

VARIATIONS IN THE USE OF MAKE A MATCH LEARNING MODELS, SCRAMBLE LEARNING MODELS, AND CONVENTIONAL LEARNING MODELS TO IMPROVE STUDENT LEARNING OUTCOMES

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Abstrak

Variasi penggunaan berbagai model pembelajaran matematika diharapkan memberikan gambaran tentang kemampuan peserta didik dalam memahami konsep matematika. Penelitian ini bertujuan untuk mengetahui variasi hasil belajar matematika siswa dengan menggunakan model pembelajaran *Make a match*, model pembelajaran *Scramble*, dan model pembelajaran Konvensional. Dengan menggunakan metode eksperimen semu, penerapan model pembelajaran *Make a Match* dan *Scramble* sebagai variabel bebas dan model pembelajaran konvensional sebagai variabel kontrol. Secara statistik digunakan uji F untuk menunjukkan terdapat perbedaan rerata dengan nilai $F_{hitung} = 4,22 > F_{tabel} = 3,18$, dan analisis Tukey's HSD menunjukkan nilai 14,18 dan dibandingkan dengan rerata kelompok maka disimpulkan bahwa penggunaan model pembelajaran *make a match* memberikan nilai hasil belajar lebih baik diantara model pembelajaran *Scramble* dan konvensional.

Kata Kunci: hasil belajar, variasi penggunaan model pembelajaran; *make a match*, *scramble*, konvensional

Abstract

Variations in the use of various mathematical learning models are expected to provide an overview of the ability of students to understand mathematical concepts. This study aimed to determine the variation of students' mathematics learning outcomes by using the *make a match* learning model, the *scramble* learning model, and the Conventional learning model. Using the quasi-experimental method, the *make a match* and *scramble* learning model was applied as the independent variable and the conventional learning model as the control variable. Statistically, the F test was used to show that there was a difference in the mean with the value of $F_{count} = 4.22 > F_{table} = 3.18$, and Tukey's HSD analysis showed a value of 14.18 and compared to the group mean, it was concluded that the use of the *make a match* learning model gave the better learning result value between *scramble* and conventional learning models.

Keywords: learning outcomes, variations in the use of learning models, *make a match*, *scramble*, conventional



1. Introduction

In the development of science, mathematics is needed as part of education, which has a vital role. Sulistiani dan Masrukan (2017) suggest that it is essential to learn mathematics to equip students with the ability to think logically, analytically, systematically, critically, creatively, and to work together. Mathematics is given to prepare students to face changes in life and a world that is constantly evolving and full of changes through the practice of acting on the basis of logical, rational, and critical thinking. Teachers and students become the main actors in achieving learning objectives through the learning process. The purpose of this learning will achieve maximum results if the learning runs effectively. Effective learning is learning that can involve students (Setyosari, 2017) actively. The results of observations made in schools showed that during the learning process, they were unable to optimize students' activeness. This lack of student activeness is characterized by a lack of interaction between teachers and students, as well as the interaction between students and students.

The learning process carried out by the teacher is still one-way. It means that the teacher is used as the center of learning. According to Ratumanan (2015), mathematics learning is currently not paying attention to the activities of students. Teachers dominate teaching and learning activities and serve as the primary source of knowledge. On the other hand, students are listeners. They are used as learning objects and only receive the material given by the teacher. The teacher's role in dominating learning causes students to be passive in receiving learning materials. The activeness of students in the classroom learning process can affect learning outcomes. Aunurrahman (2014) explained that the better the learning process and the activeness of students in participating in the learning process, the higher the learning outcomes.

The success of education is determined by many factors, one of which is the ability of teachers to choose learning models that can lead to student success (Asmani, 2016). One of the learning models that are expected to increase the activity of students and create a pleasant atmosphere in the learning process is the make a match type of cooperative learning model. The make a match type of cooperative learning model can be applied to all subjects, one of which is mathematics. According to Kurniasih and Sani (2015), Kusmanto (2017), the make a match type of cooperative learning model is learning to generate student activities where students look for partners while learning about a topic with a fun learning atmosphere in the form of games. The application of the make a match learning model used question cards and answer cards.

