


## The Effect of Focusky-Aided Scientific Approach on Learning Motivation and Mathematical Reasoning Ability of Junior High School Students on Square Materials

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Article Info	ABSTRACT
<p><b>Article History</b> Received : 19 Oktober 2022 Accepted : 23 Oktober 2022 Published : 29 Oktober 2022</p>	<p>This study aims to determine whether there is an effect of a focusky-assisted scientific approach on the learning motivation and mathematical reasoning ability of junior high school students on quadrilateral matter. In this study, two classes were selected to be sampled: class VII-A was selected as the experimental class and class VII-U was selected as the control class through purposive sampling techniques, each class consisted of 30 people. In the study experiment class, the scientific approach is used, while in the study control class the exposure approach is based on the study experiment class. Based on the results of the study motivation hypothesis test, a significance score of 0.008 (<math>0.008 &lt; 0,05</math>) and <math>t_{hitung} &gt; t_{tabel}(2,764 &gt; 2,045)</math>, this indicates that there is an effect of a focusky-assisted scientific approach on the learning motivation of junior high school students on quadrilateral materials. The results of the hypothesis test of mathematical reasoning ability obtained a significance score of 0.001 (<math>0.001 &lt; 0,05</math>) and <math>dant_{hitung} &gt; t_{tabel}(3,340 &gt; 2,045)</math> suggest that there was an influence of the focusky-assisted scientific approach on the mathematical reasoning ability of junior high school students on quadrilateral matter and the results of the manova test obtained a significance of Pillai's Trace, Wilks' Lambda, <i>Hotelling's Trace</i> dan <i>Yoy's Largets Root</i> of 0,001 (<math>0,001 &lt; 0,05</math>) which means that there is an effect of the scientific approach assisted by focusky on students learning motivation and mathematical reasoning abilities of junior high school students on quadrilateral material.</p>
<p><b>Keywords:</b> <i>Scientific Approach, Focusky, Learning Motivation, Ability Mathematiaal Reasoning.</i></p>	
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### INTRODUCTION

In Law No. 1. 2 of 2003 concerning the National Education system Article 1 paragraph (1) that education is a conscious and planned effort in realizing the learning atmosphere and learning process. The success of students can be influenced, one of which is the success of their learning (Hidayat, 2022). In realizing a good learning atmosphere and learning process, it is important to establish a learning approach and medium by adapting learning materials. In the learning process, teachers are professional educators with the primary tasks of educating, teaching, guiding, directing, training and evaluating students. As a professional educator, teachers must be able to create interesting learning for students so that students become more active and motivated in learning such as using learning approaches and learning media tools. This is supported by Yogia's opinion (2017) that multimedia using scientific learning approaches is valid and effective in learning.

Mathematics is the science that plays a role in advancing human thinking. In mathematics, teachers must be able to consider five mathematical abilities: connection, reasoning, communication, problem solving and representation (NCTM, 2000). According to NCTM's standard process (2000) reasoning math is another habit

and it should be developed through consistent use in a variety of contexts, NCTM added, people who reason and think analytically tend to recognize patterns, structures, or order in both the real world and symbols. a symbol. Mathematical reasoning standards include (a) recognizing reasoning as a fundamental aspect of mathematics; (b) creating and investigating mathematical conjectures; (c) developing and evaluating mathematical arguments; (d) selecting and using various types of reasoning.

Based on previous research results that obtained data on the study results of class VII of SMPN 1 LubukPakam, it is the result of daily math test scores of students who are still under KKM, with KKM scores of 75. From this data, the percentage ratio between students who graduated from KKM and students who have not yet graduated from KKM is 31.3% compared to 69%. This is because some of the problems with mathematics at the school, such as students finding mathematics difficult and boring, material explanations still verbally and using textbooks as the main tool of learning, which means that learning is monotonous, leaving students out of focus Following mathematics studies, students' scores are still low.

In addition to obtaining student's daily value data, researchers obtained answer sheets from student tasks that showed students' mathematical reasoning abilities were lacking in solving mathematical problems. The lack of student reasoning in solving mathematical problems is influenced by the lack of precise selection of learning approaches used in conveying learning materials and objectives. So in this case, it needs an update in mathematics so that it can improve students' mathematical reasoning skills and motivate students to learn more interestingly so that students focus on learning. One approach that can be used to improve students' mathematical reasoning abilities and motivate students in learning is a scientific approach that aids learning tools such as learning media (Yogia, 2017).

