



Science Process Skills Improvement through Cooperative Model Type Jigsaw on Students of Class IV-B MI Darun Najah Kloposepuluh

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ABSTRACT

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The results of the observation on the students of class IV-B MI Darun Najah Kloposepuluh Sidoarjo shows that the science process skills was still low, especially in theme 5 sub-theme 1 learning 1. The results of interviews with classroom teachers obtained information that the lecture method is often used in teaching so that students are less active in learning. One of the efforts to encourage the active participation of students in learning is by applying cooperative learning model type Jigsaw. This study aims to determine the implementation of cooperative learning type Jigsaw in order to improve the students' science process skills of Class IV-B Darun Najah Kloposepuluh and determine the increase of science process skills using cooperative model type Jigsaw on students of class IV-B MI Darun Najah Kloposepuluh Sidoarjo. The research method used was Classroom Action Research (CAR) with the model of Kurt Lewin, which held as much as two cycles. The results showed that (1) the application of cooperative model type Jigsaw performing well evidenced by the observation result of teacher activities in cycle I was 83.6 (good) and 90.8 (very good) in cycle II. The observation results of student activities in cycle I was 81.9 (good) and 91,7 (very good) in cycle II; (2) science process skills using cooperative model type Jigsaw was increased evidenced by the thoroughness of students in cycle I 58.3% (less) and 91,7% (very good) in cycle II.

INTRODUCTION

The learning process in school does not always run well, a lot of learning difficulties encountered by students. Learning difficulties can be defined as a condition in the process of learning which is characterized by the presence of certain constraints in achieving learning goals (Bahri, 2014). The role of the teacher as an educator is expected to design teaching and learning to address the learning difficulties of students, characteristics of students and learning materials into consideration by the teacher before the start of learning to set up fun learning and can achieve the purpose of learning. The characteristics of each student are different from each other. Student motivation to learn

needs to be improved by using various methods (Rachmawati *et al.*, 2020). Fudyratarto itemizing individual differences in aspects of psychological (psychic) outline includes the aptitude, attitude, ideals, hobbies, attention, the will, feeling, affection, emotion, and intelligence (Prawira, 2014). Teachers as educators is an external factor that plays an important role in learning. One effort that can be done is to apply the learning model in accordance with the conditions of their students. Cooperative-Jigsaw is a learning model that corresponds to the heterogeneous class and able to improve learning outcomes (Jariyah, 2018).

The results of the observation in class IV-B MI Darun Najah Kloposepuluh Sidoarjo shows that there are differences in the characteristics of each individual. Among them, there are children that he is good at talking in front of the class, but some are not brave when they asked to convey his opinion in front of the class. Among them, there are talents or more capable in certain subjects only. There are also students who are good at social skills with friends, taciturn, and others. Other characteristics found are students get bored easily in learning because of the delivery of the material using the lecture method and assignment made by the teacher so that the students are less actively involved in learning. Data obtained from the teachers of subjects thematic class IV-B MI Darun Najah Kloosepuluh Sidoarjo that the Minimum Criteria of Mastery Learning is 75. The Data assessment conducted by the teacher on theme 5 sub-theme 1 learning 1 shows still some students got score above the criteria with the percentage of 34.4%. From the results of interviews with teachers of thematic subjects about the learning model used in the thematic learning, the teacher explained that the thematic learning in the classes are still classical, i.e. lectures.

Theme 5 on thematic subjects level IV MI is "my Hero" that contains the subjects Science and social studies. Subjects of the Science contained in the theme 5 include the material properties of light. Subjects social in the theme 5 are heroes in the kingdom of Hindu, or Buddhist or Islamic, but on the theme 5 sub-theme 1 learning 1 explain the heroism of king Purnawarman. The material in charge of the science subject which consists of several sub discussion and the charge of the science subject with the heroism of king Purnawarman can not only conveyed by the lecture method, student involvement in active is very important to cultivate process skills of the students. Therefore, this research aims to improve science process skills through a cooperative model type Jigsaw on students of Class IV-B Darun Najah Kloposepuluh Sidoarjo.

