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Improving Chemistry Learning Outcomes in Electrochemistry through STAD-Cooperative Learning Model in Class X SMK 2 Palembang

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Abstract: The Increase Of Study Chemistry Through Implementation of Cooperative Learning Model Type STAD in Class X TITL 4 SMKN 2 Palembang. Classroom Action Research (PTK) aims to know the improvements studied chemistry students using a learning model of Student Teams Achievement division (STAD). The research was conducted in the class X SMK Negeri 2 Palembang and the object at students of class X TITL 4, amounting to 34 students. The research which is implemented in two cycles. The data obtained from each cycle later in the analysis to know of any amprovement in the learning process and as a corrections to proceed to the next cycle. Data obtained using sheets of observation and instrument test student learning outcomes. Improved student learning outcomes can be seen from using class average and percent students classical. In the first cycle the average score of students is 66.72 with the percentage of students classical is 41.18%. in the second cycle, there is an increase score in student learning by 78.74 with the percentage classical student to 84.84%

Keywords: classroom action research, learning model of stad, student learning outcomes.

▪ INTRODUCTION

The learning process must be student-centered and there is feedback from students who prioritize success in order to create increased learning outcomes. In this case the teacher acts as a facilitator so that all students will try to think about how to solve the principles and concepts given to them and to explore their insights.

Based on the results of observations and interviews that were conducted with a chemistry teacher at Palembang 2 State Vocational School, it was found that 60% of students who passed the KKM passed the KKM and this could be categorized as low, and the KKM score set at Palembang 2 State Vocational School was 75. Students who do not pass the KKM because: (1) students tend to prefer chemical practice rather than existing theory, (2) students tend to not like calculations in chemical material, (3) students have difficulty understanding abstract chemical concepts and students think that This concept requires high scientific reasoning.

Understanding the conditions related to learning problems that exist in SMK Negeri 2 Palembang on chemistry, it is necessary to provide a learning model that can control the learning situation. The learning model that will be applied in this research is the Students Teams Achievement Division (STAD) Learning Model. In chemistry subjects, students must be demanded to be more active in understanding existing theories by understanding the correct concepts and students can convey them in simple language. In line with that, the STAD learning model facilitates students to do this, where students will be more active in discussing with their friends, asking the teacher about some things they don't understand, providing answers to questions given, and being active in communicating.

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Based on the problems and literature review above, a study was carried out with the title "Improvement of Chemistry Learning Outcomes through the Application of the STAD Type Cooperative Learning Model in class X TITL-4 SMK Negeri 2 Palembang". This study aims to improve the chemistry learning outcomes of class X TITL-4 SMK Negeri 2 Palembang through the STAD type cooperative learning model.

▪ METHOD

Subject, Time, and Place of Research

The subjects in this study were 33 class X students of the TITL Department at SMK Negeri 2 Palembang in the 2017/2018 academic year. This research was conducted from February to June 2018. Data was collected at SMK Negeri 2 Palembang.

Research Type

The type of research that will be carried out is classroom action research conducted in collaboration between chemistry teachers in class X TITL 4. The research will be carried out in two cycles. Each cycle consists of 4 stages, namely the planning stage, the action stage, the observation stage (observation) and the reflection stage.

Planning Stage

This stage is carried out with preparations related to the implementation of cooperative learning, such as determining learning material on the topic of electrochemistry, namely electrochemical cells. Then proceed with making lesson plans, making LKPD for cycle I activities, making student and teacher observation worksheets in the form of questionnaires, making teaching materials and making evaluation test instrument questions for students at the end of cycle I

Action Stage

At this stage the action is carried out in 3 core steps, namely: (1) Introduction, (2) Core Activities, (3) Closing. In the first step which is the introduction, the first thing to do is the teacher prepares the children before the learning process so as to create active and conducive learning conditions, then the teacher gives apperception and explanations of learning objectives and group division. In the second stage which is the main activity, the teacher explains the material briefly and gives LKPD to the groups that have been divided, and instructs students to work on LKDP together with their respective groups. In the third stage, namely the closing stage, the teacher instructs them to collect LKPD, present LKPD, give tests at the end of learning and provide conclusions on the material being studied.

Observation Stage

At this stage, observations were made on students using the observation sheet that had been made at the planning stage. Observations were carried out by several observers, where the observer was tasked with observing students and was equipped with research evidence in the form of photos and videos during the learning process.

Reflection Stage

The reflection stage is the final stage of each cycle where an evaluation of the results of the action is carried out as a basis for continuing the next cycle as well as being a review for researchers and taking explanations of the data obtained.

Research Instruments

Data collection techniques in this classroom action research were carried out using test instruments in the form of multiple choices and observation sheets. The tests carried out are useful for measuring chemistry learning outcomes and student activity after being given the STAD type cooperative learning model. the number of questions in the test instrument in the form of essays given at the end of each cycle.

