Journal of Primary Education
9 (4) (2020) : 398–407

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

The Effectiveness of Guided Inquiry-Based of Interactive Media to Increase Interests and Learning Outcomes

Primanita Alfiyani[1]✉ , Sri Sulistyorini[2], Bambang Subali[2]
[1.] SDN Pati Kidul 01, Pati, Jawa Tengah Indonesia
[2.] Pascasarjana, Universitas Negeri Semarang, Indonesia

Article Info

History Articles
Received:
25 March 2020
Accepted:
12 June 2020
Published:
30 September 2020

Keywords:
guided inquiry, interactive media, interesting learning, learning outcomes

Abstract

This study was based on students' low interest in learning. The renewal of learning is needed to improve students' interest and scientific literacy. The purpose of this study was to examine and analyze the effectiveness of the guided inquiry-based of interactive media to increase interest and student learning outcomes. The method used in this research was true experimental design with a form of pre-test and post-test control group design. Population in this study were students of Elementary School Pati Kidul 01. Meanwhile, sample in this study was 88 students that consists of 30 students VA as a trial class, 28 students VB as an experimental class, and 29 students VD as a control class. Student learning interest data were collected using questionnaire and analysis technique used the T test. Simultaneously, Student learning outcomes data were collected using performance tests and analyzed using the effect size and descriptive statistics. The results in this study show that guided inquiry-based of interactive media effectively increases student interest in learning as well as their science learning outcomes. It can be concluded that research on guided inquiry model which was applied to the development of interactive media has been able to increase student interest and science learning outcomes.

✉ Correspondence address:
Panglima Sudirman No.96 RT.02/RW.05 Juwanalan, Pati Kidul,
Pati, Jawa Tengah (59114
E-mail: primanitaalfiyani470@gmail.com

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

INTRODUCTION

Education plays a role as an effort and a bridge in improving the quality of human resources. National education aims to educate the nation's life by developing abilities and shaping students' character (Law No. 20 of 2003). In preparing qualified human resources as the goal of national education, the quality of education must be improved in order to achieved the ideals of the nation. The quality of education in Indonesia is still relatively low. Sujarwo (2013) explains the Political and Economic Risk Consultant (PERC) survey, the quality of education in Indonesia is ranked 12th out of 12 countries in Asia. The position is below Vietnamese. Suryana (2017) also argues that the problems of education quality does not stand alone, but is related to something interplay of systems. Furthermore, Megawanti (2015) explained that problems also arise from the input, process, to output levels. These three levels actually related to each other. Input affects sustainability in the process learning. The learning process also influences the output. It still needs improvement in terms of teaching teachers, namely education and training and teacher workshops and the character of students found in Permendikbud number 20 of 2018 about Strengthening Character Education in Formal Education Units.

Imamah (2012) conducted a finding on student science learning outcomes that shows that Constructivism-based cooperative learning combined with animated videos can improve student science learning outcomes. Achievement of learning outcomes has increased the class average from cycle I to cycle II of 10.71. Meanwhile, research from Kurnianto, et al. on Flipped Classroom (2019) shows that mean in the experimental class is 86.45 and the mean in the control class is 70.93, so that the learning outcomes in the classroom science experiment better than the score in the control class. Previous studies have shown that interest and learning outcomes are influenced by many variables. The influence of these variables is less significant and tends to fluctuate in its influence on student interest and learning outcomes.

Cooperative learning, Flipped classroom, and Discovery Learning are types of learning models based on inquiry but less significant in influencing the variables. Guided Inquiry is choosen by researchers because this model is able to facilitate students' thinking skills in a complete, systematic, and can develop science process skills so that learning outcomes can increase. Law Number 14 of 2005 concerning Teachers and Lecturers, article 1 paragraph 1, stated "Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, evaluating, and evaluating students in early childhood education through formal education, basic education, and secondary education. This means that the teacher is not just educating and teaching, but the teacher must also be able to innovate in learning. This is so that learning is not monotonous. At least the teacher knows the various learning models and learns to apply them well.