Process skills are skills that involve skills-cognitive skills, or intellectual, manual

and social (Rusman, 2012). The skills of scientific work is often also known as science process skills. Process skills are knowledge skills in researching events or phenomena that exist in the universe used by the researchers. Process skills used by scientists can be taught to learners in learning with more simple forms in accordance with the development stages of children in primary School age (Samatowa, 2010). Science process skills are very important to be mastered by teachers and students when studying science. The importance of science process skills is to help students develop the process of learning through experience (Jariyah, 2017).

Science process skills are the skills to think, to reason and act logically to examine and establish the concept of science that is useful to solve the problem of science. Science process skills are divided into two levels, namely basic science process skill and integrated science process skill. Basic science process skills include: observation, classification, communication, measurement, prediction and interfere (conclusion). Integrated science process skills include: determining variables, preparing data tables, constructing graphs, relating variables, processing data, analyzing investigation, developing hypotheses, defining the variables in operational, planning investigations or experiments (Farida, 2017).

One of the efforts that can be done to support the learning process to improve process skills is by applying the Jigsaw cooperative learning. Cooperative Model type Jigsaw implies collaboration in learning. Slavin (1984) suggests that cooperative learning is a learning model where students can work together in small groups collaboratively which members consist of 4-6 people, with the structure of the group is heterogeneous. The success of the learning model of the cooperative depends on the ability of students, members of the group and also the activity of the group, either individually or in groups (Solihatin and Raharjo, 2007).

Arends argues that in a learning cooperative model, students learn in small groups consisting of 4-6 students in a

heterogeneous and cooperation as well as mutual dependence, and responsible for mastery of material parts of the lesson that must be learned and deliver such materials to the other groups. On the model cooperative learning type jigsaw there are groups of origin and expert groups (Fatonah and Prasetyo, 2014). Students learn the topic material in the group of experts to really understand and then explain the material they learned to the members who were in the home group. When were in the home group, each member explains the topics that have been learned in the expert groups as well as explanations of other topics from his friend. Thus, the students learn the material several times independently (Jariyah, 2018). Understanding the jigsaw is a way widely used to choose the similarity and technical, "the exchange group to another group" (group to group exchange) with a different, i.e. each of the learners to teach something to other learners" (Komarudin, 1996).

METHODS

This research is Classroom Action Research (CAR), which is a scrutiny of the activities of learning in the form of an act, deliberately done in class with the aim to improve or enhance the quality of learning (Maolani, 173). In this study, using CAR model of Kurt Lewin. Kurt Lewin stated that the concept of the principal in the action research consists of 4, namely planning, acting, observing, reflecting. Model Kurt Lewin is a study conducted gradually and continuously. This research was conducted in class IV-B MI Darun Najah Keloposepuluh Sidoarjo which is located in the Village of Keloposepuluh, Sukodono District of Sidoarjo. The research was conducted in odd semester of academic year 2019/2020. The cycle of research conducted in two cycles, namely cycle I and cycle II. The variables in this study include: (1) input variables: the students of class IV-B MI Darun Najah Klopousepuh Sidoarjo; (2) process Variables: implementing cooperative model type Jigsaw; (3) output Variable: the increase science process skills of students in thematic learning theme 5 sub-theme 1.

