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Implementation of Guided Inquiry Learning to Improve Hydrocarbon Learning Outcomes for Tenth Grade Students in SMKN 2 Palembang

Harlely Rianavita[1], Muhammad Hadeli L[1,*], Meidia Farlina[2]
[1]Universitas Sriwijaya, Indonesia
[2]SMKN 2 Palembang, Indonesia

Abstract: Application of Guided Inquiry Learning Model To Improve The Chemical Learning Outcomes of Students in Class X TBSM II SMK N 2 Palembang. This study aimed to improve students' chemistry learning outcomes through Guided Inquiry learning model in class X TBSM II SMK Negeri 2 Palembang. This study was conducted in two cycles, each cycle consists of two meetings. Data were obtained by using an instrument of observation and test. The finding showed that guided inquiry model was effective to improve student learning outcomes proven by the average student learning outcomes before the action (To) 71,87 with 63.33% learning completeness has increased in cycle I (T1) become 76.38 with 73.33% learning completeness then more in cycle II (T2) increased become 84.80 with 86.67% learning completeness.

Keywords: classroom action research, inquiry learning, student learning outcomes.

▪ INTRODUCTION

Learning targets in the 2013 curriculum must link development in cognitive, affective and psychomotor aspects. The learning process must be scientific in nature. Based on Minister of Education and Culture Regulation Number 65 of 2013, the learning models prioritized in the 2013 curriculum are Inquiry Learning, Discovery Learning, Project Based Learning and Problem Based Learning learning models. This learning model must be created in such a way that students can actively apply concepts, laws or principles in learning.

Based on the results of interviews with chemistry teachers at SMK Negeri 2 Palembang, information was obtained that a) students were less interested and interested in chemistry lessons because they prioritized practice/skills in their major compared to general lessons, in this case chemistry lessons, b) students experience difficulties in analyzing abstract chemical concepts, students can only accept the concepts given by the teacher but cannot develop their own, as a result when given different questions with the same problem students cannot work on them, c) teachers still use conventional methods (lectures).), so that students tend to be less active in the teaching and learning process, whereas in the 2013 curriculum students are required to be able to find their own concepts in learning so that learning is more meaningful, while the teacher's job is only as a motivator and facilitator. This is what triggers the low learning outcomes of students, which can be seen from the results of their tests where only 60% of students achieve the KKM score determined by the school, namely 75, which should be said to be successful if the students who achieve the KKM score are 85% of the total number of participants. educate. Apart from that, only a small number of students are active in the learning process.

The learning process can be successful, one of which is influenced by an appropriate learning model, one of the learning models prioritized in the 2013 curriculum is Guided

Muhammad Hadeli L
Email: hdl_kim@yahoo.co.id

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Inquiry, because in this model it is easier for students to find their own investigation plans in learning with the help of the teacher. Relevant research was conducted by Setiowati, H., Nugroho, A & Agustina, W. (2015) that through a guided inquiry learning model equipped with worksheets can increase activity in learning seen from students' motivation in asking investigative questions so that the results learning and learning achievement increases. This is also supported by Prasetyowati, et al (2016) that this guided inquiry learning model can improve students' mastery of concepts and critical thinking skills as seen from their increased learning outcomes. Fajariyah, et al (2016) also explained that based on the results of their research, it was concluded that the application of the quided inquiry learning model could increase the learning abilities and achievements of students at SMA Al Islami 1 Surakarta which was characterized by an increase in cognitive, affective and psychomotor skills from achievements in each cycle.

The formulation of the problem in this research is how to improve students' chemistry learning outcomes by implementing the guided inquiry learning model in class X TBSM II SMK N 2 Palembang? The aim of this research is to improve the chemistry learning outcomes of class X TBS II SMK N 2 Palembang students through the application of the guided inquiry learning model. It is hoped that the results of this research will be useful for students, namely that they can help students in resolving difficulties in the learning process and can improve the chemistry learning outcomes of students in class For schools, it can be used as a solution to overcome learning problems so that it can improve chemistry learning outcomes in schools. Meanwhile, researchers can increase their knowledge and experience in the learning process which can be used as preparation to prepare themselves as a teacher.

▪ METHOD

Types of Research

The type of research that will be carried out is classroom action research which is carried out collaboratively between researchers and teachers who teach chemistry subjects in class X TBSM II at SMKN 2 Palembang. The research was carried out in two cycles, each consisting of two meetings. Each cycle consists of four stages, namely planning, action, observation and reflection.