Nesi (2018) said that efforts to increase students' interest and learning outcomes in the science learning process require an appropriate learning method. Teacher's role is critical in improving student interest and student learning outcomes by changing the learning model from the general nature by changing it to a more effective learning model by applying the guided inquiry learning model. Guided inquiry is process-based learning that requires students to carry out activities such as investigative planning, observing, analyzing, interpreting data, proposing answers, formulating conclusions, and communicating (Purwati et al., 2016). The guided inquiry learning phase consists of presenting problems, formulating hypotheses, designing experiments, carrying out experiments, collecting and analyzing data, drawing conclusions (Trianto, 2011). The teacher plays an important role as a facilitator and guide for student learning activities.

The results from McKinney and Levy's (2017) research showed that inquiry learning has many advantages to assist students in

considering exploration and inquiry related to problem-solving to answer questions arise. According to Agustanti (2012) quoted by Gumilar (2019), the guided inquiry has the advantage because students will conduct research bear times, and students' curiosity will be fulfilled so that activities can be carried out with great enthusiasm and fullness of sincerity.

According to Margunayasa (2019), as quoted by Suastra (2017), he stated the type of inquiry learning that is suitable for elementary students is guided inquiry learning because they have no experience in inquiry learning. Guided inquiry is precisely implemented in the science process because the scientific field emphasizes the importance of the process of discovery by students themselves. Thus, there is a need for guidance and direction from the teacher so that students are not confused (Arslan, 2014). Furthermore, Hayuningtyas (2019) said that the tasks in a guided inquiry could be done individually and in groups. Students will be active and they can get material directly and create real experiences that make their learning outcomes improve.

According to the survey conducted by Trends in International Mathematics and Science Study (TIMSS) in 2015 it is revealed that in Science subject, Indonesia ranks 45th out of 48 countries with a score of 397. It can be concluded that the students ability in Sciences is still relatively low. In Sciences, Indonesia reached a score of 403 in PISA. Student activity in science learning, Indonesia is ranked 62 out of 70 countries with a score of 403 from an average score of 493. Although the increase in Indonesia's achievements is significant, the overall achievements are still below the OECD average. However, there is still hope that if we continue to maintain this increase, by 2030, Indonesia's achievements will be equal to the OECD.

Irawan (2017) revealed that according to population data, in the 2015-2045 period, the Indonesian population pyramid will be ideal with the majority of the population aged 25-45 years or of productive age. This pre-productive age will begin to be productive in 2030. Furthermore, Yuningsih (2019) tells about the 2030 Demographic Bonus owned by the Indonesian state, which is a saving of human resources that has the potential to be developed into capital development. Echazarra (2016) shows that the most important thing is how to carry out follow-up based on the diagnosis that resulted from the PISA diagnostic survey. Students must be familiarized with the questions of high order thinking skills.

To optimize the application of guided inquiry, we need tools to facilitate the students for interpreting their thoughts through a learning medium. Research by Ulfaeni, et al (2017) revealed that monopoly media was able to improve students' ability to understand science concepts with high criteria. Meanwhile, Khofiyah's research (2019) shows that media assistance with real objects also has the potential to improve understanding of the concept of science. Learning with concrete object intervention is able to stimulate students' understanding of concepts optimally. The learning media used in this learning are interactive learning media. Interactive learning media was choosen because designed to aim to clarify the presentation of messages, information, and can overcome the limitations of the senses, space, time, and objects or objects that are too big or too small objects that are not visible to the reasons can be presented with the help of a microscope, film, slides, or images. In a study conducted by Dewi (2017), there were significant differences in scientific attitudes in science learning between students who learned using guided inquiry models assisted by interactive media compared to conventional learning models.

Interactive learning media can arouse learning motivation and direct interaction between students and their environment. This can also improve students' interest to study individually according to their ability to improve learning achievement Zulhelmi (2017). Interest is a feeling that drives someone to do an activity or encouragement against someone else doing something. At the same time, the interest learning is the impetus that a person has to carry

out learning activities. Interesting teaching and learning process is one factor that has a significant effect on learning achievement. Students with high learning interest will get excellent learning achievements Rusmiati (2016).

Based on observations at Public Elementary School Pati Kidul 01 VD class, students are less enthusiastic during learning and tend to be passive. When learning occurs, students are less interested in participating in education so that student interest is still relatively low. This VD grader is actually smart enough, but science was considered very difficult, so students need a model or media that is suitable for the delivery of this material. The Minimum Mastery Criteria (KKM) is equal to 75 of each subject. In addition to challenging content, teachers are also less innovative using only a few learning models such as STAD, Jigsaw, and Talking Stick. If the material presented is too much, students will not be interested because the teacher does not use instructional media, so that makes students passive and less optimal in understanding the material presented by the teacher, because the model applied by the teacher is limited, this causes students to get bored quickly and have an impact on less interest in learning. This is indicated by one indicator of interest from three indicators of interest that have not been seen in learning activities.

