International Conference on Education and Innovation
June 2024, pp. 109-117
DOI: xxxx-xxxx

Efforts to Enhance 5th Grade Student Learning Outcomes on Volume of Spatial Buildings Using Make a Match Cooperative Learning Model

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Abstract: This research aims to improve student learning outcomes in the volume of space material in class V UPT SDN 019 Pandau Jaya through the application of the make a match type cooperative learning model. Thirty students participated in a learning cycle where action was conducted using a classroom action research approach. Observation sheets, testing, and documentation are used in this research data gathering approach together with descriptive quantitative and qualitative data analysis methodologies. Written assessments are used to gather information on student learning outcomes at the conclusion of each cycle. The research results showed a significant increase in student learning completeness from pre-cycle to cycle 2, with the percentage of learning completeness increasing from 47% to 87%. Factors causing this increase include high student engagement, increased understanding of concepts, increased collaboration and communication skills, and the use of various learning styles. So the make a match model brings an active, fun and interactive learning atmosphere, and encourages students to work together to complete assignments.

Keywords: Learning outcomes; Cooperative learning model; Make a match

1. INTRODUCTION

One of the subjects that is required for basic education is mathematics. Completing the volume of building space is one of the maths assignments that fifth-grade elementary school students frequently find challenging. (Khasanudin et al., 2020). This is because the material requires an understanding of concepts and the ability to solve complex problems. A math teacher has to be able to facilitate learning by creating educationally stimulating and engaging situations for students to engage in, such as interactions between students and teachers, students and learning resources, and students with other students, in order to support the successful completion of learning objectives. (Hadi, 2019). Applying a learning model can enhance students' interest in participating in learning. By implementing a learning model that is interesting and perceived differently by students, it can create an attraction that stimulates students' interest in learning (Magfirah et al., 2021). According to (Marwa, 2023) the learning model assisted by digital media has a positive impact on students' understanding of mathematical concepts. Therefore, the use of appropriate learning media greatly supports the implementation of the learning model.

The majority of grade V students at UPT SD Negeri 019 Pandau Jaya are not interested in participating in mathematics lessons, and this is due to the fact that the learning model that teachers frequently use is still monotonous, which prevents students' interests and learning outcomes from improving. Solving the building space volume problem continues to be a challenging concept for many students. Low student scores indicate that material has not been widely understood by students in class V at UPT SD Negeri 019 Pandau Jaya, based on teacher observations and interviews. Calculating the volume of a building space can a challenge for students.

The results of the UPT SDN 019 Pandau Jaya education report show that improvements are needed in Numeracy competence. From this information, efforts that can be made to increase student's interest and learning outcomes are that the delivery of material must use an interesting and appropriate model. Students will be more interested in participating in interesting lessons, for example, there are elements of games and giving gifts. The emergence of interest in students will provide encouragement to follow lessons so that learning outcomes can improve. Some of the problems that are often faced in mathematics lessons at UPT SDN 019 Pandau Jaya with the volume of building space materials include the lack of interest of students in learning Mathematics which is watching in doing the exercises or tests given so that the student learning outcomes are low.

Therefore, an interesting learning model is needed. According to (Hayadi, 2018) the learning model will help students apply the method. Many previous studies have used a make a match type cooperative model (Haruna & Darwis, 2020; Kencono & Harjono, 2023; Magfirah et al., 2021) can increase the value of mathematics learning outcomes. The make a match type cooperative model is one of the learning models that is quite interesting and able to increase students' interest in learning mathematics subjects. This make a match model contains elements of play in the learning process and is considered to be able to increase students' interest in learning, so that it can change students' assumptions that mathematics lessons are fun and not stressful as research conducted by (Epriliana, 2019).

According to Isjoni in (Tarigan, 2014), make a match is a learning model with a technique of finding a partner consisting of cards containing problem cards and answer cards. The learning model helps students process the information they have already acquired and organize their own knowledge about the social world and their surroundings (Bastian, 2022).