Time and Place of Research

This research was carried out from November 1 2017 – May 5 2018. Data collection was carried out in class X TBSM II SMKN2 Palembang Jl Puncak Sekuning in the even semester 2017/2018 from March 31 2018 – May 5 2018.

Research Subject

The research was carried out collaboratively with tutor teachers at SMKN 2 Palembang. The research subjects were students of class X TBSM II SMKN 2 Palembang in the 2017/2018 academic year, totaling 30 male students.

Procedure

The research steps carried out consist of the research preparation stage, research implementation, and research reporting. Research preparation began with a preliminary study at SMKN 2 Palembang through initial observations and interviews with chemistry teachers at SMKN 2 Palembang to obtain data on the characteristics of students, schools, learning achievements and problems faced by teachers and students in chemistry subjects.

The results of initial observations and interviews were analyzed to obtain alternative problem solutions which were then continued to prepare the learning tools and instruments that were applied.

The research implementation phase aims to collect data on student learning outcomes in class X TBSM II SMKN 2 Palembang. The research data is then analyzed, described and interpreted to obtain conclusions. Reporting research results can be used as information and input for tutors to improve the quality of the learning process, apart from that, other researchers can also use reporting research results as input and reference in conducting research.

Data, Instruments, and Data Collection Techniques

The test in this research was used to measure students' understanding of chemical concepts after following learning using the paced inquiry model. Written tests in the form of essays will be used as a measure of students' knowledge at the end of each cycle so that the end-of-cycle test results provide data on students' cognitive aspects.

The process of collecting observational data or orderly recording in learning the observed aspects according to the descriptors that appear on the rubric is called observation (Sudijono, 2012). Student activities during the learning process can be known through observation. Observation activities in this research were carried out using research instruments, namely observation sheets and assisted by a video camera.

Data Analysis Technique

Test Data Analysis

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

The following formula is used to calculate student test scores for each cycle:

$$Nilai\ siswa = \frac{skor\ perolehan}{skor\ maksimum}\ x\ 100 \qquad \text{(Jihad \& Haris , 2012)}$$

To calculate the percentage of students' learning completeness for each cycle, the following formula is used.

$$P = \frac{\sum siswa\ yang\ tuntas\ belajar}{\sum siswa} \times 100\% \qquad \text{(Daryanto, 2011)}$$

Calculation of the average test results from each cycle carried out in learning uses the following formula.

$$M_x = \frac{\sum x}{N} \times 100\% \qquad \text{(Sudijono, 2012)}$$

Keterangan: M_x = nilai rata-rata seluruh peserta didik
$\sum x$ = jumlah nilai seluruh peserta didik
N = jumlah seluruh peserta didik

The criteria for student learning completeness in the chemistry subject at SMKN 2 Palembang is if the student's score is >75, while class learning completeness is achieved if ≥85% of students have reached the minimum completeness criteria.

Analysis of Observation Data

The instrument used to collect observation data is the observation sheet. The activities of students in groups during the learning process will be observed based on the descriptors that appear on the observation sheet (Sudjana, 2012).

To calculate the activity presentation for each descriptor, the following formula is used:

$$konversi = \frac{skor\ total\ siswa}{skor\ maksimum} \quad x \quad 100\%$$ (Jihan & Haris, 2012)

Information :
Student total score: number of visible descriptors
Maximum score: the sum of all descriptors

From the data, % class activity can be obtained using the % class activity formula.

$$\%\ aktifitas\ kelas = \frac{rata{-}rata\ keaktifan\ siswa}{\sum siswa} \quad x \quad 100\%$$

Success Indicators

The Minimum Completeness Criteria (KKM) set by the SMKN 2 Palembang school for the chemistry subject is 75. This research is said to be successful if ≥85% of students meet the minimum completeness criteria (KKM).