An effective scientific approach is used in learning. The scientific approach focuses on the attitude and values that are expected to provide positive character development within the student, as well as the student being able to obtain a systematic solution to the problem. The scientific approach deals with objective activities that include observing, questioning, trying, reasoning and communicating (Afarat, 2018)

In addition to using a scientific approach, students are interested in learning mathematics so that learning motivation is better and provides improved student reasoning skills in mathematics, so they need teaching materials with help from media such as Focusky. Focusky is one of the software tools used as a presentation aid using the Zoom and Shift effect, which is the zooming and shifting effect. The final result of the software is EXE or video (Kusumaningtyas, 2017).

Based on the above description, researchers have the thought that it would be necessary for students to gain better learning motivation, especially learning quadrature mathematics and gain higher students' mathematical reasoning abilities by looking at the influence of focusky-aided scientific approaches, so that it is possible to understand how to understand the mathematical reasoning. He was encouraged by researchers to conduct research under the title "The Influence of Focusky-Aided Scientific Approaches on Learning Motivation and Mathematical Reasoning Ability of Middle School Students on Square Materials".

## **RESEARCH METHOD**

This study was conducted in S.MPN 1 Lubuk Pakam is on Jl. Kartini, Tj. Garbus One, Kec. Lubuk Pakam, Deli Serdang Regency, North Sumatra, 20516. The time of conducting this study in the even semester of the 2021/2022 school year is precisely on February 21 st/d of March 26, 2022.

This study is a type of quantitative research by experimental methods. Tanzeh (2009) explains that quantitative research is a model based on experience that eventually developed into problems and solutions used to obtain the truthfulness of empirical data according to facts in the field. According to Ridwan (2006) that research using experimental methods is a study that finds out about the effect that conditions are controlled between certain variables on other variables. Research by experimental methods is the study of the

experimental group according to the purpose of the study, which is to see whether or not there is any influence in giving specific actions to the experimental group to be studied such as the experimental class using a focusky-assisted scientific approach and the ability to study. Control systems do not use a focusky-assisted scientific approach.

**RESULTS AND DISCUSSION**

Before analyzing the blood, several preliminary tests such as:

**1. Data Normality Test**

Conduct a normality test to determine if the selected samples are distributed Normal or not. Data normality testing using SPSS 22.0 with the Kolmogorov-Smirnov test. In making the data normality decisions :

$H_0$  : Normal distributed population data.

$H_a$  : Population data is not normally distributed

If you get an Asympt sig. 2 tailed  $>0.05$  then  $H_0$  is accepted.

If you get an Asympt sig. 2 tailed  $< 0.05$  then  $H_0$  was rejected.

**Table 1.** The Normality of Students Motivation For Learning  
**Tests of Normality**

	Class	Kolmogorov-Smirnov <sup>a</sup>		
		Statistic	Df	Sig.
Learning Motivation Pickup	Experimental	.146	30	.105
	Pickup Pick Up Control	.120	30	.200*

According to the table above, the learning motivation score in the experimental class obtained a significance score of 0.105 and the learning motivation score in the control class obtained a significance score of 0.200. From the normality test result data that both classes have a significance value of  $>0.05$  this indicates that  $H_0$  was received which means the normality test result data on the student's learning motivationscore for experimental classes and normal distributed control classes.

**Table 2.** Pre-test Normality Tests Students' Mathematical Reasoning Capabilities  
**Tests of Normality**

	Class	Kolmogorov-Smirnov <sup>a</sup>		
		Statistic	Df	Sig.
Mathematical Reasoning Capabilities	Pre-test Experiment	.156	30	.061
	Pre-test control	.152	30	.075

It is based on the table above that the pre-test of students' mathematical reasoning ability in the experimental class obtained a significance score of 0.061 and the pre-test of students' mathematical reasoning ability in the control class obtained a significance score of 0.075. From the normality test results data that both classes have a significance value of data  $>0.05$  this indicates that  $H_0$  was received which means that the normality test results data on pre-test students' mathematical reasoning abilities for experimental classes and normal distributed control classes.

