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THE EFFECTIVENESS OF SCAFFOLDING-ASSISTED SUPERITEM LEARNING MODELS ON STUDENT LEARNING OUTCOMES

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ABSTRACT

The aims of this research are to: (1) Describe the average learning outcomes of scaffolding-assisted superitem learning that are more than the KKM, (2) Describe the proportion of learning outcomes from learning using the scaffolding-assisted superitem model that are above the KKM of more than 70% (3) Describe The learning outcomes of the superitem learning model assisted by scaffolding are better than the conventional learning model. The population in this study were students in class VIII Odd Semester of SMP Negeri 3 Petarukan for the 2023/2024 academic year, consisting of 10 classes totaling 320 students. Samples were taken from this population using a simple random sampling probability sampling technique and one experimental class, one control class and one trial class were obtained. Data collection techniques use documentation and tests. Meanwhile, data analysis for this research uses the average test, one-party proportion test and one-party t test with a significance level of 5%. The results of this research show that: (1) the average learning outcomes of students using the superitem learning model assisted by scaffolding are more than the KKM with a KKM value of 70, (2) the learning outcomes of students using the superitem learning model assisted by scaffolding can achieve KKM exceeding 70% , (3) students' mathematics learning outcomes using the scaffolding-assisted superitem learning model are better than conventional learning models.

Kata Kunci : Scaffolding-assisted Superitem Learning Model, Learning Outcomes.

INTRODUCTION

Education is very important for students. Students can achieve their desired goals through quality education, whether in the form of formal or non-formal education (Susanto, 2013: 6). Education is a strategy for realizing the nation's ideals, because it is for the formation of a quality generation. One effort to improve the quality of education in schools is by improving the learning process (Shoimin, 2014: 6). Learning is very closely related and cannot be separated from the educational process. Learning is a process of interaction between teachers and students in the learning process. Learning is a teacher's effort to create conducive conditions to create a pleasant learning atmosphere so that learning objectives can be achieved (Susanto, 2013: 9).

The learning process can be carried out in various effective ways or methods if all components that influence the learning process support each other in order to achieve educational goals (Rusman, 2015: 21). Further components stated by Rusman (2015:25) include students, teachers, curriculum, methods, facilities and infrastructure, and the environment. Based on several of these components, the teacher is the most influential component because the teacher can manage the other components. Hamalik (2014: 17) stated that the role of the teacher is very influential on the success of students, so it is very necessary to choose the right learning method so that it creates a feeling of joy for students during the learning process.

Mathematics as one of the subjects taught at every level of education plays an important role because mathematics is one way to train students to solve problems (Firmasari, 2018). The realization of the importance of teaching mathematics to students is reflected in the positioning of mathematics as one of the basic sciences for all types and levels of education. Wahyuni & Prihatiningtyas (2019) stated that mathematics is the source of all sources of knowledge or commonly known as mathematics as the Queen of Science. Mathematics is said to be the queen of sciences because mathematics is needed in almost every subject. Therefore, mathematics lessons are given at all levels of education from elementary to high school and even at universities.

Learning outcomes in mathematics learning are very important for students because learning outcomes are one that determines students' success in the learning process in class. Dimyati & Mudjiono (2013:4) state that learning outcomes can be used as a benchmark to find out how far students have changed after receiving learning experiences that can be observed and measured in the form of knowledge, attitudes and skills. Learning outcomes are a number of experiences obtained by students which include the cognitive, affective and psychomotor domains (Rusman, 2015:67). Learning outcomes are relatively permanent changes in behavior within a person as a result of a person's interaction with their environment (Susanto, 2013:18).

The phenomenon obtained from observations in Class VIII of SMP Negeri 3 Petarukan, Pemalang Regency in June 2022, namely when carrying out the final assessment of the even semester of the 2022/2023 academic year, the following data was obtained.

