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The effect of the implementation of the guided inquiry learning method and achievement motivation on the learning achievement of class VII students of SMP Muhammadiyah 4 Singosari

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ARTICLE INFO	ABSTRACT
<p>Article History:</p> <p>Received : 06-11-2021</p> <p>Accepted : 27-12-2021</p> <p>Published : 31-12-2021</p>	<p>One method that can provide opportunities to construct knowledge and develop students' abilities is the guided inquiry method. This study aims to determine: (1) the effect of student achievement with guided and conventional methods of inquiry; (2) the effect of student achievement with high and low achievement motivation; (3) the interaction between inquiry learning strategies and achievement motivation on science learning achievement. The samples used were two classes, namely the experimental class (guided inquiry method) and the control class (conventional method). The data obtained were analyzed by ANOVA test. Based on the results of the analysis, the following results were obtained: (1) student achievement using the guided inquiry method was higher than student achievement using conventional learning methods; (2) students who have high achievement motivation abilities show higher science learning achievements than students who have low achievement motivation abilities; (3) There is no interaction between guided inquiry learning strategies and motivation on science learning achievement.</p>
<p>Keywords:</p> <p>achievement motivation, guided inquiry, learning</p>	<p>Copyright © 2021 Universitas Negeri Jakarta</p>
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1. INTRODUCTION

The nation's generation needs the education to develop existing technology to produce an advanced country. One branch of instruction in schools is the subject of Natural Sciences (IPA). In the information age like now, science learning must change. Students should no longer be treated as recipients of knowledge from teachers only, but students must be used as active, critical, and creative learning agents. In contrast, teachers act as facilitators, mentors, and supporters. Based on this, it is necessary to

have a learning process. One of the most widely used methods is the conventional method. In this method, the teacher conveys the material orally, while the students only listen, take notes, ask questions, and evaluate. Traditional methods (lectures) that are less inspiring will reduce students' enthusiasm for learning^[1]. It can seem that the conventional approach in question is a learning process that is dominated by the teacher as a "transfer" of knowledge. At the same time, students are more passive as "recipients" of expertise^[2]. The cooperative learning model is a learning model that helps students develop understanding and attitudes by real life in the community. Working together will increase motivation, productivity, and learning achievement^[3].

Cooperative learning refers to a variety of teaching methods in which students work in small groups to help each other learn the learning material^[4]. Applying an appropriate method in the learning process can construct their knowledge and develop students' abilities. One of these methods is the guided inquiry method. Excellence recommended inquiry method (guided inquiry) actively stimulates students' desire to be involved in the mental process through observation, measurement, and data collection to conclude. The series of learning activities in this model emphasizes critical and analytical thinking processes to find and answer a question in question^[5].

The excellence model of guided inquiry (guided inquiry) is expected to be centered on student learning to improve student achievement. There are differences in understanding concepts and science process skills between students who follow the guided inquiry learning model and students who follow the direct learning model with a value of $F = 10.349$ and a significance level of $p < 0.05$ ^[6]. In the learning process that the teacher must consider, motivation also plays an essential role in the learning process. The reason is one of psychological aspects that encourage individuals to choose, carry out and direct their activities. The higher a person's motivation, the more likely he will carry out his duties or activities^[7] successfully. According to research that has been done, there is a positive influence between achievement motivation on learning achievement in accounting for students of class X Accounting at SMK N 1 Batang by 8%. Laksono also conducted the same research in 2009, which stated that achievement motivation had a significant effect on accounting learning achievement in class XII social studies students at SMA N 1 Sulang Rembang. From the results of his research, the results of the t count were 6.667 with a P-value of $0.000 < 0.05$ ^[8].

The success of student learning cannot be separated from the students' motivation. Therefore, achievement motivation is a factor that will determine student learning success. The success of one's learning in education can be seen from learning achievement. Learning achievement is a benchmark that can indicate student success in learning activities. Motivation is expected to produce better learning achievement with the correct method and supported by student achievement.

2. METHOD

The experimental group used a guided inquiry learning strategy (guided inquiry), while the control group used conventional learning strategies. The design of this study is presented in Table 1.

Table 1. Research Design

		Learning Strategy (A)	
		Guided Inquiry (A ₁)	Learning Conventional (A ₂)
Moderate Variable	Independent Variable		
Motivation	High (B ₁)	A ₁ B ₁	A ₂ B ₁
Achievement (B)	Low (B ₂)	A ₁ B ₂	A ₂ B ₂

In this study, there were two groups of research subjects are treated differently, namely the experimental group and control group. The research procedure can be described in Table 2.

Table 2. Research Procedure[9]

Group	Pretest	Treatment	Post test
Experiment	P ₁	X ₁	T ₁
Control	P ₂	X ₂	T ₂

Samples were taken using the technique of purposive sampling based on researchers' consideration [10]. The reviews are (1) the two classes that will use have the same ability taken from the average value of the class; (2) The two classes are homogeneous as seen from the analysis of the average class value. After asking for considerations and opinions from the study teacher, two classes were sampled, namely class VII A consisting of 30 students as the experimental class taught using the guided inquiry model and class VII C consisting of 32 students as the control class taught using the guided inquiry model. Conventional.

