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Make A Match Model For Improving The Understanding Of Concepts And Student Learning Results

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Abstract

This study applies the Make A Match model to mathematics subjects, increasing the ability to understand concepts and student learning outcomes in mathematics. This type of research is Classroom Action Research (CAR) and uses a Kemmis and Taggart model design with four stages, namely 1) Planning, 2) Action, 3) Observation, 4) Reflection with a qualitative approach. This study uses 3 cycles, namely pre-cycle, cycle I and cycle II. Each cycle consists of four stages, namely: planning, action, observation, and reflection. This research was conducted at Yogyakarta PGRI University. And research subjects are second-semester students majoring in PGSD. The instrument used was a test that contained questions in the form of essays. Analysis of the data used is qualitative descriptive analysis. The results were obtained based on indicators of concept understanding, namely in the second cycle which increased namely 1) students who were able to restate the concept from 62.50% in the pre-cycle to 76.38% in the second cycle, 2) students who were able to give examples 72, 76% in the pre-cycle to 76.38% in the second cycle, 3) students who are able to present concepts in various representations from 70.86% in the pre-cycle to 85.34% in the second cycle, and 4) students who are able to associate internal or external mathematical concepts from 70.69% pre-cycle to 76.38% in cycle II. It was concluded that the Make A Match learning model can improve students' understanding of concepts and learning outcomes in mathematics learning.

Keywords: make a match, understanding of concepts, learning results

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1. Introduction

The development of issues about the assessment models towards students has always been a polemic between academics and practitioners. According to Djemari (1999) Assessment is the activity of describing measurement results. Assessment is a process that is carried out in stages to measure student competence and progress learning outcomes in the learning process (Widiana, 2014; Cangelosi, 1995). Classification of learning outcomes according to Bloom's Taxonomy consists of cognitive aspects, attitudes, and skills. There fore, the results of learning must be discussed based on these aspects (Anderson, 2011). Seeing the complexity of student learning outcomes, it is expected that there are educators who have good competence in the field.

Mathematics is known as an abstract science, which emphasizes the importance of a logical, critical, systematic and consistent mindset. Free abstract mathematics, but the initial concepts of mathematics come from discussions about what happens every day.

Abdurahman (2003) says that mathematics is a way to get answers, obtain information and provide knowledge about shapes and sizes. Soedjadi (2001) explains mathematics is a concrete or real branch of science that is well organized and logical.

Wubbels and Theo (1997) explain that "mathematics is an organized, deductive system and the learning process in mathematics education must be guided by the structure of this system". This means mathematics is a general system that has been organized and the learning process in it has been guided by this system. Wubbels and Theo (Haylock & Tangatha, 2007) say that "mathematics is important in everyday life, for example in jobs such as science and technology, medicine, economics, environment, and development.

The results of preliminary observations made on PGSD students find the learning outcomes of mathematics courses are still low. In addition, there are some the problems found include some students who are busy talking with friends next to them that are not related to the learning material, student activity related to learning are still low because student activities listen more to the explanation of the material by the lecturer, students are to less responsive when the lecturer has difficulty turning on the LCD to be used in delivering material, the learning methods used are not diverse, some even sleep when the lecturer is explaining the material. If this is not resolved immediately, it will greatly affect the final results of student grades.

So by learning mathematics one has attitudes and habits of critical, logical, and systematic thinking. Understanding concepts is the key to learning. Understanding the conception of each material submitted to students not only promotes rote learning but also for the practice that students will do. If students do not have a good understanding of concepts, these students lack an understanding of the concept of material in mathematics, so students cannot solve mathematical problems properly. Satrio (276: 2016) in his research revealed the low achievement, understanding the concepts and student learning outcomes of several factors, discussing the use of mathematical learning models that were signaled to be less effective for students, lack of student focus in learning had not been discussed by students there was nothing challenging to question there was no which is questioned by the lecturer and gives examples of questions and practice questions to students. The learning model makes students only as a statistical object that must be in accordance with all teaching from lecturers, thus making students become involved in learning. NCTM approval of understanding of mathematical concepts can be reviewed from a student's ability in; 1) published by, 2) making models, diagrams or symbols to explain a concept, 4) making and explaining shapes, making explanations, making models, diagrams), and so on. know many kinds of meanings and interpret concepts, 6) understand the nature of concepts, and compare concepts. (Yeni, 2011: 68).

