

IMPLEMENTATION OF SEMI GUIDED INQUIRY LEARNING MODEL TO PRACTICE STUDENTS' CRITICAL THINKING SKILL AT POLAR AND NONPOLAR COVALENT BONDING TOPIC

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Abstrak

Penelitian ini bertujuan untuk mengukur keterlaksanaan model pembelajaran *semi guided inquiry* dan mengetahui keterampilan berpikir kritis siswa kelas X di SMAN 1 Driyorejo pada materi pokok ikatan kimia kovalen polar dan nonpolar. Rancangan penelitian yang digunakan dalam penelitian ini adalah *One Group Pretest Posttest Design* dengan jenis penelitian *pre-experimental design*. Instrumen yang digunakan meliputi lembar observasi keterlaksanaan model pembelajaran, lembar aktivitas siswa, lembar tes keterampilan berpikir kritis, lembar tes hasil belajar, dan lembar angket respon. Berdasarkan hasil penelitian menunjukkan bahwa keterampilan berpikir kritis siswa mengalami peningkatan setelah diterapkan model pembelajaran *semi guided inquiry*. Pada indikator keterampilan mengajukan pertanyaan mengalami peningkatan dari 1,83 menjadi 3,38, keterampilan menganalisis asumsi meningkat dari 1,75 menjadi 3,16, keterampilan menguji fakta-fakta meningkat dari 1,67 menjadi 3,20, dan keterampilan mempertimbangkan interpretasi meningkat dari 1,71 menjadi 3,20. Hal ini didukung dengan data keterlaksanaan model pembelajaran yang menyatakan bahwa peneliti yang bertindak sebagai guru melakukan sintaks dalam pembelajaran *semi guided inquiry* dapat dikatakan efektif selama 2 kali pertemuan dengan kategori sangat baik pada tiap-tiap fase pembelajaran.

Kata Kunci: model *semi guided inquiry*, keterampilan berpikir kritis, ikatan kimia kovalen polar dan nonpolar.

Abstract

This study aims to measure the feasibility of semi guided inquiry learning model and examine critical thinking skill of grade ten students of SMAN 1 Driyorejo on polar and non-polar covalent bonds. The design used in this study was one group pretest posttest with pre-experimental study type. The instruments used included observation sheet of the learning models feasibility, students' worksheets, test paper of critical thinking skill, test paper of achievement, and questionnaire response sheet. The result showed that students' critical thinking skill increased after applying semi guided inquiry learning model. The score of each skills indicator increased including skills of asking question from 1.83 to 3.38, analyzing assumptions from 1.75 to 3.16, testing facts from 1.67 to 3.20 and considering the interpretation from 1.71 to 3.20. The increasing skills were supported by the data of learning model feasibility stating that the researcher, who acted as the teacher performing syntax in semi guided inquiry learning, was effective in two meetings with excellent category in each learning phase.

Keywords: semi-guided inquiry model, critical thinking skill, polar and non-polar covalent bonds.

INTRODUCTION

The development of the current education problems are very complex, but education is very important in preparing the human being to be able to maintain and improve the quality of life as a dignified nation. In the system of national education the role and function of the curriculum is considered very important. This is because the curriculum is one tool in the realization of educational programs, both formal and non-formal education, so that the whole part of education can be seen clearly in the curriculum.

Based on the Curriculum of 2013 is clearly that the goal of learning more emphasis on the scientific approach and authentic assessment using principle of assessment as part of learning. In addition, teachers are also required to be more creative and innovative in teaching and learning so that students can be motivated. But in the curriculum 2013 is teacher's role is just as facilitator, the students themselves should be more active. Students should be guided to be able to find his own knowledge, so students will be more confident. So that students instruction will lead to inquiry learning model [11].

Sanjaya [14] asserted that inquiry is an instructional method that emphasizes critical and analytical thinking process to seek and find answers of a problem questioned on their own. In inquiry, teacher's role is only determining problems and solution phases. The students are exposed to relevant tasks to be solved through group discussion groups or individually to be able to solve the problem and draw their own conclusions. The purpose of inquiry learning is to

develop systematic, logical, and critical thinking ability.

According to Santos and Fabricio [15], "the development of critical thinking presupposes an ongoing questioning of taken-for-granted assumptions", means that the development of critical thinking presupposes continuing question of taken-for-granted assumptions. According to Schumm and Post [16], "critical readers display the following characteristics: a) base Reviews their judgments on evidence, b) ask penetrating questions and Evaluate ideas, c) distinguish between opinions and facts, and d) reflect on their ideas."

The elaboration of critical thinking above shows that there are some similarities between the nature of critical thinking and the nature of inquiry. Thus, the learning of science, especially chemistry, is suitable to develop critical thinking skill in the sense that students can develop critical thinking skills by using inquiry learning. The current research shows that through the development of thinking skill, the students' understanding of science concepts can be improved.

