IMPLEMENTING THE JIGSAW COOPERATIVE LEARNING MODEL TO DRILL STUDENT MUTUAL COOPERATION ATTITUDE IN REACTION RATE TOPIC

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Abstrak

Penelitian ini bertujuan untuk mengetahui sikap gotong royong siswa, hasil belajar siswa, dan respon siswa melalui model pembelajaran Kooperatif tipe *Jigsaw* pada materi laju reaksi. Indikator sikap gotong royong antara lain aktif dalam kelompok di kelas, bersedia menyelesaikan tugas sesuai kesepakatan, dan bersedia menolong teman dengan senang hati. Penelitian ini merupakan penelitian pre-eksperimen dengan jenis penelitian deskriptif kuantitatif dan kualitatif serta metode penelitian *"One Shot Case Study"*. Instrumen yang digunakan adalah lembar pengamatan sikap gotong royong , lembar postest, dan lembar angket respon siswa. Data diperoleh dengan cara pengamatan, tes, dan angket. Berdasarkan hasil penelitian, sikap gotong royong berada dalam kriteria Mulai Berkembang (MB) dengan nilai rata-rata untuk indikator 1, 2, dan 3 dalam dua kali pertemuan sebesar 2,78; 2,84; dan 2,84. Rata-rata hasil belajar siswa tiap pertemuan adalah 2,39 dan 3,68 dengan ketuntasan klasikal 38 % dan 100%. Respon siswa dikatakan positif dengan persentase sebesar 96,05% siswa menyatakan sikap gotong royong mereka mengalami peningkatan.
Kata kunci: Sikap Gotong Royong, Kooperatif *Jigsaw*, Laju Reaksi

Abstract

The aims of this research are to know the student attitude of mutual cooperation, student mastery learning, and student respon by implementing the Jigsaw Cooperative learning model in reaction rate topic. The indicators of mutual cooperation attitude are active in the group at class, willing to perform the task as agreement, and willing to help friend with pleasure. This research is pre-experiment research by using One Shot Case Study's method and analyzed by descriptive quantitative and qualitative. The instrument that used is the attitude of mutual cooperation observation sheet, the student mastery learning test, and student respon sheet. The data is collecting by observation , test, and questionaire. According to the result of this research, the criteria of attitude of mutual cooperation is in start to develop (MB) criteria, with average score for indicator 1,2, and 3 in two meetings are 2,78; 2,84; and 2,84. The average score of student mastery learning in for each meeting are 2,39 and 3,68 with classical mastery learning are 38% and 100%. The student respon is positive with percentage 96,05% of students said their attitude of mutual cooperation is increase.
Keywords: attitude of mutual cooperation, Jigsaw Cooperative, Reaction Rate

INTRODUCTION

Today, often appear cases of solving problems with violence between students due to the implementation of the curriculum, which tends to suppress the cognitive aspects and limits the students with a less challenging activities in their study [1].

The education system according to Regulation Number 20 in 2003 about National Education System state that the educational content which defined in the Competency Standards and developed in curriculum should become the basis for learners to develop and adapt to their lives as individuals, community members, and responsible citizens in the future [2].

The mutual cooperation attitude that include in the second core competencies of curriculum 2013 are expected to be drilled through learning activities in schools [3]. But in fact, this attitude is often overlooked by teachers, they only focus on the cognitive domain. Because of that fact, there are so many cases of solving problem with violence appeared.

In the curriculum 2013, the mutual cooperation attitude can be drilled through chemistry subject in reaction rate topic. Reaction rate topic has many daily life application and mathematic calculation for example is in the experiment of factors that affecting reaction rate and determine reaction order. In the daily life there are phenomena of corrosion and fireworks.

Based on the interview to the chemistry teacher and questionnaires to students in class XI SCIENCE 5 at Senior High School 18 Surabaya on Tuesday 14 October 2014, the results show that more than 50% of students have not completed the reaction rate formatif test with minimum score is 2,66 in scale of 0 until 4; 58% of students said that they have difficulties in reaction rate topic, and 86% of students reported that the teacher does not held experiment in learning proses.

Based on the direct observation in this research, it shows that students are still have less mutual cooperation attitude, it shown from the results of the group task is less good than the result of the individual task, its because their difficulties of students to cooperate each other. The chemistry teacher state that student with high mastery learning is difficult to cooperate with student with low mastery learning.

One of the learning model that can drill mutual cooperation attitude and increase student mastery learning are Jigsaw Cooperative learning model. This model make students work in groups composed of students with high, average, and low learning outcomes working together to achieve the learning objectives [4].