Data Collection Techniques

The data collection techniques used are:

Learning Outcome Test

Analysis of test data in this classroom action research will be carried out from the beginning of the research until the end of the data collection activities. Analysis of the test data carried out as follows.

The calculation of cognitive learning outcomes of students uses the formula:

$$skor\ siswa\ (N) = \frac{skor\ perolehanskor}{maksimum} \times 100$$

To find the percentage of learning completeness, the following formula is used:

$$P = \frac{\Sigma siswa\ yang\ tuntas\ belajar}{\Sigma siswa} \times 100\%$$

The achievement of students' mastery learning in the field of chemistry studies at SMKN 2 Palembang is if the student's score is ≥75, while class learning mastery is achieved if ≥85% of students have achieved the minimum criteria of completeness.

To find the average results of the test results from each cycle carried out in the learning process, the following formula is used:

$$M_x = \frac{\Sigma x}{N} \times 100\%$$

Where: X = the average value of all students
∑x = total value of all students N = total number of students

Student Observation Sheet Data

Observations were made at each learning meeting that used the STAD model in the learning process. The activeness of students in the learning process is observed based on the visible descriptors while the percentage of activity in each descriptor uses the formula:

$$\%S = \frac{Skor\ keaktifan}{skor\ total\ keaktifan} \times 100\%$$

(Daryanto, 2011)

Where :
Activeness score : Number of students who do activities on each descriptor.
Activeness total score : Number of students who did the activity on all descriptors.

From the data on the percentage of activeness in each descriptor, it can be obtained % of class activity using the formula:

$$\% : \frac{\text{skor keaktifan/skor total keaktifan}}{\text{Jumlah siswa di kelas}} \times 100\%$$

(Daryanto, 2011)

The results can be converted into categories of student learning activity as shown in the following table:

Table of Student Active Learning Categories

Skor	Kategori
85-100 %	Sangat Baik
65-84 %	Baik
55-64 %	Cukup
0-54 %	Kurang

(Aqib, 2011)

▪ RESULT AND DISCUSSION

Research Result Data

Data on student learning outcomes before the action (T0) was taken from students' daily test scores on the subject matter of electrolysis. The value of student learning outcomes (T1) is taken from the final test scores of cycle I, followed by cycle II the student learning outcomes (T2) are taken from the final test scores of cycle II.

Table 1. Recapitulation of student learning outcomes (T_0), (T_1), and (T_2).

Siklus	Jumlah Siswa	Jumlah siswa yang tuntas (≥75)	Jumlah siswa yang belum tuntas (<75)	Rata – rata Hasil Belajar	Persentasi ketuntasan klasikal
Sebelum Tindakan (T0)	34	11	23	64.09	32.35%
Siklus I (T1)	34	14	20	66.72	41.18%
Siklus II (T2)	34	29	5	78.74	84.84%

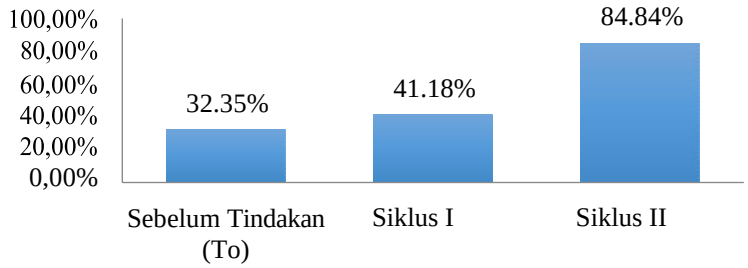

Figure 1. Presentation Chart of Classical Mastery

Table 2. Recapitulation of student activity in each cycle (T_1) and (T_2).

No	Siklus	Jumlah Siswa	% Keaktifan Pertemuan Pertama	% Keaktifan Pertemuan Kedua	% Keaktifan Siswa
1	Siklus I (T_1)	34	43.46	69.60	56.53
2	Siklus II (T_2)	34	79.90	84.31	82.1

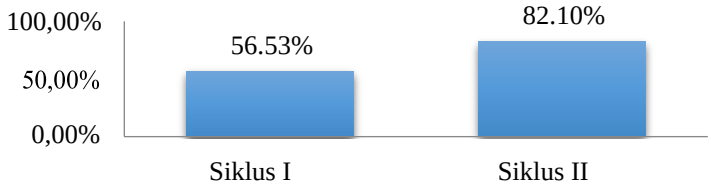

Figure 2. Student activity recapitulation chart

Action research has been carried out by applying the STAD learning model in class X TITL-4 SMK Negeri 2 Palembang. Based on research data there is an increase in student learning outcomes and student learning activeness. An increase in student learning outcomes occurs in each research cycle which is accompanied by an increase in student learning activity in each cycle as shown in Table 1 and Table 2.