Several other problems were identified as a factor causing the low student learning outcomes: First is learning that is dominated by lecture or presentations by lecturers and students record what is explained by the lecturer, then lecturers hold the Mid Semester Exams and End Semester Exams. With learning like that student are not given the opportunity to hone their abilities or knowledge. So the motivation for learning is reduced and the interest in learning elementary mathematics is reduced.

Second, the lecturer does not do environmental management and the learning atmosphere. The learning environment and atmosphere still seems conventional and

monotonous. The study table arrangement still uses the old pattern, where the learning table is arranged in a row so that the student sits sideways and extends backward. With this arrangement of the environment and learning atmosphere, it causes the absorption and understanding of student concepts to be different between those who sit in the front and those who sit in the back. De Porter, et al (2006) revealed that the arrangement of study table patterns is very influential in creating a pleasant, active, and comfortable learning atmosphere. Study table patterns that can be applied like U-shaped, circular or semicircular. That way, students have the same opportunities to be able to interact with each other, including interacting with their lecturers. Third, lecturers pay less attention to the different characteristics of each student (Candiasa, 2006). Students have different cognitive style characteristics, namely independent, and dependent.

Based on the above problems, it is important to do improvement in the learning process through the application of creative and innovative cooperative learning models. Thus, students become interested in learning elementary mathematics. Cooperative learning is a learning model that trains students to be able to work together (Nugroho, Hartono & Edi, 2009: 108). One of the cooperative learning models that can accommodate this is the Make A Match type of learning model (Febriana, 2011: 153). The application of this learning model starts from students looking for pairs of cards that are answers or questions before the time is up, students who can match the cards will be given points (Astika & Nyoman, 2012: 111). One of the advantages of applying the Make A Match learning model is that students look for a partner while learning about a concept or topic in a pleasant atmosphere (Astika & Nyoman, 2012: 111).

Rusman (2012: 223) explains that the Make A Match Model is a model that can be used for all subjects and for all ages of students, and in this method students look for pairs of cards while learning about a concept or topic in a pleasant atmosphere. Agus Suprijono (2012: 94) suggests that the things that need to be prepared if learning is applied with the Make A Match model are cards. The cards consist of cards containing questions and other cards containing the answers to these questions. So, according to researchers through the application of the cooperative learning model type Make A Match will be more helpful to students to understand mathematical concepts and can also improve learning outcomes.

Based on the description above, the purpose of this study is to apply the Make A Match learning model, improve understanding of concepts and student learning outcomes in mathematics. This study also aims to determine the contribution of the make a match learning model to the understanding of concepts and student learning outcomes.

2. Methods

This research was conducted at Yogyakarta PGRI University. This type of research is Classroom Action Research. Ahmad (2009: 50) said briefly Classroom Action Research can be defined as a form of research that is reflective by taking certain actions in order to improve or enhance learning practices in the classroom professionally. The research subjects were 29 students in class A7. The data analysis technique used in this study uses quantitative analysis and uses descriptive statistics. In this study, data collection techniques used

for research are through tests that contain a series of questions.The test given is adjusted to the specific learning objectives to be achieved, then adjusted to the mathematics material of A7 grade students of Yogyakarta PGRI University and by using the make a match learning model given by the lecturer. The ability to understand concepts and student mathematics learning outcomes through the application of make a match learning models can be said to be complete if they meet the completeness criteria. To calculate the percentage of students' understanding of concept achievement, a formula is used:

$$K = \frac{\sum k_m}{m} \; x \; 100\%$$

Information :

K : percentage of achievement indicator of understanding concepts and learning outcomes.