From this, the researcher is interested in conducting a research entitled Efforts to Improve Student Learning Outcomes on Space Building Volume Materials in Class V UPT SD 019 Pandau Jaya Students through the Make a Match Type Cooperative Learning Model. There are two important issues that are the main focus of this action research, namely; 1) Can the application of the Make A Match type cooperative learning model improve student learning outcomes in the volume of building a space in class V UPT SDN 019 Pandau Jaya?; and 2) How can the application of the Make a Match model improve student learning outcomes on the volume of building a room in class V UPT SDN 019 Pandau Jaya?. From this, the researcher is enthusiastic about carrying out research. entitled Efforts to Improve 5th Grade Student Learning Outcomes on Volume of Spatial Buildings Using Make a Match Cooperative Learning Model. This action research focuses on two key issues: 1) Can implementing the Make A Match cooperative learning model improve student learning outcomes in understanding the volume of building space in class V at UPT SDN 019 Pandau Jaya?; and 2) How can the Make a Match model improve student learning outcomes on the volume of building space in class V at UPT SDN 019 Pandau Jaya?

2. METHODS

The design of this study is based on classroom action research (CAR). Teachers of class V and other trusted observers collaborated to design, implement, and reflect on collaborative and participatory actions that aim to improve or improve the learning process in their classrooms through specific actions (treatments) in the cycle. This process is how the research was conducted. Different charts are suggested by various experts for action research models, but broadly speaking, four stages are commonly passed, namely: 1. Arranging; 2. Activity; 3. Remark; 4. Reflection alludes to the views expressed by Kemmis and MC Taggart as cited by (Kurniasari et al., 2019). This research was carried out in the VD class for the 2023/2024 school year at UPT SDN 019 Pandau Jaya. This research activity was carried out from May 2024 to June 2024. The subject of the study was 30 students in class V. Data collection is carried out by collecting observational data, interviews, documentation and final tests/assessments in written form which are carried out at the end of the cycle. The data collected will be analyzed in 2 ways, namely; 1) quantitative descriptive with percentage technique; and 2) qualitative descriptive using observation data and field notes.

This research was carried out in the VD class for the 2023/2024 school year at UPT SDN 019 Pandau Jaya. This research activity was carried out from May 2024 to June 2024. The subject of the study was class V students totaling 30 students.

Data collection is carried out by collecting observational data, interviews, documentation and final tests/assessments in written form which are carried out at the end of the cycle. The data collected will be analyzed in 2 ways, namely; 1) quantitative descriptive with percentage technique; and 2) qualitative descriptive using observation data and field notes.

3. FINDINGS AND DISCUSSION

3.1. The Make A Match type cooperative learning model can improve student learning outcomes in the volume material of building a room in class V UPT SDN 019 Pandau Jaya

The Pre-Cycle will be held on April 25, 2024, cycle 1 will be held on May 2, 2024, and cycle 2 will be held on May 16, 2024. Learning is carried out 2 times in meetings of 3 JP each. The following is a recapitulation of student test scores starting from pre-cycle to cycle 2.

LIST OF STUDENT GRADES
UPT SDN 019 PANDAU JAYA

Maple :Mathematics Number of students : 30 people
Class/ Semester : V/ 2
KD. 3.5 Describe and determine the volume of the building of space using units of volume (such as unit cubes) and the connection of the power of 3 with the root of the power of three.