Rusmiati (2017) states that several factors can affect student interest in learning, namely motives, attention, and subject matter, and teacher attitudes. To encourage high student interest, teachers need to increase innovation in learning, so students do not get bored because teachers often use conventional methods. To increase the students' interest in learning, it would be better if the interactive media-based guided inquiry learning model is used because the application of this model is a discovery so that it will be more meaningful. This is reinforced by the interactive media used, so students will be more interested, which causes students' interest in learning will increase so that learning outcomes also increase. The purpose of this study is to determine the effectiveness of interactive media-based guided inquiry models in increasing interest and learning outcomes of science students in grade V in Public Elementary School Pati Kidul 01. The benefits of this research are as reference material for guided inquiry models that can be developed as a means of learning discovery. In addition, this research is expected to become a basis for further researchers to develop guided inquiry according to the development of current educational technology.

METHOD

This research was an experimental design with true experimental design in the form of pre-test and post-test control group design. There were two class groups. The experimental class was treated using the Guided Inquiry model, while the control group was given using the Think Pair Share model. Think Pair Share model was used because there were similarities with guided inquiry in the learning syntax and science process, so that it is possible to obtain almost the same learning model intervention.

The population in this study were 88 students in class V of Public Elementary School Pati Kidul 01 consisting of 30 students VA, 28 students VB, and 29 students VD Pati in Pati District, Pati Regency. The sampling technique uses a probability sampling technique, the type of simple random sampling, that is, sampling of members of the population is done randomly without regard to strata that exist in that population. The researchers chose Class VB as the experimental class and class VD as the control class.

Variables in this research are the Guided Inquiry Model (Independet variable), Learning Media (Independent variable), Interest (dependet variable), and Learning Outcomes (dependent variable). Data collection obtained were test results of learning outcomes and questionnaire responses to learning Guided Inquiry Model and student learning interest. Test questions were carried out twice, namely pre-test and post-test. A pre-test was given before

the treatment, and post-test was given after the treatment. Data analysis techniques were prerequisite test research including normality test, homogeneity test, and hypothesis testing, which includes effect size test, descriptive statistic, t-test, normalized, and linear regression. The terms of the effectiveness of the effect size, descriptive statistics, and the T test can be seen from the increase in the average value of interest and student learning outcomes in the control class and the experimental class. Then, the regression test can be seen from the positive relationship of two variables, namely student interest and learning outcomes.

RESULTS AND DISCUSSION

The normality test results in this study include the normality test in the control class and the normality test in the experimental class. Analysis of the normality test using the Kolmogorov-Smirnov test. Based on the SPSS output in Table 1 and Table 2, the normality test data is normally distributed, because the significance value is more than 0.05. Significance value in the experimental class was 0.089 and the control class was 0.200.

Homogeneity test results on the variables of student interest in learning and student learning outcomes in science. Based on the SPSS output, the significance value of the homogeneity test is 0.771 and 0.559, more than the significance of 0.005, and the assumption of normality be met. In conclusion, the data tested has a homogeneous variance in the aspects of assessment, and the questionnaire items given to each element in the sample apply proportionally. The results of normality tests in the control class are presented in Table 1. Meanwhile, the normality test in the experimental class is summarized in Table 2.

Table 1. Test for Normality in The Control Class

One-Sample Kolmogorov-Smirnov Test		
N		30
Most extreme differences	Absolute	0.18
	Positive	.0.18
	Negative	-0.08
Test statistic		0.18
Asymp. sig. (2-tailed)		0.20

Table 2. Normality Test in The Experimental Class

One-Sample Kolmogorov-Smirnov Test		
N		59
Normal parameters a,b	Mean	82.36
	Std. deviation	6.96
Most extreme differences	Absolute	0.10
	Positive	0.10
	Negative	-0.08
Test statistic		0.10
Asymp. sig. (2-tailed)		0.09

To determine the effectiveness of interactive media-based guided inquiry models on student learning interests, data processing uses the Effect Size Test. The results are summarized in Figure 1.

