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The Effectiveness of Make a Match Cooperative Learning on Problem Solving Ability and Mathematics Learning Outcomes of Elementary School Students

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Abstrak

Penelitian ini dilakukan untuk menganalisis efektivitas model pembelajaran kooperatif make a match terhadap kemampuan pemecahan masalah dan hasil belajar matematika siswa sekolah dasar. Data yang dikumpulkan adalah dalam bentuk angka kemampuan siswa yang diukur dengan instrumen tes yang diberikan sebelum dan sesudah perlakuan. Data kuantitatif dianalisis menggunakan uji t untuk menganalisis perbandingan data pretest dan posttest serta uji gain n untuk melihat peningkatan kemampuan siswa. Nilai t kemampuan pemecahan masalah adalah 19,406 > 1,7108 dan nilai gain adalah 0,34007. Untuk uji t hasil belajar matematika adalah 16,153 > 1,7108. Selain itu, nilai gain n adalah 0,56652, ini menunjukkan bahwa pembelajaran kooperatif tipe make a match efektif untuk kemampuan pemecahan masalah dan hasil belajar matematika siswa.

Kata Kunci: *Pembelajaran Kooperatif, Make a Match, Kemampuan Pemecahan Masalah, Hasil Belajar Matematika.*

Abstract

This research was conducted to analyze the effectiveness of the make a match cooperative learning model effective on problem solving skills and mathematics learning outcomes of elementary school students. The data collected is in the form of student ability numbers which are measured by test instruments given before and after treatment. The quantitative data were analyzed using the t test to analyze the comparison of the pretest posttest data and the gain n test to see the increase in students' abilities. The t value of problem solving ability is 19.406 > 1.7108 and the gain value is 0.34007. For the t test the results of learning mathematics are 16.153> 1.7108. In addition, the value of n gain is 0.56652, this shows that cooperative learning of the make a match type is effective for problem solving abilities and students' mathematics learning outcomes.

***Keywords**: Cooperative Learning, Make a match, problem solving skill, mathematics learning outcomes.*

Introduction

The progress of a nation is determined by the education in that country. Through education, the existence of a nation can be shown. Therefore, it can be said that education is the pillar of a nation's progress. With education, the potential, talents, and culture of a nation can be developed and preserved. Ideally, education should be oriented towards the future so that life becomes better. The national goal of education is to develop the potential of the community so that they can solve problems and contribute to the nation and state and life.

Problem-solving ability is one of the important aspects that every human being has. Especially in the fast-paced era like today, this ability is very much needed. Therefore, this ability is very important to be owned by all Indonesian people. In principle, problem-solving ability can be developed through the learning process. This ability is also one of the competencies to be developed based on the 2013 curriculum. In the curriculum, the development of this ability is to become a standard competency and the goal of mathematics learning. In addition, the standard competencies that need to be achieved are basic abilities such as reasoning skills, analytical skills, communication skills, and representation skills (Hafriani, 2020).

However, in reality, the basic mathematical abilities of students in Indonesia are still very low. Based on a survey conducted by PISA every three years on students' abilities in mathematics, the students' abilities in Indonesia have not improved over the years. Based on the survey, Indonesia's ranking is still in the bottom 10. Compared to Southeast Asian countries, Indonesian students' thinking abilities are the lowest (Harususilo, 2019). Therefore, training students' thinking abilities can improve their problem-solving abilities.

Everyday life always presents students with problems that need to be solved or found a way out. Therefore, students should be able to understand the steps and stages in the problem-solving process. According to Polya, the stages are as follows:

a. Being able to understand and understand the problem faced at this stage, students know which parts need to be improved and will be solved.
b. Being able to create a plan that leads to a solution, at this stage students are able to design the steps that will be taken.
c. Being able to implement the plan where students take action from the design plan that has been created.
d. Reviewing the completeness of the problem-solving solution (Yuwono, Supanggih, & Ferdiani, 2018).

In Indonesia, students' low basic mathematical ability is also due to the assumption that mathematics learning is difficult to understand. This is because the learning is carried out in a monotonous way and is not interesting to students. In addition, the strategies applied in the classroom also do not encourage students to be active in learning (Pamungkas, Wahyudi, & Indarini, 2019). Therefore, the strategy of selecting models and learning methods in the classroom can be an important factor in improving students' basic mathematical ability.