The plan of action undertaken in the action research this class includes pre-cycle, cycle I, and cycle II. Pre-cycle consists of several activities: (1) ask permission to the headmaster of the madrasah to carry out the research, (2) ask permission to the homeroom teacher IV-B to carry out the research, (3) make observations to the object of research, (4) conduct interviews with the homeroom teacher and students IV-B. The activities in Cycle I and Cycle II, each of which includes: (1) planning, (2) acting, (3) observing, and (4) Reflecting. Data collection techniques in this research includes interview, observation, formative test to measure the science process skills, and documentation. The data analysis technique performed in qualitative and quantitative. Qualitative data in the form of information descriptively to give an overview of observation result related to the teachers and students activities in each cycle. The quantitative data in the form of formative test scores related to the students process skills, percentage of completeness and the score of teachers and students activities observations were analyzed by using the following formula:

1. The assessment formula of individual tests based on Sukmadinata (2013)

$$Final\ Score = \frac{obtained\ score}{maximum\ score} \times 100$$

After calculating the final score of all students, then calculated the average score using the formula based on Riduwan and Akdon (2010) as follows:

$$X = \frac{\sum x}{\sum n}$$

Description:

X = the average Score

$\sum x$ = the Sum of scores student

$\sum n$ = Number of all students

2. The formula of students mastery learning based on Arikunto (2006)

$$P = \frac{F}{N} \times 100\%$$

Description:

P = percentage score to be searched

F = the number of students obtaining a score ≥ 75

N = number of all students
 Furthermore, the results are classified based on the criteria of success. The criteria for the mastery learning interval are presented in Table 1.

Table 1. mastery learning interval/criteria

Final Score	qualification
90% - 100%	Excellent
80% - 89%	Good
65% - 79%	Enough
55% - 64%	Less

3. Observation assessment of the teacher and students activities based on Sudijono (2010)

$$P = \frac{F}{N} \times 100$$

Description:

P = the score of the teachers and students activities

F = the number of scores obtained

N = Number of overall score

The final observation score of teacher and students activities that is obtained can be categorized based on the criteria of activities completeness as follows:

Table 2. Criteria of activities completeness

Final Score	qualification
90 - 100	Excellent
80 - 89	Good
65 - 79	Enough
55 - 64	Less
≤ 55	Bad

Furthermore, determine performance indicators. A performance indicator is a criterion that is used to see the level of success of the activities of CAR in enhancing or improving the quality of the teaching and learning process in the classroom. The indicator of the expected performance of researchers including the following:

1. The percentage of mastery of science process skills of students ≥ 80%
2. The score of the learning outcomes students achieve 75
3. The observation score of teachers and students activities ≥ 80

RESULTS AND DISCUSSION

1. The Results of Pre Cycle

The results of pre-cycle interview and observation have been described previously in section introduction. On the activities of pre-cycle also obtained data about the score of student evaluation on the subject's thematic theme 5 sub-theme 1 learning 1, where there are many students who got score under minimum criteria specified. The results of the achievement assessment of pre cycle can be seen in Table 3.

Table 3. The achievement result of pre-cycle assessment

No.	achievement	result
1.	Number of score	167-
2.	Score of minimum criteria	75
3.	Highest score	80
4.	Lowest score	20
5.	Average score	52,2
6.	Number of students presence	32
7.	Number of mastery scores	11
8.	Number of incomplete scores	21
9.	Completeness percentage	34,4%
10.	Incompleteness percentage	65,6%

From Table 3 it can be known that from the 32 students, there were only 11 students who otherwise completed, while 21 other students got grades below the minimum criteria. The percentage of completeness students were 34.4% with an average score of 52.2. From the description of the results of the pre cycle can be concluded that the science process skills on the subjects of the thematic theme 5 sub-theme 1 learning 1, the students of class IV-B is low, it is because of the lecture method in the teaching of theme 5 sub-theme 1 learning 1 was not suitable. Learning traditionally using lectures provide less opportunities for students to build their knowledge (Wakhidah, 2018). It is need to include the corrective action on the process of learning in the classroom by using cooperative model type jigsaw which will be executed in cycle I.

