah 12 orang sedangkan siswa 9 orang lainnya belum tuntas sehingga ketuntasan klasikal siswa pada siklus I adalah 57,14% dan pada siklus II hasil belajar siswa mengalami peningkatan menjadi 80,95% dengan jumlah yang tuntas adalah 17 orang dan jumlah siswa yang belum tuntas sebanyak 4 orang. Hasil penelitian yang dilaksanakan sebanyak dua siklus menunjukkan bahwa penggunaan model pembelajaran kooperatif tipe *make a match* mampu meningkatkan hasil belajar siswa.

Abstract

This study aims to investigate the improvement of mathematics learning outcomes of junior high school students using the cooperative learning model of make a match. This research is a classroom action research. The subjects of this study were 21 students of class VIII B of SMP Satap Negeri Nakol. Data collection techniques used tests and observations. The data obtained were then analyzed to determine individual and classical completeness. In the make a match learning model, there are three main dimensions that can encourage students to achieve optimal learning outcomes, namely interaction between students and teachers, interaction between students, and the presence of game elements in the learning process. The results of the study show that based on the analysis of data in cycle I, out of 21 students who took the test, 12 students achieved completeness, while 9 other students were not complete, so the classical completeness of students in cycle I was 57.14% and in cycle II the student's learning outcomes increased to 80.95% with 17 students completing and 4 students not completing. The results of the study conducted in two cycles show that the use of the cooperative learning model of make a match is able to improve student learning outcomes.

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Introduction

Education is a very noble effort in improving human quality so that all efforts that lead to educational success are a must (Susanty, et al., 2020). Education plays an important role in improving the intelligence of the nation because education is a determinant of the progress of a nation, the progress or decline of a nation depends on the knowledge and skills of its citizens, therefore the quality of education needs to be continuously improved. According to the Director General of Teachers and Education Personnel of the Ministry of Education and Culture (Dirjen GTK Kemdikbud), there are four things that must be present in improving the quality of education, namely policy, principal leadership, infrastructure and learning process.

The less than optimal learning process is one of the triggers for low student mathematics learning outcomes, (Astutiningtyas, et al., 2017). According to (Haryanto, 2020) learning outcomes are behavioral changes that occur in students after receiving learning experiences, which can be measured through learning outcome assessments. It can be concluded that learning outcomes are the level of knowledge achieved by students regarding the material received when participating in and working on assignments in learning activities at school. Learning outcomes in psychomotor skills are characterized by increased creativity or student skills. According to (Herawati, 2017), the goal of education in principle is to create humans who can create something new, not just repeating something that has been produced by previous generations but becoming creative humans, who are able to create something new and useful. Learning outcomes are the abilities that students have after receiving their learning experiences. According to Hamna & BK (2020), learning outcomes are the achievement of educational goals in students who participate in the teaching and learning process, learning outcomes can also be interpreted as changes caused by humans changing their attitudes and behavior. Learning outcomes can be expressed in various forms, namely skills as learning outcomes, a collection of responses as statements of learning outcomes, attitudes and value references as statements of learning outcomes, problem-solving skills, knowledge, attitudes and skills in using new methods.

Based on the results of observations conducted at SMP Satap Negeri Nakol, problems were found in the learning process, namely when the teacher explains the material in front of the class, students tend not to pay attention to the teacher's explanation, students seem not to care about mathematics lessons because mathematics lessons are considered boring. One way to overcome this learning difficulty is to create new innovations that are carried out and used by teachers in the teaching process. One aspect that influences the teaching and learning process is the appropriate learning model. One form of learning that can actively involve students' cognitive abilities is the make a match learning model. The make a match learning model is a learning model that includes games in learning, namely using the help of cards where the cards contain questions and answers, students will match the question and answer cards. So in this learning model, it can foster cooperation between students, student interest in learning. With the element of play in learning, it can change students' perceptions that mathematics is no longer a difficult and boring subject but a fun subject (Dahlia, 2022). Through the make a match type cooperative learning model, it is carried out with steps that have been adjusted. In this model,

students will be divided into two groups and will match cards. Learning while playing will make it easier for students to understand the concepts or learning materials being taught by the teacher. This learning model can create a pleasant atmosphere and can attract students' interest in learning so that it will have an impact on learning outcomes.

