Journal of Primary Education
9 (2) (2020) : 148 – 154

https://journal.unnes.ac.id/sju/index.php/jpe/article/view/29256

The Implementation of Guided Inquiry Learning Models on The Concept Mastery, Scientific Attitude, and Science Process Skill

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Article Info

History Articles
Received:
January 2019
Accepted:
February 2019
Published:
August 2020

Keywords:
guided inquiry,
mastery concept,
science proces skill,
scientific attitude

DOI
https://doi.org/10.15294/jpe.v9i2.29256

Abstract

The purpose abstract of this research is (1) analyze the mastery of the concepts in fourth grade in inquiry learning guided; (2) analyze the attitude fourth grade students in inquiry learning guided; (3) analyze the science process skills in fourth grade in inquiry learning's guided; (4) analyze the different in mastery of concepts, science process skills and scientific attitudes between other students in fourth grade who learn using conventional learning with inquiry learning's guided. The type of research which has used is quantitative quasi-experimental research method with nonequivalent control group design. The population of the study consist of all fourth-grade students who have ranked includes the Papak Group of Papak Group, Leuwimunding sub-district, Majalengka District. The sample has been selected through a purposive sampling technique, so SDN Rajawangi I was chosen as the control class and SDN Ciparai II as an experimental class. The techniques of data collection using non-test techniques, including interview guidelines, observation guidelines, and documentation. The result of the study show that (1) the application of the guide inquiry approach influences the mastery of concepts are increasing in the N-gain value in the medium category with a score of 0.61; (2) the application of the guide inquiry approach influences the mastery of concepts are increasing in the N-gain value in the medium category with a score of 0.64; (3) the application of the guide inquiry approach influences the science process skills, namely an increase in the N-gain value inquiry in the medium category a score of 0.64; (4) guided inquiry approach can improve mastery of concepts, scientific attitudes and science skill of science. The Sig score obtained is less than 0.05 so, it can be applied that there is mastery of concepts, scientific attitudes and science process skills of students after the guided inquiry approach has been applied with the media in the school environment.

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p-ISSN 2252-6404
e-ISSN 2502-4515

INTRODUCTION

The learning of science is the only one of the subjects who learn about the scientific study of human relationships and interactions with his aspects of natural objects with differentiating. Based on the elementary school children (SD) basically, they still think in concrete or real so that the child owns necessary learning experience that also enables the entire senses, because, at this age, the children can't be able to think perfectly in the abstract. If the child is only given the nature of the concept of knowledge without going through of the inquiries process, then the students will have difficulty understanding about the concept, first on the concept that deals with the phenomena of everyday life. This is by many assumptions stated that teachers students had experienced difficulties on subjects related to the science material relating to daily life, one of them on the material source of heat energy and displacement.

The material on learning science in elementary school most associated with natural phenomena in everyday life. Therefore, teachers as facilitators need an intermediary translation in every science subjects; for example, it is most easily thing is the media environment of the school itself. Use of the media environment will help students to reduce the learning difficulties of students because the students can observe the phenomenon directly. Use of media learning has many benefits to make the learning process will run effectively.

Inquiry-based learning in the fourth grade of science had a positive impact on conceptual understanding and skills in the process of science students but did not makCie any difference in their attitude towards science (Şimşek, and Kabapinar, 2010). Inquiry-based activities increase the motivation of students because inquiry gives students freedom in making their choice, giving them the opportunity to implement the regulation, and to take part in the project where they involved (Bayram, Oskay, Erdem, Özgür, and Şen, 2013). Overall, inquiry-based science education proved to be more fun and relevant, from several different aspects, for young students of science lessons more fun than usual. Inquiry-based science education (IBSE) proved it could stimulate the motivation of students, students apply the skills of research, construct meaning and acquire scientific knowledge (Suduc, Bizoi, and Gorghiu, 2015).

Yunus, Sanjaya, and Jatmiko (2013) States the study of guided inquiry; the teacher should devise an inquiry learning involves students actively. At the beginning of the process of learning the teacher provide a lot of guidance then regularly reduces the frequency of guidance as such students can be a good investigator and his scientific knowledge can be fulfilled.

Agustanti (2012) also stated that the inquiry learning model (found) has an advantage because students will do research repeatedly and with ongoing guidance. The student's curiosity will be fulfilled because the model examines this can reinforce and encourage naturally to exploit so that activities can be done with a great spirit and full of sooth.