Learning is said to be successful if it is evident in the learning outcomes obtained by students. Where learning outcomes are interpreted as learning experiences in the affective, cognitive, and psychomotor aspects. In addition, learning outcomes are also seen as changes in students' behavior, knowledge, skills, abilities, and understanding after carrying out learning activities (Ulfa & Saifuddin, 2018). Students' learning outcomes, when examined further, based on Bloom's theory

which has been revised by Anderson and Krathwohl, divide cognitive processes into:

a. C1 (Remembering) is the first level, where students simply remember or know the information. They can do this by naming, showing, or memorizing.
b. C2 (Understanding) is the second level, where students understand how something happens. They can explain it in their own words.
c. C3 (Applying) is the third level, where students can implement or apply a concept to their lives.
d. C4 (Analyzing) is the fourth level, where students can break down information into its components, describe, compare, and organize.
e. C5 (Evaluating) is the fifth level, where students can evaluate information and determine whether it is useful or not.
f. C6 (Creating) is the sixth level, where students can create something new through formulation and planning (Mariani, Ansori, & Mawaddah, 2021).

Based on this theory, it can be said that the achievement of learning objectives is a requirement of every learning process. In the process, cooperation between students and teachers is needed to create a meaningful learning atmosphere and have a positive impact on the learning outcomes obtained by students.

One type of learning that can encourage students to be active in learning is cooperative learning. Cooperative learning is a learning model that emphasizes collaboration and cooperation between students in the learning process using small groups. This can allow students to develop their abilities (Anggraeni, Veryliana, & Fatkhu R, 2019).

Cooperative learning comes in many different types, each with its own advantages and disadvantages. One type of cooperative learning is the make-a-match model. This model was developed by Loma Curan in 1994. Simply put, make-a-match is a game of matching pairs. In this type of learning, students are asked to find the pairs of pictures or questions and answers that have been provided. However, they must find them while learning about a concept in a fun and engaging learning environment. This type of learning is typically implemented using picture cards or question and answer cards (Suprijono, 2018).

Here are the steps in implementing make-a-match learning:

a. The teacher presents the lesson and provides stimuli to encourage students' curiosity.
b. The teacher prepares the students and divides them into groups.
c. The teacher distributes questions and answers to different groups.
d. The teacher invites students to find the pairs of questions and answers that the teacher has distributed.
e. Each student who has found the answer presents it in front of the class (Astawa & Tegeh, 2019).

Cooperative learning make a match, like other learning methods, has both advantages and disadvantages. On the positive side, this learning method encourages students to move and actively learn, and it is interesting to students. Like other cooperative learning methods, it also trains students to work together (Kurniasih, 2017).

However, it requires a teacher who is able to manage the learning process well. In addition, the tools and materials needed must be well prepared, and it can be difficult to control in large classes. Effective mathematics learning can be seen from the improvement in student abilities and whether the achievement scores meet expectations or the minimum mastery

criteria (KKM) and classical mastery. The improvement in abilities must meet a n-gain score of 0.3, the KKM for mathematics is 70, and the classical mastery is 75% of the total students in the class.

This study will analyze the effectiveness of cooperative learning of the make a match type on the problem-solving skills and academic achievement of sixth-grade elementary school students.

Method

Quantitative data was collected through a statistical approach. The data was collected twice, before and after the treatment. This was done because the research was designed using one experimental class. The class was the sixth grade students of SD Inpres 335 Kandua, with a total of 24 students. The sample was part of 47 sixth grade students in the school. The sample was obtained using random sampling. Data was collected using test instruments for both problem-solving skills and student achievement. In addition, student activity data was also collected using observation instruments.

Descriptive data analysis was used to describe the students' problem-solving skills, mathematics achievement, and student activity. Inferential statistical data analysis used parametric analysis to test whether the data met expectations or criteria. The data analysis used a one-sample t-test and n-gain to see the improvement in learning outcomes.

Result and discussion

a. Learning Activity

Student learning activities were observed during the mathematics learning process using cooperative learning of the make-a-match type, which was carried out in five meetings that discussed the material of positive and negative integers. The observation was conducted by a teacher assistant by paying attention to what the students did during the learning. The following is a description of the student activities in the learning:

Table 1. *Description of Student Learning Activities in Mathematics*

Learning Activity	Class Meeting					Mean
	I	II	III	IV	V	
Asking / responding to questions	58%	54%	63%	54%	67%	59%
Active in groups	79%	83%	79%	88%	92%	84%
Confidence	29%	38%	63%	54%	63%	49%
Completing tasks	75%	83%	83%	88%	92%	84%

When the learning was conducted on asking or oral activities, the average of all meetings was 59% of students were active. This shows that cooperative learning of the make-a-match type encourages students' ability to express themselves through speaking, expressing opinions, and the ability to adapt to different communicative situations.

