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Application of Cooperative Learning Methods through Sending Speeches and Questions to Improve Chemistry Learning

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ABSTRACT

Purpose of the study: This research aims to find out whether the application of learning techniques for sending greetings and questions can achieve complete chemistry learning on chemical bonding material.

Methodology: The instruments used in this research are tests, observation and documentation. Tests are carried out to determine student learning outcomes. Observations are carried out to determine the development of teachers and students in the ongoing learning process. Meanwhile, documentation is carried out to obtain school data, teacher data and also student data.

Main Findings: Based on the results of data analysis, it was found that student learning completeness (classical) before the action was 42.5%, cycle I 47.5%, cycle II 72.5%, cycle III 87.5%, which increased with each meeting. , so it can be concluded that the application of cooperative learning techniques of sending greetings and questions can achieve complete student learning.

Novelty/Originality of this study: The novelty of this research is to determine the effectiveness of applying cooperative learning techniques for sending greetings and questions to achieve complete chemistry learning in chemical bonding material.

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1. INTRODUCTION

Education is a development sector that is very important for the progress of the nation and state. Education is not only the responsibility of teachers, parents and society, but also the responsibility of the government [1], [2]. With good cooperation between teachers, parents and the government, it is hoped that schools can carry out their functions well. Formally, children can increase their knowledge through school to a higher level by forming personality and skills that can direct a person to the level of development at the level they occupy [3], [4]. Improving the quality of education can be achieved by improving the learning process, because the learning process has a central and strategic position in school education [5]. Success in the learning process in class is influenced by several factors, including teachers and students.

Learning activities can be said to be successful if under optimal conditions, the majority of students can master the lesson completely [6]. Complete learning is the right condition for all students to be able to learn well and obtain maximum results on all the material studied [7]. The minimum learning completeness standard is the level of achievement of basic subject competencies by students per subject [8]. A student is said to be complete in learning if he has mastered 75% of the basic competencies and classically a student is said to be 100%

complete and has mastered 75% of the basic competencies. However, each school can determine minimum standards for learning completion according to the conditions of the school.

The material taught in class X semester 1 includes chemical bonds. Minimum Completion Criteria set by the class. Based on confirmation with the chemistry teacher at Public High School 22 South Sumatra, learning in chemical bonding subjects is taught only using the lecture method [9]. After further confirmation, information was obtained that in the chemistry learning process there were still many obstacles encountered, such as (1) students were less responsive to lessons during the learning process, (2) students with high academic abilities did not want to work together with students with low academic abilities (3) students do not do the assignments given by the teacher well, because there are many activities outside of school, this condition results in unsatisfactory student learning outcomes [10], [11].

The use of appropriate and varied methods will be able to motivate students in learning activities. Therefore, teachers adapt the use of methods to the conditions and atmosphere of the class and provide variations in learning that do not bore students but rather increase student motivation in learning [12]. Cooperative learning techniques for sending greetings and questions can strengthen group relationships by creating a typical group greeting atmosphere [13], [14]. There are times when the classroom atmosphere becomes saturated and boring, at times like this teachers can increase students' motivation and enthusiasm for learning by providing group greetings [15]. Correctly implementing cooperative learning model procedures will enable teachers to manage the class more effectively.

This research is in line with research conducted by Solissa et al [16] entitled Penerapan Model Pembelajaran Kooperatif Tipe STAD untuk meningkatkan hasil belajar kimia. The results of this research state that learning chemistry using the Student Teams Achievement Division (STAD) method can improve chemistry learning outcomes from cycle to cycle and increase student activity in learning. Although much research has explored various cooperative learning methods in chemistry education, there is still a gap in the application of techniques that combine speech and questioning as primary tools to increase student interaction and understanding [17]. Most previous studies tend to focus on group discussions or collaborative projects without emphasizing the structured aspects of verbal communication [18]. As a result, the full potential of developing targeted speaking and questioning skills in facilitating understanding of complex chemical concepts has not been fully revealed [19], [20].