$\sum k_m$: the number of scores achieved on the indicator of understanding concepts and learning outcomes

m : the total score of the indicator multiplied by the number of students

This Classroom Action Research is divided into 2 cycles and each cycle consists of 2 meetings. The steps of conducting this research through four stages, namely: planning, action, observation, and reflection (Arikunto, 2010: 137). The flowchart used in this research can be described:

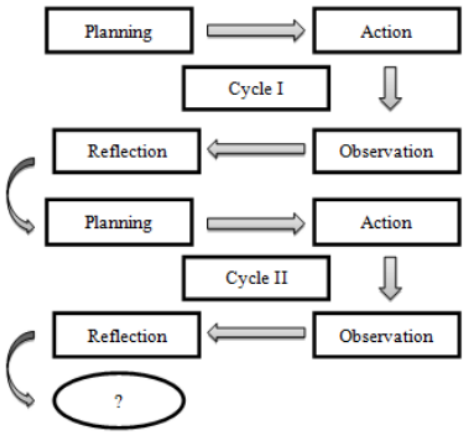

Figure 1. Class Action Research Model according to Kemmis & M. Taggart (Arikunto, 2008: 16).

3. Results And Discussion

Learning that has been done thoroughly in the action cycle I and cycle II through the application of the Make A Match learning model, shows an increase in understanding of concepts and learning outcomes in mathematics in accordance with the indicators that have been used by researchers. Cycle I was conducted in 1 meeting, namely on March 28, 2018, with an allocation of meeting time 2 x 50 minutes at 12:30 - 14.50. in this first cycle, the material taught is about multiplication and division numbers. In cycle 1 consisted of 4 stages, namely the planning stage, the action stage, the observation stage, and the reflection stage. In the first stage, namely the planning stage, the researcher designed the learning tools and instruments and discussed these tools and instruments with the elementary mathematics lecturer in the PGSD study program Yogyakarta PGRI. The next stage is the action stage using the Make a Match model. From the results obtained during the study, the learning process provided by the lecturer was in accordance with the planning of the learning tools that had been prepared together with the researcher.

The learning steps that have been planned in the study use the Make a Match learning model, which is the lecturer opens the lesson and absences the student, makes an agreement with the student about the learning model that will be used later, the Make a Match model, arranges the classroom layout into the letter U to make it easier for students do a game with the model Make a Match, then the lecturer gives apperception and learning objectives to students while showing 2 types of cards namely question cards and answer cards. After the lecturer gives the apperception and learning objectives lecturer explains the material about Multiplication number and Distribution number for 30 minutes. When explaining the material, there were still some students who did not focus on learning, such as cool chatting alone, and sleeping in the classroom. Then the lecturer gives the opportunity for students to ask questions related to the material that has been delivered that they do not understand. After explaining the material, the lecturer held a demonstration by asking all students to make two large groups, the group formed in a long line in the middle of the room and facing each other between group A and group B. Then the lecturer took the question card and answer card and explained it to students about how to play. After the lecturer explains the rules of the game, the lecturer distributes question card to group A and answer card to group B, and invites students to immediately look for the pair of cards held without giving students the opportunity to think which pair of cards they have. After students get the pair of cards, students immediately report to the lecturer and immediately sit in pairs. From this game, the lecturer noted that only 15 pairs of students managed to find their partners and 14 students who did not find their partners. For students who have succeeded in collecting points, the lecturer gives an award, as well as motivation for students who have not yet managed to find a card partner and who do not get points. This demonstration is carried out for 20 minutes. Then the lecturer closes the lesson by praying and saying hello.

