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Application of the Think Pair Square Learning Model to Improve Student Chemistry Learning Outcomes in Vocational Schools

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Abstract: Application of Think Application of Think Pair Square Learning Model to Improve Student Chemistry Learning Outcomes in SMK. This research aims to determine the effect of cooperative learning model Think Pair Square (TPS) in improving student's learning outcomes on colloidal and polymeric subjects in class XI TP 1 SMKN 4 Palembang. The type of research used in this study is a classroom action research conducted two cycles with each stage of the cycle of planning, action, observation dan reflection. The result of student learning test through the model Think Pair Square (TPS) states improvement of first cycle average equal to 63,8 with mastery learning 42,5% and second cycle is 85,33 mastery learning 87,5%. Similarly, the observation of student also increased for the results of student observations on the first cycle is 57,42% and second cycle is 81,40%. Based on Research Results and Discussion can be concluded that there is improvement of learning outcomes of learners from learning outcomes by using cooperative learning model Think Pair Square (TPS) on chemicals in class XI TP 1 SMKN 4 Palembang

Keywords: think pair square, classical action, results of student's learning

▪ INTRODUCTION

The quality of existing education needs to be further improved and developed following the development and progress of the times. The way to improve and develop the quality of education is to improve the learning process experienced by students at school which is still monotonous and teacher-centered (Teacher Learning).

Many students think that studying chemistry at school is uninteresting, boring and interest in chemistry lessons is relatively low, which results in students being less active and very few students with whom they can collaborate during the learning process. This results in learning objectives not being achieved (Sunyono, et al., 2009).

Learning is the most basic activity in the educational process at school. This means that the success or failure of achieving educational goals depends a lot on how the learning process is experienced by students as learners (Slameto, 2003).

Colloids are one of the materials taught in chemistry subjects in class XI SMA/SMK. The subject of colloids is one of the materials in chemistry lessons that is conceptual and rote.

The results of interviews with class XI TP 1 chemistry teachers at SMK Negeri 4 Palembang showed that students experienced difficulties related to chemistry lessons. The learning outcomes of students in chemistry subjects are low as evidenced by the average number of tests for students in class The minimum completion criteria for chemistry subjects at vocational schools is 75. The approach used in learning is a scientific approach using lecture and discussion methods. The reason for the low average score of students is that the learning process still tends to be teacher-centred and the

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allocation of chemistry study time is small, so it is less effective in triggering student activity and causes boredom in students. Apart from that, the low learning outcomes of students in chemistry subjects are also influenced by the fact that these students attend vocational schools so that they put chemistry subjects aside and prioritize vocational-related subjects.

There are several factors that influence learning success at each school level. These factors are teachers, students, educational facilities and infrastructure. The expected learning success is influenced by how exactly the teacher uses learning strategies, models and methods (Sulistyo, 2011).

Student activity in class can improve learning outcomes. It is not easy to maintain student learning activity. The conditions of each student can change. So a suitable and appropriate strategy is needed to overcome this problem (Barlian, 2016).

Corrective action that can be taken against a boring or teacher-centered learning atmosphere and low student learning outcomes in class XI TP 1 is to use the Think Pair Square (TPS) cooperative learning model, because learning with the TPS cooperative learning model can make students actively and enthusiastically involved during the learning process in the classroom.

Relevant research or using the same model was carried out by Ria Sita Ariska, et al (2014) on chemistry subjects in Class students also increased, where the average test score in cycle I was 53.48%, the average test score in cycle II was 72.09, and the average test score in cycle III was 86.04%. The same research was also conducted by Friska Kristiyanti, et al (2014) on chemistry subjects using the TPS learning model in class X at SMA Negeri 1 Rambah Rokan Hulu which provided information that this TPS learning model could improve student learning achievement.

The problem formulation in this paper is "how can the application of the Cooperative Think Pair Square (TPS) learning model improve the chemistry learning outcomes of class XI TP1 students at SMK Negeri 4 Palembang?". The aim of this research is to improve student chemistry learning outcomes through the application of the Think Pair Square (TPS) cooperative learning model in class XI TP1 SMK Negeri 4 Palembang.

Based on the description that has been put forward, the researcher is interested in conducting classroom action research with the title: "Application of the Think Pair Square (TPS) Cooperative Learning Model to Improve Student Chemistry Learning Outcomes in Vocational Schools"

▪ METHOD

Types of Research

The type of research carried out is classroom action research (CAR). The Classroom Action Research (PTK) that was carried out consisted of two cycles. Each cycle has four stages, namely action planning, observation and reflection.

Time and Place of Research

The research was carried out for one semester starting from February 2018 to May 2018. Classroom Action Research (CAR) was carried out in class XI TP 1 SMK Negeri 4 Palembang

Research Subject

The subjects in this research were students in the Mechanical Engineering class (TP 1) of SMK Negeri 4 Palembang for the 2017/2018 academic year, totaling 40 students, all of whom were male students.

