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STUDENTS' RESPONSES TO THE IMPLEMENTATION OF GUIDED INQUIRY MODEL INTEGRATED WITH VOLCANIC DISASTER MITIGATION ON PHYSICS LEARNING

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Abstract

This study aims to determine students' responses to the implementation of physics learning with a guided inquiry model integrated with volcanic disaster mitigation. This type of research is quantitative descriptive research methods with quasi experimental design and research design Non-equivalent control group design. The subjects of this study were students of class XI odd semester 2019/2020 SMAN 1 Puncu Kediri which is a disaster-prone school under the foot of Mount Kelud. Student responses were collected using a response questionnaire that was prepared with a Likert scale and the results were analyzed descriptively quantitative. Based on data analysis, the results show that students' responses to the implementation of physics learning with guided inquiry models integrated with volcanic disaster mitigation are included in the excellent category with an average percentage above 80% which shows that the model can be well received by students and can be applied further on learning physics and other subjects.
Keywords: Guided Inquiry, Student's responses, Disaster mitigation

Abstrak

Penelitian ini bertujuan untuk mengetahui respons siswa terhadap pelaksanaan pembelajaran fisika dengan model inkuiri terbimbing yang terintegrasi dengan mitigasi bencana vulkanik. Jenis penelitian yang dilaksanakan adalah kuantitatif deskriptif dengan metode penelitian *quasi experimental design* dan desain penelitian *Non-equivalent control group design*. Subjek penelitian ini adalah siswa kelas XI semester ganjil tahun pelajaran 2019/2020 SMAN 1 Puncu Kediri yang merupakan sekolah rawan bencana yang berada dibawah kaki Gunung Kelud. Respon siswa dihimpun menggunakan angket respon yang disusun dengan skala Likert dan hasilnya dianalisis secara deskriptif kuantitatif. Berdasarkan analisis data diperoleh hasil bahwa respons siswa terhadap pelaksanaan pembelajaran fisika dengan model inkuiri terbimbing terintegrasi dengan mitigasi bencana vulkanik termasuk dalam kategori sangat baik dengan persentase rata-rata diatas 80% yang menunjukkan bahwa model tersebut dapat diterima dengan baik oleh siswa dan dapat diaplikasikan lebih lanjut pada pembelajaran fisika maupun mata pelajaran lain.
Keywords: Inkuiri terbimbing, Respon belajar siswa, mitigasi bencana

INTRODUCTION

Indonesia is one of the equatorial countries located in the ring of fire zone in the Pacific. Along the ring of fire zone, there are 452 volcanoes of which 75% are in active status, and it can be said that Indonesia is the country that has the most active volcanoes in the world (Hariyono, 2018).

The volcanic eruption can have a big impact on the surrounding community, both positive and negative impacts. The negative impact caused by volcanic eruptions is very large. The risk of disasters caused will be high if the community does not have the ability to respond to the danger of volcanic eruptions.

Based on Law No. 24 of 2007 concerning disaster management which is a concrete step from the government in carrying out disaster risk reduction. Hariyono (2018: 86) believes that the biggest challenge in implementing disaster mitigation programs in Indonesia is the awareness of all components of the nation both from the government and society, if all components of the nation act according to their role, Indonesia will be ready to face the challenges of volcanic eruptions in the future.

Based on Law No. 24 of 2007 explains that disaster management is integrated into the development program which is included in the education sector. Various ways can be done to integrate disaster education materials, for example integrating disaster education in school subjects, one of which is physics in high school.

The concept of learning that is closely related to the environment of human life is physics. According to Singgih (2000: 12), physics is a discipline that studies natural phenomena and explains how they occur. 21st Century Learning and Curriculum 2013, the challenges that must be faced are demanding teacher skills to create learning innovations that can support and improve problem solving skills so that students do not experience difficulties when facing complex problems (Yazid, 2018).

Based on preliminary studies that have been conducted, the learning model is still conventional, which means the teacher still likes to present the material with lectures and learning is centered only on the teacher, and in the learning process the teacher does not relate to environmental conditions based on phenomena that exist in the surrounding area for example does not provide innovation learning to solve problems based on existing phenomena (S Anggrayni, 2019).

Physics learning integrated with volcanic disaster is a plan that can be used to design teaching patterns based on daily life that are adapted to environmental conditions associated with natural disaster management material based on disaster risk reduction. An alternative that can train problem solving skills for disaster risk reduction by applying the guided inquiry learning model. Guided inquiry is an approach using various sources of information and ideas to increase understanding of problems and topics (Khulthau, 2007). Guided inquiry model is a learning that emphasizes student activities to get more information (Arifin,Lina and etc, 2017). Guided inquiry is a model that emphasizes scientific inquiry (Nurdyansyah, Lesmono, and Subiki, 2016).

