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Implementation of Guided Discovery Learning to Improve Chemistry Learning Outcomes of class X TBSM 1 at SMK Negeri 2 Palembang

Cut Galuh Ayu Handira[1*], Muhammad Hadeli[1], Rahma Aini[2]
[1]Department of Chemical Education, Universitas Sriwijaya, Indonesia
[1]Department of Chemical Education, Universitas Sriwijaya, Indonesia
[2]SMK Negeri 2 Palembang, Indonesia

Abstract: Implementation of Guided Discovery Learning to Improve Chemistry Learning Outcomes of class X TBSM 1 at SMK Negeri 2 Palembang. The study is aimed to enhance the learning outcomes of chemistry on students class X TBSM 1 by implementing the Guided Discovery learning model. This study is conducted in two cycles; each cycle consists of two meetings. The data are obtained from using the observation sheet and an instrument of students' learning outcomes test which is given every meeting. The enhancement of students' learning outcomes can be observed from the average number of students' learning outcomes before treatment (T0) in the amount of 62,86 with the mastery learning in the amount of 41,67%. The enhancement happens on cycle I (T1) becomes 68,72 with the mastery learning in the amount of 44,44% and on cycle II (T2) enhances into 87,45% with the mastery learning in the amount of 86,11%. Based on the result it is concluded that students' learning outcomes achieve the mastery learning classically through the implementation of guided discovery learning model and students' activities which happen to be enhancing as well.

Keywords: class treatment study, guided discovery model, students' learning outcomes of chemistry.

▪ INTRODUCTION

School is an educational institution in which there is a learning process. One of the important things in implementing the learning process is the curriculum in order to achieve educational goals. According to Iskandar (2009) curriculum is an elaboration of national education goals that form the basis of the learning process. The learning process is an effort to achieve student competence contained in the curriculum. The learning process is the process of interaction between students and educators and learning resources in the learning environment. Learners or students act as learning subjects and educators or teachers as facilitators (Law No. 20 of 2003). This is in accordance with the educational needs of the 2013 curriculum where students must be directly involved in the learning process and the teacher acts as a facilitator.

Based on the description of the problems above, it can be formulated that the problem in this study is how to increase students' chemistry learning outcomes through the application of the guided discovery learning model for Class X students at SMK Negeri 2 Palembang?. The purpose of this study was to improve the chemistry learning outcomes of class X TBSM 1 at SMK Negeri 2 Palembang through the application of the guided discovery learning model.

This research is expected to be useful for: (1) For researchers, namely adding valuable insight and experience by conducting classroom action research. (2) For students, namely training students to be more active and independent in learning chemistry and students are free to investigate a chemical problem. (3) For tutor teachers,

Cut Galuh Ayu Handira
Email: : cutgaluh@gmail.com

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namely providing input towards improving the chemistry learning process by applying the guided discovery learning model and (4) For schools, namely adding alternative research models that will assist schools in improving learning outcomes.

▪ METHOD

Types of Research

The type of research to be carried out is Classroom Action Research (CAR) which is carried out in two cycles, where each cycle consists of 4 stages of activity namely planning, implementation (action), observation (observation), and reflection (reflection).

Time and Place of Research

This research was carried out in 2 cycles where one cycle was carried out in two meetings with a time allocation of 3 x 45 minutes per meeting. Processing and data collection was carried out at SMK Negeri 2 Palembang from 10 April 2018 to 08 May 2018.

Research Subject

The subjects in this Classroom Action Research (PTK) were students of class X TBSM 1 SMK Negeri 2 Palembang, totaling 36 students.

Procedure

This research was carried out in 2 cycles where one cycle was carried out in two meetings. Each cycle consists of 4 stages, namely: planning, implementation, observation and reflection. It is at this implementation stage that it is carried out based on planning and learning scenarios that are adjusted to the RPP and syllabus so that the desired results are achieved. The reflection stage is carried out to determine further steps in the next cycle.

Data Collection Technique

Collecting data with techniques in research are tests and observations. The test is carried out at the end of each cycle which aims to see the ability of students to answer questions before and after getting the action. While observations are made in each cycle with the aim of seeing the learning process carried out by teachers and students.

Data Analysis Technique

The data analysis used is as follows: Observation Results. Analysis for student observation used the formula:

$$\text{Persentase} : \frac{\text{jumlah aspek aktivitas yang teramati}}{\text{Jumlah seluruh aspek aktivitas}} \times 100\%$$

Criteria used:

< 60% of active students	: Less
60% - 70% active students	: Enough
71% - 85% active students	: Good
86% - 100% active students	: Very Good

Analysis for teacher observation (researchers) used the formula:

$$\text{Persentase} : \frac{\text{jumlah deskriptor yang teramati / dilakukan guru}}{\text{Jumlah seluruh deskriptor}} \times 100\%$$

Assessment criteria:
Very Good if the indicators implemented reach 86% - 100%
Good if the implemented indicators reach 71% - 85%
Enough if the implemented indicators reach 60% - 70%
Less if the indicators implemented are achieved <60%