Tabel 1.1 The Data of Final Examination Result Mathematics Subject Grade VIII SMP Negeri 3 Petarukan Year 2022/2023

Class	KKM	Score		Quantity
		< KKM	≥ KKM	
VIII A	70	17	15	32
VIII B	70	18	14	32
VIII C	70	16	16	32
VIII D	70	15	17	32
VIII E	70	18	14	32
VIII F	70	20	14	34
VIII G	70	16	16	32
VIII H	70	21	11	32
VIII I	70	19	13	32
VIII J	70	16	14	30
Total		**176**	**144**	**320**

Sumber: list of mathematics score grade VIII SMP Negeri 3 Petarukan

Based on table 1.1, it is known that the minimum completeness criteria (KKM) value that has been set for class VIII mathematics subjects at SMP Negeri 3 Petarukan is 70. There are 176 (55%) students from class VIII who are known to have a score less than the KKM. There were 144 (45%) students from class VIII who were known to have scored more than the KKM. Students' incompleteness in studying mathematics indicates that low learning outcomes can affect the further learning process. This problem is thought to be influenced by the learning model applied by the teacher which is still not suitable, causing students to be passive and not develop deeply, which causes low learning outcomes. A total of 2 Class VIII teachers at SMP Negeri 3 Petarukan also complained about the students' low ability to solve mathematics problems. This can be seen from the number of students'

mistakes in working on the questions and the students' difficulties in solving the questions.

Based on this phenomenon, to overcome the problems that occur, it is necessary to apply a learning model that is appropriate to the context of students' abilities. Some models that have been implemented by teachers are less acceptable to students, this is a predisposing factor in low mathematics learning outcomes. For example, teachers usually in implementing the learning process in class provide continuous assignments in the form of practice questions, but the practice questions given cannot fully improve students' abilities and learning outcomes. The teacher gives assignments or tests that do not match the example questions or are more complex than those explained by the teacher during the mathematics learning process in class. In fact, according to Shoimin (2014: 8) a strategy or learning model greatly influences students' abilities or learning outcomes.

Initial observations carried out by interviewing one of the class VIII students at SMP Negeri 3 Petarukan, Pemalang Regency stated that the teacher always gave tests that were very difficult and not the same as the sample questions given by the teacher during the learning process. This makes students feel difficult when taking the test. The results of an interview with Mrs. Muji Rahayu as a class VIII mathematics teacher stated that giving questions that were different from the example questions that had been given was aimed at improving students' critical thinking skills. In reality, students' critical thinking skills do not develop, but students find it difficult which results in students being lazy about working on mathematics problems.

Based on the description of the problem above, a temporary conclusion is obtained that in general class VIII students at SMP Negeri 3 Petarukan are used to working on questions that are easy and that match the example questions given by the teacher. Students will use existing formulas and get used to copying existing examples of questions. This is because students do not master or understand the basic concepts regarding mathematics learning. Some students only memorize existing formulas, so that when the questions are slightly changed or given more complex questions, students end up not being able to solve the questions given.

The problems found make it interesting to apply a learning model that is considered more effective for students to improve learning outcomes. One learning model that can improve mathematical problem solving is superitem learning (Raya et al., 2018). The superitem learning model is a learning model that starts from simple tasks and then increases to more complex tasks. Superitem questions are expected to be more challenging and encourage student involvement in learning so that teachers can carry out diagnostic activities during learning so that students' reasoning development can be monitored earlier (Jaya et al., 2020). According to Hajar & Sari (2018) superitem learning can increase students' mathematical problem solving abilities. This learning is designed to help students understand the relationship between concepts, as well as help stimulate students' reasoning maturity. This is done so that students can solve problems in learning mathematics.

Gunadi (2017) stated that the characteristics of superitem questions contain concepts and processes that the higher the cognitive level, this provides opportunities for students to develop their knowledge and understand the relationships between concepts. At the beginning of learning the superitem model according to Jaya et al. (2020) starting from the teacher who gives a problem, the problem or problem given by this teacher is dynamic in nature, so that it can use open or realistic problems. According to Maftuh & Hidayat (2018) superitem model learning can run more optimally in its development, so students must be given guidance step by step.

Referring to this, the author will use a learning theory from Vygotsky, namely scaffolding. According to Vygotsky quoted from Wolf et al. (2016), scaffolding is an area between real levels of development which is defined as the ability to solve problems under the guidance of adults or more capable peers. This causes learning using the superitem model to be more optimal if carried out with the help of scaffolding in improving learning outcomes. Therefore, it is interesting to conduct research entitled "The Influence of the Scaffolding-assisted Superitem Learning Model on the Learning Outcomes of Class VIII Students at SMP Negeri 3 Petarukan, Pemalang Regency".

1 RESEARCH METHODOLOGY

The approach taken in this research is quantitative. The type of this research is quasi-experiment. The form of research design chosen was Post-test Only Control Group Design.