Guided inquiry according to Sudaryanti (2015) has a presentation of the stages that can be explained in Table 1.

Table 1. Stages of Guided Inquiry

Stages of inquiry	Guided spiritual learning
Presentation of the issue	The teacher submits the issue to students The teacher gives a question that comes from those problems
Collection and verification of data	The teacher guides the students in collecting information related to data sharing
Doing experiments	With the teacher's help, students create a planning procedure for experiment to answer questions or problems The students choose and provide the equipment needed Students planning to apply to solve the problems
Formulating an explanation	Students are asked to process the data results of the experiment and doing a presentation in front of the class
Analyzing the process of inquiry	Students design a map/graphics and tables to organize the data collected Students searching for patterns and relationships from data and independently make conclusions and communicate the results of its finding

The media can make a school environment students are directly involved in the learning process. They can do the experiment, observe, analyze, and draw your conclusions prove about an object/circumstances. The function of the most appropriate school environment media to effect learning approach to the inquiry so that the nature of scientific curiosity and owned by students can be maximized with appropriate direction and teacher's guidance. Media of education is very important to support the achievement of the objectives of education.

Thinking skills and processes of science must be developed through learning science with a specific model to foster the ability to solve problems (Wardani, 2008). An inquiry approach to social interactions involving the process of scientifically through experiments to prove the truth of a matter that is studied to increase basic science process skills in students (Ambarsari, Santosa, and Maridi, 2013). Scientific attitude of students who learn to learn inquiry social interactions is better than a scientific attitude of students who learn the conventional learning model (Santiasih, Marhaeni, and Tika, 2013). The learning approach that considered can increase skill science processes and student learning outcomes i.e. the media environment of the school and learning inquiry social interactions, for it was in this study will try to apply learning inquiry social interactions and learning science-driven media environment of the school to find out how to increase its influence on the results of the study, the science process skills, scientific attitude, and mastery of the concepts students.

Learning activities are activities of sans in spots for you and fun atmosphere because students learn things that are contextual. Contextual in nature because the material is learning generally many of which relate to the events that are found in nature around by students. One of the learnings that can help students develop the ability of the scientific work and the ability to understand the concepts of science and its application in everyday life is a skilled process (Isnaningsih, and Bimo, 2013).

The study aims to develop a school program to improve skills in the process of science that began in the 1960s. The eternal Problem in education science concerning the emphasis to be given to the methods of science on Science process skills in the school curriculum (Ergul, Simsekli, Calis, Ozdilek, Gocmencelebi, and Sanli, 2011). Studies around the world have revealed important issues in it that the increase in the percentage of students who are not interested in science. Many students, especially women, have negative feelings and attitudes toward science, which hinder them from continuing with the scientific investigation (Hacieminoglu, 2016). Of the two studies, the notion that traditional teaching and more reliance on textbooks could be responsible for the increase in negative attitudes about science students (Hacieminoglu, Yilmaz-Tuzun, and Ertepinar, 2009) and the teacher does not teach about process skills Science first and does not encourage students to seek (Ergul, Simsekli, Calis, Ozdilek, Gocmencelebi, and Sanli, 2011).

Mastery concept is defined as the ability of the students obtained after the tackle in the learning program to do how far learning objectives can be achieved, i.e., mastery of cognitive ability that can be achieved after the students Learning (Uno, and Satria, 2012). Mastery of the concepts students are measured using the test, i.e. multiple choice tests.

The scientific attitude as a character is owned by scientists of Science (Hendracipta, 2015) as measured by the six indicators are: (1) the attitude of wonder (curiosity); (2) careful attitude, (3) honest/objective; (4) open attitude; and (5) diligent attitude. The scientific attitude is measured using a non-IE test observation sheet.

Science process skills in definition as scientific skills to find the facts, concepts or theories of (Sudaryanti, 2015) as measured by the five indicators of talent the process of science, namely: (1) experiments; (2) observation; (3) predict; (4) concludes, and; (5) to communicate. Science process skills of students were measured using a non-tests observation sheet.