Jigsaw Cooperative Model is used, because the topic characteristics which is factors that affect the rate of reaction consist of subtopic concentration, temperature, surface area, and catalysts. Students are divided into experts groups that focus study only one of the factors and then teach their friends in their Jigsaw group about their result of studies in expert group. From that activity, so the mutual cooperation is needed and can be drilled [5].

Based on the explanation above, so the problem question are: (1) How is the mutual cooperation attitude of student by using Jigsaw Cooperative Learning Model? (2) How is students mastery

learning in reaction rate topic by using Jigsaw Cooperative Learning Model? (3) How is the student response about their mutual cooperation attitude and mastery learning by using Jigsaw Cooperative Learning Model?.

From the problem question above, so the purpose of this research is to know the student mutual cooperation attitude, student mastery learning, and student response in implementation of Jigsaw Cooperative learning model in reaction rate topic.

METHOD

The kind of this research is pre-experiment of descriptive quantitative and qualitative. The focus of this research is student's attitudes of mutual cooperation. The sample of this research is all student in class XI -SCIENCE 5 Senior High School 18 Surabaya (SMAN 18 Surabaya).

The design of this research is *"One Shot Case Study"* that can be described as below [6]:

$$X \rightarrow O$$
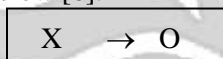
with:

X = The treatment of learning model by using Jigsaw Cooperative learning model

O = The result of treatment by using Jigsaw Cooperative learning model in drilling student attitude of mutual cooperation.

In this research, the learning materials that used are syllabi, lesson plan of reaction rate, worksheet, and textbook. The research instruments are observation sheet of mutual cooperation attitude, posttest sheet, and questionaire sheet.

The observation sheet of mutual cooperation attitude is observed by four observers where each observer observe one group that contain seven until eight students. The observer must score the mutual cooperation attitude of students while the learning process happen and write it in the observation sheet.

To know the mutual cooperation attitude of student using *Jigsaw* Cooperative Learning model, the observer give score from 0 until 3 in the observation sheet. The score that gotten is analyzed by converting it into these criteria [3]:

$$\text{Mutual cooperation attitude} = \frac{\text{obtainable score}}{\text{maximum score}} \times 4$$

Table 1 the criteria of mutual cooperation attitude

Score	Criteria
3,33 - 4,00	Entrenched (MK) :"Membudaya"
2,33 - 3,32	Start to develop (MB) : "Mulai Berkembang"
1,33 - 2,32	Start visible (MT) : "Mulai Terlihat"
0- 1,32	Have not seen (BT) : "Belum Terlihat"

[3]

The minimal criteria that must be filled is start to develop (MB).

The student mastery learning in class is good when the 75% or greater of students is success. The student must get score 2,67 or greater in scale 1-4 to success. The pattern below is to calculate the student score [7]:

$$\text{Student's mastery learning} = \frac{\Sigma \text{ right answer}}{\Sigma \text{ Question}} \times 4$$

Below is the pattern to calculate the student classical mastery learning [7]:

classical mastery learning =
$$\frac{\Sigma \text{ success student}}{\Sigma \text{ student}} \text{ x } 100\%$$

If the student response greater than 61%, so the student respon is positive. Below is the pattern to calculate the student response [6]:

$$P(\%) = \frac{\sum n_i \, x \, f_i}{\sum \text{responden}} \text{x } 100\%$$

Adverb :

P = percentage student response.

n_i = number of respondents answer Yes

f_i = score of answer Yes

The respon is positive if the student responses obtained a greater percentage of 61%.

RESULT AND ANALYSIS

The focus of the research is to know the student mutual cooperation attitude, student mastery learning, and student response.

The mutual cooperation attitude is divided into three indicators based on Minister of National Education in Republic Indonesia (2010). The indicators of mutual cooperation attitude in this research are: active in group at class, willing to perform task according to the agreement, and willing to help a friend with pleasure [3].

Those indicators is observed when the students work in group, which is in expert group and Jigsaw group. In the Jigsaw cooperative learning model there are two group called Jigsaw group and expert group, expert group consist of student from Jigsaw group that get same topic. They discuss their topic in the expert group and then back to their Jigsaw group to teach their friend.

