

THE EFFECT OF DIFFERENTIATED LEARNING MODELS ON THE MATHEMATICAL PROBLEM-SOLVING ABILITY OF GRADE V STUDENTS OF AMALIYAH SUNGGAL PRIVATE ELEMENTARY SCHOOL

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Abstract

This research is based on the lack of mathematical problem-solving skills of grade V students, students tend to have difficulties in understanding the material taught in mathematics subjects and students are still lacking in developing the ability to solve mathematical problems. This research aims to find out the mathematical problem-solving ability of students. This research method is a quantitative research method. The population is grade V students of Amaliyah Sunggal Private Elementary School which consists of two classes. Sampling was carried out with saturated samples. The independent variable is the Differentiated learning model while the bound variable is the student's mathematical problem-solving ability. Hypothesis testing uses the Mann Withney test which is preceded by a validity test and a reliability test. The results of this study using a hypothesis test obtained a significance value of 0.002. It means $0.002 < 0.05$, then H_a is accepted. It can be concluded that there is an Effect of the Application of the Differential Learning Model on the Mathematics Problem Solving Ability of Grade V Students of Amaliyah Sunggal Private Elementary School".

Keywords: Differentiated Model, Problem-Solving Ability

1. INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students can actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state (Law No. 20 of 2003 concerning the National Education System). This means that the educational process in schools carried out between educators and students, is directed towards the achievement of educational goals. Education is to create a learning atmosphere and learning process. This means that in education, the learning process and outcomes should be balanced to form students who develop as a whole. Menurut Depdiknas (2004:21) Ideally, students are ready to learn, have high self-motivation, so

that in the end they are able to achieve satisfactory learning results. Each child has a different level of readiness in the learning process. According to Russian education expert Vygotsky explained the Zone of Proximal Development, an area that describes the range of teaching and learning with different levels for each child.

Menurut Corley dalam Rosinta (2019) Differentiated Instruction is an approach that allows teachers to plan strategies to meet the needs of each student. According to Tomlinson in Marlina (2020:2), differentiated learning is learning that accommodates, serves, and recognizes the diversity of students in learning according to their readiness, interests, and learning preferences. According to Herwina (2021) Differentiated learning is an effort to adjust the learning process in the classroom to meet the learning needs of each individual

student. Based on the opinion of the above experts, it can be concluded that differentiated learning is learning that is adjusted to the characteristics and needs according to the readiness, interests and ability of students to improve student learning outcomes, so that the learning carried out can run effectively.

By conducting this research, it is hoped that students can improve their problem-solving skills in mathematics subjects. The purpose of this study is to improve students' ability to solve problems in mathematics subjects. To deal with this problem, a learning model is needed that can give flexibility to students to develop their abilities and potential in accordance with their learning readiness, interests, and learning profiles themselves.

Thus, based on these problems, the research carried out is: "The Effect of the Differential Learning Model on the Ability to Solve Mathematical Problems of Grade V Students of Amaliyah Sunggal Private Elementary School."

2. RESEARCH METHODS

The type of research used in this study is quantitative research. And the method used in this study is a quantitative descriptive method. The population of this study is grade V students of Amaliyah Sunggal Private Elementary School for the 2022/2023 Academic Year which totals 49 students consisting of 2 groups. The sample selection technique used in this study is saturated sampling (saturated sampling). Where according to Siyoto (2015:66) saturated sampling is a sampling technique if all members of the population are used as samples. So the number of samples in this study is all class V students as many as 49 students.

The data collection technique used in this study uses test instruments, the types of tests used are pre-test and post-test. The data analysis techniques used in the research are validity tests, reliability tests,

normality tests, homogeneity tests and hypothesis tests.

3. RESULTS AND DISCUSSION

This research was carried out at Amaliyah Private Elementary School, Jl. Tani Asli Gg. Asal Tanjung Gusta Village, Sunggal District, Deli Serdang Regency, North Sumatra. This research was conducted on class V students consisting of 2 classes with a total of 49 students. This study aims to determine students' mathematical problem-solving abilities through the application of the Differentiated learning model. The data obtained in this study were taken using test questions from the results of the pre-test and post-test of students tested in the classroom. The first step is to give a pre-test sheet to the students who will be tested. Then, after getting the results of the pre-test, then the researcher provides treatment in the form of teaching which is carried out by applying a differentiated learning model in the experimental class and a conventional learning model in the control class. After that, at the end of the lesson, the researcher gave a post-test sheet to find out the extent of the student's mathematical problem-solving ability.

Before the research was carried out, the researcher had conducted a validity test of the instrument first which was tested at Amaliyah Private Elementary School on grade VI students who were one level higher than the students to be tested with a total of 25 students. After the validity test is carried out, the prerequisite test is carried out, namely (reliability, normality and homogeneity test), then continued with a hypothesis test.