This research presents novelty by integrating cooperative learning methods through sending speeches and questions in chemistry learning, which has not been widely applied before. This approach is innovative because it combines aspects of structured verbal communication with student collaboration, allowing students to actively convey their understanding and ask insightful questions [21]. This innovation is expected to improve students' communication and critical thinking skills, as well as strengthen their understanding of the topic of chemical bonds through an interactive and reflective processs [22], [23].

The application of cooperative learning methods through speaking and asking questions is very important in learning chemistry, especially on the topic of chemical bonds. This method encourages students to actively participate, collaborate, and exchange information, which ultimately strengthens understanding of complex chemical concepts [24]. By submitting remarks and questions, students can clarify their understanding, resolve misunderstandings, and deepen their understanding of the material through discussion and interaction with classmates. In addition, this approach also improves communication and critical thinking skills, which are essential competencies in 21st century education [25]. Based on the description above, the author is interested in conducting research with the title "Application of Cooperative Learning Methods through Sending Speeches and Questions to Improve Chemistry Learning".

2. RESEARCH METHOD

2.1 Type of Research

This research is Classroom Action Research. Classroom action research is an examination of learning activities in the form of actions, which are deliberately carried out by teachers in their own classes. The aim of implementing Classroom Action Research is to improve the process and improve the quality of learning [26], [27]. It is carried out in a series of steps with several cycles where one cycle consists of four stages, namely the planning, action, observation and reflection stages and then repeated in several cycles.

2.2 Population and Sample

The subjects in this research were 40 class X3 students at Public High School 22 South Sumatra, consisting of 20 male students and 20 female students. Meanwhile, the object of this research is to achieve complete learning of class X Public High School 22 South Sumatra students, especially on the subject of chemical bonds.

2.3 Data Collection Technique

The learning activity instruments or learning tools used in this research are syllabus, lesson plans and worksheets. To collect data on chemistry learning outcomes, tests were carried out on student learning outcomes on the subject of chemical bonds. The data collection techniques used in this research are observation techniques, test techniques, and documentation techniques. Observations were carried out by researchers to observe the learning method process cooperative technique of sending greetings and questions which takes place in stages. Observations were carried out using teacher and student observation sheets. The test is used to determine the completeness of students' previous chemistry learning and after actions in each cycle, as well as knowing improvements chemistry learning results of class X Public High School 22 South Sumatra by holding test exam after following the learning.

2.4 Data Analysis Technique

The data analysis technique in descriptive analysis of the data obtained in this research is descriptive analysis which aims to determine mastery and completeness of chemistry learning on the subject of chemical bonds. Mastery of learning on the subject of chemical bonds is carried out by looking at students' mastery of learning classically. In this research, the target to be achieved for individual learning completeness is ≥70% and classical completeness ≥75%.

2.5 Research Procedures

The aim of implementing this Classroom Action Research is to improve the process and improve the quality of learning. Carried out in a series of steps with several cycles where one cycle consists of four stages, namely planning, action, observation and reflection (reflection) and then repeated again in several cycle.

3. RESULTS AND DISCUSSION

The research results obtained and the data analyzed in this research are the completeness of student learning from the learning process before action and the learning process before action and the learning process with action using the cooperative learning model, the technique of sending greetings and questions. The presentation of the research results analyzed is the completeness of individual student learning and the completeness of classical learning as well as observations of teacher and student activities during the learning process. Initial learning was carried out without implementing the cooperative learning model [28]. Techniques for sending greetings and questions. Observations without using the learning model of techniques for sending greetings and questions are carried out by filling in teacher and student observation sheets according to the results indicators that have been prepared and applied. Furthermore, at the next meeting, the researcher carried out a learning process using the learning model of the technique of sending greetings and questions in three meetings with three cycles.

28.75% of teachers carried out activities in accordance with the observation sheet, while 71% did not carry out activities on the observation sheet. Teachers are more likely to not carry out the activities on the observation sheet rather than carrying out the activities on the observation sheet from the beginning of the learning activity to the end of the lesson. From the results of observing student activities during pre-action, 50 % of the students carried out the activities on the observation sheet, while 50% of the students carried out the activities that were not on the observation sheet. Students prefer to listen to explanations of lesson material delivered by teachers. Then work on the worksheet given by the teacher. After completing the worksheet, students conclude the lesson material. Then students take a test at the end of the lesson.