Tabel 2.1.Research Design

Group	Treatment	Posttest
Experiment	X	O
Control	-	O

Information:

X = Providing a learning process using a superitem learning model assisted by scaffolding

O = Post-Test given after learning

The population in this study was all students of Odd Semester VIII of SMP Negeri 3 Petarukan, Pemalang Regency, totaling 320 children. The sampling technique used in this research is probability sampling with a simple random sampling technique. Sampling was carried out by drawing lots, after drawing lots class VIII B was selected as the experimental class and class VIII C as the control class.

This research uses several data collection techniques, namely documentation, interview techniques, tests. The data analysis techniques in this research are descriptive analysis and inferential analysis. Inferential analysis is carried out through testing the analysis prerequisites which consist of a normality test and a homogeneity test. To answer the research hypothesis that was proposed previously, testing was carried out using the difference test or t test.

2 RESULTS AND DISCUSSION

2.1 Data Analysis

2.1.1 Data Analysis Prerequisites

Before testing the hypothesis, prerequisite tests are first carried out, namely the normality test and homogeneity test.

1) Normality Test

The normality test is used to test whether the data obtained has a normal or abnormal distribution. The description of the results of the data normality test calculation is as follows:

Tabel 3.1
Description of Data Normality Test Calculation Results

No	VARIABLE	$L_0 Max$	L_{tabel}	CONCLUSION
1	Experiment Group	0,131	0,157	Normal
2	Control Group	0,149	0,157	Normal

It can be concluded from table 3.1 that L_(count) for student learning outcomes data is smaller than L_(table). Because L_(count) <L_(table) then H_0 is accepted, so the sample comes from a population with normal distribution. Thus it can be concluded that the data is normally distributed.

2) Homogeneity Test

The homogeneity test is used to test whether the data obtained is homogeneous or not homogeneous. The description of the results of the data homogeneity test calculation is as follows:

Table 3.2
Homogeneity Test Results of Students' Mathematics Learning Outcomes

Sample	N	Dk	1/dk	S^2	$\log S^2$	$(dk)\log S^2$	$(dk)S^2$
1	32	31	0,032	94,480	1,975	61,236	2928,875
2	32	31	0,032	82,060	1,914	59,338	2543,875
Quantity	64	62	0,065			118,912	5472,750
$S^2\ gab$							88,270
$\log S^2\ gab$							1,946
B							120,640
$X^2{}_{count}$							0,154
$X^2{}_{table}$							3,841
Conclusion	HOMOGEN						

Based on the results of the description in table 3.2, it shows that the 〖X^2〗 _calculation for students' mathematics learning outcomes data is smaller than the 〖X^2〗 _table. So because 〖X^2〗 _count≤ 〖X^2〗 _table then H_0 is accepted. Thus, it can be concluded that the data on the mathematics learning outcomes of experimental class and control class students are homogeneous.

2.1.2 Hypothesis Testing Analysis

After the data on students' mathematics learning outcomes is normally distributed and homogeneous, the next step is hypothesis testing. In this research there are 3 hypothesis tests, namely:

1) First hypothesis test (average test)

The average hypothesis test in this study used the right-hand t test. To find out the average value in the scaffolding-assisted superitem learning model, it is as follows:

Table 3,3
Average Learning Outcome Test Calculation Results

No	t_{count}	le	Conclusion
1	4,838	1,694	More than KKM

Based on the table, it can be concluded that the right side of the average test from the calculation obtained t_count=4.838 then compared with T_table=1.694. So it can be concluded that t_count>T_tabel then H_0 is rejected, so the conclusion is that the average value of student learning outcomes using the

scaffolding-assisted superitem learning model is more than the KKM with a KKM value of 70.

2) Second Hypothesis Test (Proportion Test)

Testing the percentage hypothesis to determine students' learning completeness using the right-hand one-sided proportion test. To find out what percentage of completeness students are taught using the superitem learning model assisted by scaffolding as follows:

Table 3.4
Results from the One-Party Right Proportion Test

No		Z_{count}	Z_{count}	Conclusion
1	Experiment Group	2,171	1,694	Exceeds 70%

It can be concluded that by calculating the proportion test from the table, we get Z_count=2.171, then compare it with Z_table=1.694. So it can be concluded that Z_count>Z_tabel then H_0 is rejected, so the conclusion is that the value of student learning outcomes using the scaffolding-assisted superitem learning model exceeds 70%.

