EFFECTIVENESS OF HANDS-ON ACTIVITY AND MINDS ON ACTIVITY BASED ON CONTEXTUAL APPROACH TOWARD MATHEMATICS LEARNING OUTCOMES

Annisa Mutiara Sukma[a], Aris Thobirin[b]
Program Studi Pendidikan Matematika Universitas Ahmad Dahlan
Jalan Ring Road Selatan, Tamanan, Banguntapan, Bantul Yogyakarta
[a]annisa.mutiara11006227@gmail.com, [b]aris.thobirin@math.uad.ac.id

ABSTRACT

Until now, in general, mathematics is still a subject with learning outcomes that tend to be unsatisfactory, including data shown by observations of mathematics learning outcomes at Islamic Junior High School (MTs) Wahid Hasyim Yogyakarta. It can be seen from the few students who are active in asking questions when finding difficulties and students who want to go forward to work on the problem. This study aims to determine contextual learning effectiveness through Hands-on Activity and Minds on Activity in improving student learning outcomes. This study's population were all eighth-grade students of MTs Wahid Hasyim Sleman Regency 2015/2016 Academic Year consisting of 3 classes. The class sampling technique is that classes are taken randomly from classes in the population, and each class is homogeneous. The class drew results. It was found that class VIII A was the experimental class and class VIII C was the control. Data collection is done using the test method. The instrument test uses content validity. Data analysis techniques used for analysis prerequisite tests include normality test, homogeneity test, and hypothesis testing. After researching with Randomized Posttest-Only Comparison Group Design with a population of VIII class of MTs Wahid Hasyim, the data showed that 1) t-test results obtained t_{count} = 2.0217> t_{table} = 2.0190, this means that there are differences in learning outcomes student mathematics between students who learn using contextual learning models with students who learn using conventional learning models. 2) the t-test was obtained t_{count} = 2.0217> t_{table} = 1.6826, this shows that Hands-On Activity and Minds On Activity in mathematics learning with contextual approaches are more effective than mathematics learning using conventional learning models of students' mathematics learning outcomes 7^{th} MTs Wahid Hasyim Sleman Academic Year 2015/2016.

Keywords: Effectiveness, Hands-On Activity and Minds On Activity, learning outcomes

INTRODUCTION

Education is one of the important aspects of human life. One indicator of the progress of civilization and human culture is seen from education's progress and success. The integration between human life and education is due to education's influence and role, which is very large for human life development. Therefore education cannot be separated from human life. According to the large Indonesian dictionary quoted by Syah, Muhibbin (2004: 10), education is changing the attitudes and behavior of a person or group of people to mature humans through teaching and research efforts.

Mathematics is one of the foundations in the development of science and technology. Mathematical mastery is very necessary to survive in the future. According to Roseffendi ET in Suherman, Erman (2003: 16), Mathematics is formed from human thought related to ideas, processes, and reasoning. Mathematics is needed to meet practical needs and solve problems in everyday life. One of the benefits of learning mathematics for students is that it helps them understand other sciences, such as physics, chemistry, economics, etc. Based on students' observations at MTs Wahid Hasyim, Sleman Regency, students' enthusiasm for mathematics is still lacking. Most students assume that mathematics is a science that is difficult to understand. This assumption is very influential on student learning outcomes. The following is the average grade of Mathematics Odd Semester Midterm Grade Exams for MTs Wahid Hasyim, Sleman Regency, with a Minimum Completion Criteria (MCC) of 70.

Contextual learning is a learning model that places students in a meaningful context connecting students' initial knowledge with the initial material. This learning process is expected to encourage students to realize and use their understanding to develop themselves and solve various daily life problems. Research conducted by Hussain, Munir, and Mumtaz Azhar (2013) with the title Impact of Hands-on Activities on Students 'Achievement in Science shows significant differences between achieving students' knowledge in supporting the experimental group. This study's results are also effectively used in developing countries or disadvantaged areas that are difficult to get learning media to make students physically active and involved in learning science.

The research's relevance that the author did with the first and second studies that are both using hands-on based learning and Minds On Activity. The difference in the research that the author did with the first research is on the variables. The research variables that the author did are on learning outcomes in mathematics learning, while in the first study, the variables were to improve rational thinking skills learning physics. The difference between the second research and the research that the researcher did is in the second research, which emphasized developing the means of achieving science in supporting science groups.

The hands-on activity is part of a contextual approach to learning or better known as Contextual Teaching and Learning (CTL). In this learning, students listen or read and directly engage students and test their ideas. According to Haury and Rillero (1994) in research (Hairy, Ade Idrus. 2015. Learning-Based Hands On Minds On Activity in Contextual Science Learning As one of the models of interactive involvement and also models that emphasize hands-on activity) and mind activities (Minds on Activity) that provide direct feedback through discussions with peers or teachers, this learning model aims to encourage their creativity in problem-solving, promote students' independence, improve skills such as special reading, arithmetic calculations, and communication emphasize that students learn better when they can touch, feel, measure, manipulate, draw, graph, record data and when they find answers for themselves instead of giving answers in textbooks.