Chemistry is a science developed based on experiments that seek answers to the questions of what, why, and how natural phenomena related to the composition, structure and properties, changes, dynamics, and substances energetics. Therefore, Chemistry subject in high school covers everything about a substance including composition, structure and properties, changes, dynamics, and substances energetics that involves skill and reasoning [4].

One of chemistry topics that requires direct experiment is chemical bond. The basic competence to be achieved is to design and conduct experiments to

investigate polar compounds in the laboratory. The expected indicator to achieve is that students are able to investigate polarity of some compounds and its relationship with electronegativity through experiments. Therefore students can better understand and are interested in learning deeper chemistry topics especially the subject matter of polar and nonpolar covalent bonds. This is proven by the results of the questionnaire of pre-study conducted in SMAN 1 Driyorejo. 75% of 20 students answered that chemical bond is a difficult topic, particularly to polar and nonpolar covalent bond with 90% students consider lab will facilitate them understanding chemical bonds topic. Therefore, to achieve the expected learning indicator, appropriate learning model was needed. In addition, pre-study questionnaire results also showed 33.75% of students cannot analyze critical thinking based questions characteristics based on well provided phenomenon.

In order to strengthen scientific education, thematic integrated (thematic among subjects), and thematic (in a subject), discovery/inquiry learning needs to be applied [11]. Learning indicators are expected to be achieved and student learning outcomes increase with the implementation of semi guided inquiry learning model to train critical thinking skill.

Semi Guided Inquiry Learning model is a model of learning where the problems, the tools and materials are still given by the teacher. Then students will design their own trial procedures in accordance with the given tools and materials, to prove their hypotheses and explain the answer to the problem given. This type of inquiry is more effective than the guided inquiry,

because more students have the opportunity to learn to design experiments with a variety ways, in accordance with the tools and materials provided by the teacher [8].

Based on the previous background, the writer was interested in conducting a research entitled "Application of Semi Guided Inquiry Learning Model to Train Students' Critical Thinking Skill at Polar and Nonpolar Covalent Bonding Topic in SMAN 1 Driyorejo Grade X".

METHOD

The research design used in this study was "One Group Pretest Posttest Design" by using one class as a research subject in the absence of comparable class. This type of research is Pre-Experimental or quasi-experimental with pretest and posttest design pattern [3].

$O_1 \quad X \quad O_2$

Description:

O_1 : Value Pre-test X : Treatment

O_2 : Value Pos-test

The targets in this research are 37 students of X MIA-4 grade semesters 1, taken from randomized population of grade X SMAN 1 Driyorejo. This research was conducted in odd semester of academic year 2015-2016. The learning tools used in this study were syllabus, Lesson Plan, textbooks, and the Students Worksheet. In accordance with the purpose of learning, the instrument used for collecting data in this study was observation/observation of semi guided inquiry learning model feasibility and critical thinking skill test sheets. The research procedure consisted of three stages of the implementation of the learning activities including preparation

phase, implementation of learning activities, and data analysis stage.

Data collection methods used in this study was method by the teacher to plan the implementation of critical thinking learning skill. Data of the observation was collected by using inquiry learning with assessment aspects of assessment scores ranging from 0-4, where 4 means very good, 3 for good, 2 for sufficient, 1 for poor; and 0 for not feasible. The test data was collected by using pretest and posttest taken prior to and after implementing the learning by using a semi guided inquiry learning model.

Data analysis technique used in this research is the analysis of observational data on the feasibility and data test on critical thinking skills. The analysis of observational data on the feasibility can measure the feasibility inquiry learning syntax carried out by the teachers in accordance with the lesson plan. Through the analysis of the test data, the level of students' critical thinking by applying semi guided inquiry learning model can be measured

Components critical thinking skills observed include the skills of asking questions, analyze the assumptions, testing the facts and consider interpretation [5].

The feasibility of the learning model can be carried out by using observation sheets of the feasibility of the learning model. The feasibility of Semi Guided Inquiry learning model is effective if the percentage criteria of quality of the learning model is good and excellent. The percentage of the learning feasibility is calculated by using the formula

% of quality of inquiry learning feasibility =

$$\frac{\text{Observer average score}}{\text{maximum score}} \times 100\%$$

The percentage of quality criteria feasibility learning following the table below:

Table 1. Percentage of Quality Criteria on the Feasibility of Learning

No	Percentage	Criteria
1.	0% - 20%	Very Bad
2.	21% - 40%	Bad
3.	41% - 60%	Enough
4.	61% - 80%	Good
5.	81% - 100%	Very Good

In this study, inquiry learning is said to be effective if the quality criteria on the learning feasibility is good and excellent [12].

