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Cooperative Learning Model Type of Index Card Match Against Science Learning Outcomes in Elementary School

[1]Zulherman

ABSTRACT--- *This study aims to determine the effect of science learning outcomes by using the Cooperative Learning Model Index Card Match type in fourth-grade students of SDN Jatiwaringin III Pondok Gede in semester 2 of the 2018-2019 school year. The research method used is a quantitative method with a Posttest-Only Control Design research design. The sampling used in this study is the Non-Probability sampling technique, which is saturated sampling. In the validity test using Point Biserial Correlation as many as 50 questions. Data were analyzed using the normality requirements test using the Liliefors test obtained in the experimental class Lo 0.14 <L_{count} 0.161, in the control class Lo 0.15 <L_{Count} 0.161. Then it can be concluded that the data from the two groups are normally distributed. Furthermore, a homogeneity test using the homogeneity test of two independent variables with the F test obtained F_{count} of 1.12 with S_x12 = 82.80 and S_x22 = 73.82 and F_{table} = 1.85. F_{count} (1.12) <F_{table} (1.85) it can be concluded that the variance of the two groups is homogeneous. In the hypothesis test t-test was used obtained t_{count} = 3.824 with S_{gab} = 8.85 at a significance level of α 0.05 degrees of freedom (DK) = 58 for 2.002. Because tcount (3,824)> t_{table} (2,002). Then it can be concluded that Ho was rejected and H1 accepted. The data stated that there is a significant effect on learning by using the Cooperative Type Index Card Match model on the learning outcomes of Natural Sciences fourth-grade SDN Jatiwaringin III Pondok Gede (Indonesia).*

Keywords--- *Cooperative Learning Model, Index Card Match, Science Learning Outcome.*

I. INTRODUCTION

Education is a deliberate attempt by adults to carry out the learning process and also a need that must be met by every Indonesia citizien. In education at the school today one of them is expected to produce active graduates. By way of education, students can develop their abilities through learning assited by educators. In 2019, was most of the Jakarta area (Indonesia) school have implemented the 2013 curriculum (K-13). Through K-13, It is expected that students will be more active than their teachers in lerning.

According to the principle of drafting in lesson plan (RPP) on PERMENDIKBUD number 22 in 2016 about the process standard on letter C by Ismayati (2016) that reads “Centered on learners to encourage the spirit of learning, motivation, interest, creativity, initiative, inspiration, motivation and self-reliance”.

It can be said that learning requires an innovative method so that it can make learners more active in the process of learning and have the best motivation of a friend in his class, school environment and his teacher. “Educational

[1] *Zulherman, Muhammadiyah University Prof. Dr. Hamka, Indonesia, zulherman@uhamka.ac.id.*

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use of small groups of two or more students working together to achieve the highest standards and enhance the learning of each other and on their own" (Hussien, 2020) .

"Contemporary teaching methods rely on active learning techniques such as cooperative learning, problem-based learning, peer learning, and scenario-based learning. The term cooperative learning refers to students working in a group or team under certain circumstances completing tasks or projects" (Salim et al., 2019).

"Many similarities between collaborative and cooperative learning. Specifically relevant to this review is the notion that the role of the teacher while guiding either cooperative or collaborative learning is similar: he or she is seen as a facilitator with the aim to guide groups of students" (van Leeuwen & Janssen, 2019).

According to Yusiati (2016) in the use of learning methods, most of the theachers are more monotonous in TCL (Teaching Centered Learning) strategy which includes a method of answer and lecture and deductive. The strategy used is a teacher who is more dominant as a facilitator and mentor whi learns through the question and answer process as well as learning that is common to the special.

The game makes learning more interesting and motivates students to study harder and most importantly the game is able to make students enjoy learning (Mardati & Wangid, 2015)."To avoid students memorizing concepts and formulas, modules must also be contextual, so that students can relate to knowledge they obtain in real life" (Zulherman, 2013).

"The foundation of constructivism theory is that the presence of teachers not only gives guidance to students, but also plays roles in developing the ability of students so that the students can create their own knowledge" (Jampel et al., 2018).

"Cooperative learning can be called a pedagogical model based on small working group and interaction betw een students, where students develop their own learning looking for a common goal" (Saborit et al., 2016). Cooperative learning at school is more effective in improving the learning attitude and enthusiasm of students than lecture-based learning (Tran, 2019).