The result of student mutual cooperation attitude for each indicator in two meetings are shown in table 2 below:

Table 2 Score of student mutual cooperation attitude in two meetings

N	Meeting 1 Indicator			Meeting 2 Indicator		
	1	2	3	1	2	3
S1	1	2	3	3	2	3
S2	2	1	1	2	3	2
S3	2	2	2	3	2	2
S4	2	2	2	2	3	3
S5	3	2	2	2	3	2
S6	2	1	1	2	2	3
S7	1	1	2	2	2	2
S8	1	2	2	3	2	2
S9	2	1	0	3	3	2
S10	2	1	3	3	3	3
S11	2	3	3	3	3	3
S12	2	2	2	3	3	3
S13	1	2	3	2	3	3
S14	1	3	2	2	3	3
S15	3	2	1	3	2	3
S16	3	1	2	3	3	3
S17	2	1	2	2	2	2
S18	1	3	1	2	3	2
S19	2	1	1	2	3	3
S20	1	2	2	3	3	2
S21	2	1	2	2	3	2
S22	1	2	1	2	2	3
S23	2	1	1	2	3	2
S24	1	2	2	3	3	3
S25	2	0	1	2	3	3
S26	3	1	1	3	3	2
S27	2	2	1	2	2	2
S28	1	2	2	2	2	2
S29	1	1	2	2	2	2
n̄	1,76	1,62	1,72	2,41	2,62	2,55
X	2,34	2,16	2,29	3,22	3,49	3,40

Note: N = name; n̄= average score;

x= converted score

Indicator   = 1. Active in group at class
                    2. Willing to perform task according to agreement
                    3. Willing to help friend with pleasure

Rubric score = 0 : Never
                    1 : Enough Often
                    2 : Often
                    3 : Very Often

Based on table 2, the student attitude of mutual cooperation is succesfully drilled to the student. The attitude is drilled when the students work in their expert group and Jigsaw group. It is suitable with Arends (2012), which state that students from different Jigsaw group with same topic join together to study and discuss the topic in expert group. After that the students back to their Jigsaw group and teach their friend about their topic in expert group [8].

On the first indicator which is active in group at class, the score is 2,34 for first meeting and 3,22 for second meeting. The average score for two meetings is 2,78 with start to develop (MB) criteria. For every moment in cooperative learning model, the member of group should do the best for their group, and also the group should do the best to help their member [9]. Based on the score of first indicator, it shown that the student has been active in group at class.

Second indicator is willing to perform task according to the agreement. The score is 2,16 for first meeting and 3,49 for second meeting. The average score for two meetings is 2,84 in start to develop (MB) criteria. This indicator was observed when the students in Jigsaw group make an agreement and divide the topic of factor that affecting reaction rate. For each member get one topic that will be discussed in the expert group with the other member who get same topic.

Based on Lie (in Isjoni; 2012), which state that cooperative learning next called mutual cooperation learning is learning model that give chance to student to cooperate with other students in a structural assignment [10]. And then according to Trianto (2007), he state that coordination is an impotant thing in cooperative learning, the emphasis is not only in completion assignment but also in interpersornal relationship. Every member then now can relieve the result of discussion [11].

Third indicator is willing to help friend with pleasure. The score of the third indicator is 2,24 in the first meeting and 3,40 in second meeting. The average score is 2,84 in start development (MB) criteria. This indicator was observed when the student back to their Jigsaw group to teach their friend about topic that has been discussed in expert group.

The score above shows that student have helping their friend in the Jigsaw group by teaching them about the topic in their expert group. It is suitable with Nur (2011), which state that student cooperate to study and have responsibility about their friend's learning beside their own learning [4]. The student mutual cooperation attitude in two meetings can be shown as the figure 1 below:
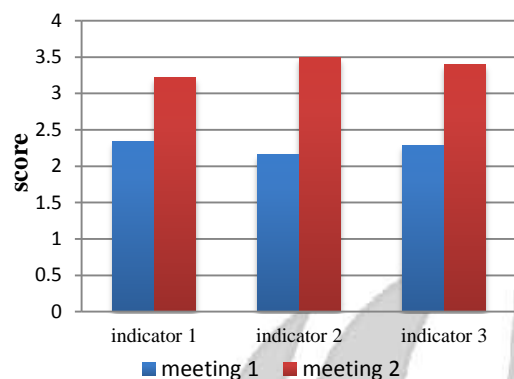
Figure 1 Graph of student mutual cooperation attitude

The reaction rate topic that used in this research is the factors that affect reaction rate. In the first meeting the student do the experiment about factors that affect reaction rate, and in the second meeting, student discuss about the correlation between factors that affect reaction rate with collision theory. The student posttest score for tow meetings s shown in table 3 below:

Table 3   Postest Score for two meetings

N	Meeting 1		Meeting 2	
	Score	T / TT	Score	T/TT
S_1	2,40	TT	3,20	T
S_2	2,80	T	4,00	T
S_3	2,80	T	4,00	T
S_4	2,80	T	4,00	T
S_5	2,80	T	4,00	T
S_6	1,60	TT	3,20	T
S_7	2,40	TT	4,00	T
S_8	2,40	TT	3,60	T
S_9	2,80	T	4,00	T
S_{11}	2,40	TT	3,60	T
S_{12}	3,20	T	4,00	T
S_{13}	2,80	T	3,60	T
S_{14}	1,60	TT	3,60	T

