UPGRADES HIGH SCHOOL STUDENT CRITICAL THINKING USING GUIDED INQUIRY LEARNING

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Abstract

This research aim are to describe the increase of critical thinking ability and quality of learning process with guided inquiry model in high school learners. This research using "group pre-test and post-test design" with one experimental class and two replication classes. Data will analyzed with some techniques : paired t-test analysis and normalized gain for pre-test and post-test result than analyze of inquiry learning process. The results showed that: (1) the average assessment of learning process using guided inquiry has excellent category, (2) an increase of critical thinking ability in third grade sequentially got 0.35 (medium), 0.59 (medium) and 0.74 (high) in scores and the category. Overall based on the result, implementation of guided inquiry can improve student critical thinking ability about global warming topic.

Keywords : Guided inquiry, Critical thinking ability, Global Warming.

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan peningkatan kemampuan berpikir kritis dan kualitas keterlaksanaan pembelajaran model inkuiri terbimbing pada peseerta didik SMA. Penelitian ini menggunakan desain *group pre-test and post-test* dengan 1 kelas eksperimen dan 2 kelas replikasi. Analisis data menggunakan teknik analisis uji t-berpasangan dan *gain* ternormalisasi untuk hasil *pre-test* dan *post-test* kemudian analisis keterlaksanaan pembelajaran inkuiri. Hasil penelitian menunjukkan (1) rata-rata penilaian keterlaksanaan pembelajaran menggunakan inkuiri terbimbing berkategori sangat baik. (2) peningkatan kemampuan berpikir kritis di ketiga kelas secara beurutan mendapatkan skor dan kategori 0,35 (sedang), 0,59 (sedang) dan 0,74 (tinggi). Kesimpulan penelitian ini adalah bahwa pembelajaran menggunakan model inkuiri terbimbing dapat meningkatkan kemampuan berpikir kritis peserta didik.

Kata Kunci : Inkuiri Terbimbing, Kemampuan Berpikir kritis, Pemanasan Global.

INTRODUCTION

The progress of a nation can be seen through the quality of education owned by it due to the human factor as the driving force of the nation. Indonesia's education is currently trying to improve the quality by adjusting the system to the demands of the 21st century skills (Sajidan, 2017). Review of the system has been formed from the basis and one of which is the implementation of the curriculum. Curriculum 2013 that is used today have undergone an evaluation process and adjusted to the future generation's needs (Juweni, 2016). The concept of learning in curriculum 2013 has been adjusted to the demands of the 21st century skills, that is 4C (Creative, Critical Thinking, Communicative and Collaborative). One of the competencies that must be mastered by the students is critical thinking. Ennis (2011) stated that critical thinking is a process that aim to make logical

decisions about what is trusted and what is done (Prayogi, 2018). Through the process of critical thinking, students will be directed, able to conclude, and able to provide settlement of the problem based on the information that can be justified. That process is very suitable to be applied on the topic of science, such as Physics.

But the reality showed a gap. Based on research that has been conducted in SMA Negeri 1 Manyar through written tests that contain critical thinking's indicators by Ennis (2011) on the topics of Global Warming shows that students are able to answer correctly amount 35.2% on giving a basic explanation indicator, 21.2% on building basic skills indicator, 62.8% on concluding indicator, 47.85% on providing further explanation indicator and 29.5% on setting the strategy and tactics indicator.

To fix the problem described on the previous paragraph, the selection and the use of instructional

model must be considered. Application of an appropriate learning models could be successful factor for critical thinking skills' establishment (Purwati, 2016). The Implementation of guided inquiry learning model assisted with virtual laboratory media could be the solution to improve students' critical thinking skills, based on the research by Yusuf. et al (2017) that virtual laboratory media has positive influence on increasing students' critical thinking skills.

Inquiry learning model allows students actively involve in the experimental activity that leads them to think scientifically, one of which is critical thinking (Madladzim et al, 2015).Iinquiry learning model makes students to be able to find a concept that learned by they theirselves. Teacher guidance is necessary to point the students to achieve the desired conclusion.

Previous research that has been done by Kusumawati and Budiningarti (2016), Yunianti and Admoko (2016) stated that inquiry learning can help students to improve their critical thinking ability on the matter of heat. Therefore, this research is done using a different reference indicator of the critical thinking on global warming material, entitled "Upgrades High School Students Critical Thinking Using Guided Inquiry Learning ".

METHOD

This research type is pre-experimental research using with group pre-test and post-test design, design patterns as follows.
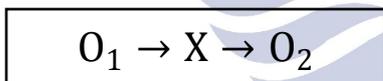
$$O_1 \rightarrow X \rightarrow O_2$$

Figure 1. Research Design Patterns

Information :
O_1 : Initial tests before being treated (pre-test).
X : Treatment to learners that is guided inquiry learning.
O_2 : Final test after treatment (post-test)

This study was conducted in SMAN 1 Manyar in the second semester of the academic year 2018/2019. Pre-test is given to determine the beginning of critical thinking abilities of learners and then given treatment that is guided inquiry learning to increase critical thinking skills and giving post-test to determine the increase critical thinking skills of learners.