Learning Outcomes

To find out the learning outcomes of students independently obtained from the results of learning tests using the Benchmark Reference Assessment (PAP) formula according to Gronlund (quoted from Purwanto 2011: 2017), namely:

$$\text{Hasil Belajar} : \frac{\text{skor yang diperoleh peserta didik}}{\text{Skor maksimal}} \times 100$$

Table 1. Success criteria for student learning outcomes

Tingkat Keberhasilan	Keterangan
1 – 60	Tidak Tuntas
61 – 70	Tidak Tuntas
71 – 80	Tuntas
81 – 90	Tuntas
91 – 100	Tuntas

To find out the average value of all students is used:

$$X = \frac{\sum x}{\sum n}$$

Sumber : Aqib (2011)

With :
X : Average value
∑X : Total value of all students
∑N : Number of students

To find out the percentage of completeness of student learning outcomes using the formula

$$P = \frac{F}{N} \times 100\%$$

Source: Aqib (2011)

With :
P : Achievement score
F : Number of students who have changed (completed)
N : Total number of students
A class is said to have studied thoroughly if the class has 85% complete learning.

▪ RESULT AND DISCUSSION

Data on student learning outcomes before the action (T0) were taken from students' daily test scores on the subject 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 scores (T2) are taken from the final test scores of cycle II. Following is the recapitulation of learning outcomes and learning completeness data at (T0), (T1), and (T2) can be seen in Table 1 below.

Table 1. Recapitulation of Student Learning Outcomes (T0), (T1) and (T2)

Siklus	Jumlah Siswa	Jumlah siswa yang tuntas (≥75)	Jumlah siswa yang belum tuntas (<75)	Rata - rata Hasil Belajar	Persentasi ketuntasan klasikal
Sebelum Tindakan ($T_{0)}$	36	15	21	62.86	41.67%
Siklus I (T_1)	36	16	20	68.72	44.44%
Siklus II (T_2)	36	31	5	87.45	86.11%

Student activity in the learning process was observed using observation sheets. Recapitulation of student activity per cycle can be seen in Table 2 below.

Table 2. Recapitulation of Student Activity for Each Cycle (T1) and (T2)

No	Siklus	Jumlah Siswa	% Keaktifan Pertemuan Pertama	% Keaktifan Pertemuan Kedua	% Keaktifan Siswa
1	Siklus I (T_1)	36	47.78	53.33	50.55
2	Siklus II (T_2)	36	61.67	67.22	64.45

Classroom action research has been carried out by applying the guided discovery learning model for class X TBSM 1 at 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 coincides with an increase in student learning activeness in each cycle as shown in Table 1 and Table 2.

In cycle I, there was an increase in learning outcomes seen from the average student learning outcomes before taking action (T0) of 62.86 with 41.67% mastery learning on electrolysis material, experiencing an increase in average learning outcomes after being given action in cycle I (T1), to 68.72 with 44.44% mastery learning on the subject of hydrocarbons with student learning activeness of 50.55%. This increase occurred due to the application of the guided discovery learning model in class X TBSM 1 SMK Negeri 2 Palembang. In this model students find their own concepts of science,

formula or subject matter, and the teacher only guides the student. With only the guidance of the teacher the students are also able to draw their own conclusions according to what the teacher wants. In this learning students look very interested when the teacher gives stimulus to students. After that students identify the existence of an existing problem then collect data and process the data to complete the LKPD that has been given

by the teacher. Students find and seek information from various available sources such as teaching materials, textbooks and other literature related to the material.

This was observed when students solved the problems in the LKPD regarding alkane, alkene and alkyne hydrocarbon nomenclature material in the first meeting and isomerism material and the impact of burning hydrocarbons in the second meeting, seen through observational data that 61.15% of students responded to the stimulus given by the teacher , then 54.2% of students were enthusiastic in identifying problems found in LKPD. 52.8% of students were enthusiastic in collecting data such as reading chemistry textbooks to make presentations and looking for additional literature sources of information via the internet using their cellphones or from teaching materials that had been given by the teacher consisting of 18 students at the first meeting and 20 students in the second meeting.

After the implementation of cycle I (T1), even though there was an increase in learning outcomes, this was still not optimal because there were still some weaknesses that occurred during the implementation of the actions in Cycle I, such as there were still students going in and out of class during group discussions and there were still students only 54.2% of students who did not take advantage of the time to discuss with their group discussed and answered questions on the LKPD.

Then when students presented the results of their group discussions in front of the class there were still many students who still felt embarrassed and not confident, this was seen only by 50% of students who presented the results of the discussions in front of the class which consisted of 17 students at the first meeting and 19 students at the second meeting. Students were also not active in expressing opinions or providing responses to groups of friends who had presented the results of their group discussions, namely only 37.5% consisting of 12 people at the first meeting and 15 people at the second meeting. If seen from the results of observations in making conclusions obtained by 44.45% of students consisting of 15 people at the first meeting and 17 people at the second meeting. Students are also still less active in communicating the conclusions obtained from the results of group discussions, namely 44.45% as well.