▪ RESULT AND DISCUSSION

Research Result

This research consists of two cycles, each cycle consisting of two meetings. The first cycle studied the topic of hydrocarbons. The second cycle studies the topic of petroleum and polymers. Learning outcomes tests are carried out at the end of each cycle. Data on student learning outcomes before the action (T0) were taken from students' daily test scores, while data on learning outcomes after applying the quided inquiry model cycle 1 were taken from the final test scores of cycle 1 and data on learning outcomes after applying the quided inquiry model cycle 2 were taken from grades. end of cycle 2 test. Data on student learning outcomes before action (T0) can be seen in Table 1 below

Table 1. Students' learning outcomes (T_0), (T_1), dan (T_2)

Test	No. of Participan	Students who Completed the tast (≥75)	Students who Not Completed the tast (<75)	Average score	Percentage
T_o	30	19	11	69,87	63,33%
T_1	30	22	8	76,38	73,33%
T_2	30	26	4	84,80	86,67%

The following data from Table 1 is presented in a bar chart which can be seen in Figure 1 below:

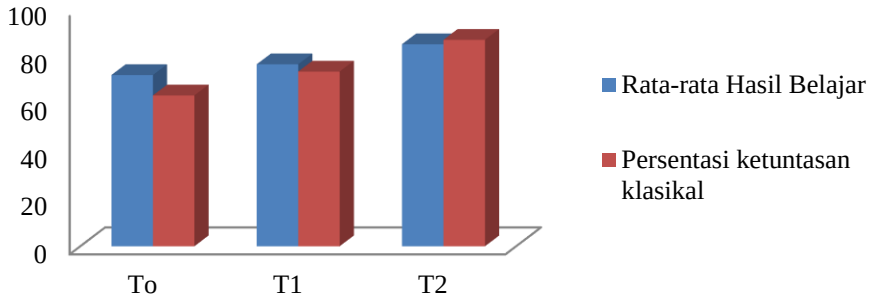

Figure 1. Diagram of Increasing Student Learning Outcomes

Students' activeness in the learning process was observed using an observation sheet. A recapitulation of student activity per cycle can be seen in Table 2 below.

Table 2 Recapitulation of the average score of learning activity

Stages		Percentage	Average
Cycle 1	Meeting 1 Meeting 2	41.33% 44.33%	42.83%
Cycle II	Meeting 3 Meeting 4	54.33% 58.67%	56.5%

Classroom action research has been carried out by applying the quided inquiry learning model in class X TBSM II SMK Negeri 2 Palembang. Based on research data, there is an increase in student learning outcomes and student learning activity. An increase in student learning outcomes occurs in each research cycle which is accompanied by an increase in student learning activeness in each cycle which is shown in Table 1 and Table 2

Cycle 1

The cognitive learning results of students in cycle 1 can be seen from the end of cycle test. In cycle I there was an increase in student learning outcomes which can be seen from the average student learning outcomes before taking action (T0) of 69.87 with learning completeness of 63.66%, after being given action through the quided inquiry model in cycle 1 (T1) students experienced an increase in the average learning outcome to 76.35 with learning completeness of 73.33% on the subject of hydrocarbons with an average learning activity of students of 42.83%. This increase occurred due to the implementation of the quided inquiry learning model in class X TBSM II SMK Negeri 2 Palembang.

In this model, students can actively apply concepts, laws or principles in learning, students are given more opportunities to be actively involved in searching for information through various available information sources, such as LKPD (Learner Worksheets) and teaching materials. This was observed when students solved the problems on the LKPD regarding hydrocarbon material which discussed the general formula, compound names and properties of alkane, alkene and alkyne compounds at the first meeting and discussed skeletal isomers, positional isomers, reactions of hydrocarbon compounds, as well as the impact and how to overcome the impact of burning hydrocarbon compounds in the second

meeting. In this cycle, it can be seen from observation data that 48.33% of students looked for sources of information through teaching materials and chemistry books, consisting of 15 students at the first meeting and 14 students at the second meeting.

After implementing cycle I (T1), although there was an increase in learning outcomes, this was still not optimal because the results obtained still had several weaknesses that occurred during the implementation of actions in cycle I, such as, there were still some students who did not pay attention during discussions and There are still students who do not use the time to discuss. It can be seen that 43.33% of students do not ask questions to either the teacher or their friends. Apart from that, students are still shy about asking the teacher and are not used to sharing information with friends in the group formed by the teacher. Then, during the presentation, students looked less enthusiastic, did not actively ask questions and express opinions, it was seen that only 28.33% of students asked questions to other groups consisting of 8 students at the first meeting and 9 students at the second meeting, and only 18.33% of students expressed opinions consisting of 3 students at the first meeting and 4 students at the second meeting. This is because only one group presented the results of their group discussion, resulting in no opportunity for other groups to present the results of their group discussions and limited other students to ask questions. So that in the first cycle, the learning outcomes of students who had not yet reached classical learning completeness were 73.33% and the learning activity of students was 42.83%, which was still in the poor category.

