

Implementation of Index Card Match to Improve Interest and Achievement among Primary School Student in Mathematics

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1. Abstract

This classroom action research aims to increase the interest and learning achievement of participants in grade 3 primary school class by applying a learning model *Index Card Match (ICM)*. The subjects of this study were class IIIC students at SDN Bantul which consisted of 20 students. The research object is an interest in learning Mathematics using a learning model *Index Card Match (ICM)*. Based on the results of the actions in cycle 1, an average score of 66.5 was obtained with a completeness percentage of 60%. The research results in cycle 1 showed that the results were not optimal. Based on the results of the actions in cycle 2, an average score of 82.5 was obtained with a completeness percentage of 80%. Thus the results of the study in cycle 2 showed an increase from cycle 1. Based on these results, it can be concluded that the application of the learning model *Index Card Match (ICM)* can increase the interest and learning achievement of students in grade 3 primary school class with an increase from cycle 1 to cycle 2 by 20%. Based on the results of the student learning interest questionnaire that was carried out, it was obtained before being given exposure to the material, an average score of 6.77 was obtained, which still had not reached the KKM, showing results that were not optimal. Based on the presentation of the material, an average score of 7.99 was obtained which was included in the KKM, showing maximum results. So it can be concluded that the learning interest of class IIIC SDN students in the Bantul area increased by 40%.

Keywords: *learning interest, learning achievement, Index Card Match (ICM) model*

2. Introduction

World of Education, Education is a determinant so that our nation can move forward and be able to compete with other countries. There have been many efforts made by the government to improve the quality of education in Indonesia, especially the quality of mathematics education in schools. These efforts include improving the curriculum, completing facilities and infrastructure, conducting training and seminars for teachers. The decline in the quality of education in Indonesia has been experienced by the government and society for years. This condition is demonstrated by the repeated accusations of the curriculum being the cause of the decline in the quality of education (Firman, 1998).

Education must actually be obtained by every level of society so that the development of a nation and that country can run well. This can also be seen in article 31 of the 1945 Constitution which states that every citizen has the right to education (Amendment to the 1945 Constitution, Chapter XIII on Education and Culture). The statement in article 31 is at the same time the basis and guarantee for every Indonesian citizen to obtain education without discriminating against ethnicity, religion and class.

The educational results obtained by every citizen are expected to improve the quality of Indonesia's human resources individually or as a whole in the present and in the future. The quality of Indonesian human resources has the characteristics as stated in the national education goals, namely: "National education functions to develop capabilities and shape dignified national character and civilization in order to educate the nation's life, aims to develop the potential of students to become human beings who believe in and fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible country." (Indonesian Constitution of the Republic of Indonesia National Education System: 2003, 2)

Education is the starting point for the realization of the younger generation to be ready to compete in the era of globalization and the demands of the times (Riyanto, 2012). In the world of education, especially at the Elementary School (SD) level, subjects are the main thing in an educational process. At school there are several Thematic subjects which contain Indonesian Language, Mathematics, Natural Sciences, Social Sciences, SDDP. In Thematic, there is subject matter that these students still lack in value, one of the subjects that is very important and often becomes the main discussion is Mathematics. Mathematics has always been a frightening specter for students in schools, especially in Indonesia, the achievement of learning mathematics in Indonesia is still very low compared to other countries. SDN in Bantul area class IIIC, Bantul Regency, Special Region of Yogyakarta, is one of several elementary schools in the Bantul area.

Interest in learning also influences student learning achievement. Student interest in mathematics itself needs to be grown in students because when students are interested in mathematics, of course they pay attention and always try to learn more about mathematics so that their math scores are certainly much better than children who have no interest in learning at all in mathematics, of course. According to Slameto (2010) interest in learning is a feeling of preference and a sense of interest in something or activity without being told. In addition, according to Djamarah (2002) interest in learning tends to produce high achievement whereas less interest in learning will result in low learning achievement, in line with Sardiman (2011) stating that the teaching and learning process will run smoothly if accompanied by interest in the subject matter itself. The factors that affect interest in learning according to Robert (in Syah, 2005) are basic abilities, learning strategies, and family environment, while indicators of interest in learning according to Slameto (2010) are interest in learning, attention to learning, learning motivation, and knowledge.