Based on the above of the description, the teacher should devise activities refer to activities found for learning to be better than just recite the entire process and cultivate knowledge. This effort will encourage students to have meaningful knowledge through mastery of concepts, scientific processes, and attitude skills of students. Seen from the advantages of exploiting media school environment with inquiry approach at a time when the learning took place then the implement guided inquiry learning model is considered able to improve learning outcomes, process skills Science, scientific attitude, and mastery of the concepts students.

METHODS

This research uses Quasi-Experimental methods (quasi-experimental) design with Nonequivalent Control Group Design (Sugiyono, 2012). Nonequivalent Control Group Design that is almost the same design with pre-test – post-test control group design this design, with only the experimental group or the control group, was not selected at random in the study which became population is fourth Grade SD in Leuwimunding that Sub-districts are ranking his school including a group of Papak. SD se-Leuwimunding Sub Papak Groups consisting of 5 schools as SDN Ciparay I, SDN Ciparay II, SDN Ciparay III, SDN Rajawangi I and SDN Rajawangi II.

Engineering data collection using the techniques of tests and nontest. Data collection instruments used is a matter of pre-test and post-test in the form of multiple choice and essay to measure the understanding, learning, observation sheet implementation guidelines for interviews, as well as documentation. Data analysis techniques used in this research is the analysis of quantitative data and qualitative data. Quantitative data analysis techniques include: (1) a test of normality; (2) the average similarity test; (3) a test of proportions; (4) test improved understanding of science concepts and process skills; and (5) test N-gain. Qualitative data analysis techniques using an interactive model that consists of three main components, namely the reduction of the data, the presentation of data, and the withdrawal of the conclusion.

RESULTS AND DISCUSSION

Test instrument test was done in the class test in SDN Rajawangi I. multiple choice Question that adds up to 25 items reserved so that obtained results 18 reserved a valid and reliable.

Normality test using SPSS Kolmogorov Smirnov obtained: (1) the results of a data concept mastery 0.61 > 0.05, then H_0 is accepted and Gaussian; (2) the results of the scientific attitude data 0.66 > 0.05, then H_0 is accepted and Gaussian; (3) the results of the science process skills are data 0.87 > 0.05, then H_0 is accepted and normally distributed.

Application of the Guided Inquiry models to the study of science learning of heat transfer material at SDN Ciparay II Leuwimunding Sub-district Majalengka Regency is running according to plan instruction. Here there are data on average score class control and experimental class students as presented in Table 2.

Table 2. The Average Score of The Control Class and Classroom Experiments

Variable	Control class	Experiment class
Mastery of the concept	75.89	83.33
The scientific attitude	76.19	81.95
Science process skills	75.89	81.88

Based on Table 2 it can be seen that the average value of grade controls on tests mastery of 75.89, and increased to 83.33 on the results of the experimental class, the value of the average grade on tests of scientific attitude control of 76.19, and increased be the result of experimental classes at 81.95, and the average value of grade controls on tests of critical thinking skills of 75.89 and increased to 81.88 on the results of experimental classes. This is due in class experiments; students are taught with the model inquiry social interactions that lead to student's ability in finding information/data of a given issue to make this class students are becoming more familiar. Whereas in the control classes, students are taught with conventional learning such as lectures and discussion groups. Students

not directly involved in the learning process, just move the existing answers in the book Science package fourth grade to categorized as given. This resulted in the students being unable to complete the answers and look for weaknesses of the matter which is shaped like the problem or situation.

Score N-gain mastery of the concept of class and class control experiments on an individual basis can be seen in Table 3.

Table 3. Score N-gain Mastery of The Concept Control Class and Experiment Class

N-gain	Control class (%)	Experiment class (%)
Low	7.46	2.90
High	20.90	47.83

Based on Table 3 it can be seen that the recapitulation of the N-gain mastery of the concepts individually on the control class shows 5 students (7.46%) experience increased mastery of the concept of the category is low, 48 students (71.64%) experience increased mastery of the concept of the category being and 14 students (20.90%) experience increased mastery of the concept of higher category. While recapitulating the value gain mastery of the concepts individually on classroom experiments 2 students (2.90%) experience increased mastery of the concepts of low category, 34 students (49.28%) experience increased mastery of the concepts and categories of 33 students (47.83%) experience increased mastery of the concept of higher category. This is due to a mastery of concepts in class experiments makes it easy for students to understand the concepts and procedures in doing precisely on heat transfer material using the inquiry model of social interactions. Whereas in the control class mastery students less immersive due to using a contextual model that results in students understand the concept of applying heat transfer material.

