STUDENT RESPONSE TO THE IMPLEMENTATION OF AN ECOPRENEURSHIP BASED MODIFIED FREE INQUIRY MODEL ON PHYSICS LEARNING

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Abstract

This research aims to describe student's learning response toward an Ecopreneurship-Based Modified Free Inquiry Model on physics learning especially Kinetic Gasses Theory matter. The type of research is True Experimental Design and Posttest Only Control Group Design. The participants of this research is student from an experimental class and control class with normally distributed. Data was collected from questionnaire. Data was analyzed using the response questionnaire score. The results show that an Ecopreneurship Based Modified Free Inquiry Learning Model on Kinetic Gasses Theory matter obtained student well response.
Keywords: Ecopreneurship, Modified Free Inquiry, Kinetic Gasses Theory, Learning Responses

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan respon belajar siswa terhadap Model Pembelajaran *Modified Free Inquiry* berbasis *Ecopreneurship* pada pembelajaran fisika khususnya materi Teori Kinetik Gas. Jenis penelitian adalah *True Experimental Design* dan *Posttest Only Control Group Design.* Sampel dari penelitian ini adalah siswa dari kelas eksperimen dan kontrol dengan distribusi normal. Data dikumpulkan dari angket. Data dianalisis menggunakan skor angket respon. Hasil penelitian menunjukkan bahwa Model Pembelajaran *Modified Free Inquiry* berbasis *Ecopreneurship* pada materi Teori Kinetik Gas memperoleh respon yang baik dari siswa.
Keywords: Ecopreneurship, Modified Free Inquiry, Materi Teori Kinetik Gas, Respon Belajar

INTRODUCTION

Kinetic gases theory is the one of abstract physics subject matter. Kinetic gases theory is a theory which states that gas atoms move randomly and continuously (Kamajaya et al., 2016). Kinetic gases theory examines physical objects in the form of atoms or particles in ideal gases that are not visible (Sofi'ah, 2017).

Kinetic gases theory subject matter is taught to senior high school at second grade by 2013 Curriculum learning references with Basic Competence points 3.6 (as a reference for students cognitive competencies) and Basic Competence point 4.6 (as a reference for students competency skills).

The purpose of Basic Competence point 4.6 as a reference for students competency skills for kinetic gases theory subject matter is to presenting works related to kinetic gases theory and their physical meanings. This means that in learning activities, the teacher must direct students to be able to present works related to kinetic gases theory. However, based on the results of an interview conducted with one of the physics teachers stated that, the teacher did not carry out learning activities that directed students to present their work on the kinetic gases theory subject matter, but the learning activities about the material directed students to practice using the PhET (application for science experiment simulation). This shows that the learning activities of physics material about kinetic gases theory are not in accordance with Basic Competencence point 4.6 at second grade. Because, there is no learning activity where students present a work on the material.

Therefore, researchers want to direct students to make works related to the kinetic gases theory in the form of simple tools related to one of the laws regarding the material, Boyle's Law. Students will be directed to a problem in the form of a tool that applies Boyle's Law, namely a simple Vacuum Chamber & Vacuum Pump. Then students are directed to analyze the damage to the tool and make the same tool that can work as it should.

To make the tool, students will be directed to use used materials.

Using used materials as work or learning media is one form of upcycling. Upcycling is the process by which used materials are converted into something that is of use or quality (Sung, 2015). The use of used materials in learning in schools has been examined by (Adinugraha, 2017). From this research, making work or learning media from used materials can be used as an Ecopreneurship education model.

According to Sund and Trow Bridge in (Sugiyati, 2011) Modified free inquiry is one of the inquiry methods wherein this type of teacher gives a problem. Furthermore, students are asked to solve these problems through observation, exploration and research procedures. Then the teacher provides opportunities for students to solve problems individually or in groups (Nursilawati, 2017). Solving these problems can be in the form of solutions in the form of explanations, images or works that are able to demonstrate the problem solving process.

This learning model has advantages including: (1) helping develop students' reasoning abilities, (2) students get discoveries about basic concepts and good ideas, (3) students with their own will will be motivated to think and work hard to resolve the problems given by the teacher (Winda, 2017).

Thus, researchers will implement an Ecopreneurship-Based Modified Free Inquiry Learning Model on kinetic gases theory matter to . This learning is expected to be able to hone students's learning responses. Based on several research, like as (Pujiningrum & Admoko, 2017), (Tamara & Sunarti, 2017) and (Mahmudah & Wasis, 2016), student response to inquiry learning is excellent and good.

Based on the description above, the researcher carry out the research "Student Response to The Implementation of an Ecopreneurship Based Modified Free Inquiry Model on Physics Learning".

METHOD

The researcher used quantitative descriptive research with a True-Experimental Design approach where this study was used to reveal causal relationships by involving control groups in addition to the experimental group, which selected the two groups using Simple Random Sampling techniques. The sample consist of two classes of second grade science.

This research used the Posttest Only Control Group Design where the experimental group was treated in the form of the application of an Ecopreneurship-Based Modified Free Inquiry learning model while the control group was given the application of the Guided Inquiry learning model. In both groups, after giving the treatment a posttest was taken.