Mathematics is always used as a subject that is avoided just because the students' initial thoughts that are embedded are already negative. So that here the teacher's role is needed, the teacher is not limited to being able to master the material to be taught but the teacher must be able to make class conditions pleasant when learning mathematics so that students can participate actively when participating in learning. As explained by that (Jaya, 2017) one of the abilities of a teacher is to be able to make the class atmosphere happy. From the above, it is hoped that teachers will be able to carry out successful learning strategies in increasing the value of understanding concepts and student learning outcomes, one of which is learning that is used as an alternative or variation in mathematics learning is the ICM active learning strategy (*Index Card Match*). According to Hisyam Zaini (2008: 66) the Index Card Match method is a fun learning method that is used by teachers with notes, students are given the task of studying the topics to be taught first. So that when entering the class, students already have stock of knowledge.

Ahmad Susanto (2013: 186) argues that learning Mathematics is a teaching and learning process built by teachers to develop students' creative thinking which can improve the ability to construct new knowledge as an effort to improve good mastery of Mathematical material. Another opinion was put forward by Fatimah (2009: 8) who stated that learning Mathematics is to form logical thinking, not just a numerical viewpoint.

According to Hamruni (2009: 290) the steps for implementing the Index Card Match learning method are as follows. 1) On separate index cards, write questions about whatever is taught in class. Make enough question cards to equal one and a half students. 2) On a separate card, write down the answers to each of these questions. 3) Combine two cards and shuffle several times until completely random. 4) Give one card to students. Explain that this is a practice game. Some hold questions and others hold answers. 5) Instruct students

to find their game cards. When the game is formed, instruct students who are playing to find a seat together. (Tell them not to tell another student what is on the card.)

The advantages of the Index Card Match Method according to Hisyam Zaini (2008:69) are 1) It can increase student learning activities, both cognitively and physically. 2) Because there is an element of play, this method is fun. 3) Increase students' understanding of the material being studied. 4) Effectiveness as a means of training students' courage. 5) The effectiveness of training students' discipline in appreciating time to study.

In the era of globalization and information technology, Indonesian people need teachers who are professional, qualified, and comparable to the quality of teachers from other countries in the world (Firman, 2009). In realizing the process of learning activities, it is the teacher who carries out the learning process in teaching these students. In the learning process, the teacher carries out the process of learning activities by realizing changes in the behavior of students by conveying learning material.

Mathematics is one of the subjects that has been given since elementary, secondary, and even up to the university level where at the primary and secondary education levels the time allocated to study mathematics tends to be more than other subjects. The important role of mathematics is that the government continues to make efforts to improve curriculum improvements, teacher training and improvement of school facilities and infrastructure. Even so, we still have the problem of low student learning outcomes which lead to low quality of education. Mathematics subjects are subjects that are intended to develop students' creative thinking, and can improve the ability to construct new knowledge as an effort to improve good mastery of mathematical material. Mathematics is an exact science that is related to reasoning, is abstract, and has a deductive mindset.

To improve student learning outcomes, one of the alternatives that will be carried out is to use a learning model that can improve student learning outcomes. Rusman (2014: 132)

argues that, "The learning model is a learning activity that must be carried out by teachers and students so that learning objectives can be achieved effectively and efficiently.