The results of the analysis of score N-gain scientific attitude on class control and experimental classes in classical can be seen in Table 4.

Based on Table 4 it can be seen that the score N-gain scientific attitude on the control class shows an increase of 47.98 in the initial meeting and an increase of 76.19 at the last meeting. While in class experiments showed an increase of 49.56 on the initial meeting and an increase of 81.95 at the last meeting. This is due to the attitude of the scientific experiment class was a class of control because in class experiments using model guided inquiry learning, student of many self-employed to be able to study the process of invention itself to foster an attitude of scientific and adapted to real life is there, so that students can impart scientific attitudes as a character in learning science.

Table 4. Score N-gain Scientific Attitude Control Class and Experiment Class

Category	Control class	Exsperiment class
S_{first}	47.98	49.56
S_{Last}	76.19	81.95
N-gain	0.54	0.64
Criteria	Medium	Medium

The results of the analysis of score N-gain science process skills gain on the class of the control and experimental classes in classical can be seen in Table 5.

Table 5. Score N-gain Science Process Skills Control Class and Experiment Class

Category	Control class	Exsperiment class
S_{first}	47.98	48.88
S_{Last}	75.89	81.88
N-gain	0.55	0.67
Criteria	Medium	High

Based on Table 5 can be seen that the recapitulation of the science process skills gains value in the control's class on classical shows an increase of 47.98 in the initial meeting and an increase of 75.89 at the last meeting. While in class experiments showed an increase of 48.88 in early meetings and an increase of 81.88 at the last meeting. This is due to the skill of the process of science class experiment is better than on the control class for class experiments using model guided inquiry, students can actively build their knowledge through real experience by watching objects and phenomena with the senses, classify, communicate ideas, create a design (prediction), and concluded based on the observations of an object or event.

The magnitude of increased mastery of concepts, scientific process skills and attitudes of science students known with trials gain normalization. Based on the calculation of score N-gain, obtained the data as presented in Table 6.

Table 6. The Average Score of N-gain in The Control Class and Experiment Class

Variable	Control class	Experiment class
Mastery of the concept	0.56	0.61
The scientific attitude	0.54	0.64
Science process skills	0.53	0.67

Based on Table 6 it can be seen that the average value score gain grade controls on tests mastery of 0.56 and improved to 0.61 in the classroom experiment, average value score gain grade controls on tests of scientific attitude of 0.54, and increased to 0.64 in the classroom experiment, average value score gain grade control on process skills test sans of 0.53, and increased to 0.65 on the results of experimental classes. This shows that the average score gains N-gain in the classroom experiment is better compared to the control class.

Increasing mastery of concepts, scientific attitude, science process skills and analyzed using one-way ANOVA test with SPSS. Based on data obtained as presented in Table 7.

Table 7. Analysis using One-way ANOVA Test with SPSS

Variable	Sig.
Mastery of the concept	.000
The scientific attitude	.001
Science process skills	.003

Based on Table 7 can be seen that an increasing mastery of concepts, scientific attitude, science process skills and analyzed using one-way ANOVA test with SPSS. Based on the data obtained for the mastery of concepts, known the results of Sig of 0.000 < 0.05, so can be said that there is a growing mastery of the concepts students. Based on data obtained for scientific attitude, results of Sig of 0.001 < 0.05, so can be said that there is a growing scientific attitude of the students. Based on the data obtained for the science process skills, note the results of Sig of 0.003 < 0.05, so it can be said that there is a growing process skill science students.

CONCLUSION

Based on the results of research that has been elaborated can be expressed as the following conclusions; Application of the Inquiry approach to social interactions influence on mastery of concept namely an increase in the value of the N-gain in the category are currently with the score reaching 0.61; Application of the Inquiry approach to social interactions influence the scientific attitude, namely an increase in the value of the N-gain in the category is currently with the score reached 0.64; Application of the Inquiry approach to social interactions influence on Science process skills, namely an increase in the value of the N-gain in the medium category score reaches 0.65; Inquiry approach to social interactions to increase mastery of concepts, scientific attitude and science process skills, the value of the Sig gained less than 0.05 so that it can be concluded that there is a mastery of concepts, scientific attitude and science process skills students after Inquiry approach applied social interactions with the media environment of the school.

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