The second indicator shows that 84% of students are active in groups by discussing and working together with their group mates. This can foster students' ability to interact socially and stimulate students' skills to solve problems through teamwork and working in groups. The activity of students in groups also allows students to share knowledge and experiences, so that it can strengthen students' understanding of the material taught.

The indicator of student confidence shows that 49% of students are confident during learning. Although less than 50%, the data shows that student confidence can be built and confidence can help students in overcoming difficulties and achieving their goals. In addition, confidence shows that students dare to try new things and make decisions independently.

During the learning, 84% of students can complete the tasks well. This shows that students have high abilities and commitment in completing the tasks given. In addition, this indicator is proof that students are sincere in completing the tasks and able to apply the knowledge they have obtained in the tasks given.

In general, the following are the students activities from each meeting

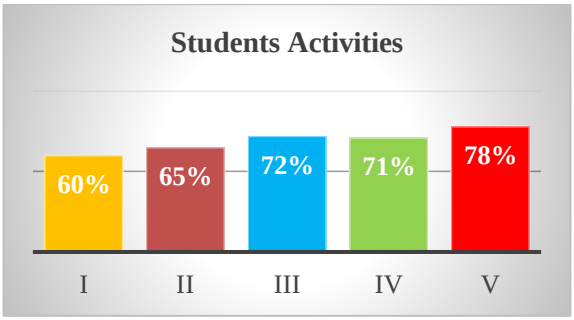

Diagram 1. Average Student Activity in Learning

In the first meeting, 60% of students were active during learning. This indicates that students were still in the adaptation phase with cooperative learning of the make-a-match type. In the second meeting, 65% of students were actively learning. In the third meeting, 72% of students were active in the learning process, and in the fourth meeting, their activity decreased to 71%. In the fifth and final meeting, 78% of students were active. The increase in student activity from the first to the last meeting indicates that students are more active in learning and show a higher commitment to the learning process. This can be seen by the increased level of student participation in the classroom. Students who are active in learning are more likely to succeed than students who are passive in learning (Rosali, 2020).

b. Problem solving ability

The problem solving ability is a complex skill that requires students to be able to understand and apply mathematical concepts to real-world situations. In this study, the ability to solve problems was measured using a pretest and posttest. The pretest was administered before the intervention, and the posttest was administered after the intervention. The table.2 below shows the descriptive statistics for the pretest and posttest scores.

Table 2. *Description of Problem-solving score in pretest-posttest*

Test	N	mean	St. dev	max	min	t	Sig.	n-gain
Pretest	24	38.125	13.417	65	15	19.406	0.000	0.34
Posttest	24	59.1667	11.099	80	35			

The study found that cooperative learning make a match was effective in improving students' problem-solving skills. The average ability of students to solve problems increased from 38.125 to 59.1667, which is a significant increase. The n-gain score of 0.34 indicates that the treatment was moderately effective.

However, the study also found that students' problem-solving skills were not up to expectations. The average posttest score

was 59.1667, which is still below the expected score of 60. This suggests that there is still room for improvement in students' problem-solving skills.

The study also found that the improvement in students' problem-solving skills was not uniform across all indicators. The following table shows the data for each indicator:

Table 3. *Description posttest score of Problem-solving*

Indicator	Scale	Mean	Category
Understanding the problem	0-25	18.333	High
Planning	0-25	15.208	High
Implementing the plan	0-25	11.042	Medium
Checking back	0-25	14.583	Medium

The data shows that, in general, students were able to understand the presented problem with an average score of 18.333, which is classified as high. This is positive because students who understand the problem are able to identify the factors that trigger or cause the problem, as well as identify the information that is available and can be used to solve the problem.

Then, at the planning stage, the average student score was 15.208, which is interpreted as high. This is positive because most students were able to develop strategies and plans. Planning includes making a list of potential solutions that can be used to address the problem, as well as evaluating the ideas that will be used.