N	Meeting 1		Meeting 2	
	Score	T / TT	Score	T/TT
S_{15}	1,60	TT	3,60	T
S_{16}	2,80	T	4,00	T
S_{17}	2,40	TT	3,60	T
S_{18}	2,80	T	4,00	T
S_{19}	2,40	TT	4,00	T
S_{20}	2,40	TT	4,00	T
S_{21}	2,40	TT	3,60	T
S_{22}	2,80	T	2,80	T
S_{23}	2,00	TT	3,60	T
S_{24}	2,00	TT	3,60	T
S_{25}	2,40	TT	3,60	T
S_{26}	2,80	T	3,20	T
S_{27}	2,40	TT	4,00	T
S_{28}	2,40	TT	4,00	T
S_{29}	0,80	TT	3,20	T
$\bar{n}$	2,39		3,68	

Note: N = name; $\bar{n}$ = average score; T = complete; TT = Not Complete

The student mastery learning for two meetings is shown in figure 2 below:
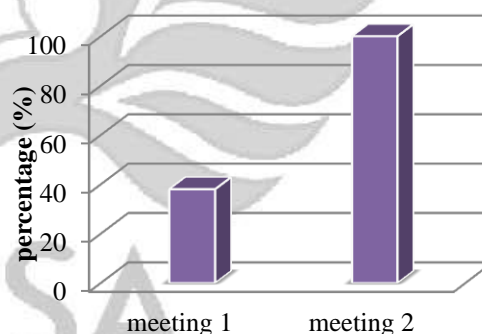

Figure 2 Diagram of Student mastery learning in two meetings.

Figure 2 above shows that the student mastery learning of students in the first meeting is not good enough, the mastery learning is 38%. In the second meeting the student mastery learning is

good with percentage 100%. The average score of postest in first meeting is 2,39 while in the second meeting is 3,68.

The average score and student mastery learning for two meeting is increase. According to Hanbury (in Suyono and Haryanto; 2011), which state that some aspect that need more attention in Piaget constructivism learning theory are: students construct their knowlege by integrating their own ideas, learning will be more meaningfull because the student is understand, student own strategy is more important, and student have a change to discuss and exchange their experience and knowledge with their friend [12] .

The student respon about Jigsaw cooperative learning is shown in figure 3 below :
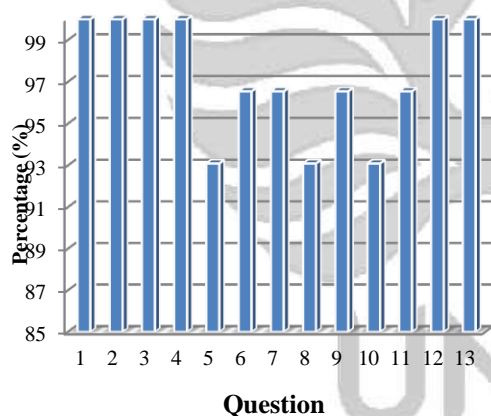

Figure 3 Diagram of student response for each question

The average percentage of student response is 96,05%, so the student response for Jigsaw cooperative learning model in reaction rate topic is positive. Student realize that their mutual cooperation attitude and mastery learning

is increase. It is suitable with Arends (2012), which state that one of the important aspect in cooperative learning is the cooperative learning help to increase the cooperative attitude and group relationship between student, at the same time, its also help student in their academic aspect [8].

CLOSING
Conclusion
Based on the results and analysis of research's data, the conclusions can be written as follows:

1. By implementing the Jigsaw cooperative learning model in reaction rate topic, The student mutual cooperation attitude could be drilled, the average score of first indicator active in group at class is 2,74 in start to develope (MB) criteria, second indicator willing to perform task according to the agreement is 2,84 in MB criteria, and third indicator willing to help friend with pleasure is 2,84 in MB criteria.

2. The students mastery learning average score for posttest in first and second meetings are 2,39 and 3,68. The classical mastery learning for first meeting is not good because the score is less than 75%, and in the second meeting is good because the score is 100% .

3. Student response is positive with average score 96,05% of students said that their mutual cooperation attitude was increase after following learning.

Suggestion
Based on the conclusion, so the suggestion that can be proposed are:

1. The competencies of mutual cooperation attitude needs much attention and training from teacher continueously to make student keep it.
2. To drill the mutual cooperation attitude and keep it entrenched to student, it needs to train continueously and in long time not only two meetings.
3. To do research about mutual cooperation attitude, it needs more observer, so there is no attitude of students that not observed.

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