In addition to the cooperative learning model of the make a match type, the learning model that used question cards and answer cards in this learning activity is the scramble learning model. Scramble learning model is learning that has answers arranged randomly and requires students to think actively in compiling answers to become the correct answers. According to Komalasari (2013: 84), the scramble learning model is learning that requires students to find answers to a question or a pair of concepts by arranging letters arranged randomly to form an answer/pair. The cooperative learning model of the make a match type and the scramble learning model have similarities and differences. However, both of these learning models have similarities in learning, using question and answer cards. Question cards and answer cards are distributed to each student for the make a match type of cooperative learning model. Some students hold question cards, and some students hold answer cards. Question cards and answer cards are distributed to each group for the scramble learning model. Then each group solves the questions on the card.

Learning the material of cubes and blocks, students have difficulty. When the initial test was given to 25 students, 20 or 80% of students scored below the specified KKM (Minimum Completeness Criteria), which was 70. The questions given were in the form of story questions. The difficulty students face regarding story problems is that using the formula to solve story problems is still wrong. Students memorize existing formulas without understanding the statements and question the questions properly and correctly. Based on the explanation above, the following problems were formulated: (1) Are there differences in student learning outcomes taught with the make a match learning model and conventional learning models on cube and block material? (2) Are there differences in student learning outcomes taught with scramble learning model and conventional learning model on cube and block material? (3) Which learning model is better between make a match learning model and scramble learning model to teach cube and block material?

Based on the formulation of the problem above, the purpose of this study was to determine: (1) whether there are differences in student learning outcomes taught with the make a match learning model and conventional learning models on cube and block material, (2) whether there are differences in learning outcomes students taught with scramble learning model and conventional learning model on cube and block material, (3) better learning model between make a match learning model and scramble learning model to teach cube and block material.

Literature Review

Learning is a process carried out by students to gain new understanding or knowledge so that changes occur as a result of students' experiences in interacting with their environment and learning resources. The learning process results can be shown in various forms, such as changing knowledge, attitudes, understanding, information, skills, and skills based on experience. For example, mathematics learning is a process of interaction of students with teachers and learning resources in a learning environment. Therefore, students can improve their thinking skills in constructing (building) mathematical concepts or principles with their abilities to improve good mastery of mathematical material.

Cooperative learning is cooperation to achieve a goal using students learning and working in small groups collaboratively whose members consist of four to six people with heterogeneous group members. According to Suyadi (2013), the cooperative learning model is carried out by students in groups.

Komalasari (2013) suggests that the make a match learning model is learning that invites students to find answers to questions or pairs of concepts through a pair card game within the specified time limit. In addition, Sani (2013) also said that the make a match type of cooperative learning model is a group learning with two members. In addition, the make a match learning model is used to generate student learning activities in the form of games and can foster cooperation in answering questions by matching cards. The learning process is said to be more attractive because most students are more enthusiastic about participating in the learning process, and students look very active when each student looks for a pair of cards.

According to Shoimin (2013), the scramble learning model is learning that invites students to find answers and solve existing problems by distributing question sheets and answer sheets accompanied by available alternative answers. The same thing was stated by Komalasari (2013), that the scramble learning model is learning that invites students to find answers to questions or pairs of a concept creatively by arranging letters arranged randomly to form an answer/pair. Meanwhile, Kurniasih and Sani (2015: 99) suggest that the scramble learning model has the answers to questions written in the answer boxes arranged randomly. Students are assigned to correct the answers so that they become the right and correct answers. Using this model, students are not only asked to answer questions but also quickly answer questions that are already available but still in random conditions.

Conventional learning that has been used in classroom learning places the teacher as the primary source of knowledge. The teacher conveys knowledge to students and regulates all learning activities, including controlling what knowledge and skills must be mastered by students. Students are positioned as objects in learning activities and passive in receiving information or knowledge conveyed by the teacher (Ratumanan, 2015).

Each learning model has characteristics that distinguish one model from another. The differences between the make a match type of cooperative learning model, scramble learning model, and conventional learning model are shown in the following Table 1.