At the implementation or execution of the plan indicator, the average student score was 11.042. Students took the necessary actions to solve the problem according to the strategy they had designed. And at the indicator of reviewing or checking back, the average was 14.583 and is in the medium category. This shows that, in general, students are not yet fully able to evaluate the solutions that are planned and implemented.

Table 4. Frequency distribution of problem-solving ability

Intv	Fre	%	Category
80-100	0	0%	Very High
60-79	9	38%	High
40-59	13	54%	Medium
20-39	2	8%	Low
0-19	0	0%	Very Low

The table shows that 54% are in the medium category, and in the high category there are 38% of students with problem-solving skills in the high category, while the remaining 8% fall into the low category. This provides evidence that the classical problem-solving ability of students has not met expectations, with 75% achieving a minimum of 60.

From the explanation above, it can be concluded that cooperative learning of the make a match type is not effective against student problem-solving ability. Problem-solving ability cannot be developed in a short period of time, it must be trained continuously so that this ability can continue to develop and be honed. In principle, cooperative learning of the make a match type affects student problem-solving ability, this is in line with the opinion of Latifah & Luritawaty (2020) who say that cooperative learning has an impact and improves student problem-solving ability.

c. Learning Outcomes

The results of student learning were obtained from a test of student cognitive abilities ranging from C1 to C4. In this case, the learning outcome test measures the level of knowledge, understanding, application, and analysis of students on the learning material on positive and negative integers. The following is a comparison of the average learning outcomes of students before and after learning:

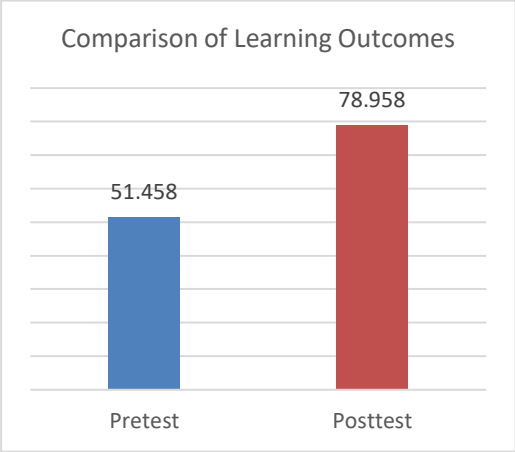

Diagram 1. Comparison pretest-posttest of learning outcomes

Based on the diagram, it is known that the average posttest scores were higher than the pretest scores, with 78.958 and 51.458, respectively. After being analyzed using a paired samples t test, a significance score of 0.00 < 0.05 was obtained. This value indicates that there is a significant difference between the two, which proves that cooperative learning models have an effect on student math achievement. In addition, the n-gain value for the learning improvement test was 0.566, which is classified as moderate. When compared to the minimum mastery criteria (KKM) score of 70, a t value of 4.65 with a significance level of 0.00 was obtained. This indicates that student achievement has exceeded the KKM standard. This indicates that the general absorption of the material has met expectations. Student achievement is influenced by instrumental factors, one of which is the teacher's teaching methods (Hadi, 2019).

The following data were obtained from a comparison of the categories of student learning outcomes.

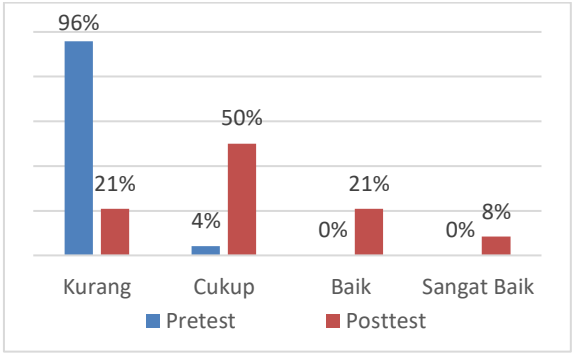

Diagram 3. comparison of the categories of student learning outcomes

. The data shows that the learning outcomes, which were previously 96% below the minimum passing score, changed after the learning. 50% of students were in the "sufficient" category, 21% of students were in the "good" category, and 8% of students scored "very good." When compared to the classical mastery criteria of at least 75% of students, 79% of students in the class met the minimum passing score. Based on the analysis of the learning outcomes data, it can be concluded that cooperative learning of the make-a-match type is effective in improving the mathematics learning outcomes of students

Conclusion

a. Based on the analysis of the data, it can be concluded that cooperative learning of the make-a-match type is not effective in improving students' problem-solving skills
b. Based on the analysis of the data, it can be concluded that cooperative learning of the make-a-match type is effective in improving students' mathematics learning outcomes.