2. The Results of the Cycle I

On Cycle I, the researcher carried out a series of activities that include planning, implementing, observing and reflecting. The Result of research in cycle I were the evaluation test and non-test. The results of the evaluation test in the form of 10 item multiple choice questions and 5 essays, while the results of the evaluation of non-test with the performance assessment. Result of non-test and test assessment in cycle I is presented in Table 4 and 5, while the results of the accumulated score of the first cycle are presented in Table 6.

Table 4. Result of non-test assessment in Cycle I

No.	Achievement	Result
1.	Number of score	1.668,75
2.	The score of Minimum Criteria	75
3.	Highest score	81,25
4.	Lowest score	43,75
5.	Average score	69,5
6.	Number of students presence	24
7.	Number of complete score	15
8.	Number of incomplete score	9
9.	Completeness percentage	62,5
10.	Incompleteness percentage	37,5

Based on Table 4 it can be seen that from the overall number of 24 students, there are only 15 students got grades above minimum criteria that has been determined with the percentage of completeness of 62.5%, while 9 other students still have not otherwise completed with the percentage of incompleteness of 37.5%. As for the score of the average grade obtained is 69,5.

Table 5. Result of test assessment in Cycle I

No.	achievement	result
1.	Number of score	1724
2.	The score of Minimum Criteria	75
3.	Highest score	90
4.	Lowest score	39
5.	Average score	71
6.	Number of students presence	24
7.	Number of complete score	16
8.	Number of incomplete score	8
9.	Completeness percentage	66,7%
10.	Incompleteness percentage	33,3%

Based on Table 5 it can be known that from the 24 students there are 16 students got grades above minimum criteria that has been determined with the percentage of completeness 66.7%, while 8 students have not been completed with the percentage of incompleteness 33.3%. As for the score of the average grade obtained is 70,9.

Table 6. Result of accumulated score in Cycle I

No.	achievement	result
1.	Number of score	1696,5
2.	The score of Minimum Criteria	75
3.	Highest score	82,5
4.	Lowest score	41,4
5.	Average score	70,7
6.	Number of students presence	24
7.	Number of complete score	14
8.	Number of incomplete score	10
9.	Completeness percentage	58,3%
10.	Incompleteness percentage	41,7%

Based on Table 6 the result is a combination of the evaluation of the science process skills test and non-test at the stage of the cycle I. From 24 students, there are 14 students got grades above minimum criteria that has been determined with the percentage of completeness to 58.3% while 10 other students still have not otherwise completed with the percentage of incompleteness 41,7%. As for the score of the average grade obtained is 70,7.

3. The results of the second Cycle

After implementation of the first cycle is completed, then researcher implemented Cycle II, consisting of activities of planning, implementation, observation, and reflection. The results on the second cycle includes the results of non-test and test assessment in Cycle II is presented in Table 7 and Table 8, while the results of the accumulated score of the second cycle are presented in Table 9.

Table 7. Result of non-test assessment in Cycle II

No.	achievement	result
1.	Number of score	2.131,25
2.	The score of Minimum Criteria	75
3.	Highest score	100
4.	Lowest score	62,5
5.	Average score	88,8
6.	Number of students presence	24
7.	Number of complete score	22
8.	Number of incomplete score	2
9.	Completeness percentage	91,7%
10.	Incompleteness percentage	8,3%

Based on Table 7 from 24 students, there are only 22 students got grades above minimum criteria that has been determined with the percentage of completeness 91,7% whereas the 2 other students still have not otherwise completed with the percentage of completeness of 8.3%. As for the score of the average grade obtained is 88.

Table 8. Result of test assessment in Cycle II

No.	achievement	result
1.	Number of score	2.115
2.	The score of Minimum Criteria	75
3.	Highest score	100
4.	Lowest score	68
5.	Average score	88,2
6.	Number of students presence	24
7.	Number of complete score	22
8.	Number of incomplete score	2
9.	Completeness percentage	91,75%
10.	Incompleteness percentage	8,3%

Based on the Table 8, from 24 students, there are 22 students got grades above minimum criteria that has been determined with the percentage of completeness 91,7% whereas the 2 other students still have not otherwise completed with the percentage of incompleteness 8.3%. As for the score of the average grade obtained is to 88.5.