Cooperative learning is the use of small groups to maximize their learning and the learning of other members in the group so that in completing group assignments, each member cooperates and helps each other to understand a learning material. Cooperative learning is part of a broader paradigm shift that is occurring in the field of teaching. Cooperative learning is learning that consciously creates interaction so that learning resources for students are not only teachers and textbooks, but also fellow students. Cooperative learning is learning that conditions students to work together in small groups to help each other learn. Make a match learning is one type of cooperative learning. Therefore, each step must be adjusted to the objectives of cooperative learning. In principle, the cooperative learning procedure consists of four stages, namely: a). Explanation of the material. The explanation stage is interpreted as the process of delivering the main points of the lesson before students study in groups. The main goal in this stage is students' understanding of the main points of the lesson. b). Learning in groups. After the teacher explains the general description of the main points of the lesson. Next, students are asked to study in their respective groups that have been formed previously. c). Assessment. Assessment in cooperative learning models can be done with tests or quizzes. Tests or quizzes are done either individually or in groups. Individual tests will provide information on the abilities of each student, and group tests will provide information on the abilities of each group.

The final result of each student is a combination of both and divided by two. The value of each group has the same value in its group which is the result of the cooperation of each group member. d). Group recognition. Group recognition is the determination of which group is considered the most prominent or which group has the most achievements, which deserves to be given a prize or reward. Recognition and awarding are expected to motivate groups to continue to excel and also motivate other groups to be better able to improve their achievements (Hasanah, Z., & Himami, A. S. 2021). The make a match learning model is one of the active, innovative and fun learning strategies. This learning model invites students to be able to work together in groups so that students are actively involved in the learning process. This is in line with the opinion of Rusman (2018) who stated that the make a match learning model is one type of cooperative learning model, namely a form of learning by means of students learning and working together in small groups collaboratively whose members consist of four to six people with a heterogeneous group structure. Heterogeneous of course refers to the diverse backgrounds of students, both from black skin, Javanese ethnicity and so on.

According to (Rusman, 2018) the steps of the make a match learning model are as follows. a). The teacher prepares cards containing several concepts that are suitable for the review session, one part is a question card and the other part is an answer card. b). Each student gets a card that says a question

or answer and thinks about the answer or question from the card they are holding. c). Each student looks for a pair of cards that match their card. d). After finding their partner's card, students are asked to present the pair of cards they get. e). After one round, the cards are shuffled again so that each student gets a different card from before, and so on. f). The teacher together with the students draw conclusions about the learning material.

Advantages and Disadvantages of the Make a Match Learning Model. Huda (2023) stated that the make a match type of cooperative learning model has the following advantages: a). Can increase student learning activities, both cognitively and physically. b). The presence of game elements makes this method interesting and fun. c). Students will have a deeper understanding of the lesson, which encourages their learning motivation. d). Effective as an exercise to build students' courage in delivering presentations. e). Effective in training students' discipline to value time for learning. The disadvantages of the Make A Match type of cooperative learning model are as follows: a). If the preparation for this model is not mature enough, it can waste time. b). Students may feel embarrassed because they are paired with the opposite sex. c). Failure to direct the teacher can result in a lack of student attention during the partner's presentation. d). Continuous use of this model can cause boredom.

Method

The type of research used in this study is classroom action research. The subjects in this study were students of class VIII B of SMP Satap Negeri Nakol. The data collection techniques used in this study were tests and observations. In accordance with the type of classroom action research, this study has several stages which are a cycle. Each cycle is carried out based on the changes to be achieved. In this study, it will be carried out in two cycles, namely cycle I and cycle II. This research procedure uses several stages, namely starting from planning, action, observation, and evaluation and reflection. The data collection techniques used in this study are tests and observations. While the research instruments used are test questions and observation sheets. The test as an instrument for data collection in this study is a series of questions and exercises used to measure the abilities of students. The test is used to obtain data on student learning outcomes. While observations are carried out by researchers to obtain an objective picture during the learning process and to observe students' attitudes during the action.

The procedure for implementing this classroom action is applied in cycle mode. This research was conducted in 2 cycles, and each cycle is interrelated so that the actions in cycle I are prerequisites for cycle II which is the end of the research that is used as an evaluation of whether or not the research objectives have been achieved.

Analysis of Observation Data

The results of observations of student and teacher activities obtained from observation sheets carried out in each cycle are analyzed using the following formula:

P = F / N x 100%

Description

F = Number of activities that appear

N = Total Number of Activities (Nurhaeni, 2018)

Analysis of Test Result Data

The test result data collected in each cycle is analyzed to determine the level of student completion. In this study, to determine individual and classical completion, the following learning completion guidelines are used:

Individual Completeness

A student is said to have succeeded (achieved learning completion) if he has achieved a minimum mastery target of 75% or with a score of 75 (stipulations from the school). The formula used is the percentage of student completion = T/Tt x 100% (Mamoh 2017).