In cycle I, there were still many deficiencies in the learning activities which made the learning objectives at the first meeting and the second meeting still not achieved. This can be seen from the student learning outcomes of 44.44% which still have not achieved classical learning mastery and the student learning activeness of 50.55%.

Based on the deficiencies obtained from cycle I and the completeness of student learning outcomes that were not achieved as expected, improvements were made in cycle II, namely before entering learning the teacher provided more enthusiastic motivation and enthusiasm for students to be more enthusiastic and motivated in following the lesson to be delivered by teachers such as using PowerPoint media which is more interesting and using a learning video. The use of instructional media like this can increase student motivation and interaction in learning because the display provided is more able to attract students' attention (Ghufroni, et al. 2013). Then the student representatives were also guided to read the instructions or work steps in the LKPD in order to make it easier for students to work on or complete the LKPD. The teacher also guides students in completing LKPD, students can ask the teacher if there are things they don't understand. With the guidance of the teacher it is hoped that the learning objectives can be achieved. At the time of presentation the teacher asked all selected group members to present the results of the discussion. The teacher also provides rewards in the form of additional cognitive value for students who provide responses during question and answer group

presentations in this way to make students more active in providing responses to other groups who present the results of discussions in front of the class.

In cycle II, after repairs were made for the deficiencies that occurred in cycle I, there was an increase in the average student learning outcomes of 68.72 with 44.44% completeness in cycle I (T1) then increased to an average student learning outcome of 87.45 with 86.11% learning completeness in cycle II with the subject of petroleum and polymers. In addition to an increase in learning outcomes in cycle II, there was an increase in student activity of 64.45%.

This increase in cycle II can be seen through the results of observational data of 73.6% of students who respond to the stimulus given by the teacher, then 66.65% of students are very enthusiastic in identifying problems found in LKPD. 63.85% of students were also very enthusiastic in collecting data such as reading chemistry textbooks and searching for other additional literature via the internet using their cellphones and also reading teaching materials that had been given by the teacher consisting of 22 people at the first meeting and 24 people at the second meeting.

An increase also occurred during group discussions of 68.06% of students actively discussing in their respective groups and the students were quite good at utilizing their time while working on the LKPD, during discussions it was seen that no students came in and out of class. Then during group presentations it was seen that students were confident to present the results of their group discussions in front of the class which can be shown by the results of the observation data of 65.28%. The same thing also happened to the activeness of students in expressing opinions or giving responses to friends who had presented the results of their group discussions, namely 55.55%. There was also an increase in student activity in making their own conclusions from the learning outcomes, namely 62.49% when compared to cycle I which was only 44.45%. This is in accordance with the opinion of Istiana, et al (2015) Guided discovery is a learning that involves students in solving problems for the development of knowledge and skills. In this lesson the teacher acts as a facilitator or students learn intensively by following the scientific investigation method under the teacher's supervision. So the learning takes place when it is designed, supervised, followed by investigative methods.

According to Herdian (in Istiana, et al., 2015) there are several specific things from learning using guided discovery, namely: (1) finding and solving problems to create, combine and draw conclusions; (2) learning focuses on students; (3) a process for combining new knowledge with existing knowledge. The stages of implementing guided discovery learning according to Muhibbin (in Ramadhani, 2017), namely: (1) stimulus (providing stimulation); (2) problem statement (identifying problems); (3) data collection (data collection); (4) data processing (data processing); (5) verification; and (6) generalization.

The increase in mastery learning outcomes from cycle I to cycle II increased by 41.67%, this result was greater than the increase in mastery learning outcomes from T0 to cycle I, which was 2.77%. This is because several improvements have been made in implementing the guided discovery learning model during the learning process in the classroom. The weaknesses found in the learning outcomes of cycle I were then carried out by several corrective actions in the next cycle, namely in cycle II, although there were still other weaknesses, the student learning outcomes in cycle II had achieved classical mastery, namely 86.11%, which meant that the research could discontinued in cycle II, this is because the research conducted is limited to the completeness of student learning outcomes in a classical manner which must be achieved by 85%.

Research results always show an increase in student learning outcomes and active learning, this is in accordance with Rohim, et al., (2012) who argued that the application of the guided discovery model can improve students' creative thinking abilities. This student's creative thinking ability is in the form of learning outcomes as seen from the increased pre-test and post-test results. Based on the explanation above, it can be concluded that through the application of the guided discovery learning model it can improve student learning outcomes in class X TBSM 1 at SMK Negeri 2 Palembang.

▪ CONCLUSION

There is an increase in student learning outcomes by applying the guided discovery learning model for class X TBSM 1 at SMK Negeri 2 Palembang. Increased learning outcomes seen from the average value of student learning outcomes before action (T0) was 62.86 with 41.67% mastery learning, experienced an increase in learning outcomes in cycle I (T1) with an average learning outcome of 68.72 with learning completeness 44.44% and student activity obtained during the learning process of 50.55% and increased in cycle II (T2) with an average learning result of 87.45 and learning completeness 86.11% with student learning activeness which also increased by 64.45%.

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