Cycle I Procedure

Planning Stage

1. Look for data on student learning outcomes in the material before action is taken as a T0 value.
2. Determine the learning material, namely the meaning of colloid systems and the properties of colloids
3. Prepare a lesson plan about the material studied by applying the TPS learning model
4. Provide an observation sheeT
5. Create a grid of end-of-cycle test questions and answer keys for end-of-cycle test questions.

Action Implementation Stage

Implementation of actions is carried out based on the learning implementation plan (RPP) that has been created. The steps are as follows:

Preliminary Activities

1. The teacher says hello
2. The teacher checks student attendance
3. Teachers condition students to learn and motivate students regarding colloid and polymer materials.
4. The teacher provides apperception or previously learned knowledge related to the material to be studied
5. The teacher conveys the learning objectives to be achieved
6. The teacher explains that the learning activities will apply the TPS cooperative learning model

Core Activities

1. The teacher assigns students to better understand the material by providing problem topics in the form of prepared Student Worksheets (LKPD).
2. Students work on the questions on the LKPD individually
3. Students try to find the core of learning through LKPD guidance and other reading sources that are relevant to the material being studied, then write down the results of their understanding individually.
4. The teacher assigns students and their partners to discuss and share information about the material being studied.
5. The teacher again directs two pairs to join into one group and discuss the material studied again
6. The teacher assigns several groups to present the results of group discussions in front of the class.
7. The teacher assigns another group to provide comments or responses to the results of the presentation from the presenting group
8. The teacher explains things that students don't know and corrects wrong concepts.

Closing Activities

1. Students, guided by the teacher, make conclusions about the material
2. Students give the final test of cycle I
3. The teacher gives assignments to students
4. The teacher conveys the next lesson plan
5. The teacher ends the lesson by saying hello

Observation Stage

Researchers together with tutors and colleagues made observations of activities during the learning process. Observations are made to find out how far the actions have been given can produce the desired changes and to ensure the suitability of the plans that have been made with the actions being implemented. Observations are also carried out to collect data regarding the activities carried out by students during the learning process.

Reflection

Reflection is carried out to correct any deficiencies in the learning process. This reflection is carried out by looking at all sides, both from the researcher's side and the student's condition. For example, if the researcher does not master the material and learning model, the researcher must prepare more firmly for the next meeting in cycle II. Another example is the condition of students who have difficulty concentrating because the outdoor environment is noisy. So for the next meeting the teacher must ensure that the student's condition is ready to learn.

Cycle II

The actions taken in the second cycle consist of planning, implementation, observation and reflection based on the weaknesses or shortcomings that occurred in the first cycle. The instruments used in this research are:

Test Instrument

The test form used is in the form of multiple choice questions totaling 15 questions. Questions are given to students at the end of each learning cycle, namely at the end of the second meeting in each cycle. The tests given will provide information on the extent to which student learning outcomes achieve the expected targets.

Observation

Observation activities are carried out using an observation sheet where the observation sheet contains all conditions in the form of teacher and student activities. The activities observed were student activity, the researcher's own teaching performance, and the atmosphere or conditions in the classroom. Observations were also carried out by observing videos taken during the research.

The success of the research was carried out by measuring the comparison of the average values of each cycle. If T2 > T1 > T0 is obtained, then this research is said to be successful. Where :

T_0 is the result of students' daily test scores from previous material or before being given action

T_1 is the learning outcome value obtained by students after being given action in cycle I

T_2 is the value of student learning outcomes after being given action in cycle II

The percentage of completeness of student learning outcomes is calculated or determined using the following formula:

$$P = \frac{\sum siswa\ yang\ tuntas\ belajar}{\sum siswa} x$$

Information :
P is the percentage of student learning completeness

If the cycle shows that the student's classical learning results reach 85% of subject completion, namely ≥ 75, then the cycle is deemed sufficient because the indicator of success has been achieved. However, if the subject has not been completed, it will continue with the next cycle, and so on.

▪ RESULT AND DISCUSSION

This research consists of two cycles where each cycle consists of two meetings. The first cycle studied the topic of understanding colloid systems, types of colloids and the properties of colloids and their role in everyday life. Learning outcomes tests are carried out at the end of each cycle.

Data on student learning outcomes before the action (T0) was taken from students' daily test scores on the subject of chemical equilibrium. Student learning outcome scores (T1) are taken from the final test scores of cycle I, followed by cycle II where student learning outcome scores (T2) are taken from the final test scores of cycle II.