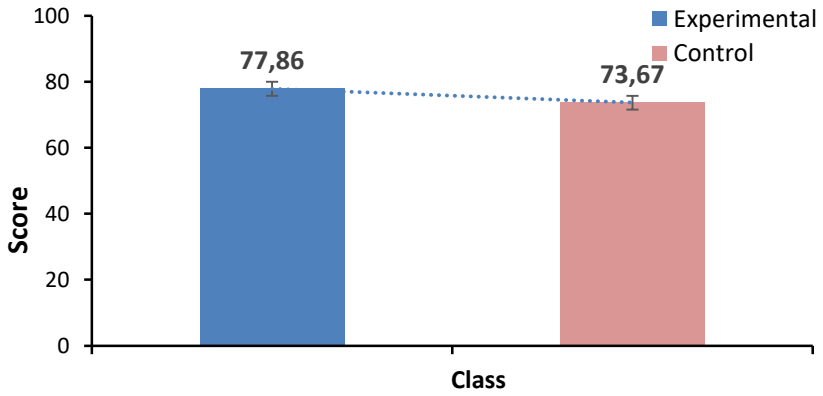

Figure 1. Effectiveness Score of Guided Inquiry Model

Figure 1 shows an impact of increased interest and learning outcomes in the experimental and control groups, shown in the connection between the two bars as a result of the implementation of interactive media-based on Guided Inquiry learning model. The Y-axis represents the student's mean score and the X-axis represents the experimental and control classes. The science learning outcomes in the experimental group was 77.86 and control group was 73.67. It was concluded that the the interactive media-based on Guided Inquiry learning model increasing student interest. Furthermore, to test students' interests in the experimental class, quantitative analysis using descriptive statistics is presented in Table 3.

Table 3. Descriptive Statistics on Student Interest in Learning

	N	Range	Min	Max	Sum	Mean	SD	Variance
Student interest in learning	29	16	73	90	2438	84.07	4.242	17.995

Based on Table 3, the minimum value in the experimental class is 73, and the maximum value in the experimental class is 90. The mean value in the experimental class was 84.07, and in the control class was 78.00, so the science learning outcomes in the experimental class were better than the value of science learning in the control class.

The guided inquiry model learning was quite influential in increasing students' interest in learning. The inquiry approach is the concept of learning, where the teacher does not merely provide knowledge to students. Students must build their knowledge in their minds. For students to feel interested and motivated to learn, a learning approach using the right media is needed. In this research, Macromedia Flash 8 Professional software was employed as a learning medium with the Guided Inquiry approach to increase student interest and understanding.

This is consistent with research conducted by Wahyudin (2010), that by implementing the guided learning model student interest would improve significantly. In this research we obtained student responses to teaching process was 72.90% 76.81% before and after action, respectively. Meanwhile, Erinda et al. (2018) in their research, they developed a guided inquiry-based plant diversity module home science process skill with character. The results of the product validation and trial show that the guided inquiry diversity of the home science process skill module has a proper and effective character in improving student learning outcomes and interests.

Data processing using a t-test was conducted to determine the effectiveness of interactive media-based guided inquiry models on student learning outcomes. The results are summarized in Table 4 for test results in the control class and Table 5 for the experimental class.

Table 4. t-test of Learning Outcomes in Control Class

	Mean	N	Std. Deviation	Std. Error Mean
Pre test	56.90	30	9.061	1.654
Post test	80.20	30	6.392	1.167

Table 5. t-test of Learning Outcomes in Experimental Classes

	Mean	N	Std. Deviation	Std. Error Mean
Pre test	54.66	29	8.178	1.519
Post test	84.59	29	6.915	1.284

The acquisition of science learning outcomes for students in the experimental and control classes is presented in Figure 2.