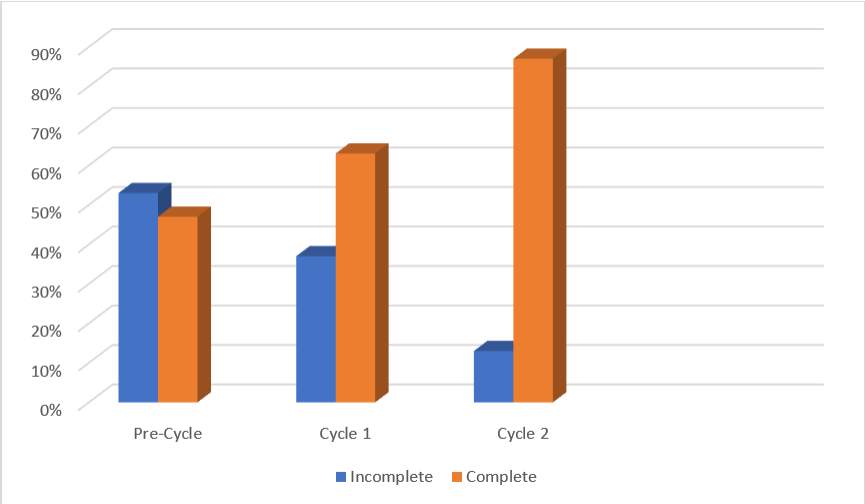
NO	Initial Name	Pre-cycle	T/TT	Cycle 1	T/TT	Cycle 2	T/TT
1.	ANP	75	T	85	T	95	T
2.	ASH	75	T	80	T	85	T
3.	ANZ	65	TT	80	T	85	T
4.	APT	75	T	85	T	90	T
5.	AHS	45	TT	55	TT	70	T
6.	BST	50	TT	60	TT	65	TT
7.	FAR	75	T	85	T	90	T
8.	FAN	60	TT	75	T	80	T
9.	GTA	75	T	85	T	90	T
10.	JMM	75	T	80	T	80	T
11.	BFS	50	TT	60	TT	65	TT
12.	ERV	45	TT	60	TT	60	TT
13.	NAZ	85	T	95	T	100	T
14.	MPR	75	T	80	T	85	T
15.	MRD	40	TT	50	TT	55	TT
16.	MYR	65	TT	75	T	80	T
17.	HET	60	TT	65	TT	75	T
18.	HNS	75	T	80	T	85	T
19.	NAI	80	T	90	T	100	T
20.	MHH	50	TT	60	TT	75	T
21.	MAM	45	TT	60	TT	75	T
22.	NUB	50	TT	60	TT	70	T
23.	MAH	80	T	80	T	90	T
24.	NDP	75	T	80	T	80	T
25.	RNF	75	T	80	T	90	T

26.	ZYR	50	TT	60	TT	70	T
27.	SYA	60	TT	75	T	80	T
28.	RHY	60	TT	70	TT	75	T
29.	SNM	75	T	80	T	90	T
30.	SAS	65	TT	75	T	80	T
	Average Value	64	TT	74	TT	80	T
	Number of Students Completed	14/30 = 47 %		19/30 = 63 %		26/30 = 87%	
	Number of Incomplete Students	16/30 = 53 %		11/30 = 37 %		4/30 = 13.3 %	

In this study, there was a significant increase in student learning completeness from pre-cycle to cycle 2. In the initial or pre-cycle stage, the completeness of student learning is at the basic level. After the first intervention carried out in cycle 1, there was an increase in student learning completeness by 16%. This rise indicates that students' comprehension and academic performance are beginning to benefit from the strategies used.

It did not stop there, in cycle 2, the results were even more satisfactory with a higher increase in learning completion, which was 24% compared to cycle 1. This increase indicates that the methods or strategies applied are increasingly effective and have succeeded in significantly improving the quality of learning. Overall, from pre-cycle to cycle 2, the total number of completed student learning tasks increased significantly, indicating that the implemented interventions were successful in raising the standards of student learning.

Table 1. Recapitulation of Cycle Evaluation Results



An explanation of the Recapitulation of Cycle Evaluation Results through a bar chart is seen in Table 1. The grade of KKM Mathematics Class VD is 75. Student learning outcomes in the Pre-Cycle are incomplete 53% and complete 47%. In Cycle 1, students were incomplete 37% and 63% complete. Because cycle 1 has not gotten the desired results, it will be continued in cycle 2. In cycle 2, 13% of students did not complete and 87% of students completed it.

This research aims to evaluate and improve the completeness of student learning in Mathematics in class VD. The minimum completeness standard (KKM) set is 75. Student learning outcome data is presented through

a bar chart to illustrate the change in the percentage of completeness and incompleteness from pre-cycle to cycle 2.

In the pre-cycle stage, the evaluation results showed that only 47% of students achieved learning completeness with a score above the KKM, while 53% of students were still below the KKM and had not achieved completeness. This indicates an urgent need to improve teaching methods and learning strategies.

After the implementation of the new learning strategy in cycle 1, there was a significant increase in student learning completion. The percentage of students who achieved completion increased to 63%, while those who have not completed it decreased to 37%. This increase of 16% shows that changes in learning methods are starting to have a positive impact on student learning outcomes.