Data of critical thinking skill score are analyzed by using percentage system with the following formula:

$$\text{Students score} = \frac{\text{Oscore obtained}}{\text{maximum total score}} \times 4$$

The percentage of mastery learning is then calculated by using the formula:

$$\% \text{Classical mastery} = \frac{\text{the number of mastering students}}{\text{the total number of all student}} \times 100\%$$

A student achieves individual mastery if the post-test score is ≥ 3.00 .

RESULT AND DISCUSSION

The feasibility of semi guided inquiry learning model in polar and non-polar covalent bonds was carried out well in accordance with the lesson plan made. Data of the average results of the model feasibility is presented in the following table.

Table 2 Data of the average result on the feasibility in each phase of learning

Phase	1 Meeting	2 Meeting
1. Focus of students' attention and explaining the inquiry process.	97,62 (Very Good)	100 (Very Good)
2. Presenting problems	100	100

Phase	1 Meeting	2 Meeting
of inquiry or phenomenon.	(Very Good)	(Very Good)
3. Formulating Problem	95,83 (Very Good)	91,65 (Very Good)
4. Formulating hypotheses to explain the phenomenon	100 (Very Good)	83,3 (Very Good)
5. Collecting Data for Testing Hypotheses	100 (Very Good)	88,3 (Very Good)
6. Formulating the Statement	100 (Very Good)	95,83 (Very Good)
7. Reflecting the Problem Situation and Thinking Processes.	100 (Very Good)	100 (Very Good)

Overall, semi guided inquiry learning activities were carried out well, supported by the evidence of the data in Table 2 that researcher, who act as teachers performed syntaxes in semi guided inquiry learning was effective for two meetings with the excellent category in each phase of the learning. The data can be presented in graphic of the feasibility of the learning with semi guided inquiry learning model.

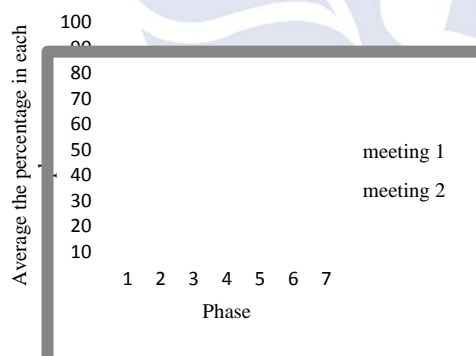


Figure 1 Graph of Average in Each phase Semi Guided Inquiry Learning Feasibility

Despite the decrease in the percentage, the average score at each meeting was still in a very good criterion. School, as an institution, has responsibility to provide education to help students develop critical thinking skills.

One model for effective learning to train critical thinking skill for students is to use semi guided inquiry learning model. There are four components of critical thinking skills trained in this research including asking questions, analyzing assumptions, examining facts and considering interpretations. The students' critical thinking skills are measured by using the instrument sheets of critical thinking skills given before and after applying learning models. Data from students' critical thinking skills score during pretest and posttest are presented in Table 3 below.

Table 3 Average Value Pretest and Posttest for Each Indicator Critical Thinking Skills

No.	The indicators assessed	Value	
		Pre-test	Post-test
1.	The skill of asking questions	1.83	3.38
2.	The skill to analyze the assumptions	1.75	3.16
3.	The skill to testing facts	1.67	3.20
4.	The skill to considering interpretations	1.71	3.20

Table 3 provides information on the students' critical thinking skills score during pretest and posttest for each indicator. Base on data in Table 3 shows that the score of critical thinking skill increased after applying semi guided inquiry learning model. The score of each skills indicator increased including skills of asking question from 1.83 to 3.38, analyzing assumptions from 1.75 to 3.16, testing facts from 1.67 to 3.20 and considering the interpretation from 1.71 to 3.20. The increase indicates that using semi guided inquiry learning model can develop students' critical thinking

skills for inquiry learning model emphasizes the process of critical thinking and analysis to search and find their own answer to the problem in question [14].

CLOSING

Conclusion

The researcher, who acts as the teachers perform syntax in semi guided inquiry learning was effective in two meetings with the excellent category in each phase of learning.

Critical thinking skill increased after applying semi guided inquiry learning model. The score of each skills indicator increased including skills of asking question from 1.83 to 3.38, analyzing assumptions from 1.75 to 3.16, testing facts from 1.67 to 3.20 and considering the interpretation from 1.71 to 3.20. Therefore, it can be concluded that the semi guided inquiry learning model succeeded in improving students' critical thinking skills.

Suggestion

Good classroom management becomes one of the factors that can support the success in the learning process. Thus teachers' skill in classroom management needs to be considered. In addition to developing the critical thinking skills, students need to be trained repeatedly.

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