Tabel 1. Research Design

Class	Treatment	*Posttest*
Experimental	X	O_1
Control	-	O_2

(Sugiyono, 2016)

Information:
X = Treatment uses the Ecopreneurship Based Modified Free Inquiry learning model
- = Treatment uses the Guided Inquiry learning model
O_1 = Posttest
O_2 = Posttest

Data collection is done using the questionnaire method. Questionnaire is a collection of written questions that are used to find out certain information from respondents which means personal reports from respondents to a matter / activity that we want to know (Arikunto, 2013). The questionnaire method was conducted by distributing questionnaires to students and students were asked to fill out the questionnaire according to their opinions on the learning done. It aims to determine the learning response of students after the application of the Ecopreneurship-based Modified Free Inquiry model to kinetic gasses theory material. The response measured is the learning attitude response of students. According to (Rosenberg and Hovland, 1960), attitudes have several components, namely cognitive (experience, views, knowledge, etc.), affective (emotions) and behavior (behavior and tendency to act).

Questionnaire consists of positive statements and negative statements. Steps for analyzing student response data:

a. Recap the number of students who respond strongly agree, agree, disagree and strongly disagree
b. Calculate scores in each category by:
   1) Number of scores that answer Strongly Agree (SS), then: 4 x a for positive statements and 1 x a for negative statements. a are many students who answer SS.
   2) The number of scores that answers Agree (S), then: 3 x b for positive statements and 2 x b for negative statements. b are many students who answer S.
   3) Number of scores that answer Disagree (TS), then: 2 x c for positive statements and 3 x c for negative statements. c are many students who answer S.
   4) Amount of score that answers Strongly Disagree (STS), then: 1 x d for positive statements and 4 x d for negative statements. d are many students who answer S.
c. Count the total score

d. Calculating the maximum number of scores, namely: (number of respondents x 4) The equation used to determine the percentage of student responses to the questions asked is:

$$\% \text{ response qustionnaire} = \frac{t\epsilon}{max}$$

(Riduwan, 2010)

RESULTS AND DISCUSSION

The results of student learning responses are presented in the following Graph.

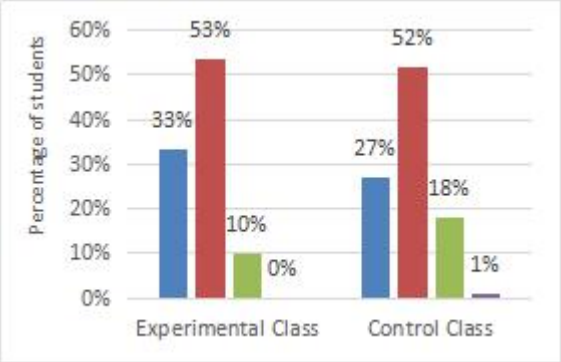

Figure 1. Graph of student responses after learning

Information:
Red : Strongly Agree (SS)
Blue : Agree (S)
Green : Disagree (TS)
Purple : Strongly Disagree (STS)

Based on the graph above, students in the experimental class provide better learning responses to the learning applied to their classrooms than the control class. This can be seen in the higher percentage of students who answered strongly agree (SS) and agreed (S) in the experimental class. For the percentage of learning response components are presented in the following graph:

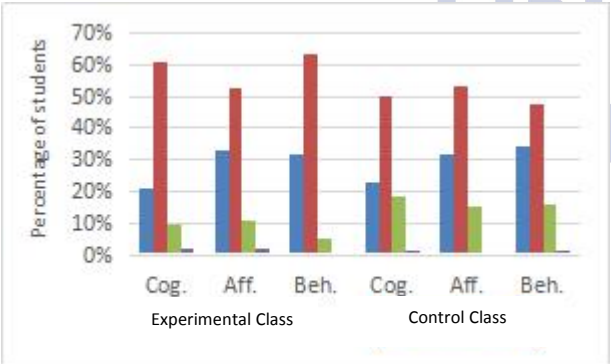

Figure 2. Graph of student responses after learning

Based on the graph we can see that each component of the learning attitude in the experimental class gets a higher response compared to the response in the control class.

Table 2. Results of Average Student Learning Response

Class	Precentage (%)	Criteria
Experimental	77	Good
Control	75	Good

Table 3. Precentage of Learning Response Component

Class	Cog. (%)	Catg.	Aff. (%)	Catg.	Beh. (%)	Catg.
Exp.	76	Good	79	Good	82	Excellent
Con.	74	Good	78	Good	79	Good

Based on the tables above, it can be seen that the response of students both experimental class and control class is included in the good category. This means that the response in the form of learning attitudes of students in the experimental class and the control class is good. This also shows that students both from the experimental class and the control class are enthusiastic, happy and interested in the learning done in each class.

This is due to the fact that both classes have learned the same model, the inquiry learning model. So that even though the experimental class gets learning with the Ecopreneurship-based Modified Free Inquiry learning model and the control class gets learning using the Guided Inqury learning model, the learning response of students is almost the same. The experimental class gets a greater percentage than the control class. The acquisition of a higher percentage in the experimental class is caused by the existence of activities to create works that make students more active in learning.

CLOSURE

Conclusion

Based on the data analysis reviewed in the previous chapter, it can be concluded that an Ecopreneurship Based Modified Free Inquiry Learning Model on Kinetic Gasses Theory Materials obtained student well response.

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