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Improving Students' Ability to Understand Redox Reactions Using Jigsaw Techniques

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Abstract
This study is aimed at finding descriptions about : a) to what extent Jigsaw Technique can improve students' ability in comprehending of the Redoks reaction at grade XI ATP of SMK N 4 Muaro Jambi, and b) factors that influence the changes of students' ability in comprehension of Redoks reaction at grade XI ATP of SMKN 4 Muaro Jambi. The design of the research is Classroom Action Research. The research is conducted in three Cycles. At each cycle, it is administered in four phases, namely: Plan, Action, Observation, and Reflection. The participants of the research are the students at grade XI ATP of SMKN Muaro Jambi in the 2017-2018 academic years. The instruments of the research consist of; tests, and observation checklists. The data were analyzed using quantitative and qualitative techniques. The findings of the research are: a) the use of Jigsaw Technique could improve the students' ability in comprehension of the Redoks reactions at grade XI ATP of SMKN 4 Muaro Jambi, b) the factors that influence the changes of the students' ability in comprehension of Redoks reaction: redoks reaction material, teaching technique, and classroom management. Based on the findings the researcher suggsets English teachers who have the same problem to use jigsaw technique to solve their problems in teaching to comprehend the redoks reaction and the future researchers are expected to do the research on the other skills.

Keywords: Jigsaw; Redox Reactions; Student Abilities

INTRODUCTION

To create an advanced, smart, intelligent and dignified people, an advanced, meaningful and high-quality education system is needed. The quality of the world of education can be proven by the quality of educational products. Quality, smart and intelligent educational products will be born by many factors, including teacher competence, effectiveness of the learning process, availability of educational facilities and the level of student motivation to learn.

In line with this, in reality the learning process is not yet meaningful, where student motivation is still relatively low, so it is hoped that teachers can equip themselves by always analyzing the learning

process they have implemented, and looking for weaknesses and shortcomings in the activities that have been applied in class so that students can motivated in learning. For example, the process of learning chemistry subjects at SMKN 4 Muaro Jambi has not yet gone as expected. This was proven when the teacher asked several students to explain and draw conclusions about the concepts and theories of the material that had just been presented, they were not yet able to explain the concept of redox material. This was also proven when they were given a test in Redox Reaction material, in general the students' scores had not reached the minimum completeness criteria, which are the criteria The minimum completeness in the Redox Reaction Competency Standard is 78, however the pre-test results show that the students' average score is 75, which is still below the minimum completeness criteria.

Therefore, to improve students' ability to understand the material provided, it is necessary to apply alternative techniques that can foster student activity and curiosity. Thus, in this study, researchers used the Jigsaw technique to improve students' learning abilities. The jigsaw technique is a cooperative learning technique where students have greater responsibility in carrying out learning to master knowledge than trying to learn the material alone. This is supported by the opinion of Sudrajat (2008: 1) that "Jigsaw technique cooperative learning is a type of cooperative learning consisting of several members in one group who are responsible for mastering parts of the learning material and are able to teach the material to other members in their group".

Paying attention to the phenomenon described above, the researcher is interested in researching the use of the Jigsaw technique in the learning process to improve students' abilities in understanding Redox Reaction material with the research title being: "The Use of Jigsaw Techniques in Improving Students' Ability to Understand Redox Reactions Class XI ATP SMK Negeri 4 Muaro Jambi Year Teachings 2017-2018." Based on the problem limitations, the research problem formulation is "Can the use of the Jigsaw Technique improve students' ability to understand Redox Reactions?"

Through research, it is hoped that the use of the jigsaw technique in the chemistry learning process in improving students' ability to understand redox reactions can increase and the use of the jigsaw technique is also expected to provide several benefits, including being able to provide information for teachers about a learning technique carried out using the Jigsaw technique in improving ability and motivation towards learning chemistry.

Redox (Reduction/Oxidation reaction) is a term that describes the change in oxidation number (oxidation state) of atoms in a chemical reaction. The concept of oxidation-reduction (redox) reactions was originally based on the involvement of oxygen. In the opinion of Erawati E, et al (2009: 10) that "Redox reactions are a combination of oxidation and reduction reactions". Here he explains that oxidation reactions always occur simultaneously with reduction reactions, where a process of binding and releasing oxygen occurs. Reactions that bind oxygen are called oxidation reactions, and reactions that release oxygen are called reduction reactions. In other words, the oxidation reaction releases electrons while the reduction reaction receives electrons. According to Farhan's explanation (2012: 4) that "oxidation-reduction (redox) reactions are a type of chemical reaction that is important for life. Where redox reactions produce energy that is useful for humans. As in burning fuel, batteries produce electricity and metabolism of food substances."

Then the Jigsaw technique is a learning technique where in the learning process students are required to be more active than the teacher. The use of the Jigsaw Technique in the learning process aims to increase student activity and learning outcomes. In the opinion of Arends (1997: 23) that "jigsaw cooperative learning is a cooperative learning technique that consists of several members in one group who are responsible for mastering a part of the learning material and are able to teach that part to other members in their group". Here it is explained that the jigsaw technique is a cooperative learning process (working together) in a group of students where each student is expected to be able to master the teaching material by working together with friends. Then Arends (1997: 26) also added the explanation that "the cooperative learning model of the Jigsaw technique is a cooperative learning model, with students learning in small groups consisting of 4-6 people heterogeneously and working together in positive interdependence and being responsible for the completion of the material. lessons

that must be learned and convey the material to other group members.