From the opinion of the problem above. Learning is that no longer centered on the teacher, but more student centered and is teachers who can be facilitators in the classroom during the learning process. According to Prastowo in Triana, Amirudin and Widiati (2015) the teacher is very dependent on the teaching materials, but the teacher does not develop the teaching materials according to needs and conditions of the student environment. Teachers usually only use existing teaching materials. A teacher is required to be able to craft innovative, varied, interesting, contextual materials and to suit the needs of students.

In Description that teachers are expected to be able to compile innovative, varied, interesting and contextual teaching materials but there are stil many teachers who use monotonous models such as lecturers, questions and assigments that result in learning so centered on teachers, students cannot be a lot of opportunities to develop their creativity, with such models will have an impact on the students such as quikly bored, saturated, not all materials are well absorbed, too much memorizing and experience in learning is not extensive.

One of the subjects that students learn by memorizing is natural science. There are opinions from the following experts, according to Binti (2014) "Learning of the natural science is not a memorazation of meaningful words, but rather a results of associations of experiences, learning will be more meaningful if the child experiences what they learned, not just working it. From his experience, students are expected to understand science in greater depth

and can be remembered for a relatively long time. Teacher need to implement a learning strategy that engages students directly in teaching and learning activities.

According to the explanation it can be said that in shaping the students memory, one of them by providing a good learning experience as well as a good method also. Model memorization without experience can make students only remember temporary and will quickly forget again. It is therefore a better learning process that can create an experience for students so that student memory will increase learning. Teachers are deeply involved in shaping the learning experience of the students, teacher should be smart to create an innovative learning model that later make students more active in learning one of them in science learning in the IV class of Elementary school. Learning will also be more easy if it is cooperatively.

Supporting the improvement of quality learning programs in schools is the improvement of the quality of education that is mostly played by teachers, because teachers are practitioners, theoretical with innovative steps that are crucial in managing the classroom (Puspita, 2016).

The Opinion of Slavin (2015:1) "the many influences of cooperative learning toward students and the conditions needed to make effective cooperative learning, especially for achievement". Cooperative learning can create effective learning and help students achievement. With this effective cooperative learning will build experience and make it easier for students to recall learning. Therefore, in the process of cooperative learning it would be nice if accompanied by an appropriate model.

New teaching approaches, techniques, and strategies that will inspire individuals to consider, debate, study, challenge, critically think, and actively participate in the learning process should be used in classroom environments when implementing new teaching curriculums. Cooperative learning is one of the teaching approaches in which the learners have been actively involved (Avci et al., 2019).

One form of a model that supports cooperative learning in science subjects in grade IV of Elementary school is Index Card Match (ICM) model. Index Card Match (ICM) is one type of active strategic learning. It is a fun and successful way of evaluating the content on the lesson (Rohartati & Subekti, 2019). According to Silberman (2014:205) Index Card Match "Is an active and fun way to review subject matter". This mthod allows students to pair uo and give quiz questions to their friends. Cooperative learning is seen as one of the instructional approaches that can satisfy the Indonesian students ' learning needs and fulfill the Indonesian government's need to develop teaching methods in the Science classes of elementary school (Mantik & Choi, 2017).

This Index Card Match method deals with ways to recall what they have learned and test their current knowledge and abilities with techniques for finding pairs of cards that are answers or questions while learning about a concept or topic in a pleasant atmosphere (Suwartiani, 2017). Index card match is a learning strategy that requires students to work together and can increase students' sense of responsibility for what is learned in a fun way. This joint learning activity can help spur active learning and the ability to teach through small group collaborative activities that make it possible to gain understanding and mastery of the material. This strategy is a strategy for overcoming learning problems by matching index cards. index card match is another fun active way to review subject matter (Situmorang et al., 2016).

In accordance with this opnion, this model is very helpful for students to remember the learning material. Index Card Match can be a problemsolving model that is used in increasing student learning activities and outcomes. The Index Card Macth Model can collaborate with students in answering questions by matching the cards in their

hands. Students who can match or find a partner will be given points. I this model must be used often in learning so that students are accustomed to matching answers and questions. With the habit of students will easily remember the material that has been taught.