Table 1. The Differences in the make a match Type Cooperative Learning Model, the scramble Learning Model, and the Conventional Learning Model

Characteristics	<i>Make a Match Type Cooperative Learning Model</i>	<i>Scramble Learning Model</i>	<i>Conventional Learning Model</i>
The teacher's role	The teacher as a facilitator by giving directions about paired cards to students	Teachers as facilitators who help students in learning	The teacher as the center of learning

Characteristics	<i>Make a Match Type Cooperative Learning Model</i>	<i>Scramble Learning Model</i>	<i>Conventional Learning Model</i>
The students' role	Students play a direct role in learning activities, especially in finding partners	Students are involved in finding answers	The role of students in learning is lacking because the teaching and learning process is dominated by the teacher
Student activeness	Students are active in teaching and learning activities because students are directly involved in learning	The activeness of students appears with group work and compiling answers to a problem	Students are less active because the teacher dominates learning activities
Material presentation	Students are directly involved in learning the material through pairing question cards and answer cards	Students are assisted by the teacher in studying the learning material	The teacher conveys the material to students with the lecture method

2. Research Method

The type of research used in this study is experimental research in the form of a quasi-experimental design with the research design seen in Table 2 below.

Table 2. Research design

Groups	Treatments	Post-Test
E ₁	P ₁	T
E ₂	P ₂	
K	P	

(Sukardi, 2011: 186)

The research was conducted in the 8th grade class of Ambon Catholic Junior High School. The samples were determined by using a purposive sampling technique. There were three classes selected, namely 8th-grade class D (VIII-D) as an experimental class using a make a match cooperative learning model, 8th-grade class C (VIII-C) as an experimental class using a scramble learning model, and 8th-grade class A (VIII-A) as a control class. The data analysis technique used was descriptive statistics to calculate the average student learning outcomes and inferential statistics to test hypotheses. The requirements were calculating the normality test using the Kolmogorov-Smirnov test and the homogeneity test using the Levene test. Then, **one-way ANOVA** was used to test the learning outcomes hypothesis for the three classes.

3. Result and Discussion

The descriptive statistic was used to calculate the average value of student learning outcomes. The calculation results are shown in the table. 3 next:

Table 3. Average student learning outcomes

Classes	Average
VIII A	56,47
VIII C	70,75
VIII D	71,81

Table 3 shows the three classes that have different average values. For example, the average value of the control class (VIII-A) is 56.47; experimental class 1 (VIII-C) is 70.75, and experimental class 2(VIII-D) is 71.81.

The inferential statistics were used to test for normality using the Kolmogorov-Smirnov and Levene-test homogeneity tests. Then, **one-way ANOVA** was used to find the difference in the learning outcomes of the three classes.

The results of the normality test using the Kolmogorov-Smirnov test are shown in Table 4 below.

Table 4. Kolmogorov-Smirnov test results with $\alpha=0,05$

Classes	Sig.
Experiment I (<i>Make a Match</i> Type Cooperative Learning Model) (X_1)	0,141
Experiment II (<i>Scramble</i> Learning Model) (X_2)	0,200
Control (<i>Conventional</i> Learning Model) (X_3)	0,200

Table 4 shows the value of Sig. for the experimental class I (X_1) of 0.141, the experimental class of II (X_2) of 0.200, and the control class (X_3) of 0.200. The three variables have a Sig value. More than the significance level of 5% ($\alpha = 0.05$). It can be concluded that the three classes are normally distributed. Since the three classes are normally distributed, the homogeneity test was then carried out using the Levene test, and the results are shown in Table 5 below.

Table 5. Levene-test results with $\alpha=0,05$

Classes	Sig.
Experiment I (<i>Make a Match</i> Type Cooperative Learning Model)	0,100
Experiment II (<i>Scramble</i> Learning Model)	
Control (<i>Conventional</i> Learning Model)	

The results of the Levene test for the three classes in Table 5 obtained the value of Sig. = 0.100 more than the value of $\alpha= 0,05$. Therefore, it can be concluded that the data has a homogeneous variance. Because the three classes have homogeneous data, a one-way ANOVA test was carried out to see the differences between the three classes, as shown in Table 6 below

Table 6. ANOVA Calculation.