Student learning outcomes in basic mathematics subjects is the level of understanding of student concepts that can be mastered by students on the material that has been delivered by the lecturer, namely cognitive abilities, affective abilities, and psychomotor abilities. The learning outcomes and understanding of this concept can be shown as follows:

Table 1. Data about increasing the understanding of concepts and mathematics learning outcomes of UPY PGSD students

No	Aspect	Before Research	After research	
			Cycle I	Cycle II
1	Restate the concept and learning outcomes	62,5%	67,5%	76,03%
2	Give an example	72,76%	74,14%	76,38%
3	Presenting the concept of	70,86%	75,17%	85,34%
4	Connecting concepts with everyday life	70,69%	74,66%	76,38%

Table 1 shows the comparison of student learning outcomes before conducting research and after conducting research. The results obtained are not too high but have increased in each cycle. The following data improve the understanding of concepts and student learning outcomes before and after research in graphical form:

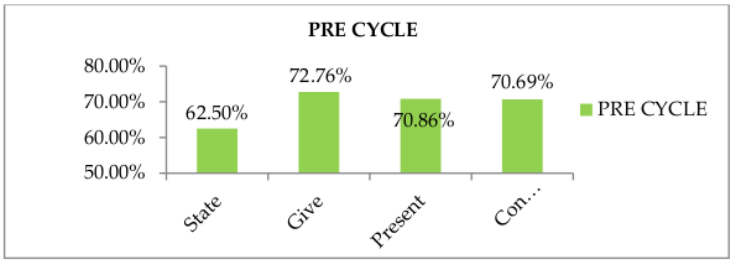

Figure 2. Pre cycle understanding results the concepts and learning outcomes of UPY PGSD students

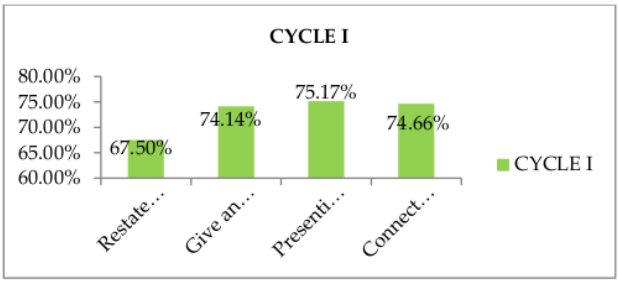

Figure 3. The results of the first cycle of understanding the concepts and learning outcomes of UPY PGSD students

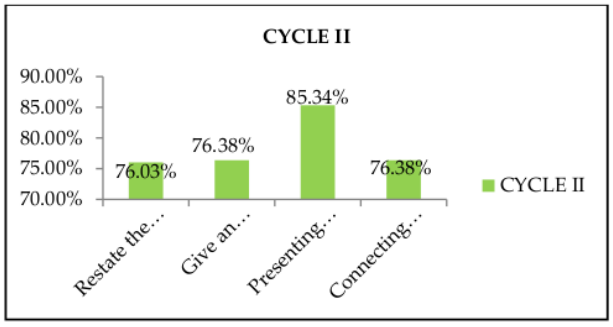

Figure 4. The results of the second cycle of understanding the concepts and learning outcomes of UPY PGSD students

Research conducted by researchers on understanding concepts and student learning outcomes in mathematics has increased from before the implementation of the action to the first cycle and the second cycle of action by applying the Make A Match learning model. This can be shown from the indicators, namely 1) students who are able to restate the concept from 62.50% to

76.38%, 2) students who are able to give examples from 72.76% to 76.38%, 3) students are able to present concepts in various representations from 70.86% to 85.34%, and 4) students who are able to connect mathematical concepts internally or externally from 70.69% to 76.38%.

Overall after applying the model make a match learning can improve the understanding of concepts and student learning outcomes in mathematics from cycle I to cycle II. Increased understanding of students' mathematical concepts can clearly be seen in cycle II. The learning process in the second cycle shows students' attitudes that can be controlled through learning activities provided by the lecturer. This condition has an impact on increasing understanding of mathematical concepts in restating concepts, giving examples, presenting concepts, and linking mathematical concepts internally or externally.