Description:

T = Total number of student scores

Tt = Total number of scores

Classical/group completion

A class is said to have succeeded (achieved learning completion) if at least 75% of the data on the number of students in the class have achieved individual completion

Formula used:

Percentage of class completion = S/n x 100% (Mamoh, 2017)

Description:

s = number of students who achieved completion

n = number of students in the class

Results and Discussion

This section will present the research results and discussions related to improving junior high school students' mathematics learning outcomes using the make a match cooperative learning model. Data analysis and research findings will be discussed in depth to understand how to use the make a match learning model in mathematics learning.

Results

Based on the test results in cycle I, there were 9 students who had not achieved completion out of 21 students. The test results in cycle I can be seen in the following table:

Table 1. Cycle I Test Results

No	Name	Value	Description
1	A. S	40	TT
2	A. A	37	TT
3	B. T. N	76	T
4	F. X. E. L	89	T
5	G. N	78	T
6	I. R. N	64	TT
7	J. S	78	T
8	J. S. A	86	T
9	K. Y. N	53	TT
10	L. M	47	TT
11	M. C. S	78	T
12	M. C. N	66	TT
13	M. G. N	86	T
14	M. O. N	76	T
15	P. G. N	53	TT
16	R. P	78	T
17	S. A	76	T
18	V. A	80	T
19	V. T	49	TT
20	Y. P. U	56	TT
21	Y. M. K	76	T
Completed: 57.14%			
Not Completed: 42.86%			

In the test results table of cycle I, it can be seen that out of 21 students who took the test, 12 students completed the test or the completion percentage was 57.14% obtained from the number of students who completed the test divided by the total number of students multiplied by 100%. Meanwhile, the number of students who did not complete the test was 9 people or the percentage was 42.86% obtained from the number of students who did not complete the test divided by the total number of students multiplied by 100%.

Table 2 Results of Teacher Observations in Cycle I

The results of observations of teacher activities in cycle I are described in the following table:

No	Aspect of Teacher Activities	Implementation	
		Yes	no
1.	The teacher greets the students	√	
2.	The teacher checks the students' attendance	√	
3.	The teacher motivates the students	√	
4.	The teacher conveys the learning objectives	√	
5.	The teacher presents the material	√	
6.	The teacher gives practice questions	√	
7.	The teacher divides the students into two heterogeneous groups √	√	
8.	The teacher distributes question cards and answer cards to the groups	√	

9.	The teacher gives students the opportunity to work on or formulate questions and answers from the cards they hold	√	
10.	10. The teacher accompanies students when students work on or formulate questions from the cards they hold		√
11.	The teacher gives instructions to students to start looking for pairs of question cards and answers from the cards they hold	√	
12.	The teacher gives each pair the opportunity to present the results of their search for their card pairs	√	
13.	13. The teacher confirms the correctness and suitability of the students' pair cards √	√	
14.	The teacher directs students to make conclusions	√	
15.	The teacher closes the lesson and says closing greetings	√	

Based on the results of observations of the implementation of teacher activities in cycle I in the learning process, the results obtained were 93.33% where there are categories that must be considered by teachers, namely teachers must be more active in assisting students when students work on or formulate questions and answers from the cards they hold.

Table 3 Results of Student Observations in Cycle I

The results of observations of student activities in cycle I are described in the following table:

No	Component	Yes	No
1	Students respond to teacher's greetings	√	
2	Students' attendance	√	
3	Listen carefully to the motivation given by the teacher	√	
4	Listen to the learning objectives conveyed by the teacher	√	
5	Listen to the learning material	√	
6	Together Complete the given practice questions	√	
7	Listen to the teacher's explanation about the steps to make a match	√	
8	Gather with their respective groups	√	
9	Work on or formulate questions and answers from the cards held	√	
10	Find answers from the cards held	√	
11	Students can match their partner cards correctly		√
12	Students can manage time well in matching their partner cards		√
13	Students can present the results of searching for partner cards	√	
14	Draw conclusions related to the material studied	√	
15	Students respond to teacher's greetings	√	

Based on the results of observations of the implementation of student activities in cycle I in the learning process, the results were 86.66%. There are several categories that have not been implemented properly, namely when matching the partner cards, there are students who cannot find their partner cards correctly because students do the questions incorrectly from the cards they hold so that students become less confident. Students are also not able to manage their time well when students match their

partner cards because students have to find partner cards in all students who hold answer cards. Therefore, the researcher will fix it in cycle II by dividing students into smaller groups.