The advantage of Index Card Match is that it fosters excitement in teaching and learning activities, the subject matter delivered is more attractive to students, able to create an atmosphere of active and fun learning, able to improve student learning outcomes to reach the level of mastery learning, assessment is carried out with observers and players, while the shortcomings from Index Card Match, which requires a long time for students to complete assignments and achievements, teachers must spend more time making preparations, demanding certain characteristics from students or a tendency to work together in solving problems (Bima & Widodo, 2017).

The teacher also acts as a facilitator of Index Card Match learning model. If this model is carried out cooperatively, the learning atmosphere will be fun and will not make students get bored quickly and make the learning process experience of students easier to remember. This model can train students thinking skills. Student nit only continue to memorize but are able to remember and understand learning well. When student work on the exercises, students will work on the questions in accordance with the memory and understanding of the lessons learned. “group work was mostly of good quality, both with regard to students’ cooperation and understanding of the case study” (Wolfensberger & Canella, 2015).

II. METHODOLOGY

The research methods used are quantitative due to research data in the form of numbers and analysis using statistic. According by Sugiyono (2015) on quantitative research, “quantitative research methods can be interpreted as a research method base on the philosophy of positivism use to examine on a specific population or sample”.
In the quantitative used is the experiment research is the experiment research method. The subject is divided into two groups of IV A class into experimental classes and IV B into control class in this method of experimentation that would like to do is looking for a significant difference from the results of science study given the treatment not given the treatment of cooperative model tyoe of Index Card Match.

The experimental research methods used are Quasi Experimental design with non-equivalent design posttest only control group design. Sugiyono (2015) reveals about quasi experimental design. “This experiment design form is a development of true experimental design which is difficult to implement. This design has a control group, but it cannot fully function to control the outer variables affecting, the implementation of experiment”. While according of Zakarsyi (2017) about non-equivalent posttest only control group design that “This design there are two groups, the first group was given the treatment of X. Group given the treatment called the group of experiments and groups that are not given treatment is called the control group. Then the two groups were given posttest”.

The population in this study is interpreted as all research objects. As population by researchers are students in IVA class and IVB class at SDN Jatiwaringin amounting to 60 students. The population is grouped into two learning groups of class IVA class and IVB class for 30 students each class. IVA class was elected to the experiment class using the Index Card Match (ICM) type cooperative learning model and IVB class into the control class and did not implement.

The sampling technique used in this research is a Non probability sampling technique that is sampling saturated. Sugiyono (2015) explains that "the saturation sampling is all members of the population used as a sample, as the population number is relatively small. Another term of a saturated sample is a census where all population members are made samples. "Research want to make a generalization wit a very small mistake then the entire population is made samples. Tests used to measure learning outcomes are objective tests. According of Arikunto (2016) "The validity of a support for the total score". The validity of an item is said to be valid if it has great support for the total score". In addition to the validity test also need to hold the reliability test, the problem given is the double choice by conducting an analysis of the item eith formula used is the formula Arikunto (2016) K-R 20.

The data analysis technique is the data to be analyzed from the results of post-test students that have been done after the learning process. The analysis used is by testing the normality. A test of normality used by researhers was Liliefors test because it made easier for reseachers to know the data was a normal or not. After the normaliy test gives an indication of normal distribution data, then the test of homogeneity used is the homogeneity of two independent variables with a test F with a significant level $\alpha = 0,05$.

Furthermore, in the data collection techniques researchers conduct testing using T-test conducted to find out whether is an influence of cooperative learning with significant level $\alpha = 0,05$. After gaining influence, it will then be measured by the effect size to use the Cohen's count from T-test.

III. RESULTS AND DISCUSSION

Before conducting the research, it conducted a test instrument to determine the eligibility of the instrument problem. The trial was conducted in IV class with a total of 30 students with an item of 50 questions.

Table 1: Clarification of the research instrument test item

Status	Number of Item	Item Number
Valid	32	1,2,4,5,7,8,9,12,13,14,16,18,20,21,26,27,29,30,31,33, 35,37, 39,40,41,42,43,44,45,47,49,50
Drop	18	3,6,10,11,15,17,19,22,23,24,25,28,32,34,36,38,46,48

Based on the data above clarifications about test results of science in get a valid question amounting to 32 items and a drop amounting to 18 items.

The reliability test was done after knowing a valid problem instrument amounting to 32 questions. The research conducted reliability calculations using the formula K-R 20 (Zarkasyi, 2017).

