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USING INQUIRY-INTERACTIVE DEMONSTRATION LEARNING TO ENHANCE STUDENTS' LEARNING OUTCOMES

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ABSTRACT

This study aims to determine the effect of inquiry-interactive demonstration learning on student learning outcomes in the topic of material classification and changes. This type of research was a quasi-experiment with the post-test only control group design technique. The experimental class used Inquiry-Interactive Demonstration, and the control class used expository learning. The research instrument consisted of 20 multiple choice questions that had been validated by evaluation experts and tested for validity and reliability. Data analysis used a t-test. The results showed that students' learning outcomes is better when student are thought by Inquiry-Interactive Demonstration learning rather than by expository learning.

KEYWORDS: Inquiry, Interactive Demonstration, Science Learning, Learning Outcomes

1. INTRODUCTION

Science learning is a process that is closely related to observation and inquiry activities (Kemendikbud, 2016). Based on Permendikbud No 22 of 2016, one of the principles of natural science learning is students from being told to finding out. Science learning emphasizes direct experience to develop competencies, so students can understand the nature around them through the process of finding out and doing. It will help students to gain a deeper understanding. The skills in finding out and doing are called the inquiry process skills (Trianto, 2010).

Based on observations of learning at SMPN 20 Surakarta, science learning is still conducted in one direction by verbal delivery to students (expository learning). The teacher is the primary source of all information and knowledge. Students are not invited directly to find their knowledge, resulting in students becoming uninterested in science lessons. It results in students not having a deep understanding, which then results in suboptimal learning outcomes (Amanda et al., 2014).

A learning outcome is a process that is marked by changes in a person (Sudjana, 2009). Changes, in this case, are shown in various forms of behavioral changes and changes in other aspects that exist in each individual who learns. The existence of low learning outcomes of students, in the realm of knowledge, requires more attention for teachers to be able to overcome them.

One of the lessons expected to overcome these problems is an inquiry. An inquiry is one of student-centered learning that is recommended to be applied in the 2013 Curriculum. Inquiry learning emphasizes student thinking processes. Students will be invited directly to find their knowledge through scientific activities (Gulo, 2002; Hamalik, 2004; Hamnuri, 2012).

A study shows that learning science by inquiry can improve student knowledge through direct scientific experience compared to receiving knowledge from the teacher (Jerrim et al., 2019). One level of inquiry learning, according to Wenning (2011), is Interactive Demonstration. Interactive demonstration learning is one of student-centered learning. At this level, students are involved in explaining, predicting, identifying, and completing alternative concepts (prior knowledge experience) (Wenning, 2011). The interactive demonstration consists of teacher demonstration activities. Through demonstration activities, they help students connect concepts with the real world (Miller et al., 2013).

2. MATERIAL AND METHODS

This research method was quasi-experimental. The form of research used was a quasi-experiment design with posttest only control group design. The design in this study can be seen in Table 1.

Table 1. Research Design

Group	Treatment	Posttest
Experiment (E)	X_1	O_1
Control (K)	X_2	O_1

(Creswell, 2012)

The population in this study were all VII grade students of SMPN 20 Surakarta. Sampling in this study was purposive sampling. The samples in this study were class VII A and VII B. Class VII B as the control class were treated with the lecture method and class VII A as the experimental class was treated with the Inquiry-Interactive Demonstration learning model.

The data collected were in the form of quantitative data results from students' posttest scores on the material classification material and its changes. The instrument used was in the form of 20 multiple choice questions that had been validated by experts.

Analysis of the data used in this study was the t-test. Data analysis used the help of IBM SPSS Statistics 25. Data analysis began with a prerequisite test that was normality test and homogeneity test to determine the type of statistics used. The normality test in this study was to use the Kolmogorov Smirnov test. The homogeneity test in this study was to use the Levene test.

3. RESULTS

The data obtained in this study were in the form of students' initial ability data and posttest scores on the topic of material classification and its changes. The students' initial ability scores were obtained from the test scores on the previous material, the measurement topic. To find out the initial abilities of students, a different test was carried out using the t-test. The different tests began with the prerequisite test, namely, normality and homogeneity. Table 2 below summarizes the normality of students' initial ability tests.

Table 2. Results of Normality Tests for Students' Initial Ability

Treatment Class	Data Type	*Asymp.Sig*	α	Criteria
Experiment	Initial ability score	0,099	0,05	Normal
Control		0,062	0,05	Normal

Based on Table 2, it is known that the initial ability scores of students are normally distributed with Asymp. Sig <α. Homogeneity testing was then performed, with the results in Table 3 below.

Table 3. Results of Homogeneity Test for Students' Initial Ability

Treatment Class	Data Type	*Asymp.Sig*	α	Criteria
Experiment	Initial ability score	0,174	0,05	Homogeneous
Control				

Based on Table 3, it is known that the Asymp. Sig value <α, so it can be concluded that the initial ability data of both classes are homogeneous. Then the students' initial ability test was conducted using the two-tiled t-test.