Results

Based on the results of research that has been carried out using the Think Pair Square (TPS) learning model, the following results were obtained:

Average Student Learning Outcomes

From the results of the cycle I and cycle II learning tests which have been tested on the class used as the research class, the average student learning outcomes are as shown in table 1 as follows:

Table 1. Average student learning outcomes

Siklus	Rata-rata Hasil Belajar
Siklus I (T_1)	63,8
Siklus II (T_2)	85,33

Criteria for Student Classical Completeness

Based on student learning results in research that has been carried out, the criteria for classical completion in cycle I and cycle II are obtained as shown in table 2 as follows:

Table 2. Criteria for students' classical completeness

Siklus	Kriteria Ketuntasan Klasikal
Siklus I (T_1)	42,5 %
Siklus II (T_2)	87,5 %

From the data above, it shows that the students' classical completeness criteria obtained from cycle 1 and cycle 2 have increased, namely 42.5% to 87.5%.

Observation Results

Based on the research that has been carried out, the value of student activity in cycle I and cycle II is obtained as shown in table 3 as follows:

Table 3. Recapitulation of student activity in each cycle (t1) and (t2)

Siklus	Jumlah Peserta Didik	Keaktifan Peserta Didik	Kategori
Siklus I (T_1)	40	57.42 %	C
Siklus II (T_2)	40	81.40	A

Classroom action research has been carried out by applying the Think Pair Square (TPS) cooperative learning model in class XI TP 1 SMK Negeri 4 Palembang. Based on research data, there is an increase in student learning outcomes and student learning activity. Increases in student learning outcomes occur in each research cycle, which is followed by an increase in student learning activity in each cycle as shown in table 1 and table 3.

Discussion

In cycle I, there was an increase in learning outcomes as seen from the average student learning outcomes before taking action (T0) of 61.45 with learning completeness of 40% in chemical equilibrium material, experiencing an increase in average learning outcomes after being given action in cycle I (T1) became 63.80 with learning completeness of 42.5% on the subject of understanding colloids and types of colloids as well as the role of colloids in everyday life with learning activity of 57.42%. There has been an increase in student learning outcomes in this cycle because student learning activity has begun to increase. As stated by Dimyati and Mudjiono (2009), the increasing activity of students shows that there is an increase in direct involvement in the learning process.

This increase occurred because learning had implemented the Think Pair Square (TPS) learning model in class XI TP 1 SMK Negeri 4 Palembang. According to Spencer Kagan (in Isjoni, 2011) think pair square cooperative learning is a technique that provides opportunities for students to work alone and collaborate with other people. The advantage of this technique is that it optimizes student participation, namely giving students more opportunities to be recognized and show their participation to others. This can be observed when students solve problems in the LKPD regarding the material on understanding colloids and the types of colloids and their role in daily life. The number of students who actively expressed opinions during discussions at the first meeting was 25 students and at the second meeting there were 25 students. 27 students.

After the implementation of learning cycle I (T1), although there was an increase in learning outcomes, it was still not optimal because there were still several weaknesses that occurred during the implementation of learning, such as, students still felt unfamiliar with the learning model that was applied because it was the first time, there were still many students who only copied The results of their friends' LKPD answers and not using enough time to discuss showed that 14 people did not ask questions to either the teacher

or their friends, so that the evaluation test in cycle I was still not as desired. This is also because students are still not used to sharing information with friends in a group formed by the teacher. During participant presentations

The students also looked less enthusiastic, only 4 students asked questions and 6 students expressed opinions to the group presenting. This is because only one group presented the results of their discussion, resulting in no opportunity for other groups to present the results of their discussions in front of the class due to time constraints where time was not optimal because the students were still unfamiliar with the learning being applied.

Based on the weaknesses and the students' learning completeness that was expected in cycle I, corrective actions were carried out in cycle II, namely before entering learning, the teacher provided motivation and encouragement to students to be more enthusiastic in discussing, students were guided again to read first. First, the LKPD instructions can help students better understand the learning steps being applied. During the presentation, the teacher calls group members to present in front of the class at least 2 groups per meeting. Then the teacher provides rewards in the form of additional cognitive value so that students are more active in providing opinions or rebuttals during questions and answers and presentations.

In cycle II, after improvements were made to the weaknesses that occurred in cycle I, there was an increase in the average student learning outcomes of 63.80 with 42.5% completeness in cycle I (T1) increasing to the average student learning outcomes education 85.33 with learning completeness of 87.5% on the subject of colloids and polymers.

The research results show an increase in the learning process, which can be seen from the increase in average learning outcomes and student activity. This is because students have more opportunities to share information and work together with their classmates (pair stage) and other friends in the same group (square stage).

▪ CONCLUSION

Based on the research results, it was concluded that students' cognitive chemistry learning outcomes increased through the application of the Think Pair Square (TPS) learning model. The increase in students' chemistry cognitive learning outcomes can be seen from the increase in the completeness of student learning outcomes and the average student learning outcomes. The average cognitive learning result of students in cycle 1 (T1) was 63.80 with learning completeness of 42.5%, the average cognitive learning result of students in cycle 2 (T2) was 85.3 with learning completeness of 87 .5.

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