4. The increase in Science Process Skills from Cycle I to Cycle II

Based on the results of the research in cycle I and cycle II, the science process skills of students increase. The results of the improvement of science process skills from cycle I to cycle II is presented in figure 1.

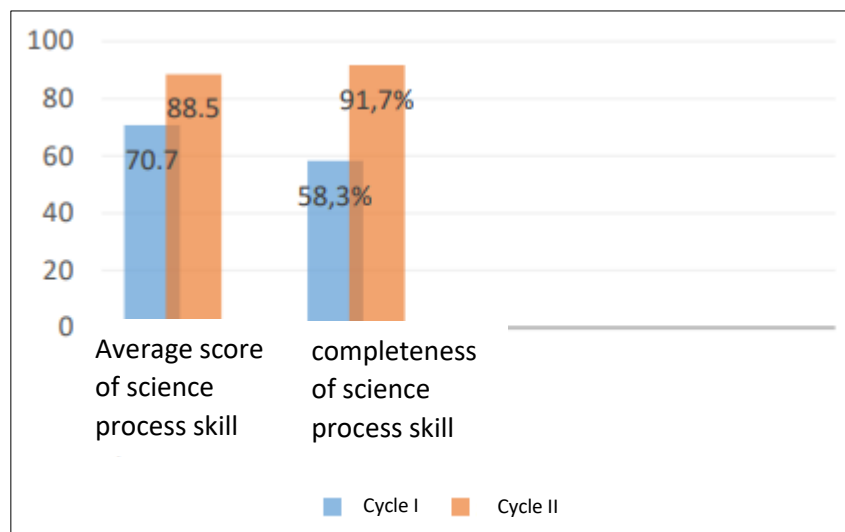


Figure 1. Science Process Skill Improvement

Based on Figure 1, it is known that the average score of science process skills increased from 70,7 in Cycle I to 88.5 in Cycle II. The score of the mastery of science process skills has also increased from 58.3% in cycle I to 91,7%. It is caused by several factors, students still do not accustomed to the use of model cooperative learning type jigsaw in Cycle I and minimum role of teacher in organizing the group. Based on the results obtained from cycle I, the researcher coordinated with the classroom teachers to do reflection in order to know the shortcomings of Cycle I. These deficiencies subsequently corrected in the second cycle.

The increase of student's science process skills showed that the cooperative model type jigsaw is suitable for improving students' science process skills in theme 5 sub-theme 1 learning 1. The jigsaw cooperative learning brings students build their own knowledge through their active involvement in the learning process better in a team of experts or home. This is in accordance with the theory of cognitive development Piaget, cognitive development is largely determined by the manipulation of and active interaction of the child with the environment. Knowledge comes from action. Piaget is convinced that the

experience and physical manipulation of the environment is pending for the occurrence of developmental changes. Meanwhile that social interaction with peers, in particular to argue and have discussions to help clarify thinking and be more logical (Al-Tabany, 2014).

The process of observing according to Moreno can occur in a real object or a simulation that can be used as a stimulus to stimulate students in learning. According to the theory of information processing, the object of the observations is given in the process of learning will respond to the students if it is interesting and suitable with the needs of learning (Wakhidah, 2018). In this study the researcher uses the research object in the form of images and props that fit with the learning material. De Vito explains, the use of media in learning will multiply the learning experience that interesting to students (Samatowa, 2010)

5. The observation results of teacher and students activities

The research also made observation of teacher and students activities during the implementation of cycle I and cycle I. The results of the observation activities of the teacher and students can be seen in figure 1 and 2.