From the pre-action learning completion test data, the average student learning outcome was 61.75, only 18 students completed individually and 22 students did not complete individually. Meanwhile, classical learning completeness has not been achieved, namely 42.5 %. Because the classical completeness standard is ≥ 75%, at the first meeting without applying the cooperative learning model the technique of sending greetings and questions has not yet achieved classical learning completeness. So the researcher continued to cycle I by applying the cooperative learning model, the technique of sending greetings and questions.

64.29% of teachers carried out activities in accordance with the observation sheet, while 35% did not carry out activities on the observation sheet. The teacher carries out the activities on the observation sheet by applying the cooperative learning model, the technique of sending greetings. However, there are still several activities that have not been implemented. From the results of observing student activities in cycle I, 75% of the students carried out the activities on the observation sheet, while 25% of the students carried out the activities that were not on the observation sheet. Students begin to actively participate in learning activities with cooperative learning methods. However, there are still some activities that have not been carried out by students.

From data from the first cycle chemistry learning completion test, the average student learning outcome was 63.5, only 19 students completed individually and 21 students did not complete individually. Meanwhile, classical learning completeness has not been achieved, namely 47.5%. Because the classical completeness standard is ≥ 75%, the researchers continued to cycle II so that students' chemistry learning completeness was

achieved. From the results of observing teacher activities in cycle II, 85.71% of teachers carried out activities in accordance with the observation sheet, while 14.29% did not carry out activities on the observation sheet. The teacher carries out the activities on the observation sheet by applying the cooperative learning model, the technique of sending greetings. However, there are still several activities that have not been implemented.

87.5% of students carried out activities listed on the observation sheet, while 12.5% did not appear on the student observation sheet. Students begin to actively participate in learning activities with cooperative learning methods. However, there are still some activities that have not been carried out by students. From the second cycle chemistry learning completion test data, the average student learning outcome was 69.25, only 29 students completed individually and 11 students did not complete individually. Meanwhile, classical learning completeness has not been achieved, namely 72.5%. Because the standard for classical learning completeness was ≥75%, the researchers continued to cycle III so that students' chemistry learning completeness was achieved.

From the results of observing teacher activities in cycle III, teachers carried out activities that were in accordance with the observation sheet at 100%, while those who did not carry out activities on the observation sheet were 0%. The teacher has carried out the activities contained in the observation sheet by applying the cooperative learning model, the technique of sending greetings. From the results of observing student activities in cycle III, 100% of students carried out the activities on the observation sheet, while those not on the student observation sheet were 0%. Students have actively participated in learning activities using cooperative learning methods.

From the chemistry study completion test data for cycle III, the average student learning outcomes were 77.75, 35 students completed individually and 5 students did not complete individually. Meanwhile, classical learning completeness has been achieved, namely 87.5%. Because classical completeness had been achieved ≥75%, the fourth meeting (cycle III) using the cooperative learning model of the technique of sending greetings and questions was stopped. The achievement of complete student learning on the subject of chemical bonds is due to the use of the learning model of techniques for sending greetings and questions in the teaching and learning process. By using the learning model of techniques for sending greetings and questions, students become more active. Apart from that, learning techniques for sending greetings and questions can involve students working together in small groups. The students' completeness scores from the pre-action cycle to cycle III experienced a very good increase. This can be seen in the graph as follows:

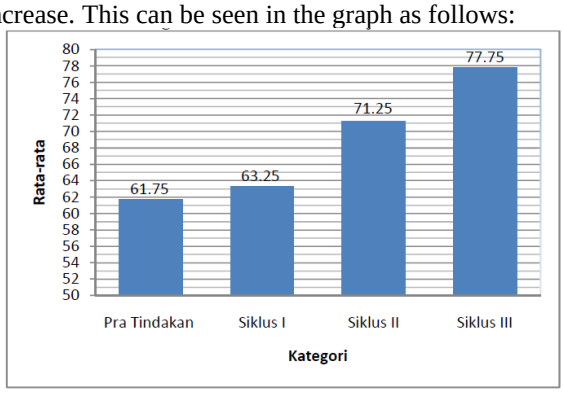

Figure 1. Graph of Average Increase in Student Learning Outcomes

The average student learning outcomes before the action were 61.75, in cycle I it was 63.25, in cycle II it was 71.75, and in cycle III it was 77.75, from the results obtained it can be seen that after implementing the learning model The cooperative technique of sending greetings and questions at each cycle change has increased.