**Table 3.** Post-test Normality Test Students' Mathematical Reasoning Capabilities

		Tests of Normality		
		Kolmogorov-Smirnov <sup>a</sup>		
Kelas		Statistic	Df	Sig.
Mathematical Reasoning Capabilities	Post-test Experiment	.124	30	.200*
	Post-testcontrol	.158	30	.055

According to the table above, the post-test of students' mathematical reasoning ability in the experimental class obtained a significance score of 0.200 and the post-test of students' mathematical reasoning ability in the control class obtained a significance score of 0.055. From the normality test result data that both classes have a significance value of >0.05 this indicates that H<sub>0</sub> is accepted which means the normality test result data on the post-test of students' mathematical reasoning abilities for experimental classes and normal distributed control classes.

**2. Homogeneity Test**

Conduct homogeneity test This allows us to determine whether the two groups selected as homogeny samples or not. Data homogeneity testing using SPSS 22.0 with Levene test. In taking the data homogeneity decision as follows:

H<sub>0</sub>: population data homogeny.

H<sub>a</sub> : population dataNot homogeny.

If it gets a grade Asympsig. 2 tailed > 0.05 then H<sub>0</sub> is accepted.

If it gets a grade Asympsig. 2 tailed < 0.05 then H<sub>0</sub> was rejected

**Table 4.** Homogen TestStudent Learning Motivation Unit  
Test of Homogeneity of Variances  
Learning Motivation Pickup

Levene Statistic	df1	df2	Sig.
.117	1	58	.734

It is based on the table above that the significance value of homogeneity in the student's learning motivation score in the experimental class and control class is 0.734. From the homogeneity test result data that both classes obtained a significance value of >0.05 this means that H<sub>0</sub> was received which means that the homogeneity test result data on the student's learning motivation score for the experimental class as well as the control class were both homogeneity.

**Table 5.** Pre-test Homogeneity Test of Students' Mathematical Reasoning Capabilities  
Test of Homogeneity of Variances  
Mathematical Reasoning Capabilities

Levene Statistic	df1	df2	Sig.
.180	1	58	.673

It is based on the table above that the significance value of homogeneity in the pre-test of students' mathematical reasoning abilities in experimental classes and control classes is 0.673. From the homogeneity test result data that both classes obtained a significance value of >0.05 this means that H<sub>0</sub> was received which means that homogeneity test result data on the pre-test of students' mathematical reasoning abilities for experimental classes and control classes were both homogeneity.

**Table 6.** Post-test Homogeneity Test of Students' Mathematical Reasoning Capabilities

**Test of Homogeneity of Variances**  
**Mathematical Reasoning Capabilities**

Levene Statistic	df1	df2	Sig.
3.433	1	58	.069

It is based on the table above that the significance value of homogeneity in the post-test of students' mathematical reasoning abilities in experimental classes and control classes is 0.069. From the homogeneity test result data that both classes obtained a significance value of >0.05 this means that  $H_0$  was received which means that the homogeneity test result data on the post-test of students' mathematical reasoning abilities for experimental classes and control classes were both homogeneity.

**3. Average Similarity Test**

Test the mean similarity It needs to be done to determine the level of ability of students in the two classes selected as subjects in the study. The average similarity test is performed in pretest results, and the pretest results are compared between experimental classes and control classes to prove that the two selected classes have not significantly different initial conditions. If the average results of the two classes are not significantly different, then research can be continued. In this average similarity test, we used tests with normal distributed data with SPSS 22.0.

**Table 7.** Independent Test-Mathematical Reasoning Ability Pre-test

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Mathematical Reasoning Capabilities	Equal variances assumed	.180	.673	1.743	58	.087
	Equal variances not assumed			1.743	57.835	.087

Based on the table above that the value of significance (Sig. 2-tailed) by 0.087. Because the significance gain is >0.05 then in this case  $H_0$  is accepted. This gives the conclusion that the pre-test of the mathematical reasoning ability of experimental class students is the same as the mathematical reasoning ability of control class students, meaning that there is no pretest difference in the mathematical reasoning ability of experimental class students with control class.

**4. Test the Average Difference of Two Groups**

Variables in this study have two categories. The average difference test for two paired samples using a paired sample t-test test for normal distributed data was conducted. These differential tests were performed to analyze pre-test and post-test research.