Based on the test results in cycle II, there were 17 people who completed and 4 people did not complete. The test results in cycle II can be seen in the following table:

Table 4 Cycle II Test Results

No	Name	Value	Descrition
1	A. S	70	TT
2	A. A	60	TT
3	B. T. N	93	T
4	F. X. E. L	90	T
5	G. N	80	T
6	I. R. N	85	T
7	J. S	88	T
8	J. S. A	90	T
9	K. Y. N	75	T
10	L. M	78	T
11	M. C. S	80	T
12	M. C. N	95	T
13	M. G. N	90	T
14	M. O. N	90	T
15	P. G. N	65	TT
16	R. P	83	T
17	S. A	90	T
18	V. A	95	T
19	V. T	70	TT
20	Y. P. U	80	T
21	Y. M. K	88	T
Comlete	: 80,95%		
No Comlete	: 19,05%		

The test data in cycle II shows that from the total number of students, 21 people have taken the test with a total of 17 people completing the test and the percentage of completion is 80.95% which is obtained from the number of students who completed it divided by the total number of students multiplied by 100%. The number of students who did not complete it was 4 people with a percentage of 19.05% obtained from the number of students who did not complete it divided by the total number of students multiplied by 100%.

Thus, the results of the cycle II test have met the indicators of successful action, namely individual completion of at least 75 and class completion of at least 75%, so the implementation of learning activities in cycle II can be declared successful and limited to cycle II.

Table 5 Results of Teacher Observations in Cycle II

The results of observations of teacher activities in cycle II can be seen in the following table:

No	Aspect of Teacher Activities	Implementation	
		Yes	No
1	The teacher greets	√	
2	The teacher fills in the students' attendance	√	
3	The teacher motivates the students	√	
4	The teacher conveys the learning objectives	√	

5	The teacher presents the material	√
6	The teacher gives practice questions	√
7	The teacher divides the students into several heterogeneous groups	√
8	The teacher distributes question cards and answer cards	√
9	The teacher gives students the opportunity to work on or formulate questions and answers from the cards they get	√
10	The teacher accompanies students when students work on or formulate questions from the cards they get	√
11	The teacher gives instructions to students to start looking for pairs of question cards and answers from the cards they get	√
12	The teacher gives each pair the opportunity to present the results of their search for their card pairs	√
13	The teacher confirms the correctness and suitability of the students' partner cards	√
14	The teacher directs students to make conclusions	√
15	The teacher closes the learning and says Closing greetings	√

The results of observations of teacher activities in cycle II reached 100%, namely teachers were able to accompany students when students were working on or formulating questions and answers from the cards obtained by students.

Table 6 Results of Student Observations in Cycle II

The results of observations of student activities in cycle II are described in the following table:

:No	Comonent	Yes	No
1	Students respond to teacher's greetings	√	
2	Students' attendance	√	
3	Listen carefully to the motivation given by the teacher	√	
4	Pay attention to the learning objectives conveyed by the teacher	√	
5	Listen to the learning material	√	
6	Together Complete the example questions given	√	
7	Listen to the teacher's explanation about the steps to make a match	√	
8	Gather with their respective groups	√	
9	Work together in working on or formulating questions and answers from the cards obtained		√
10	Send one member to find the answer card in another group	√	
11	Students can match their partner cards correctly	√	
12	Students can manage time well in matching their partner cards	√	
13	Present the results of searching for partner cards	√	
14	draw conclusions related to the material studied	√	
15	Students respond to teacher's greetings	√	

The results of student activity observations also increased to 100%. By dividing students into small groups, students can discuss with other group members and by discussing in groups, students become more confident in finding their partner cards and can match their answer cards correctly. After

dividing students into smaller groups, the time needed also becomes more effective so that students can manage their time well in matching their partner cards

After making improvements to the shortcomings in cycle I, there was an increase in cycle II, with the percentage of classical completeness reaching 80.95 This increase was due to developments in the learning process, namely. students become more confident because students can discuss in groups so that students can match their partner cards correctly. The application of the make a match type cooperative learning model in small groups makes time more effective. Thus, the implementation of learning in cycle II is said to be successful and is limited to cycle II.