The advantages of contextual learning with Hands-on Activity and Minds On Activity are expected to be a solution or alternative to solve existing problems. Therefore, a study aimed to measure contextual learning effectiveness through Hands-on Activity and Minds on Activity in improving student learning outcomes. So that the objectives of this study are: 1) To find out whether there were differences in learning outcomes between students who obtained mathematics learning with a contextual approach based on Hands-on Activity and Minds on Activity, compared with students who obtained conventional learning in class VIII students at MTs Wahid Hasyim, Sleman Regency, 2015/2016 school year. 2) To find out that mathematics learning with a contextual approach based on Hands-On Activity and Minds On Activity is more effective than conventional mathematics learning in class VIII students of MTs Wahid Hasyim, Sleman Regency, 2015/2016 school year

METHODS

In this study, three research classes, namely classes that only use a contextual approach through Hands-On Activity, then classes that use Minds On Activity only, and classes that use a combination of Hands-On Activity and Minds On Activity. The research design used was Randomized Posttest-Only Comparison Group Design. This research was conducted at MTs Wahid Hasyim Gaten, Sleman Regency, in class VIII students of the 2015/2016 academic year even semester. The sampling technique uses Random Sampling of the class. Namely, the sampling class is taken randomly from the existing class. This sampling is based on considering that all class VIII in the school has the same mathematical abilities, so class VIII A was chosen as the experimental and class VIII C as the control class.

The data collection technique used in this study is the documentation method. This technique is carried out by taking UTS grades of grade VIII students at MTs Wahid Hasyim, Sleman Regency to determine students' initial abilities. In addition to the documentation method, this study also uses a test method. The test is given after being treated with different learning. The type of test used is a written

test. The prerequisite test used was the normality test with the χ^2 test and the homogeneity test with the F test. The data analysis technique used was the t-test.

RESULTS AND DISCUSSION

The learning methods used in this study are contextual learning methods with Hands-On Activity and Minds On Activity. Before being given treatment, the initial conditions of students did not show any difference in learning outcomes. In other words, the students' initial data are normally distributed and homogeneous. The preliminary data, normality test results, and homogeneity test results of the initial data are presented in Table 1, Table 2, and Table 3.

Table 1. Summary Description of Initial Ability Values

Sample	Parameter				
	Highest	Lowest	$\bar{x}$	S	S^2
Experimentation Class	88	44	61,4286	9,1464	83,6571
Control class	68	46	57,4783	7,0895	50,2609

Table 2. Summarization of Test Results for Normality of Initial Ability Value

Sample	χ^2_{count}	χ^2_{table}	Significant level	Degrees of Freedom	Info.
Experimentation Class	0,1022	3,8415	5%	1	Normal
Control class	1,2273	5,9915	5%	2	Normal

At a significant level of 5% and df = 1, the data are normally distributed. While the value of χ^2_{count} the initial ability value of the control class 1.22273 and χ^2_{table} 5,9915 at a significant level of 5% and df = 2, then the data is normally distributed.

Table 3. Summary of the Initial Ability Test Homogeneity Value

Data	Significant level	χ^2_{count}	χ^2_{table}	df	Distribution
Initial Ability	5%	1,3561	3,841	1	Homogeneous

Based on Table 3, it can be seen that $\chi^2_{count}(1{,}3561) < \chi^2_{table}(3{,}841)$ at a significant level of 5% and dk = 1, which means that the sample has the same (homogeneous) variance. Then the similarity of the two tests is tested to find out whether the average ability of the two classes is different or not. Based on Table 4, obtained $-t_{table} < t_{count} < t_{table}$. This means that the average ability of students before being treated is the same.

Table 4. Summary of Average Similarity Test Results for Initial Ability Score

df	Significant level	t_{count}	t_{table}	Conclusion
42	5%	1,6090	2,0190	H_o accepted

Based on Table 4, it can be seen that $-t_{table}(-2{,}0190) < t_{count}(1{,}6090) < t_{table}(2{,}0190)$ at the 5% significance level and dk = 42, so H_o is accepted and H_1 is rejected, which means that there is no difference in initial ability between students of the experimental class and the control class.

After the two samples were given treatment, the sample was given a test in test questions. It was found that the average class of learning using the Hands-on Activity model and Minds On Activity with a contextual approach was higher than the class learning using the conventional learning model. The test results obtained, the average value of the experimental class $\bar{x}$= 66.8571, while the average value of the control class $\bar{x}$= 58.7826.