E.Hariyono eta (2016) in their research showed that students and teachers still have low knowledge about volcanic eruptions, the need to reconstruct the curriculum of knowledge, attitudes and skills in geoscience education. Based on the background, researchers are interested in conducting research "students' responses to the implementation of the guided inquiry model integrated with volcanic disaster mitigation in physics learning".

METHOD

This research is a descriptive quantitative study using a type of experimental design research. Quantitative research carried out using experimental design with Non-equivalent Control Group research designs pre-test and post-test design. This research involved an experimental group and a control group.

The above scheme explains that before starting learning activities, students are given a pre-test in advance to find out the student's initial ability (O1) in problem solving skills. Then given an X treatment by applying an integrated physics learning model with volcanic disaster mitigation. After being treated students are given a post-test (O2) to determine the extent of the influence of the application of integrated physics learning in volcanic disaster mitigation that has been carried out. The following is a table of research designs used::

Table 1. Desain Penelitian *Non-equivalent control group design*

Class	Pre-test	Treatment	Post-test
XI MIA 1	O_1	X_1	O_2
XI MIA 3	O_1	X_0	O_2

(Sugiyono,2014:74)

Information :
O1 = pre-test score (before treatment)
O2 = post-test score (after treatment)
X0 = Model of learning physics commonly taught at school
X1 = Physics learning model integrated with volcanic disaster mitigation

From both the sample classes, the response questionnaires are only given to the experimental class, which consists of 31students, because the class' physics learning process is held to integrated with volcanic disaster mitigation-oriented guided inquiry model. Before the response questionnaires are given to the students, it was validated on two physics professors in Unesa and then the validation score results were analyzed to determine the validity and reliability of the response questionnaire. Determining the validity of the questionnaire responses was done by finding the average score of validation and categorized it based on the following criteria:

Table 2. Validity Criteria of Instrument Research

No.	Interval Validation Score	Criteria
1	3.6 ≤ SV <4	Very Valid
2	2,6 ≤ SV <3.5	Valid
3	1.6 ≤ SV <2.5	Less Valid
4	1.0 ≤ SV <1.5	Invalid

(Ratumanan and Laurens, 2011)

Then, the reliability was determined by using percentage of agreement formula: percentage of agreement = $(1 - \frac{A-B}{A+B} x 100\%)$.......................................(1)

Informations :
A = The highest frequency of ratings
B = The lowest frequency ratings

The results of instrument research reliability is analyze by categorizing it based on the following criteria:

Table 3. Reliability Percentage Interpretation of Research Instruments

No.	Percentage Reliability (%)	Criteria
1.	<20	Very Low
2.	21-40	Low
3.	41-60	Moderate
4.	61-80	High
5.	81-100	Very High

A developed learning device said to be reliable if it has a value of reliability with a percentage of ≥ 75% (Borich, 1994).

The response questionnaire that is used contains 12 statements on Likert scale. The results of the response questionnaires com-pleted by the students were analyzed descriptive-quantitatively and classified by categorizing it according to students responses classification by Riduwan (2012) on Table 4.

Table 4. Students Response Classification

No.	Percent of Students (%)	Category
1.	0-20	Very Poor
2.	21-40	Not good
3.	41-60	Pretty good
4.	61-80	Well
5.	81-100	Very Good

RESULTS AND DISCUSSION

The following is a table that shows the validity and reliability analysis results of the responses questionnaire used on this research.

Table 5. Results of Research Instruments Validity Analysis

No.	Research Instruments	Validation Score	Criteria
1	Students' response questionnaire	3,65	Very Valid

Table 6. Results of Research Instruments Precentage of Agreement Analysis

No.	Research Instruments	Percent of Students (%)	Category
1.	Students' response questionnaire	80	High

Based on the results in Table 5 and Table 6, it can be concluded that the responses questionnaire is in the valid and reliable category and fit for use on the research.