The improvement of more intensive learning methods was applied in cycle 2, resulting in an even more significant improvement. The percentage of student completion jumped to 87%, while those who have not completed it have decreased drastically to only 13%. This increase of 24% from cycle 1 to cycle 2 shows the high effectiveness of the learning strategies implemented, bringing the majority of students to achieve or exceed KKM scores.

Overall, this data illustrates the success of educational interventions in improving student learning completeness from pre-cycle to cycle 2. Through a systematic and sustainable approach, the completeness of student learning in Mathematics subjects can be significantly improved, from 47% in pre-cycle to 87% in cycle 2. The bar chart accompanying this data provides a clear visualization of the change in completeness and incompleteness percentages, showing positive trends that illustrate the success of the learning strategies implemented.

3.2. Factors of the application of the Make a Match model in improving student learning outcomes on the volume of building space in class V UPT SDN 019 Pandau Jaya

Based on observation records and the results of interviews between researchers and teachers in each cycle, several things can be taken that are the factors that cause the application of this make a match model to improve student learning outcomes for space building volume materials, including:

- High student engagement and motivation

The make a match model presents an active and fun learning atmosphere, encouraging students to be directly involved in the learning process. The activity of matching and finding card pairs sparks students' curiosity and enthusiasm for learning. The use of attractive and colorful cards can improve students' focus and concentration (Figure 1.a). Then interaction and cooperation between students in groups increases learning motivation and a sense of togetherness. In addition, it also increases students' confidence with the make a match model as evidenced by activities such as (Figure 1.b).

(a) (b)

Figure 1. (a) This is Make a Match cards; (**b**) Students are actively involved in the group.

- Improvement of understanding of concepts and subject matter

The process of matching pairs of cards related to a concept or subject matter helps students connect ideas and understand concepts better. This activity also trains students' ability to classify, analyze, and synthesize information. Learning through fun games and activities helps students retain information in long-term memory. This activity is seen from (Figure 2.a) and (Figure 2.b).

(a)

(b)

Figure 2. (a) Students practice the Make make a match model in cycle 1; (**b**) Students practice the Make make a match model in cycle 2

- Improving Collaboration and Communication Skills

The make a match model is cooperative learning, where students work together in groups to complete assignments. This activity trains students' ability to communicate, negotiate, and work together in a team. Students learn to respect each other's opinions and resolve conflicts constructively. This can be seen in (Figure 3).

Based on the results of interviews with teachers as follows:

"I see that students are more engaged and excited when they work in groups. They help each other and learn from each other which makes the learning process more dynamic. In addition, students who are usually passive become more active because they feel more comfortable speaking in small groups".

Figure 3. Students are happy because it suits their learning style.

- Utilization of Various Learning Styles

The make a match model accommodates various learning styles of students, both visual, auditory, and kinesthetic. The use of visual cards and activities that involve physical movement helps students who learn kinesthetically. Discussion and cooperation between students help students who learn auditorily.

This is in accordance with the results of interviews with students as follows:

"It's a lot of fun. We can learn in different ways. I can look at the pictures on the cards, listen to my friends, and actively move to match the cards".

Learning is following the student's learning style, making them more confident in understanding the lessons that they initially considered difficult. It is evident from (Figure 4) that these students are very enthusiastic even though they are usually less active/quiet children.

Figure 4. Students are happy because it suits their learning style

Field notes carried out by collaborators can help teachers in seeing firsthand the interaction between teachers and students. That way it can help teachers develop effective and interactive learning strategies. It can be seen from (Figure 4) that the collaborators recorded all the things that happened in the classroom using make a match on the volume of the build space topic.

Figure 5. Collaborators take field notes during learning

Discussion

Increasing the learning outcomes of mathematics learning materials for the volume of building a room for students of UPT SD Negeri 019 Pandau Jaya by applying the make a match model is the purpose of the research. This is in accordance with research conducted by (Kencono & Harjono, 2023; Kurniasari et al., 2019; Tarigan, 2014). In a study conducted (Kencono & Harjono, 2023) in grade 5 of SD Negeri Bergas Kidul 03 in mathematics, it is proven that the make a match model increases students' interest in learning and learning outcomes. Learning interest from the pre-cycle was 17%, the first cycle was 48% and the second cycle increased to 57%, and the average learning outcome in the pre-cycle was 41.4, the first cycle was 67 and the average of the second cycle was 81.5. This is different from what the author did, where in this study the author did not calculate the percentage of students' interest in learning, but only focused on student learning outcomes. The average score obtained in this study was 64 pre-cycle, 74 cycle I and cycle II were not much different from the study, which was 80.