Table 5. Summary Description of Mathematical Learning Outcomes

Sample	Parameter				
	Highest	Lowest	$\bar{x}$	S	S^2
Experimentation Class	82	34	66,8571	12,5151	156,6286
Control class	80	34	58,7826	13,8530	191,9051

Table 6. Summary of Normality Test Results Mathematics Learning Outcomes

Sample	χ^2_{count}	χ^2_{table}	Significant level	Degrees of Freedom	Info.
Experimentation Class	5,6475	5,9915	5%	2	Normal
Control class	0,8801	7,8147	5%	3	Normal

Table 6 shows that χ^2_{count} experimental class learning outcomes 5.6475 and $\chi^2_{table} = 5.9915$ at a significant level of 5% and df = 2. The data are normally distributed. While the value of χ^2_{count} the control class's initial ability value was 0.8801 and $\chi^2_{table} = 7.8147$ at a significant level of 5% and df = 3, the data is normally distributed.

Table 7. Summary of Homogeneity Test Results Mathematics Learning Outcomes

Data	Significant level	χ^2_{count}	χ^2_{table}	df	Distribution
Initial Ability	5%	0,2151	3,841	1	Homogeneous

Based on Table 7. it can be seen that $\chi^2_{count}(0{,}2151) < \chi^2_{table}(3{,}841)$ at a significant level of 5% and dk = 1, which means that the sample has the same (homogeneous) variance.

Table 8. Summary of First Hypothesis Test Results Mathematical Learning Outcomes

df	Significant level	t_{count}	t_{table}	Conclusion
42	5%	2,0217	2,0190	H_o rejected

Based on Table 8, it can be seen that $t_{count}(2{,}0217) > t_{table}(2{,}0190)$ at the 5% significance level and df = 42, so H_0 is rejected and H_1 is accepted, which means that there is a difference in the improvement of student learning outcomes that obtain mathematics learning by approach contextual through Hands-On Activity and Minds On Activity compared students who study conventionally in students of class VIII MTs Wahid Hasyim Sleman Regency Academic Year 2015/2016.

Table 9. Summary of the Second Hypothesis Test Results Mathematical Learning Outcomes

df	Significant level	t_{count}	t_{table}	Conclusion
42	5%	2,0217	1,6826	H_o rejected

Based on Table 1.9, it can be seen that $t_{count}(2{,}0217) > t_{table}(1{,}6826)$ at the 5% significance level and df = 42, so H_0 is rejected and H_1 is accepted, which means that Mathematical learning uses a contextual approach through Hands-On Activity and Minds On The activity is more effective compared to conventional mathematics learning towards the learning outcomes of students of class VIII MTs Wahid Hasyim 2015/2016 Academic Year.

Based on the analysis of the first hypothesis test using t-test analysis of mathematics learning outcomes, it is obtained that $t_{count}(2{,}0217) > t_{table}(2{,}0190)$ shows that mathematics learning outcomes between students learning using the Hands-on Activity and Minds On Activity models with a contextual approach with conventional learning models there are differences. Moreover, from the second hypothesis test obtained $t_{count}(2{,}0217) > t_{table}(1{,}6826)$ shows that mathematics learning using the Hands-on Activity and Minds On Activity model with a contextual approach is more effective than mathematics learning using conventional learning models on mathematics learning outcomes of class students VIII MTs Wahid Hasyim Sleman Regency Even Semester Academic Year 2015/2016.

This study's results based on test results in the form of tests prove that there are differences in mathematics learning outcomes between students whose learning uses the Hands-on Activity model and Minds On Activity with a contextual approach with students whose learning uses conventional learning models. Mathematics learning using Hands-on Activity and Minds On Activity models with a contextual approach is more effective than learning mathematics using conventional learning models on mathematics learning outcomes for students of class VIII MTs Wahid Hasyim Sleman Regency Even Semester Academic Year 2015/2016.

Hypothesis test results show that students who use the Hands-on Activity and Minds on Activity models with a contextual approach are more effective than students who obtain mathematics learning using conventional learning models of student mathematics learning outcomes. Moreover, there are differences in mathematics learning outcomes between students whose learning uses the Hands-on Activity and Minds on Activity models with a contextual approach with students whose learning uses conventional learning models.

CONCLUSION

Based on the results of the analysis and discussion presented in Chapter IV, the following conclusions can be drawn:

1. There is a difference in students who gain mathematics learning with contextual approaches through Hands-on Activity and Minds on Activity compared to students who obtain conventional learning in students of class VIII MTs Wahid Hasyim Sleman Regency Academic Year 2015/2016.
2. Mathematics learning using a contextual approach through Hands-on Activity and Minds On Activity is more effective than conventional mathematics learning towards the learning outcomes of Grade VIII students of MTs Wahid Hasyim 2015/2016 Academic Year.

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