Based on these problems, one alternative to solving the problem is by applying the Index Card Match (ICM) learning model, which is a learning model that matches cards consisting of two parts, namely questions and answers that are matched by students in pairs between questions and answers. The author wants to apply alternative problem solving because this model is quite fun for students to follow the learning process. By finding and matching cards based on learning material, students understand learning material by using these cards, students are more active during the learning process by finding pairs of cards that match one another. Learning with Index Card Match students can learn with their peers, so that collaboration between peers is formed. Communication between students will be built, this will also train them to respect the opinions of other students. Learning also does not take place in one direction, because there is a transfer of knowledge from teacher to student, or between students themselves. Students also will not feel bored, because they are not constantly in their seats. By applying this learning model in order to create an enlivened classroom atmosphere, fun learning, which increases student activity in learning.

Based on the description of the problem and the relevant research above, in order to improve the learning outcomes of Mathematics itinerant Shapes for class IIIC students, the researcher conducted collaborative classroom action research with class IIIC teachers of a primary school in Yogyakarta, Indonesia.

3. Methods

The type of research carried out is Classroom Action Research (CAR). This research was conducted in grade 3 of a primary school class. Which aims to improve student achievement. This research was conducted in 2 stages per cycle, each cycle covering

planning, acting, observing and reflecting. This research was designed with a research model developed by Mc. Taggart. (Rahman 2018).

Yuniantika & Harini, 2018 in classroom learning activities carried out by teachers and students by applying learning models *Index Card Match*, as well as documentation in the form of photos of the learning activities.

Steps from the use of learning models *Index Card Match* is as following:

- a. The researcher prepared several pairs of cards containing questions and answers about integer arithmetic operations
- b. The researcher mixes the question and answer cards in one place
- c. Half of the students will take the question cards and the other the answers
- d. The students will look for the appropriate partner (question-answer).

Data collection techniques in this study are observation and tests. Observation is an activity of observing (data collection) to photograph how far the effect of the action has reached the target. (Kunandar, 2013:143). Observations are used to obtain data about students' interest in learning Mathematics in the teaching and learning process through learning methods *Index Card Match*. The test was carried out to retrieve data on Mathematics learning achievement after being given learning using the Index Card Match learning method. The instruments used in this research are observation sheets and tests. The observation sheet used is an observation sheet of students' interest in the learning process using the Index Card Match method.

The method used is a multiple choice test. The instrument trials used in this study were validity, difficulty level, discriminatory, and instrument reliability tests. Data analysis techniques in this study were analyzed descriptively. Results data analysis Observations were analyzed by describing students' interest in learning. Analysis of

learning achievement data obtained from student answer test sheets by counting average student grades.

Interest data collection technique used using the questionnaire method, according to Suharsimi Arikunto (2007) thinks that the questionnaire can be divided into 2 types, namely open and closed questionnaires. An open questionnaire is a list of written questions given to respondents, where respondents are given the opportunity to answer in their own words. A closed questionnaire is a written list of questions that have provided answers, where the respondent only has to choose the answer that best suits his personality. In this study using a closed questionnaire which lists written questions that have provided answers, where students only have to choose the answer that best suits their personality.

3.1. Participants and context

The subjects in this study were class IIIC SDN students in the Bantul area for the 2022/2023 academic year. Class IIIC students totaled 20 people with 9 male students and 11 female students. Classroom action research was carried out collaboratively with tutor teachers and made observations together. The object of this study is the application of learning *Index Card Match* to increase interest and achievement in learning mathematics around a flat shape.

3.2. Material

The techniques used in this study to obtain data are observation, tests and document studies. In-depth descriptions related to these techniques are as follows:

- 1) Observation

Observations in this study aim to observe the activities of students during the learning process both before and when using the learning model *Index Card Match*. Observation before action is used to obtain an overview of students' activities during the learning process. Observation when action is taken to determine interest and achievement in learning mathematics with learning models *Index Card Match*.

2) Hands

The test is used as a measure of the abilities possessed by students in the form of tasks that need to be completed both individually. The test consists of objective tests, objective tests are tests by providing answers to questions in the form of choices while in this study using objective tests by answering evaluation questions.