Research conducted (Kurniasari et al., 2019) on 4th grade students of SD Negeri 1 Jipang also showed an increase in learning outcomes by using make a match learning assisted by concrete media. The value of student learning completeness classically experienced a large increase of 89.39% compared to that done by the author, which was 87%. This can be due to the addition of the make a match model, namely the use of concrete media so that it can be distinguished from the results of the research by the author.

Research conducted by (Wahyuni, 2023) also concluded that the make a match model can improve students' numeracy skills, which is needed for learning in the 21st century today. When this this cooperative model of make a match type was applied to studenst,, it turned out that they were more interested in participating in learning activities as they paid attention to what they were learnig. Student learning outcomes increased from 47% to 87%.

A fun atmosphere can be created in learning this model, namely finding pairs of question cards and answer cards is one of the advantages of the make a match model (Magfirah et al., 2021). This was also researched by Lie in (Tong & Akbar Tobe, 2022), the advantage of the make a match type cooperative model is that students

motivated so that they become active in looking for their card pairs. This aligns with the objectives of the make a match learning model, which include developing problem solving skills, information finding abilities, a cooperative attitude, and responsibility for resolving issues through the use of problem cards. (Ramadhani, 2021). The factors that cause an increase in learning outcomes, one of which is that students are motivated to learn, this is in accordance with research conducted by (Istaria, 2022) Other factors are also in accordance with research conducted by (Suhartati, 2023) which states that with this make a match model, there is an increase in student activity in the learning process and the use of appropriate and interesting learning media. In line with that (Gosachi & Japa, 2020) apply this model and reveal that the success factor of make a match in mathematics is that students are actively looking for answers and provide great opportunities for students to actively dive into learning. In addition to the above factors, there are also other factors, namely increased cooperation, interaction, interest in learning, and strengthening understanding of mathematical concepts as researched by (Kencono & Harjono, 2023) This model also increases collaboration between students in line with research (Anggraeni et al., 2019) According to (Syam et al., 2021) the role of teachers is also important in this model of learning because teachers develop students' curiosity so that students are motivated, collaborate and learning activities are higher. Next, the last factor discussed by the author is that in this make a match model, various learning styles can be fulfilled, both visual, auditory and kinesthetic. Because the teacher's creative teaching style has an effect on student learning outcomes. It has also been researched by (Anggelina et al., 2023) that there is a significant influence between teachers' teaching styles and student learning styles on student learning outcomes. This is because teachers can apply teaching styles that are in accordance with students' learning styles so that learning outcomes increase. This model's application is not limited to mathematics courses; it can also be used in other subjects. It is clear from several earlier studies that learning outcomes in subjects other than mathematics specifically, research improving. (Ramadhani, 2021)in social studies subjects, (Pratiwi Pane & Marulitua Manurung, 2020) in science subjects, (Wijendra, 2020) in Indonesian subjects, and (Hamela et al., 2021) in chemistry.

4. CONCLUSION

The make a match learning model has been proven to be effective in improving student learning outcomes in the volume of building space materials at UPT SD Negeri 019 Pandau Jaya. In this study, we conclude that the make a match learning model with interactive and collaborative patterns can motivate students to be actively involved in learning. By creating a fun learning atmosphere, this model not only improves the understanding of mathematical concepts, but also strengthens students' confidence and their ability to work together. Our Suggestion is the make a match cooperative learning model is highly recommended for mathematics education as it fosters engaging and interactive learning environments, enhancing collaboration among teachers, students, and other stakeholders.

Acknowledgments: We would like to extend our heartfelt gratitude to everyone who contributed to the completion of this research. Special thanks to our academic advisor, Dr. Marwa Zuhri, M.A., for her invaluable guidance and support throughout the action research process. Additionally, we appreciate the assistance and constructive feedback from our colleagues and fellow researchers. Lastly, we are grateful to our families and friends for their unwavering support and understanding throughout this study.

Conflicts of Interest: The authors declare no conflict of interest in this study. The entire research process, data analysis, and article writing were carried out independently without any influence from third parties or other institutions.

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