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 as a source of information. During the presentation, the teacher calls all group members selected for the presentation and for presenting the results of the discussion, a minimum of 2 groups are given at each meeting. Then the teacher gives rewards in the form of additional cognitive value so that students are more active in providing opinions or rebuttals during question and answer group presentations.

Cycle II

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 76.38 with 73.33% completeness in cycle I (T1) increasing to 84.80 for the average score -The average learning outcomes of students with learning completeness was 86.67% in cycle II (T2) with the topic of petroleum and polymers. The increase in learning outcomes was accompanied by an increase in student activity by 56.5% which was included in the quite good category. This increase occurred during group discussion and question and answer presentations. Students looked enthusiastic during the discussion, it appeared that students were able to utilize discussion time quite well as shown by observation data where 71.33% of students asked questions to the teacher consisting of 20 students at the first meeting and 23 people at the second meeting and 83.33% of students asked their group friends to solve the problems in the LKPD consisting of 25 students at the first meeting and 25 students at the second meeting, and during group presentation questions and answers, it can be seen from the observation data that there was an increase in asking students or students asking questions to other groups by 36.66%, consisting of 10 students at the first meeting and 12 students at the second meeting. There was also an increase in students' activeness in expressing opinions by 23.33%, consisting of 6 people at the first

meeting and 8 people at the second meeting. This shows that the paced inquiry learning model is able to increase students' active role in learning. This statement is in line with the opinion of Dwiputri, M.Y., Dasna, W.I., & Sulistina, O (2013) who stated that the quided inquiry model is better in improving learning outcomes and students' high-level thinking abilities.

The increase in completeness of learning outcomes in cycle II increased by 10%, while in cycle II the increase in completeness of learning outcomes from cycle I to Cycle II was 13.33%. This is because in the topic of petroleum and polymers, students mostly explain by rote, while in hydrocarbons, students are asked to be able to determine isomers and nomenclature of hydrocarbon compounds, which has a high level of understanding. The increase in students' cognitive learning completeness based on the results of the end of cycle test was 63.66% (T0) < 73.33% (T1) < 86.66% (T2) with an average increase of 69.87 (T0) < 76, 38 (T1) < 84.80 (T2). Increased student activity, namely 42.83% (T1) < 56.5% (T2). Based on the research results in cycle 2, the students' learning completeness had reached the classical completeness criteria of ≥85%, so the research was stopped.

The results of this research always show an improvement in the learning process, which can be seen from the increase in learning outcomes and student activity. This is similar to research conducted by Prasetyowati, N.E., & Suyatno. (2016) in their research stated that the inquiry learning model can improve students' mastery of concepts and critical thinking skills, apart from that there is a significant relationship between critical thinking skills and students' mastery of concepts. Based on the explanation above, it can be concluded that implementation through the application of the quided inquiry learning model can improve the learning outcomes of class X TBSM II SMK N 2 Palembang students.

▪ CONCLUSION

Based on the objectives and results of the research, conclusions were obtained, including: a) the quided inquiry learning model can improve student learning outcomes in class X TBSM II SMKN 2 Palembang; b) cognitive learning outcomes and student activity increase through the application of the paced inquiry learning model. The increase in students' cognitive chemistry learning outcomes can be seen from the increase in the completeness of students' learning outcomes and the average student learning outcomes. The increase in learning can be seen from the average learning outcomes of students before action (T0) was 69.87 with learning completeness 63.33%, there was an increase in cycle I (T1) to 76.38 with learning completeness 73.33% increasing to 84.80 with 86.67% completeness in cycle II (T2). It can be concluded that in this study there was an increase in students' chemistry learning outcomes, namely T2>T1>T0. Meanwhile, the increase in student activity during the learning process in cycle I was 42.83%, increasing to 56.5% in cycle II.

Based on the research that has been conducted, the researcher provides suggestions, including that teachers in teaching and learning activities in the classroom can apply the quided inquiry learning model as an alternative to improve student learning outcomes in chemistry subjects on the topic of hydrocarbons, petroleum and polymers; Meanwhile, teachers who want to apply the paced inquiry learning model for the first time must pay attention to the allocation of available time and be able to use the time as efficiently as possible.

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