Source Variance	dk	JK	MK	F _{count}	F _{table}	Conclusion
Total	53	18.592,714				
Between Groups	2	2.641,183	1.320,592	4,222	3,18	4,222 > 3,18
In Groups	51	15.951,531	312,775			

The results of the one-way ANOVA test obtained the value of sig. = 0.02, which means less than = 5% (0.05), and $F_{count} > F_{table}$, which is $4.222 > 3.18$. It can be concluded that there are differences in student learning outcomes among the three learning models. Next, a follow-up test was carried out, namely Tukey's HSD test, to determine which learning model is better than the three learning models. The calculation results can be seen in Table 7 below

Table 7. The Average Difference among Groups

	X_1	X_2	X_3
X_1	-	1,06	15,34
X_2	1,06	-	14,28
X_3	15,34	14,28	-

Tukey's HSD test was conducted to compare the significant differences between the three learning models. It also determines whether the average difference among the three classes is more than Tukey's HSD test value. Based on the results of Tukey's HSD test, Tukey's HSD value is 14.18.

Calculating the average of each class:

$$\text{Experiment Class I } (X_1) = \frac{1.292,57}{18} = 71,81$$

$$\text{Experiment Class II } (X_2) = \frac{1.273,56}{18} = 70,75$$

$$\text{Control Class } (X_3) = \frac{1.016,53}{18} = 56,47$$

- a. The difference test of X_1 and $X_2 = 1.06$ is obtained from the difference between the averages of X_1 and X_2 , namely $(71.81-70.75)$. The average difference between groups X_1 and X_2 is less than the HSD value, $1.06 < 14.18$, so there is no difference.

- b. The difference test of X_1 and $X_3 = 15.34$ was obtained from the difference between the averages of X_1 and X_3 , namely (71.81–56.47). The average difference between groups X_1 and X_3 is more than the HSD value, which is $15.34 > 14.18$, so there is a significant difference.

The difference test of X_2 and $X_3 = 14.28$ was obtained from the difference between the averages of X_2 and X_3 , namely (70.75–56.47). The average difference between groups X_2 and X_3 is more than the HSD value, which is $14.28 > 14.18$, so there is a significant difference.

From the calculation results of Tukey's HSD test, there are significant differences between the experimental class I and the control class, as well as the experimental class II and the control class. Experimental class I (X_1) has the highest average score. Therefore, it can be concluded that the make a match type cooperative learning model is better than the scramble and conventional learning models.

The research was conducted to know the variations in the use of cooperative learning models of the make a match type, scramble learning models, and conventional learning models to improve student learning outcomes. This research was conducted in three classes: two experimental and one control class. The experimental class I was taught with the cooperative learning model of the make a match type, the experimental class II was taught with the scramble learning model, and the control class was taught with the conventional learning model

Learning Activities using the *Make A Match Learning Model*

The learning process in the experimental class I used the make a match type of cooperative learning model. The learning process was begun by dividing students into four groups of five heterogeneous students, materials, and worksheets. Students in groups did LKS. Furthermore, after the material was delivered, the teacher determined the question and answer groups to facilitate the distribution of question cards and answer cards. There were four groups in the class, so there were two groups of questions and two groups of answers. The purpose of distributing question and answer cards was to provide practice questions and test students' understanding. In the question group, the task was to work on the questions on the cards, while the answer groups practiced solving the problems in the book.

There were ten pairs of cards dealt by the teacher. Each consisted of 10 question cards and ten answer cards. Of the 10 question cards, there were six valid cards and four pairs of wrong cards. The activity of finding a partner could create a pleasant atmosphere. It could arouse the activeness of students in learning activities. Following the opinion of Kurniasih and Sani (2015), make a match is a learning model in which students are invited to find a partner while learning about a concept or topic in a pleasant learning atmosphere.

The last step in cooperative learning type make a match was presentation and discussion. Students who had found a partner presented their work in front of the class. This percentage was done to confirm the correctness of the answers from the paired cards. The learning outcomes obtained by students taught with the cooperative learning model of the make a match type obtained the average value of learning outcomes was 71.81. It shows that students who are taught using the make a match type of cooperative learning model are better than the scramble learning model and the conventional learning model.

Learning Activities using the *Scramble Learning Model*

Before applying the *scramble* learning model, students were divided into four groups, each consisting of five students. First, the teacher distributes Teaching Materials and Student Worksheets which must be completed in groups. Then, after students complete the LKPD, the teacher distributes question cards for students to work on and answer cards for each group. Meanwhile, on the answer card, there are alternative answers that are arranged randomly. Therefore, students must arrange these answers into the correct answer.