The instrument for measuring the ability of achievement motivation uses an achievement motivation questionnaire. The value of the student achievement motivation scale is 4 for SS (Very Appropriate), 3 for S (Agree), 2 for TS (Not Appropriate), and 1 for STS (Very Disagree). The instrument for measuring learning achievement in this study used a mixed test form, namely a combination of multiple-choice and description questions. A student's correct answer is one, while an incorrect student's response score is zero.

3. RESULTS AND DISCUSSION

Description of the achievement motivation value and the number of samples in each category of the two groups of students who study with different learning strategies are presented in Table 3.

Table 3. Description of Achievement Motivation Scores

Group	Learning Strategy	Number of Samples	Achievement Motivation Value		Average
			Highest	Lowest	
Experiment	Guided Inquiry	30	72	50	62,77
Control	Conventional	32	70	53	62,44

Table 4. Science Learning Achievement Pretest Value Based on Learning Strategies

Learning Strategy	Number of Samples	Science Learning Achievement Pretest Score		Average
		Highest	Lowest	
Guided Inquiry	30	95	84	87
Conventional	32	90	83	86

Table 5. Science Learning Achievement Posttest Value Based on Learning Strategies

Learning Strategy	Number of Samples	Science Learning Achievement Posttest Score		Average
		Highest	Lowest	
Guided Inquiry	30	98	90	94,44
Conventional	32	98	89	93,00

Table 6. Science Learning Achievement Posttest Value Based on High Achievement Motivational Ability

Group	Number of Samples	Science Learning Achievement Posttest Value		Average
		Highest	Lowest	
Experiment	15	98	92	96,00
Control	16	98	90	94,88

Table 7. Science Learning Achievement Posttest Value Based on Low Achievement Motivational Ability

Group	Number of Samples	Science Learning Achievement Posttest Value		Average
		Highest	Lowest	
Experiment	15	98	89	93,00
Control	16	98	87	92,00

Description of the results of N-gain science learning achievement on the subject learning achievement on the subject matter of temperature and displacement based on learning strategies is presented in Table 8.

Table 8. N-gain Learning Achievement in Science Based Learning Strategies

Learning Strategy	Number of Samples	N- Gain Science Learning Achievement		Average	Standard Deviation	Description
		Highest	Lowest			
Guided Inquiry	30	0,85	0,21	0,58	0,20	Medium
Conventional	32	0,84	0,20	0,52	0,20	Medium

Table 9. N-gain Learning Achievement in Science Based Motivation Capability High

Group	Number of Samples	N- Gain Science Learning Achievement		Average	Standard Deviation	Description
		Highest	Lowest			
Experiment	15	0,82	0,41	0,66	0,13	Medium
Control	16	0,82	0,22	0,62	0,10	Medium

Table 10. N-gain Learning Achievement in Science Based Motivation Capability Low

Group	Number of Samples	N- Gain Science Learning Achievement		Average	Standard Deviation	Description
		Highest	Lowest			
Experiment	15	0,85	0,21	0,49	0,20	Medium
Control	16	0,84	0,21	0,45	0,19	Medium

Normality testing in this study used the statistic Kolmogorov-Smirnov at a significance level of 5% with the help of SPSS 16.0 for windows

Table 11. Normality Test Results of Science Learning Achievement Test Data

Tests of Normality							
	LEARNING STRATEGY	Kolmogorov-Smirnov ³			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Science Learning Achievement	Guided Inquiry	.141	30	.132	.937	30	.074
	Conventional	.126	32	.200	.930	32	.039
a. Liliefors Significance Correction							

In the table 11, the results of the normality test of science learning achievement test data for both groups using the Kolmogorov-Smirnov test showed a significance (sig.) greater than 0.05 (sig. > 0.05), namely 0.132 and 0.200. Thus, the data on the science learning achievement test for the two groups were normally distributed.

Table 12. Homogeneity Test of Variance Data Science Learning Achievement Using Test of Homogeneity of Variance

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Physics Learning Achievement	Based on mean	.118	1	60	.732
	Based on median	.072	1	60	.790
	Based on median and with adjusted df	.072	1	59.968	.790
	Based on trimmed mean	.127	1	60	.723

In the table 12, the homogeneity test results the variance of the science learning achievement test data using the test of homogeneity of variance showed a significance (sig.) greater than 0.05 (sig. >0.05), which was 0.723.

Table 13. Homogeneity Test of Variance Data Science Learning Achievement Using Levene's Test of Equality of Error Variances

Levene's Test of Equality of Error Variances				
Dependent Variable : Science Learning Achievement				
F	df1	df2	Sig.	
1.163	31	30	.340	

In table 13, the results of the homogeneity of variance test using Levene's Test of Equality of Error Variances show a significance (sig.) greater than 0.05 (sig. > 0.05), which is 0.340. Thus, it can conclude that the data on the physics learning achievement test comes from of the homogeneous group. After the prerequisite tests, including the

normality test and the homogeneity of variance tes, can be met, then can continue the data calculation/analysis process.