Student responses were obtained through a questionnaire for all students who received physics learning integrated with volcanic disaster mitigation with guided inquiry models. The questionnaire sheet used to determine student responses consisted of 12 statement points. The percentage of student responses are in Table 7 below:

Table 7. The Result of Students' respond

No	Pernyataan	Persentase %
1.	This integrated physics learning disaster mitigation was able to increase my interest and motivation to study physics.	83,33%
2.	Physics learning activities taught me to be able to identify problems well.	88,33%
3.	Learning activities train me to make a hypothesis of a problem.	88,33%
4.	The teacher guided me in designing the experiments and when conducting experiments.	94,16%
5.	The teacher guides the experimental data analysis activities.	95,00%
6.	The teacher guides students in making learning conclusions.	92,83%
7.	Students are given the opportunity to present the results of the experiment with the guidance of the teacher.	92,50 %
8.	This integrated physics learning disaster mitigation is interleaved with problem-solving steps such as a useful description, the physics approach used, the application used, mathematical procedures, and also the logical process of concluding the problem.	88,33%
9.	Learning physics by integrating disaster mitigation, can spur students to be more active, because they are directly involved in learning so learning is not boring.	93,33%
10.	After following this lesson, increasing cooperation, tolerance between friends, and raising awareness of the importance of knowledge of volcanic eruption disaster mitigation.	89,17%

11.	I agree if integrated disaster mitigation learning can be applied to other relevant material.	90, 83 %
12.	Integrated physics learning of volcanic disaster mitigation grows knowledge when facing volcanic eruptions.	91,67 %

Based on Table 7. the percentage value of each point has a result above 80% which means that each point in the questionnaire responses of students with excellent categories. Based on the student response questionnaire, it can be seen that learning physics is integrated with volcanic disasters, students can identify problems well and learning can foster awareness of the importance of knowledge of volcanic eruption disaster mitigation so learning can be meaningful.

A high percentage of responses was found in the statement of the teacher who provided guidance in carrying out the design and also in conducting the experiment which obtained a percentage of 95%. It can be concluded that students find it very helpful when teachers continue to guide students in conducting experiments because they are not accustomed to using physics practicum tools. Students also find it very helpful when the teacher guides the experiment data analysis activities, guides the conclusions of learning and when presenting the results in front of the class, it can be known through the response of students who get a percentage above 90%.

The other highest percentage is the statement that learning physics integrated with volcanic disaster mitigation can grow their knowledge and awareness when facing volcanic eruptions which get a percentage of 91.67%. The knowledge gained by students is more knowledge to measure basic knowledge about natural disasters such as their characteristics, symptoms, and causes. Emergency planning is more curious about what actions have been prepared in the face of natural disasters. It can be concluded that learning physics based on phenomena can increase awareness and increase problem solving.

The statement that integrated learning of volcanic disaster is inserted with steps of problem solving can trigger students to be active in learning so that learning is not boring getting a positive response from students who get a percentage of 88.33%. Physics learning activities teach to identify problems well and can train to make hypotheses from a problem to get a percentage of 88.33% with a very good category, as is known in the learning process students are taught to identify the physical quantities associated with a problem from volcanic eruptions and make hypotheses based on the problems faced. The statement with the lowest percentage is in the statement of motivation and interest in learning. It can be concluded that students feel difficulties with learning physics so they feel less motivated. This is a very constructive criticism so that researchers can improve learning activities better.

In addition to the results of the checklist from students in giving their responses about the learning that has been done, also provided a column of comments, criticisms, and suggestions at the bottom of the questionnaire. As for some positive impressions also given by students including feeling very happy and enthusiastic being taught the application of integrated physics learning with volcanic disaster mitigation compared to physics learning which is usually only taught material in writing in the classroom, besides that students agree if learning is inserted with disaster material with subjects or relevant material.

Based on these findings, researchers argue that learning physics integrated with disaster mitigation should be applied further, in physics or other subjects taught at school to foster students' knowledge and awareness of the surrounding environmental conditions. This is due to the statement of Sani (2015: 3) and Zulfa et al (2016) that the problem of disaster is a problem that can affect life which must be faced by students in the future. Therefore, students must be equipped with disaster skills and knowledge so that they can complete or reduce disaster risk (disaster mitigation) as an effort to sustain life and be prepared to face disasters if at any time.

CONCLUSION

Based on the research that has been done, it can be concluded that physics learning integrated with volcanic disaster-oriented guided inquiry model has a very good response, which means students are very interested in learning physics integrated with volcanic disaster mitigation. Learning integrated physics of volcanic disaster mitigation not only teaches students the concept, but also practices and enhancing skills whish are important to be in 21st Century, such as problems solving skills. Disaster problems are problems that can affect life that must be faced by students in the future. Therefore, students must be equipped with disaster skills and knowledge so that they can complete or reduce disaster risk (disaster mitigation) as an effort to sustain life and be prepared to face disasters if at any time. Based on the findings, the researchers found physics learning process to be integrated with volcanic disaster mitigation-oriented guided inquiry models should be applied more either in physics or other varieties of subjects that are taught in schools to give students an interesting and valuable learning.

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