**Table 8.** Paired Samples Test of Mathematical Reasoning Capabilities

**Paired Samples Test**

	T	Df	Sig. (2-tailed)

Pair 1	Pre-Test Experiment – Post-Test Experiment	-10.971	29	.000
Pair 2	Pre-Test Control – Post-Test Control	-11.571	29	.000

According to the table above that in pair 1 the value (Asymp.Sig) is 0.000 and the value of  $t_{number} - 10.971$ , the negative sign on the count means that the gain on the pre-test has a lower value than the value on the post-test. In pair 1 the pre-post test results in the experimental class are sig. (2-tailed)  $<0.05$  which is  $0.000 < 0.05$  meaning  $H_0$  is rejected so  $H_a$  is accepted which means that there is a difference in the mean value of the pre-test and post-test of the student's mathematical reasoning ability before and after learning. Whereas in pair 2 the value (Asymp.Sig) is 0.000 and the count value  $t_{number} - 11.571$ , the negative sign on the count means that the pre-test value has a lower value than the post-test value. In pair 2, the control-class pre-post test shows that the value of sig. (2-tailed)  $<0.05$  is  $0.000 < 0.05$  which means that  $H_0$  is rejected so  $H_a$  is accepted that there is a difference in the average value of the pre-test and post-test of students' mathematical reasoning ability before and after learning.

**HYPOTEAL TEST**

1. The hypothesis of the effect of a focusky-assisted scientific approach on students' learning motivation

**Table 9.**Independent Test T Test of Learning Motivation

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Learning Motivation	Equal variances assumed	.117	.734	2.764	58	.008
	Equal variances not assumed			2.764	55.511	.008

According to the t-test results on learning motivation, the value of Sig. (2-tailed) in the experimental class was 0.008 with a  $t_{number}$  of 2,764 herefore, based on the decision-making basis in the independent sample test, the value of Sig. (2-tailed)  $<0.05$  is  $0.008 < 0.05$  and the value of  $t_{number} > t_{table}$  is  $2.764 > 2.045$  which rejects  $H_0$  and accepts  $H_a$  which means students' learning motivation uses a focusky-based approach rather than learning. The effect of the focusky-assisted scientific approach on the learning motivation of middle school students in class VII of SMP Negeri 1 Lubuk Pakam.

2. The hypothesis of the influence of the focussy-assisted scientific approach on students' mathematical reasoning ability

**Table 10.** Test Independent T Test of Mathematical Reasoning Capabilities

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Mathematical Reasoning Capabilities	Equal variances assumed	3.433	.069	3.340	58	.001
	Equal variances not assumed			3.340	54.616	.002

Regarding the results of the mathematical reasoning tests, students obtained a Sig. (2-tailed) grade of 0.001 and a  $t_{\text{number}}$  of 3.340. Therefore, based on the decision-making basis of independent samples test that the value of Sig. (2-tailed)  $< 0.05$  is  $0.001 < 0.05$  with a  $t_{\text{number}} > t_{\text{table}}$  value of  $3.340 > 2.045$  then rejects  $H_0$  and accepts  $H_a$  which means that the student's mathematical reasoning ability uses a scientific approach. The effect of focusky's scientific approach on mathematical reasoning is greater than that of junior high school students' mathematical reasoning ability on quadrilateral matter.

3. The hypothesis of the influence of a focusky-assisted scientific approach on students' learning motivation and mathematical reasoning ability

Before performing a manova test, the following prerequisite tests should be performed beforehand:

- a. Homogeneity Test

Variance homogeneity testing is required to determine whether the data have homogeneous or non-homogeneous variant. This test was assisted using SPSS 22.0 by looking at the Levene test results

**Tabel 11.** Homogeneity Test  
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Learning Motivation Pickup Reasoning Capabilities	.117	1	58	.734
	3.433	1	58	.069

The section on the Levene test found significance in the learning motivation score was 0.734 ( $0.734 > 0.05$ ) and in the reasoning capability 0.69 ( $0.69 > 0.05$ ) this could conclude that  $H_0$  was accepted to mean that the learning motivation and the mathematical reasoning ability of the experimental class was equal to the mathematical reasoning ability of the control student. There is no difference between the learning motivation variant and the experimental class's mathematical reasoning ability with the control class.

- b. Covarian Homogeneity Test

Covariant homogeneity testing is intended to determine whether the selected data have a homogeneous or non-homogeneous variance/covariant matrix. This test was assisted using SPSS 22.0 by looking at Box's test results.