Discussion

Classroom action research began with observations at SMK Negeri 2 Palembang, namely interviews with chemistry teachers. The results showed that the number of students who passed above the KKM score was 11 people, and the number of students who did not pass below the KKM score was 23 people. Then the number of student scores was analyzed, it was found that the average student learning outcomes was 64.09 with a classical completeness percentage of 32.35%. The average value of these students is considered a T0 value, namely before the action of implementing the STAD learning model is carried out.

After the observation is complete, the researcher prepares research procedures, starting from the planning, action, observation and reflection stages.

In cycle I, the research began with the planning stage, namely determining the material, making learning tools such as lesson plans, action observation sheets for teachers and students, test instrument sheets and test answer keys. Then proceed with the

implementation stage of the action, namely the research process carried out in accordance with the lesson plans that have been prepared beforehand. The learning process begins first by providing brief material explained by the researcher, then grouping students heterogeneously and providing student worksheets in the form of LKPD.

In this model, students are given the opportunity to discuss with their group mates in solving the questions contained in the LKPD. Students can exchange ideas and opinions and look for answers together, but students are still under the supervision of researchers in guiding to link between concepts in learning. Indirectly, students became active in asking and answering questions to their own group of friends. After the students finished discussing, the researcher guided the students to present the results of their discussion in front of the class and other friends gave questions to complete the presentation. After all groups of students have finished presenting their answers, the researcher conveys conclusions together with the students to provide the correct answers to the questions in the LKPD.

After implementing the STAD model, the average value of student learning outcomes increased to 66.72 with a classical completeness percentage of 41.18%. In addition to the average value of learning outcomes, it was also found that the percentage of student activity in cycle I was 56.53%. The results obtained in cycle I were the average completeness score below the KKM, this was because there were still weaknesses that occurred during the implementation process such as there were still students who did not make good use of the discussion time, there were students who played around during the discussion process, there were students who were indifferent during the discussion and there were also students who went in and out of the room because they did not want to follow the learning process. This is because there are students who are still adapting in the learning process using the STAD type cooperative learning model,

After the implementation of cycle I (T1), even though there was an increase in learning outcomes from before being given the application of the learning model, this was still classified as less than optimal because there were still weaknesses that occurred during the learning implementation process such as there were still students who did not make good use of discussion time, there were students who play around during the discussion process, there are students who are indifferent during the discussion and there are also students who go in and out of the room because they don't want to follow the learning process. This is because there are students who are still adapting in the learning process using the STAD type cooperative learning model, and the low level of cooperation (Team Management) in one group.

Based on the weaknesses and the lack of achievement of the expected student mastery in cycle I, improvements were made in cycle II, namely (1) before entering the learning activities the teacher motivated students to be more enthusiastic in participating in lessons such as using multimedia in the form of powerpoint and video, (2) explaining the steps of STAD cooperative learning and this makes students interested such as giving awards to groups that excel, (3) explaining that cooperation in groups is very important not only to get awards but also to deepen the material because by helping group members apply knowledge already acquired, and (4) preparing more mature material from cycle I and improving class mastery.

After reflecting on the second cycle, there was an average increase in learning outcomes of 78.74 with 84.84% mastery, followed by an increase in learning activities of 82.1%. the increase occurred because students were getting comfortable with the application of the STAD learning model. students can be more conducive, excited, and

enthusiastic in the learning process. Their attitudes can be monitored during the learning process such as being enthusiastic in watching the videos shown, conducive in discussing with their group mates, and enthusiastic in working on LKPD and asking questions during presentations. The increase that occurred from T0 to T1, experienced an increase but the average learning outcomes obtained did not reach the KKM value. However, after conducting the research cycle II (T2) there was a significant increase and the average learning outcomes obtained were 78.74 and KKM mastery was 75.

This is in line with Widodo (2011) that in the learning process there must be feedback from students and prioritizing the creation of an increase in learning outcomes. The STAD model that is applied will not work well if the teacher does not act passively, instead the teacher must act as a facilitator so that all students will try to think about how to solve the problems given to them in line with the addition of growing insight (Anggriani, 2013).

The advantages of STAD learning such as working together, students becoming more independent, students becoming competent and supporting their own groups, students increasing interaction and communication in groups, and students increasing their willingness to express opinions (Sianipar, 2012) occur in the research process carried out.

It can be concluded that the STAD model applied is able to improve learning outcomes and student activity in the learning process in class X TITL 4, SMK Negeri 2 Palembang.

▪ CONCLUSION

Based on the research that has been done, it was found that there was an increase in student learning outcomes, namely Cycle I (T1) of 66.72 and Cycle II (T2) of 78.74. So it can be concluded that the STAD learning model can improve chemistry learning outcomes for class X students of SMK Negeri 2 Palembang

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