References

[1] Anggraeni, A. A. A., Veryliana, P., & Fatkhu R, I. F. R. (2019). Pengaruh Model Pembelajaran Kooperatif Tipe Make A Match terhadap Motivasi dan Hasil Belajar Matematika. *International Journal of Elementary Education*, *3*(2), 218. https://doi.org/10.23887/ijee.v3i2.18552

[2] Astawa, P. A., & Tegeh, I. M. (2019). Pengaruh Model Pembelajaran Kooperatif Tipe Make a Match Terhadap Hasil Belajar Matematika. *Jurnal Ilmiah Sekolah Dasar*, *3*(1), 223. https://doi.org/10.26858/publikan.v10i3.15159

[3] Hadi, A. P. (2019). Pengembangan Media Pembelajaran Berbasis Ispring Suite 8 Pada Materi Perwasitan Matakuliah Teori dan Praktek Bola Voli 1 Tahun Akademik 2018/2019. *Paradigma: Jurnal Filsafat, Sains, Teknologi, Dan Sosial Budaya*, *25*(2), 18–26. https://doi.org/10.33503/paradigma.v25i2.559

[4] Hafriani. (2020). Mengembangkan Kemampuan Dasar Matematika Siswa Berdasarkan NCTM Melalui Tugas Terstruktur Dengan Menggunakan Ict. *DIDAKTIKA : Jurnal Kependidikan*, *22*(1), 121–161.

[5] Harususilo, Y. E. (2019). Skor PISA 2018: Peringkat Lengkap Sains Siswa di 78 Negara, Ini Posisi Indonesia. *Kompas.Com*. Retrieved from https://edukasi.kompas.com/read/2019/12/07/10225401/skor-pisa-2018-peringkat-lengkap-sains-siswa-di-78-negara-ini-posisi

[6] Kurniasih, I. S. B. (2017). *Ragam pengembangan model pembelajaran untuk peningkatan profesionalitas guru*. Bandung: Kata Pena.

[7] Latifah, S. S., & Luritawaty, I. P. (2020). Think Pair Share sebagai Model Pembelajaran Kooperatif untuk Peningkatan Kemampuan Pemecahan Masalah Matematis. *Mosharafa: Jurnal Pendidikan Matematika*, *9*(1), 35–46.

[8] Mariani, R., Ansori, H., & Mawaddah, S. (2021). Kemampuan Berpikir Tingkat Tinggi Menurut Teori Anderson Dan Krathwohl Pada Siswa SMP Kelas IX. *Jurmadikta*, *1*(1), 49–55. Retrieved from http://jtam.ulm.ac.id/index.php/jurmadikta/article/view/729

[9] Pamungkas, D., Wahyudi, W., & Indarini, E. (2019). Pengembangan Media Komik Dengan Pendekatan Saintifik Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematika SD. *JURNAL PAJAR (Pendidikan Dan Pengajaran)*, *3*(6), 1405. https://doi.org/10.33578/pjr.v3i6.7904

[10] Rosali, E. S. (2020). Aktifitas Pembelajaran Daring Pada Masa Pandemi Covid -19 Di. *Geography Science Education Journal (GEOSEE)*, *1*(1), 21–30. Retrieved from https://www.researchgate.net/publication/340917125_Kendala_Pelaksanaan_Pembelajaran_Jarak_Jauh_PJJ_dalam_Masa_Pandemi/stats

[11] Suprijono, A. (2018). *Cooperative Learning Teori dan Aplikasi PAIKEM*. Yogyakarta: Pustaka Pelajar.

[12] Ulfa, M., & Saifuddin. (2018). Terampil Memilih Dan Menggunakan Metode Pembelajaran. *Suhuf*, *30*(1), 35–56.

[13] Yuwono, T., Supanggih, M., & Ferdiani, R. D. (2018). Analisis Kemampuan Pemecahan Masalah Matematika dalam Menyelesaikan Soal Cerita Berdasarkan Prosedur Polya. *Jurnal Tadris Matematika*, *1*(2), 137–144. https://doi.org/10.21274/jtm.2018.1.2.137-144

Profil Penulis

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