Table 14. Results of Two-Way ANOVA Analysis

Tests of Between-Subjects Effects					
Dependent Variable : Physics Learning Achievement					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2.403 ²	31	.078	110.147	.000
Intercept	12.072	1	12.072	1.715E4	.000
STRATEGY	.053	17	.003	4.414	.000
Motivation	.039	8	.005	6.855	.000
STRATEGY* motivation	.001	30	.000	.326	.894
Error	.021	30	.001		
Total	21.004	62			
Corrected Total	2.425	61			
a. R Squared = .630 (Adjusted R Squared=.619)					

Based on the two-way ANOVA analysis test result above, F_{count} 4.4414 at a significance level of 0.000 is less than 0.05 (sig. < 0.05). Thus, H_0 rejected or H_1 accepted means differences in science learning achievement. The students learn science using guided inquiry learning strategy (guided inquiry) with students who learn science using conventional learning strategies. The difference is indicated by the average N-gain of physics learning achievement of students in the experimental group (guided inquiry) of 0.58 which is included in the medium category, while the average N-gain of physics learning achievement of students in the control group (conventional) is 0.52 which belongs to the medium category. This is due to the guided inquiry method, students are more active in the learning process, while the conventional way of learning is only centered on the teacher, and students do not play an active role in it. In the guided inquiry method, students are directly involved in the material presented by the teacher. Students find a solution to a problem by experimenting. In contrast to conventional learning, students still experience a high level of difficulty solving physics problems. Because in this learning, there is no process of linking the knowledge that already exists in students with the concepts to be studied.

Conventional learning tends to be teacher centered, meaning that teacher activities more dominate the learning process. The teacher presents and explains the material step by step. At the same time, the students only pay attention and listen to the material presented by the teacher, resulting in students being limited to remembering the concepts of the material that the teacher has delivered. These activities do not develop cooperative abilities that will affect physics learning achievement.

In this research, the theme is related to temperature and its displacement, which is presented through explanations or words and presented through experiments. For example, why the hand can not measure the temperature precisely. In giving this

problem, students pay close attention to the main problem in the experiment carried out. Direct application in presenting problems will make students better understand the problem[11]. Students can directly see the object or process related to the problem so that abstract problems become more concrete. From Table 14, it is also obtained that the F_{count} at 4.414 at a significant level of 0.000, whose value is less than 0.05 (sig. <0.05). Thus H_0 rejected or H_1 accepted, meaning that there are differences in learning achievement of science students who have high achievement motivation capability, with students who have low achievement motivation capability. The difference is shown by the average N-gain of science learning achievement of students who have high motivational abilities in the experimental group (guided inquiry) is 0.66, which is included in the medium category, while the average N-gain of science learning achievement of students who have the ability low achievement motivation in the experimental group (guided inquiry) was 0.49 which was also included in the medium category. And the average N-gain of science learning achievement of students who have high motivational abilities in the control group (conventional) is 0.62, which is included in the medium category. At the same time, the average N-gain of science learning achievement of students who have low achievement motivation abilities in the control group (conventional) is 0.45, which is also included in the medium category.

Students who have achievement motivation abilities will tend to be more active in asking questions and more responsive in responding to learning and instructions from the teacher. In contrast, students who have low achievement motivation abilities tend to be less active in asking and answering the teaching they receive. Thus the power of student achievement motivation is significant in improving science motivation abilities tend to be less active in asking and answering the teaching they receive. Thus the power of student achievement motivation is significant in improving science learning achievement. Achievement motivation plays a vital role in achieving learning achievement[12]. Other studies also prove a relationship between achievement motivation and learning outcomes in mathematics as indicated by the regression equation, namely $Y = 68.88 + 0.118x$, which is significant[13]. The two-way ANOVA analysis test results in Table 14 obtained a F_{count} of 0.326 at a significance level of 0.894, greater than 0.05 (sig. > 0.05). Thus H_0 Is accepted or H_1 rejected, meaning there is no interaction between guided inquiry learning strategies and motivation to learn science achievement. This is because during the learning process, both learning using guided inquiry learning strategies and using conventional learning strategies, students who have high achievement motivation abilities always show higher learning achievements when compared to students who have low achievement motivation abilities. In other words, students who have high achievement motivation tend to be more active during learning than students who have low achievement motivation.

This study is in line with previous research, which states that there is no interaction between learning models and achievement motivation on cognitive learning outcomes and motor skills[14]. Other studies also conclude that there is a strong main influence of independent variables and moderator variables on the dependent variable, thereby weakening the existing interactions. That is, the learning model does not have a strong (significant) interaction with achievement motivation on student achievement[15].

4. CONCLUSION

Based on the results of the study, the following conclusions were drawn: (1) There were differences in science learning achievement between students who studied with guided inquiry learning methods and students who studied with conventional learning methods; (2) There are differences in science learning achievement, between students who have high achievement motivation and students who have low motivation using guided inquiry learning strategies and students who learn science using conventional learning strategies; (3) There is no interaction between inquiry learning strategies in terms of achievement motivation on science learning achievement.

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