3) Document study

Documentation study is a record of incidents or events that have passed. The documents needed in this study include student identities, teaching modules, teacher learning tools, documentation of students in carrying out diagnostic tests, capital letter writing skills scores before and after using the model *Index Card Match* and documentation of the learning process.

3.3. Data Collection and analysis

Data analysis is useful for producing information that can be used as a basis for answering existing problems. This study uses two data analysis techniques, namely quantitative data analysis techniques and qualitative data.

The analysis technique used is the Miles and Huberman model in Sugiyono (2015) with 3 components including: 1) data reduction; 2) presentation of data; 3) drawing conclusions. Explanation of each component is as follows:

1) Data reduction

Data reduction was carried out in this study, namely by collecting data through the learning process, syllabus, observations, tests, documents or photos of learning activities about interest and learning achievement using learning models *Index Card Match*, then sort the data.

2) Data presentation

Presentation of data in the form of an arrangement of information that can give an idea of the existence of conclusions and taking action. The data presented in this study include:

- a. Data on the observational value of the learning interest of class IIIC SDN students in the Bantul area.
- b. Data on the learning achievement scores of class IIIC SDN students in the Bantul area.

3) Conclusion

Drawing conclusions is the process of analyzing the results of the data obtained to answer the research problem formulation. The results of all stages of data analysis are the key to drawing conclusions.

3.4 Limitations to the Study

In this study, the subjects used were limited to class IIIC students at one of the SDNs in the Bantul area regarding application *Index Card Match* to increase interest and achievement in learning mathematics SDN Bantul

4. Results and Discussion

This research was conducted in two cycles. Each class is held in two meetings. After doing cycle 1 at the end of the meeting, a formative test was given. To find out student learning outcomes after participating in a series of lessons delivered by the teacher. In cycle 2 at the end of the meeting a formative test was held to determine the increase in student learning outcomes. From the observation sheet of the assessment of student interest in learning, it was obtained that there was an increase from 60% in cycle 1 to 80% in cycle 2. This indicates an increase in student interest in learning as reflected in the learning model *Index Card Match*.

Table 1. Student learning outcomes

	Pratindakan	Cycle 1	Cycle 2
Lowest Score	40	50	60
Highest Score	90	90	100
Rate-rate	59	66,5	82,5
Completeness	8 students 40%	12 students 60%	16 students 80%

The student interest in learning mathematics questionnaire consists of 20 questions with the following indicators. This research was carried out in two questionnaires of interest in learning mathematics. The cycle is carried out in two meetings. The first meeting was before giving the material and the second was after giving the material in cycle 2. Before the cycle was carried out, an interest in learning mathematics questionnaire was given to find out students' interest in learning mathematics before participating in a series of lessons delivered by the teacher. In cycle 2 at the end of the meeting a questionnaire test of interest in learning mathematics was held to determine the increase in student interest in

learning.

Table 2. Questionnaire indicator table

No.	Indicator
1.	Have the initiative to learn mathematics
2.	Study seriously
3.	Have tools and math textbooks
4.	Doing assignments on time
5.	Actively ask if the lesson is not understood
6.	Train yourself to answer math questions
7.	Curiosity
8.	Have a study schedule
9.	Has benefits in everyday life
10.	Have a target value

Tabel 3. Student learning interest questionnaire

	Cycle 1	Cycle 2
Lowest Score	5,62	6,37
Highest Score	8,37	9,62
Rate-rate	6,77	7,99
Completeness	9 students 45%	17 students 85%

Based on the reading interest table for class IIIC SDN students in the Bantul area, it shows students who have a high category reading interest after being given the method *Index Card Match*. From the observation sheet for the assessment of student interest in learning, it was obtained that there was an increase from 45% in the first session to 85% in cycle 2. This indicated an increase in student interest in learning.

This classroom action research was carried out in two cycles. Each cycle consists of 2 meetings. Before the cycle took place, pre-cycle learning was carried out without any action in learning so that the results of mathematics learning for class IIIC SDN students in the Bantul area were still not appropriate.