Pre-test and post-test were then tested for normality and homogeneity as a prerequisite test before-paired t test. While improving critical thinking skills are tested using normalized gain test, with this equation.

$$N\langle g \rangle = \frac{S_{posttest} - S_{pretest}}{S_{max} - S_{pretest}}$$

Information :
$N\langle g \rangle$: Nomalized gain
$S_{posttest}$: Final test value (*post-test*)
$S_{pretest}$: Initial test value (*pre-test*)
S_{max} : Maximum value
The result $N\langle g \rangle$ then interpreted with this table below :

Tabel 1. Criteria interpetation of Normalized gain value.

Nilai $N(g)$	Interpretation
$N(g) \geq 0,7$	High
$0,7 > N(g) \geq 0,3$	Medium
$N(g) < 0,3$	Low

(Hake,1999)

RESULT AND DISCUSSION

Based research that has been done, it shows implementation of guided inquiry learning and improvement of critical thinking skills of learners. The following discussion of the results and research data were obtained:

The presented learning implementation data is assesed by two Physics teacher and colleagues. Guided inquiry learning model is applied to an experiment class and two replication class. The following is the average value of learning implementation in all classes.

Table 2. Learning implementation Value

Learning Activities	Eksp. Class	Repl . Class(1)	Repl. Class (2)
Preliminary	88%	91%	94%
Core Activity	81%	83%	82%
Closing	88%	88%	88%
Class milieu	88%	81%	85%
Time management	69%	75%	75%
Class Rate	83%	84%	85%
Rate	**84%**		
Criteria	**Very good**		

Table 2 shows learning implementation average value of three sample classes. It gets 84% percentage with very good category. It shows that the researcher as a teacher is able to carry out the phases of guided inquiry learning properly and suitable with the lesson plan that has been developed previously. The percentage difference of three classes is due to difference of learning process in each class. The results of the prerequisite tests (normality and homogeneity) of pre-test and post-test are presented in the table below.

Table 3. Normality Test Result

Class	x^2_{tabel}	x^2_{hitung}	
		Pre-test	*Post-test*
Eksp. Class		6,661	9,801
Rep. Class (1)	11,1	1,991	1,217
Rep. Class (2)		6,130	10,297

Table 3 shows the value of $x^2_{count} \leq x^2_{table}$, so that the conclusion is H_0 accepted which means that the entire sample is distributed normally.

Table 4. Homogeneity Test Result

Test type	x^2_{tabel}	x^2_{hitung}
Pre-test	5,991	0,510
Post-test		0,271

Table 4 shows that the value $x^2_{count} \leq x^2_{table}$, so the conclusion is H_0 accepted, which means that the sample pre-test and post-test derived from a homogeneous population.
After fulfilled the prerequisite test, paired t-test can be done to determine whether there is a difference between the pre-test and post-test.

Table 5. Paired t-Test Result

Class	t^2_{tabel}	t^2_{hitung}
Eksp. Class		1,72
Rep. Class (1)	1,711	2,01
Rep. Class (2)		2,00

Table 5 shows that the value $t_{count} \leq t_{table}$, it means there is significant difference between pre-test and post-test in the all classes. To determine the increase between pre-test and post-test can be analyzed using normalized gain. The average normalized gain of all classes can be seen in the following table.

Tabel 6. Nomalized gain Test Result

Class	<g>	Criteria
Eksp. Class	0,35	Medium
Rep. Class (1)	0,59	Medium
Rep. Class (2)	0,74	High

The graph below shows the difference between pre-test and post-test, also increase visible in between.
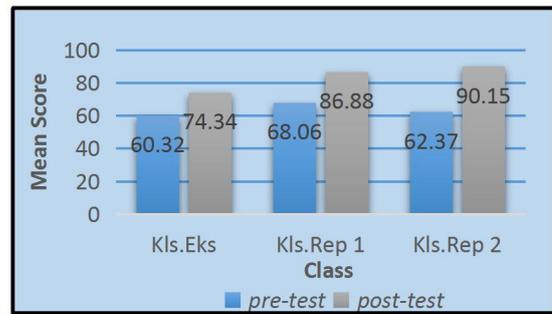

Figure 2. Comparison charts of pre-test and post-test average value

Figure 2 explains the difference between the pre-test and post-test in average value increase form. This increase was experienced after application of guided inquiry learning. Supported by the research of Yunianti and Admoko (2016), also Kusumawati and Budiningarti (2016) which explains that inquiry learning process can improve critical thinking skills of learners. Increase in each class is not same. Increase score is different for each class with medium and high categories. It happens becouse of two things, differences in the attention given by the students as well as the difference in treatment by the investigator. According to the theory of cognitive, differences in learners' attention are due to each individual has a different mental states. The next mental condition involving attention, perception and motivation.

CLOSING
Conclusions

Based on research data and analysis we can conclude two things, first that the enforceability of the guided inquiry learning in third grade are in the very good category with 84% percentage. Second, the implementation of guided inquiry learning can enhance the critical thinking skills of learners with values <g> in a third grade are 0.35, 0.59 and 0.74 with medium, medium and high criteria. So it can be conclude that implementation of guided inquiry learning can enhance the critical thinking skills of students at SMAN 1 Manyar in global warming topic.

Suggestion

For further research, advice given was more give attention of time allocation. Reducing interference from outside, so the treatment given maximum and consistent in every experiment and replication classes.

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