Based on the results of discussions between lecturers and researchers, the use of make a match learning model can be used as an alternative in improving the understanding of concepts and mathematics learning outcomes of PGSD students. This research was conducted by applying two learning cycles with the same learning model, that make a match.

The results of the study through the test, pre-cycle activities 29 students on the first indicator can be seen that students' understanding of mathematical concepts is still very low with an average of 62.5% or equivalent to 11 students who completed 29 students, then in the first cycle increased to 67, 5% but in this cycle 1 the number of students who finished was still the same at the pre-cycle which was 11 students who completed from 29 students because in the first cycle there was no increase, so research do in cycle II, in Cycle II students' understanding of mathematical concepts had increased to 76, 03%, with 24 students completing from 29 students. So the increase in understanding of concepts and learning outcomes of UPY PGSD students between cycle I to cycle II was 8.53%.

Then the results of research through tests on concept understanding and learning outcomes, in pre-cycle activities of 29 students on the second indicator can be seen that the understanding of concepts and student learning outcomes in mathematics is quite good with an average of 72.76% or equivalent to 22 students who have completed from 29 students, then in the first cycle increased to 74.14% ie as many as 25 students who completed from 29 students, then in the second cycle the understanding of concepts and mathematics learning outcomes of students increased to 85.34% ie as many as 27 students who completed from 29 students. So the increase in understanding of concepts and learning outcomes of UPY PGSD students between cycle I to cycle II was 11.2%.

Then in the third indicator, in the pre-cycle activities it is known that the average understanding of mathematical concepts of students is 70.86% or as many as 13 students who finished out of 29 students because in the pre-cycle activities the number of students completing is still small, the researchers take action by applying cycle I. In the first cycle the results obtained an average understanding of concepts and learning outcomes of 75.17% or as many as 22 students who completed. It can be seen from the pre-cycle activities to cycle I experienced a significant increase, but researchers are still trying to continue the cycle to cycle II. After the second cycle is applied, the average results of understanding concepts and mathematics learning outcomes

of students are obtained by 85.34% or as many as 26 students who complete. So it can be concluded on this third indicator, students have begun to understand mathematical concepts given by the lecturer. So the increase in understanding of concepts and learning outcomes of UPD PGSD students between cycle I to cycle II on this third indicator is 10.17%.

And at the last indicator, indicator four, the pre-cycle results obtained the average understanding of students' mathematical concepts is 70.69% or 17 students who completed from 29 students. And because in the pre-cycle activities the number of students who completed was still relatively small, the researchers took action by applying the first cycle. In the first cycle, the average understanding of the concept was 74.66% or 23 students who completed it. From pre-cycle activities to cycle I can be seen that the average understanding of the concept of students has increased significantly, but researchers are still trying to continue the cycle to cycle II. After the second cycle is applied, the average result of understanding students' mathematical concepts is obtained by 76.38% or as many as 24 students who complete it. Then it can be concluded on this fourth indicator, students have begun to understand mathematical concepts given by the lecturer. So the increase in understanding of the concept of UPY PGSD students between cycle I to cycle II on this fourth indicator is 1.72%.

From the results of the tests carried out from cycle I to cycle II, the researcher can conclude that the application of the make a match learning model has been proven to be able to improve the understanding of concepts and learning outcomes of UPY PGSD students. These results can be proven by the average and the number of students who complete each cycle on each indicator.

4. Conclusion

First, Make a Match is a learning model designed to help students learn and understand the material, and help improve student learning outcomes. Second, based on the results of research and application, the Make a Match model can be used in mathematics learning and greatly helps improve student learning outcomes. Third, based on the test instrument used there is an increase in understanding of concepts and student learning outcomes.

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GENERAL COMMENTS

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