**Tabel 12.**Covarian Homogeneity Test

**Box's Test of Equality of Covariance Matrices<sup>a</sup>**

Box's M	3.534
F	1.134
df1	3
df2	605520.000
Sig.	.334

Based on the Box's test, the significance score was 0.334 ( $0.334 > 0.05$ ) it was concluded that  $H_0$  was accepted that the learning motivation and mathematical reasoning ability of experimental class students were equal to the mathematical reasoning ability of control class students, meaning that there was no difference in the covariance of learning motivation and experimental ability. Mathematical studies of experimental class students with control classes. Finished with the results of a prerequisite test that matches the requirements then the manova test can be performed, this test will be the final point of the Manova test conclusion.

**Table 13.**TestManova  
Multivariate Tests<sup>a</sup>

Effect	Value	F	Hypothesis df	Error df	Sig.	
Intercept	Pillai's Trace	.995	5174.540 <sup>b</sup>	2.000	57.000	.000
	Wilks' Lambda	.005	5174.540 <sup>b</sup>	2.000	57.000	.000
	Hotelling's Trace	181.563	5174.540 <sup>b</sup>	2.000	57.000	.000
	Roy's Largest Root	181.563	5174.540 <sup>b</sup>	2.000	57.000	.000
Kelas	Pillai's Trace	.231	8.554 <sup>b</sup>	2.000	57.000	.001
	Wilks' Lambda	.769	8.554 <sup>b</sup>	2.000	57.000	.001
	Hotelling's Trace	.300	8.554 <sup>b</sup>	2.000	57.000	.001
	Roy's Largest Root	.300	8.554 <sup>b</sup>	2.000	57.000	.001

The output of the Manova Test has two lines, one line (intercept) to see the value of change in each bound variable influenced by its free variable, while the second line (class) to see the influence of the free variable on the two bound variables simultaneously. If the Significance values present in the Pillai's Trace, Wilks' Lambda, Hotelling's Trace, Roy's Largest Root  $< 0.05$  then  $H_0$  is rejected and  $H_a$  is accepted so that there is a free variable influence on the two bound variables. Based on a simultaneous manova test, two lines, one line, the intercept, which is used to determine the value of changes in students' learning motivation and mathematical reasoning abilities, which are not influenced by the focusky-ass scientific approach, while the second line is the class used. It is important to understand the value of changes in students' learning motivation and mathematical reasoning abilities influenced by the focusky-assisted scientific approach, as it is possible to understand the value of changes in students' learning motivation and their mathematical reasoning abilities. That's the line that's used is in the second line which is the class. See table 4.16. that the Sig value for Pillai's Trace is 0.001, Wilks' Lambda is 0.001, Hotelling's Trace is 0.001 and Roy's Largest Root is 0.001. From the fourth result Sig. It is known that the value of Sig is known.  $< 0.05$  which means



$H_0$  was rejected and  $H_a$  accepted that the learning motivation and mathematical reasoning ability of students with focusky-aided scientific approaches are greater than the learning motivation and mathematical reasoning ability of students with exposure approaches or there is an influence of focusky-aided scientific approaches on learning motivation.the mathematical reasoning ability of junior high school students in quadrilateral materials.

## CONCLUSION

Based on data analysis and testing if the hypothesis has been implemented, it can be concluded that:

There's an influence on the person's mental health. Scientific approachThe school also has a focus on students' learning motivation in class VII of SMP Negeri 1 LubukPakam. It's in Prove the hypothesis test results, where the significance scores of 0.008 ( $0.008 < 0.05$ ) and  $t_{number} > t_{table}$  ( $2.764 > 2.045$ ) and the average score of learning motivation taught by focusky-aided scientific approaches were 76.13 which fall into the good category, while the average score in the control class was 71,30.

There is an influence on the health of children.scientificapproachThe school has a focus on the mathematical reasoning ability of students in class VII of SMP Negeri 1 LubukPaka.m. This is demonstrated from the hypothesis test results, where the significance scores of 0.001 ( $0.001 < 0.05$ ) and  $t_{number} > t_{table}$  ( $3.340 > 2.045$ ) and the average mathematical reasoning ability of students taught by focussy-assisted scientific approaches were 80.33 which belonged to good categories, while the average score in class control the average literacy rate was 72.50.

There is an influence on the environment. Scientific approach the study of mathematics helped focusky on the learning motivation and mathematical reasoning ability of students in class VII BC.P Negeri 1 Lubuk Pakam. This is demonstrated from the test results through the Manova Test shown with significance values of Pillai's Trace, Wilks' Lambda, Hotelilling's Trace and Yoy's Largets Root by 0.001 ( $0.001 < 0.05$ ).3. There is an influence on the environment. Scientific approachThe study of mathematics helped

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