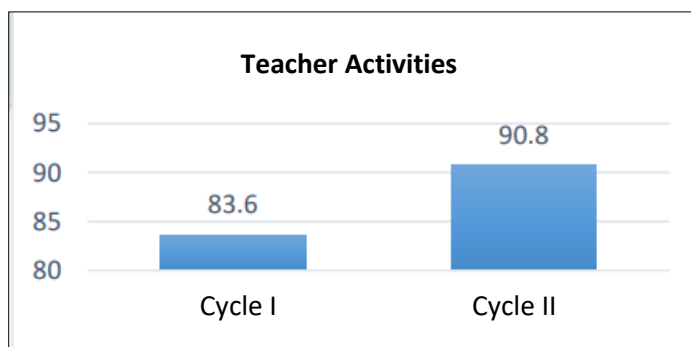


Figure 2. Observation Result of Teacher Activities

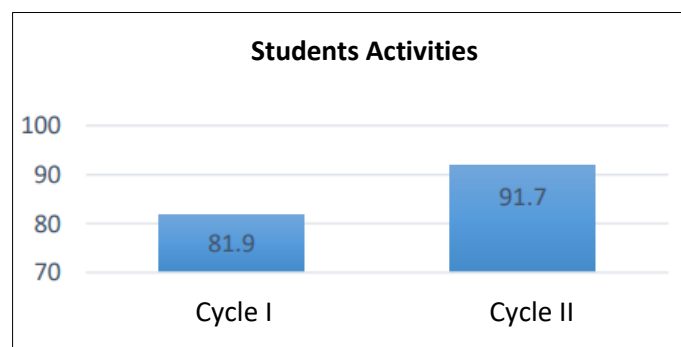


Figure 3. Observation Result of Students Activities

Based on figure 2 and 3 it is known that the activities of teachers and students increased from Cycle I to Cycle II. Activities of teachers increased from is 83.6 in the first cycle to 90.8 in the second cycle. The Data of student activities in Cycle I and Cycle II shows the increase. In the first cycle of students activities obtained a score of 81.9 and 91,7 on Cycle II . Students and teacher activities can be increased in the cycle II because conducting efforts in accordance with the results of reflection. Teacher organizes any activities properly in accordance with the planned time and the students were active during the learning. Results increased in the second cycle, the score is included in the excellent qualifications and have reached the performance indicators that have been set.

The teacher guide or organize the process of learning as well as in conveying the results of the discussion so the students and teacher activities can be increased in the cycle II. According to the theory of constructivism, a principle in educational psychology is that teachers not only provide knowledge to the students. Students have to build their own knowledge. The teacher can give ease to the process of learning, by giving students the opportunity to discover or implement their own ideas. Also teaching students to be aware. Teachers can give students ladders that bring them to a higher understanding, with the notes that students themselves who must climb the stairs. According to Soemosasmito, effective teacher is the teacher who found a way and are always trying to get students to engage appropriately in some subjects, with the

percentage of high academic learning time to walk without the use of force, negative, or punishment techniques (Al-Tabany, 2014).

Some students express happiness in the learning process because of the active learning situation. The student's involvement in discussion activities, observations, experiments, and communication makes the learning process very fun. This is in accordance with Kahleand Damnjanovic who stated that student participation in the learning process makes them happy (Wakhidah, 2018).

CONCLUSION

Based on the results of research it can be conclude that;

1. The application of cooperative model type Jigsaw on students of class IV-B MI Darun Najah Klopsepuluh can be done well in the two cycles. The activities of the teacher in Cycle I obtain the score 83.4 with excellent qualification, and in the second cycle obtain the score 90,8 with very good qualification. The activity of students in cycle I obtain the score 81.9 with excellent qualification, and in the second cycle obtain the score 91, 7 with very good qualification
2. Science process skills of students class IV-B MI Darun Najah Klopsepuluh increased. The percentage of students science process skills in cycle I was 58,3% with insufficient qualifications, continued in cycle II increased to 91,7% with the very good qualification.

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