Table 4. Results of T-Test of Students' Initial Ability

Treatment Class	*Sig. (2-tailed)*	α	Conclusion
Experiment	0,318	0,05	There is no difference in the initial abilities of students in the two classes.
Control			

Based on Table 4, it is known that Sig. (2-tailed)> α, meaning that there is no difference in initial ability between the experimental and control classes. After knowing that both classes had the same initial ability, then a one-tiled t-test was performed to determine the learning model that had a higher learning outcome value.

The second data in the form of students' posttest scores were obtained after students received treatment in the form of learning Levels of Inquiry-Interactive Demonstration in the experimental class and expository learning in the control class. Table 5 below summarizes the normality test of students' posttest scores after receiving treatment.

Table 5. Normality Test of Posttest Scores

Treatment Class	**Data Type**	***Asymp.Sig***	**α**	**Criteria**
Experiment	Post-test Score	0,132	0,05	Normal
Control		0,092	0,05	Normal

Based on Table 5, it is known that the value of Asymp.Sig> α, so it can be concluded that the posttest score data in both classes are normally distributed. Table 6 below summarizes the homogeneity test of students' posttest scores after receiving treatment.

Table 6. Homogeneity Test of Posttest Scores

Treatment Class	**Data Type**	***Asymp.Sig***	**α**	**Criteria**
Experiment	Post-test Scores	0,454	0,05	Homogeneous
Control				

Based on Table 6, Asymp.Sig> α is obtained, so that student learning outcomes in both classes are homogeneous. Furthermore, hypothesis testing was performed to determine the learning model that had a higher learning outcome score. Hypothesis testing used the one-tailed t-test. Table 7 below summarizes the results of the t-test.

Table 7. T-Test Results of Posttest Scores

Treatment Class	***Sig. (1-tailed)***	**α**	**Conclusion**
Experiment	0,007	0,05	Student learning outcomes in the experimental class are higher than the control class.
Control			

Based on Table 7, it is known that the value of Sig. (1-tailed) <α, meaning that the learning outcomes in the realm of knowledge of students who are treated with Levels of Inquiry-Interactive Demonstration learning are higher than students who are given expository learning treatment.

4. DISCUSSION

Learning outcomes in the realm of knowledge are essential as one of the benchmarks of student success. Learning outcome as a measure of the extent to which the learning system provided by the teacher is successful or not. A teaching and learning process is said to be successful if the desired basic competencies are achieved. Based on the results of the analysis that has been done, the learning outcomes in the realm of knowledge of students who were given the treatment of inquiry-interactive demonstration learning were higher than students who were given expository learning. These results are in line with other studies that show that interactive demonstration learning can improve student learning outcomes (Wijaya et al., 2012; Annisa et al., 2014). Furthermore, various studies show that interactive demonstration learning is effective in enhancing critical thinking skills, analytical skills, mastery of concepts, problem solving abilities, and reducing student misconceptions (Sulistyo, et al, 2018; Fakhrurrazi, et al, 2019; Azizah, et al, 2016; Jauhariyah, et al, 2018).

The difference in student learning outcomes in the experimental group, which is higher than the control class, is because the influence of the learning model applied. The interactive demonstration is constructivism learning that is centered on students. Interactive demonstration learning aims to invite students to explain and make hypotheses that involve teachers to identify, deal with, and resolve alternative conceptions (Wenning, 2011). Through the learning phase, which consists of observation, manipulation, generalization, verification, and application, it can make students active in constructing their knowledge. Active learning is the existence of interaction between students and teachers, optimizing the use of all the potential possessed by students so that they have the opportunity to achieve satisfactory learning outcomes (Suprijino 2010).

Through the interactive demonstration learning phase, it actively involves students in asking questions, analyzing problems, making predictions, conducting simple experiments, and collaborating with other students. The demonstration by the teacher by giving students inquiry questions aims to focus the attention of students on analyzing the problems that arise from the demonstration. Through demonstration activities, students will be more interested and make students learn about concept illustrations that are connected to the real world (Miller et al., 2013). Meanwhile, expository learning is teacher-centered learning. Expository learning, which is one-way, is all information and knowledge are sourced from the teacher's verbal explanation. Learning, which is done in one direction, will make student understanding only temporary because student understanding does not originate from his findings.

5. CONCLUSION

Applying appropriate learning can improve student learning outcomes. Based on the results of the analysis and discussion, it can be concluded that the application of Interactive demonstration learning can effectively develop student' learning outcomes in the realm of knowledge compared to expository learning. Through Interactive demonstration learning, students' learning outcomes is higher than expository learning.

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