Table 2: Criterion of reliability

$R11 \leq 0,00$	Very Bad
$0,00 < R11 \leq 0,20$	Bad
$0,20 < R11 \leq 0,40$	Normal
$0,40 < R11 \leq 0,70$	Good
$0,70 < R11 \leq 1,00$	Excellent

Table 3: Reliability test results

N	α	r(count)	Criteria
30	0,05	0,96	Reliable

The results are r = 0.96, it can be concluded that r count (0.96) ≥ r table (0.36) then the problem is reliable and comparative determination 0.7 < R11(0.96) ≤ 1.00 then the problem has excellent reliability. A valid problem item is mostly a matter of what is already learned. Some of the problems that are not valid caused by sentences that are not understood by students or have not been learned before. A valid and reliable question item will be reused for the postest test in the study.

Table 4: Science study results

Class	Number of Students	Ideal Score	Low Score	High Score	Average
Experiment (IVA)	30	100	56	91	71,1
Control (IVB)	30	100	47	81	62,3

The data above is obtained that in the class of experiments with the number of 30 students get the lowest post-test score of 56 and the highest score of 91 by Ideal score of 100 and average of 71.1, while for the control class of 30 students get lowest post-test score of 41 and the highest score of 81 by Ideal score of 100 and average of 62.3. Therefore, a significant difference and distinction of 8.8 between Science test results in experimental classes and Control Classes was taken average grade score of the control class.

Table 5: Normality test results

	Description	n	$L_{count}(L_o)$	L_{tabel}	Criteria
Experiment	30	0,14	0,161	$L_o < L_t$	Population with normal distribution
Control	30	0,15	0,161		Population with normal distribution

Based on the data above the normality tes of Lo < $L_{critical}$, which the experimental classes of Lo (0,14) < $L_{critical}$ (0,161) and the control classes kontrol Lo (0,15) < $L_{critical}$ (0,161). The test results of the normality of both classes is expressed lower than the Lt scores then it can be obtained that Ho is accepted and samples derived from the population with normal distribution of experimental and control classes. So the samples that are taken to do post-test or research both in the experimental and control classes are of normal and appropriate populations.

Table 6: Homogenity test results

	Sample	dk	Variance	F_{count}	F_{table}	Criteria	Decision
Experiment	30	Db_x = 29	82,80	1,12	1,85	$F_{hitung} < F_{tabel}$	Ho(accepted)
Control	30	Db_x = 29	73,82				

The homogenity testing using of Fisher test which $F_{count} < F_{table\ (\alpha = 0,05)}$ is Fcount (1,12) < F_{table} (1,85). The homogeneity test results than Ftables. HO received or data from the two classes is homogeneous. The variance data compared between the experiment class and control class are both of homogeneous data. There is a difference between the experiment class

and control class, it can be judging from the treatment given. The experimental class is given the ICM of cooperative learning model which the control class is not given treatment.

Table 7: Hypothesis test results

dk	t_{count}	t_{table}	Criteria	Decision
58	3,824	2,002	$t_{hitung} > t_{tabel}$	Ho rejected

Data of the hypothesis tes results with t-test get Ho rejected and H1 accepted. This $\alpha = 0,05$ with dk = 58 for 2,002 because t_{hitung} (3,824) > t_{tabel} (2,002). It can be concluded that Ho rejected meaning there is an influence on the use of cooperative learning type of Index Card Match t the results pf the science study because it can be seen by data obtained of average, variance and standard of difference between the experiment a control class.

Table 8: Criteria of *Effect Size*

Interval	Interpretasi
$0 < d < 0,2$	Low
$0,2 \leq d \leq 0,8$	Medium
$0,8 \leq d$	High

Measured of influence with effect size using the formula of cohen's D, with d=1.01 the ($0.8 \leq d$) means interpretation of the high effect size criteria. The influence of cooperative learning type index card match against the science of IVclass has high category.

IV. CONCLUSION

Based on data the results of research and discussion that has been tested normality and homogeneity, it is found that learning outcomes of classes using cooperative learning model of index card match type in IVA class of experimental class learn better from the control class. Analyses of the normality test of the experimental class and the control class have samples derived from the populatin of normal distribution. Due to the small population, all population are sampled which the analysis of the homogeneity test of the experimental class and control class is homogeneous reviewed from comparing the score of variance between experimental and control class. The hypothesis testing conducted, it can be concluded that there is a significant difference in learning outcomes between the experimental class and control class of 8.8. There is influence on the using cooperative learning model of index card match.

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