In a learning process without action, interaction between teachers and students is less than optimal, there are only a few people who are willing to ask questions and respond to the lesson material provided by the teacher. In pre-action, interaction between teachers and students increased slightly from before cycle I and continued to increase until cycle III. This happened because there was a discussion using the cooperative learning model, the technique of sending greetings and questions. By implementing the cooperative learning model, the technique of sending greetings and questions, students are actively involved. Cooperative learning, the technique of sending greetings and questions, is one type of cooperative learning where the characteristics of cooperative learning will make students more active and the learning will provide group rewards so that students are more motivated to get better results. One of the characteristics of cooperative learning is that there are group awards, so that each student is motivated to get better results.

From the research results from cycle I to cycle III, there were several students whose individual completeness scores were decreasing. This is because students lack understanding of the questions. Apart from that, the questions from cycle I to cycle III are also different, the level of difficulty of the questions is also different. Students think that cycle I questions are easier than cycles II and III. The results of classical student learning obtained can be seen that after implementing the cooperative learning model, the technique of sending

greetings and questions and at each cycle change, classical learning mastery has increased. And this can be seen from the following graph:

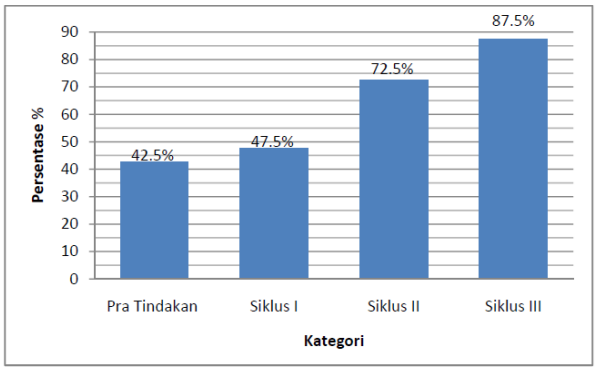

Figure 2. Graph of Increasing Classical Learning Completeness

Completeness of classical learning before the action was 42.5%, in cycle I was 47.5%, in cycle II was 72.5%, and cycle III was 87.5%, from the results of classical learning it can be seen that after implementing the model cooperative learning techniques for sending greetings and questions at each cycle change have increased. This research presents novelty by integrating cooperative learning methods through sending speeches and questions, which have not been widely applied in chemistry learning, especially on the topic of chemical bonds. This approach not only encourages active participation and interaction between students, but also introduces new ways of developing communication and critical thinking skills [29].

The results of this research have important implications for educators and educational policy makers. By demonstrating the effectiveness of these methods, teachers can be more motivated to adopt similar techniques in their teaching, enriching the variety of learning methods used in the classroom [15]. In addition, these findings can be the basis for developing a more interactive and collaborative curriculum, so that chemistry learning becomes more interesting and easier for students to understand [30]. At the policy level, this approach could be integrated into teacher training programs to improve the quality of teaching in schools. Although this study showed positive results, there are several limitations that need to be considered. This research was conducted in a specific context with a limited sample, so the results may not be generalizable to all chemistry learning situations.

4. CONCLUSION

Based on the results of the research that has been carried out, it is concluded that students' learning mastery on the subject of chemical bonds in class The research results obtained from the research explain that the implementation of the cooperative learning model of the technique of sending greetings and questions in class X3 of Public High School 22 South Sumatra makes students more active and students are more motivated to get better learning results. The application of cooperative learning techniques by sending speeches and questions in chemistry learning raises a variety of significant beliefs. With collaboration between students, opportunities to deepen understanding and overcome difficulties in understanding chemical bonds become more open. Apart from that, this method can also increase student involvement in the learning process, develop their social skills, and develop attitudes of mutual respect and cooperation.

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