He also explained that in the learning process using the jigsaw technique, one student was appointed to be responsible for the complete mastery of the material to his group members, and then also convey or explain to the other groups. Then Slavin and Lie (1995: 32) explained that In this jigsaw technique cooperative learning plan, it is arranged instructionally (commands/rules) with the following steps: (1) Reading: students get expert topics and read the material to get information, (2) Group discussion expert: students with the same expert topics meet to discuss the topic, (3) Group discussion: the expert returns to his original group to explain the topic to his group, (4) Quiz: students get an individual quiz that covers all topics, (5) Group awards: calculating group scores and determining group awards.

Thus it can be understood that in the learning process using the jigsaw technique two groups or teams are first formed, namely: the home group and the expert group. First, the expert group discusses in their group solving the problem or topic given after finishing the discussion, then they (the expert group) return to their original group. After returning to their home group, they are tasked with explaining the material that has been discussed by the expert group to the members of the original group. Here, the expert group is responsible for the success of the other members in understanding the material provided.

Based on the background of the problem in chapters I and chapter II, it can be concluded that the course of the research process will follow the flow in the framework of thinking so that when conducting research there are no mistakes and things that don't end up being as expected, the framework of thinking here starts from the problem of the low ability of Class XI students. ATP SMK Negeri 4 Muaro Jambi in understanding Redox Reactions. On this occasion the researcher used the Jigsaw Technique to improve students' abilities in understanding redox reactions, especially the abilities of class XI ATP students at SMK Negeri 4 Muaro Jambi for the 2017-2018 academic year.

RESEARCH METHODS

Research Design

The research used is a type of classroom action research. Classroom Action Research is a form of reflective research carried out by action actors to increase the rational stability of actions in carrying out learning, deepen understanding of actions and improve the conditions of learning practices carried out. Added by Stephen Kemmis (1982: 132) that Classroom Action Research is a study or inquiry through self-reflection carried out by participants in certain educational activities in social situations (including education) to improve the rationality and truth of: (a) The practices of educators who they do it themselves, (b) Their understanding of these practices and (c) The situation in which the practices are carried out.

Research Target/Subject

The place to carry out the research was at SMK Negeri 4 Muaro Jambi in Jaluko District, Muaro Jambi Regency. The time for conducting the research was the first semester of the 2017-2018 academic year which started from January to June 2018. The research population was class XI ATP students at SMK Negeri 4 Muaro Jambi in the 2017/2018 academic year. The research sample was class XI ATP, totaling 21 students consisting of 9 male students and 12 female students. The instruments used to collect data are tests and observation sheets. The test is a question sheet given to students, which is held before the research, namely the pre-test, and at the end of each cycle, namely: the end of cycle one, and the end of the second and third cycles. Then an observation sheet to collect qualitative data.

Instruments, and Data Collection Techniques

The methods used to collect data are: qualitative and quantitative. Quantitative is the method used to collect quantitative data, namely by giving tests to students to find out about the progress of student achievement in learning, and calculating the value obtained from each cycle. Data analysis uses

qualitative and quantitative techniques. Qualitative is a way of analyzing qualitative data by collecting observational data, reading it, analyzing it, explaining it and grouping it into units according to specified categories and drawing conclusions. The validity of the collected data is checked using a cross check, namely by examining the collected data or analyzed again to get accurate results. Quantitative techniques are a way of analyzing quantitative data, namely to analyze test results at the end of each cycle by calculating student test results.

Data analysis technique

The test results are determined by the acquisition value, and the average value (mean) of the class is sought to determine the progress of each cycle which refers to the opinion of Paul S (2008: 81), namely:

$$X = \frac{Y \ X \ 100\%}{N}$$

Information:

X = Average value (percent %)
Y = Total score obtained
N = Maximum score

RESULTS AND DISCUSSION

Due to the breadth of topics discussed, the cycles discussed are oxidation and reduction reactions. The steps arranged in the lesson plan are designed according to the steps in the Jigsaw technique cooperative learning model. Teaching materials are a collection of material descriptions of the topics discussed that must be mastered by the expert group, and group work sheets contain material steps that must be owned and understood by the original group. Then the instrument or tool is an observation sheet which contains students' activity in the expert group and home group, and the question sheet contains the competencies that students must master.

From the results of data analysis in cycles I, II and III, it can be concluded that the use of the jigsaw technique in the chemistry learning process can make a very good contribution. This is evident from the table of learning outcomes in cycles 1, II and in cycle III, students' abilities in general have increased, this can be seen in Figure 1 below.

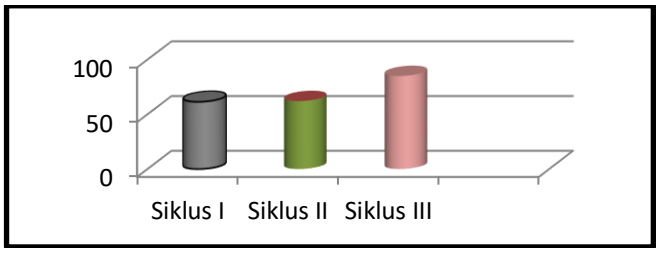

Figure 1: Student Learning Achievement in Cycles, I, II and III.

From Figure 1 above, it can be understood that in the third cycle (3) students' ability to understand redox reactions using the jigsaw technique increased significantly, as evidenced by the class average score, where in the first cycle the class average score was only sixty-one point four (61.4), and in the second cycle II sixty-two point one (62.1), and in the third cycle eighty-five (85).

CONCLUSION

Based on the description and analysis of the research results and discussion, it can be concluded that: the learning process using the Cooperative Learning method with jigsaw techniques in Chemistry subjects can improve students' abilities or competencies, especially in understanding redox reactions.

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