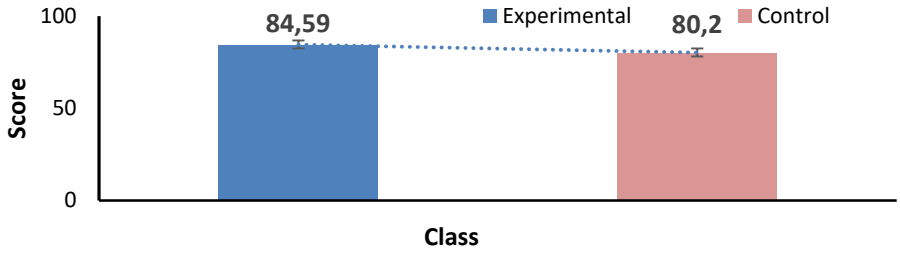

Figure 2. Average scores on Student Learning Outcomes

Based on the explanation of Table 4, Table 5, and Figure 2 that the average value in the experimental class is higher compared to the control class. In Figure 2, the relationship between the two bars is shown, which means that there is an increase in the average value of student learning outcomes in the experimental and control classes. the Y-axis shows the average score of students' science learning outcomes and the X-axis shows the experimental and control classes. There is a significant influence in the Guided Inquiry Model on Student Learning Outcomes in the experimental class compared to the control class.

The score for the students' answers in the control class shows an average 80.2 from the Minimum Mastery Criteria (KKM) score limit, which is 75. The questions consist of 25 items on the material of heat and its displacement. The indicators of this material are (1) analyzing sources of heat energy in everyday life; (2) identify objects around which can conduct heat; (3) Demonstrating activities to differentiate heat and its displacement. The student's answer score has reached the Minimum Mastery Criteria (KKM), but better learning outcomes are needed with the treatment of discovery-based learning models that will be presented in the experimental class.

The score for the students' answers in the experimental class shows an average 84.59, which is better than the score in the control class. Guided inquiry provides students with critical thinking using scientific steps. One indicator of guided inquiry is conducting an experiment. Question number 15 shows a contextual form that allows students to process their thoughts because in this process, students get facts and concepts from the object under study so that it affects students' critical thinking.

Question 30 also provides a project for students to analyze more deeply about heat transfer from sea breeze to land. This question affects students in high-order thinking skills with blended learning syntax processing. This is what distinguishes learning in the control and experimental class. Critical questions like this that can spur students to learn discovery So that students are able to get optimal learning outcomes scores.

Guided Inquiry-based learning based on interactive media directly influences student learning conditions, which also affects learning outcomes. Azis (2016) in his research showed an increase in students' cognitive learning outcomes with an average N-gain 0.72 and a significance value of $0.00 < \alpha = 0.05$, growing and increasing students' science process skills in aspects of formulating problems, observing, making hypotheses, and making conclusions. Sarianti et al. (2019) revealed that the Relating, Experiencing, Applying, Cooperating, and Transfering (REACT) Guided Inquiry learning model effectively improves learning outcomes. The students' chemistry learning outcomes reached an average value of 76.25 or the medium category from the calculation and analysis of the data, so it can be said that guided inquiry learning with a REACT strategy is quite effective.

The findings of this study indicate that the implementation of interactive media-based Guided Inquiry can increase student interest and learning outcomes in class V in Public Elementary School Pati Kidul 01. Based on the calculation of effect size test, which shows the impact of increased interest in learning in control class and experimental class from an average of 73.67 to a score of 77.86. At the same time, the effectiveness of student learning outcomes was analyzed by t-test. The average value in the experimental class was higher, equal to 84.59 compared to the control class, with an average score of 80.20.

Similar research conducted by Yuniastuti (2013) was only able to increase learning completeness. Similarly, research conducted by Siregar and Natalia (2019) which shows the Guided Inquiry model has an effect on student learning outcomes but is less significant (N-Gain = 0.72). Even though they have high N-gain data, the scientific and inquiry process by students is less meaningful, because there is no combination and collaboration from other learning media. The findings indicate that the Guided Inquiry model is not yet fully effective if it is not manipulated with discovery-based learning media. But, in this study, from the calculation of the analyzed data and empirical and theoretical studies examined, it can be seen that the Guided Inquiry model based on interactive media, is effective in significantly increasing student interest and learning outcomes.

In this study using the help of interactive media in the form of interactive learning videos, which directly affect and foster student enthusiasm for learning, because interactive video content is presented in the form of contextual discussion and an easy-to-understand language of instruction, so students' interest in learning increases which is followed by increasing learning achievement student.

CONCLUSION

The evidences collected from the research show that guided inquiry-based of interactive media have a significantly increases students interest in learning as well as their science learning outcomes. The suggestion in this research is the implementation of the Guided Inquiry model will be more optimal, if collaborated with contextual and innovative learning media, so that the meaningfulness of learning will continue well following the learning objectives to be achieved.

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