Based on the pre-cycle research, the results obtained for the mathematics subject on flat shapes were still low. Based on the data obtained from the pre-cycle results in the form of multiple choice questions, it was recorded that 40% or only 8 students out of 20 students succeeded in achieving the Minimum Completeness Criteria (KKM) set at 70. So there are still 60% or 12 students who have not reached the KKM. Based on the results of the analysis, students did not pay close attention to the mathematics subject matter of flat shapes. This result is proof that students have not mastered the math material about flat shapes. Therefore, teachers can apply various varied and innovative learning models to be able to overcome learning problems that occur. The learning model applied should be adapted to the characteristics of the material to be delivered. One learning model that can be used to overcome the problem of low skill in writing capital letters in sentences is the model *Index Card Match* (ICM)

In cycle 1 in the application of the model *Index Card Match* in mathematics flat wake is quite good. Learning in cycle I was carried out in 2 meetings. Learners tend to be active and enthusiastic in learning with the learning model applied, namely the model *Index Card Match*, although often the teacher needs to reprimand students who joke on their own. The completeness of the learning evaluation in cycle I was 60% with a total of 12 students who had completed a total of 20 students.

Based on reflections on learning in cycle I where there are still deficiencies in terms of applying learning models *Index Card Match*, then carried out classroom action research in cycle II to correct deficiencies in cycle I. Improvements were made to increase the activity

of students, the learning process and the mathematical values of flat shape material.

Learning in cycle II took place enthusiastically and was also active because students had obtained an overview of the material obtained in the previous lesson. The learning process in cycle II shows students are more enthusiastic in learning activities. The evaluation results in cycle II showed an increase to 80% and the average learning outcomes from cycle I to cycle II increased to 82.5.

Reflection on the actions of cycle II were shown based on the data obtained on the value of writing skills in capital letters of class II students from pre-cycle to cycle II. This obtains the result that the model *Index Card Match* can increase the interest in learning mathematics in flat shape material according to the ideal completeness criteria of more than 70%, in other words, the learning mastery of students has been achieved. After obtaining the results of improving the learning outcomes of mathematics in flat shape material starting from a low pre-cycle to achieving good grades in cycles I to II, this research only reached the second cycle.

Based on the results of the student learning interest questionnaire that was carried out, it was obtained before being given exposure to the material, an average score of 6.77 was obtained, which still had not reached the KKM, showing results that were not optimal. Based on the presentation of the material, an average score of 7.99 was obtained which was included in the KKM, showing maximum results. So it can be concluded that the learning interest of class IIIC SDN students in the Bantul area increased by 40%.

5. Conclusion

Based on test results and observation data on learning by applying the Index Card Match learning model described above. Concluded that learning by applying the Index Card Match model then learning becomes active and is able to increase interest and learning achievement in learning Mathematics learning about flat shapes at SDN Bantul area.

At the time of learning has implemented Index Card Match learning. Evidenced by the results of the action in cycle 1 obtained an average score of 66.5 with a completeness percentage of 60%. The research results in cycle 1 showed that the results were not optimal. Based on the results of the actions in cycle 2, an average score of 82.5 was obtained with a completeness percentage of 80%. Thus the results of the study in cycle 2 showed an increase from cycle 1. Based on these results, it can be concluded that the application of the learning model *Index Card Match (ICM)* can increase the interest and learning achievement of students in grade 3 primary school class with an increase from cycle 1 to cycle 2 by 20%.

Based on the results of the student learning interest questionnaire that was carried out, it was obtained before being given exposure to the material, an average score of 6.77 was obtained, which still had not reached the KKM, showing results that were not optimal. Based on the presentation of the material, an average score of 7.99 was obtained which was included in the KKM, showing maximum results. So it can be concluded that the learning interest of class IIIC SDN students in the Bantul area increased by 40%.

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