Students were given time to solve problems by discussing them in their groups. In the answer card, there were alternative answers, but the teacher prioritized the work steps in solving the problem. After students complete the problem, group representatives present the results of their group work while other groups respond. The teacher provides an evaluation of the answers that have been

presented. The average learning outcome of learning outcomes obtained by students with the *scramble* learning model was 70.75.

Learning Activities with Conventional Learning Models

Learning in the control class used a conventional learning model taught by the teacher according to the steps. The teacher dominates learning by how the teacher delivers the material while the students only listen and take notes on the material that has been delivered. Ratumanan (2015: 15) states that in conventional learning, students are positioned as objects in teaching and learning activities and passive in receiving information or knowledge conveyed by the teacher. The activeness of students in the class was low. There was a lack of interaction between teachers and students as well as students and students.

After completing the learning process, a post-test was carried out to determine student learning outcomes. The average value of student learning outcomes with conventional learning models is 56.47.

The Differences in Learning Outcomes of Students taught with the *make a match* Type Cooperative Learning Model, *scramble* Learning Model, and Conventional Learning Model

During the learning process, students in the experimental class looked more active than in the control class. The activeness is seen when students work together on the Student Worksheet. However, there is noise in the class when working on the Student Worksheet. This noise occurs because of differences of opinion among students in solving problems. Meanwhile, in the control class, students received the material following what was taught by the teacher. After completing the entire learning process, a final test was given to the three classes.

Based on hypothesis testing with the one-way ANOVA test, the F_{count} value is 4.222 and the F_{table} value is 3.18. Because the value of $F_{\text{count}} > F_{\text{table}}$, it can be concluded that there are differences in the learning outcomes of students who are taught with the *make a match* cooperative learning model, *scramble* learning model, and conventional learning model. The results of this study are in accordance with research conducted by Souhoka, et al. (2019) that there are differences in learning outcomes taught using the *make a match* type cooperative learning model with conventional learning models on statistics. The average value of student learning outcomes in the experimental class is 65.59 while in the control class is 54.72. The difference in the average value of student learning outcomes between the two classes is 10.87.

Learning Outcomes of Students taught with *make a match* Type Cooperative Learning Model, *scramble* Learning Model, and Conventional Learning Model

Determine a better learning model among the three learning models, as seen from the average value of student learning outcomes from the three learning models. The highest average value of student learning outcomes is the class taught with the *make a match* cooperative learning model (71.81). The class is taught with the *scramble* learning model (70.75), and the lowest is the class taught with the conventional learning model (56,47). Tukey's HSD test was carried out to find out which learning model is better among the three learning models used. Based on Tukey's HSD test results, the HSD value is 14.18, so there are significant differences among the three learning models used.

Significant differences were seen in the average difference between groups. In addition, significant differences occur between the cooperative learning model of the *make a match* type and the conventional learning model, namely $15.34 > 14.18$, and the *scramble* learning model with the conventional learning model of $14.28 > 14.18$. Of the three learning models used, the cooperative learning model of the *make a match* type has the highest average value compared to the *scramble* learning model and the conventional learning model. Thus, the best learning model of the three learning models is the *make a match* type cooperative learning model.

The *make a match* type of cooperative learning model is better than other learning models because this learning model can create a pleasant learning atmosphere. Then, various questions are obtained to enrich students' knowledge of the material being taught, and students become more active and able to think critically in learning. Although there are differences in the learning outcomes of students taught with cooperative learning models of the *make a match* type, *scramble* learning

models, and conventional learning models, the class conditions were not conducive to the activity of finding partners. The teacher had difficulty controlling the class. However, after students found a partner, the class was conducive again.

4. Conclusion

Based on the results and discussion, it can be concluded that: (1) there are differences in the learning outcomes of students who are taught with the make a match type of cooperative learning model with conventional learning models. It can be seen from the difference between the average X1 and X3 = 15.34. Because the average difference between groups X1 and X3 is more than the HSD value, namely $15.34 > 14.18$, there is a significant difference, (2) There are differences in student learning outcomes taught by the scramble learning model with the conventional learning model. It can be seen from the difference between the averages of X2 and X3 = 14.28. Because the average difference between groups X2 and X3 is greater than the HSD value, namely $14.28 > 14.18$, there is a significant difference, and (3) The learning model that is better used in learning is the cooperative learning model of the make a match type. Based on the average value of the highest class, namely the experimental class I (71.81), then the experimental class II (63.68) and the control class (50.83).

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