Discussion

This study uses a cooperative learning model of the make a match type which is implemented in two cycles consisting of cycle I and cycle II. The subjects of the study were students of class VIII B of SMP Satap Negeri Nakol. This study aims to determine the improvement in mathematics learning outcomes of junior high school students using the make a match type cooperative learning model. This research was carried out in accordance with the research procedures, namely the planning stage, implementation stage, observation stage and evaluation and reflection stage. In implementing the make a match type cooperative learning model, students are required to find partners according to the cards they have, both question cards and answer cards. In this model, a fun learning atmosphere while playing is implemented so that students are active in learning. This is in line with the opinion of (Rahmawati, 2022) which states that the make a match learning model can make students more active and involved in the learning process because students can learn while playing.

The make a match type of cooperative learning model is an effective learning model in creating interaction between teachers, students and fellow students. In this learning model, there are three main dimensions that can encourage students to achieve optimal learning outcomes, namely interaction between students and teachers, interaction between students and students, and the presence of game elements in the learning process. In the make a match model, the interaction between students and teachers is that the teacher acts as a facilitator where the teacher provides initial instructions on how to play and what material will be studied by students. The teacher can also provide feedback during the game to ensure that students can understand the content being discussed. The interaction between students and students in the make a match learning model is cooperation between students in the form of discussions in matching card pairs. Students work together to find the right card pairs based on the cards obtained by the students. In this process, students not only study the material together but develop communication, collaboration and problem-solving skills. In the make a match learning model, the game element in learning can create a fun learning atmosphere and can increase student involvement. With the challenge of matching cards within a certain time, students are more motivated and enthusiastic in learning.

The results of data analysis in cycle I and cycle II showed an increase in classical completeness of 23.81% as seen from cycle I that out of 21 students who took the test, the number of students who achieved completeness was 12 people while 9 other students had not completed it so that the classical completeness of students in cycle I was 57.14% and in cycle II student learning outcomes increased to 80.95% with the number of students who completed being 17 people and the number of students who had not completed being 4 people. Teacher activity in cycle I was 93.33% and in cycle II 100%. Student activity in cycle I was 86.66% and student activity in cycle II 100%. This is due to the corrective actions taken in cycle II based on reflection notes in cycle I, namely students were divided into smaller groups which were initially only two groups into six groups.

In cycle I, cooperative learning of the make a match type using individual strategies is to divide students into two groups consisting of question card groups and answer card groups. This learning has not gone well because during the implementation of learning there are students who have not found the answer card because students do the questions wrong so that students are less confident. In cooperative learning of the make a match type using individual strategies it takes quite a long time to find a pair of cards. Cooperative learning of the make a match type collaboratively in small groups can make learning better. Cooperative learning of the make a match type in small groups can make learning better because it can make students more confident, students can discuss in groups and the time needed becomes more effective.

The application of the make a match type cooperative learning model can improve student learning outcomes because in the learning process it can create an active and enjoyable learning atmosphere because of the element of play in the learning process so that students become more active in the classroom. This is in line with the opinion (Komalasari, 2017) which states that the make a match learning model is a learning model that invites students to find answers to a concept question through a pair card game. By implementing the make a match learning model, it can hone students' skills and thinking speed to find partners from the cards they hold. In addition, students can also find partners while learning to recognize a concept or topic in a pleasant atmosphere. Research with the make a match type cooperative learning model can improve student learning outcomes, but this model also requires an active role for teachers in facilitating the learning process because teachers cannot provide enough individual attention to each student. This model also requires active participation from students in the learning process so that the results of the study depend on the motivation and abilities of students.

Based on the results of data analysis obtained in cycle I and cycle II which have increased and aspects contained in student activities have run well. Students are able to carry out learning with the established learning model. Thus it can be said that by implementing the make a match type cooperative learning model, it can improve the mathematics learning outcomes of junior high school students.

Conclusion

The results of this study indicate that the make a match type cooperative learning model can improve students' mathematics learning outcomes. This is evidenced by an increase in classical completeness of 23.81%, namely from 57.14% in cycle I and in cycle II student learning outcomes increased to 80.95%. Teacher activity in cycle I was 93.33% and in cycle II increased to 100%. Student activity in cycle I was 86.66% and increased in cycle II to 100%. Therefore, the make a match type cooperative learning model can be used as an alternative effective learning model to improve student learning outcomes.

Recommendations

Researchers can recommend teachers to implement the make a match type cooperative learning model well to achieve the learning objectives that have been implemented. For schools, it is recommended that the research schools use the results of this study as a reference or guideline in implementing learning in schools. For readers, it is hoped that readers can use the findings of this study to deepen their understanding of learning models, especially the make a match type cooperative learning model and consider its application in the mathematics learning process at various levels of education.

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