3) Third Hypothesis Test (One Party t Test)

In this third test hypothesis, it is to find out which learning model is better, between the superitem learning model assisted by scaffolding and the conventional learning model for student learning outcomes. The following are the results of the description of the right-tailed t-test:

Table 3.5
Right One-Tailed t Test Results

No	Variable	t_{count}	t_{table}	Conclusion
1	Learning Outcomes	3,140	1,67	H_0 rejected

With the right-hand t-test from the calculations in the table, we get t_count=3.140 and then compare it with T_table=1.67. So it can be concluded that t_count>T_table then H_0 is rejected, so the conclusion is that the value of student learning outcomes using the scaffolding-assisted superitem learning model is better than the conventional learning model.

2.2 Discussion

Based on research conducted in class VIII at SMP Negeri 3 Petarukan on the main material of the Pythagorean theorem and Pythagorean triples, it shows that the mathematics learning outcomes of students taught using the superitem learning model assisted by scaffolding are higher than those of students taught using the conventional learning model.

This is because the learning process uses a superitem learning model assisted by scaffolding, namely the teacher explains the material in stages and provides questions from easy to more complex questions and the teacher provides support and encouragement in the form of helping students who have difficulty in working on the questions. -questions and provide correct answers if students make mistakes when working on questions during the ongoing learning process. Support is given in a reduced manner so that students are able to improve problem solving so that they can improve learning outcomes.

Based on research, the mathematics learning outcomes of students who use the scaffolding-assisted superitem learning model show a higher average score than the conventional learning model, because the experimental class is treated with a scaffolding-assisted superitem learning model which is able to enable students to improve their learning outcomes. With this, the experimental class students were better than the control class. Meanwhile, in the control class with a conventional learning model, the learning process is carried out by only receiving material explained by the teacher so that students are less active. So it can be concluded from the first hypothesis that the average score of students taught using the superitem learning model assisted by scaffolding is more than the KKM (KKM = 70). It can be seen in the right side average test calculation.

With the latest innovations in the learning process, namely the superitem learning model assisted by scaffolding, it is able to achieve learning objectives thereby improving learning outcomes. So it can be concluded that the second hypothesis is that the learning outcomes of the superitem learning model assisted by scaffolding reach KKM exceeding 70%. It can be proven by looking at the proportion test calculation.

Based on the research results, the experimental class taught using the superitem learning model assisted by scaffolding had an average greater than that of students taught using the conventional learning model in the control class. So it can be concluded that the third hypothesis is that the learning outcomes of students taught using the superitem learning model assisted by scaffolding are better than those taught using the conventional learning model. Can be proven by testing the right one-sided t test.

So it can be concluded that the superitem learning model assisted by scaffolding has better learning outcomes, especially in the material on the Pythagorean theorem and Pythagorean triples.

As for several obstacles that occurred during the research, at the first meeting the learning process was carried out using the scaffolding-assisted superitem learning model, which made students confused because this model required students to be more active and must be able to solve problems so they did not adapt quickly to the scaffolding-assisted superitem learning model. are used to using conventional learning models where the learning process focuses on the teacher, where students only listen to what the teacher explains in front of the class so that students are less active.

Educators also have obstacles in the scaffolding-assisted superitem learning process because they have to change the learning process from the conventional model to the scaffolding-assisted superitem model and are required to make questions from easy ones to more complex questions.

The solution to these obstacles is that teachers must implement and begin to adapt to the superitem learning model assisted by scaffolding so that students are also more active and optimal in the learning process so that they can improve mathematics learning outcomes. Little by little the obstacles can be reduced because students are directed to the learning process using a superitem learning model assisted by sacffolding so that later they will get used to it and start to be active and able to adapt their learning.

3 CLOSING

Based on the results of research in class VIII of SMP Negeri 3 Petarukan, odd semester of the 2023/2024 academic year, the following conclusions can be obtained: The average mathematics learning outcomes of students using the scaffolding-assisted superitem learning model are more than the KKM, namely with KKM = 70. Mathematics learning outcomes Students using the superitem learning model assisted by scaffolding achieved KKM exceeding 70%. The mathematics learning outcomes of students using the superitem learning model assisted by scaffolding are better than the conventional learning model

Based on the description above, it can be concluded that there is effectiveness of the scaffolding-assisted superitem learning model on the learning outcomes of class VIII students at SMP Negeri 3 Petarukan

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