1. Validity Test

The validity test was carried out on grade VI students totaling 26 students with a total of 15 questions tested, then the results of the validity test conducted based on the results of the validity test output, it can be seen that there are 10 valid questions, while 5 questions are invalid. Furthermore, the researcher used 10 valid questions to become questions in the

research instrument.

2. Reliability Test

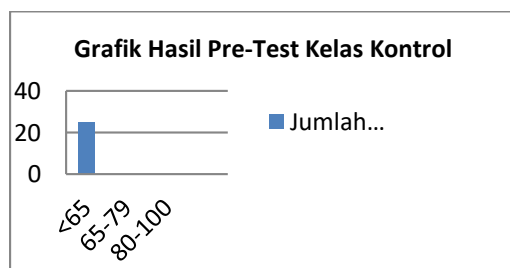
After the question items are tested for validity, the next thing to do is to conduct a question reliability test, this aims to measure the consistency of the measuring tool, so it is trusted to be used as a data collection tool.

3. Data Collection Results

The control class of 25 students was given questions in the form of a pre-test to measure students' initial abilities before participating in learning activities. After students follow. Learning activities Then they were given post-test questions to find out their problem-solving skills after participating in learning activities.

Gambar 1

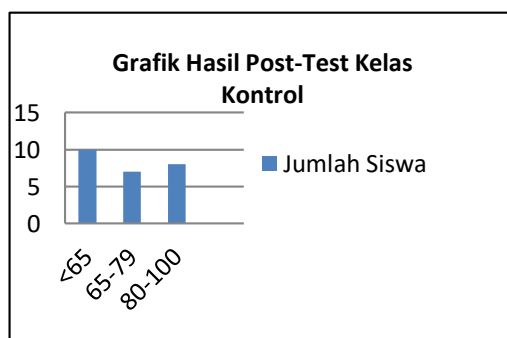
Diagram Hasil Pre-Test Kelas Kontrol



Source: Results of research data processing

Gambar 2

Diagram Hasil Post-Test Kelas Kontrol



Source: Results of research data processing

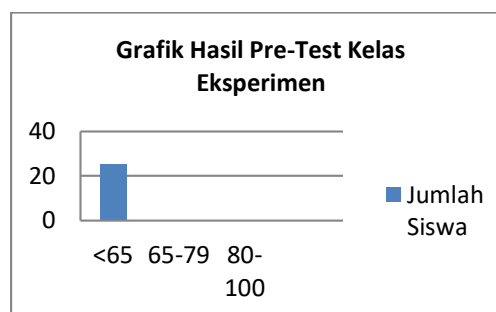
Based on the graph of the pre-test results above, it shows that the mathematical problem-solving ability in the control class is entirely located at a low interval with a score range of < 65 with a frequency of 25 students.

From the graph, it can be seen that the

mathematical problem-solving ability of grade V students of Amaliyah Sunggal Private Elementary School using the conventional learning model in the control class obtained a percentage of final scores, namely 10 students in the low category with a percentage of 40%, 7 students in the medium category with a percentage of 28% and 8 students in the high category with a percentage of 32%.

Gambar 3

Diagram Hasil Pre-Test Kelas Eksperimen

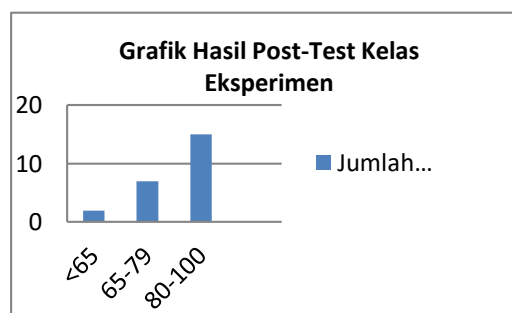


Source: Results of research data processing

Based on the table of pre-test results above, it shows that the ability to solve mathematical problems in the Experimental class is entirely located at a low interval with a score range of < 65 with a frequency of 24 students. It can be interpreted that the level of students' mathematical problem-solving skills is still very low before carrying out learning activities.

Gambar 4

Diagram Hasil Post-Test Kelas Eksperimen



Source: Results of research data processing

From the graph, it can be seen that the mathematical problem-solving ability of grade V students of Amaliyah Sunggal Private Elementary School using the

Differential learning model in the experimental class obtained a percentage of final scores, namely 2 students in the low category with a percentage of 8%, 7 students in the medium category with a percentage of 29% and 15 students in the high category with a percentage of 63%.

1. Test Normality

From the results of the tests carried out, the data was not distributed normally, therefore the Wilcoxon non-parametric normality test was continued using SPSS version 26.0 for windows. The Wilcoxon test is a non-parametric test to measure the significance of the difference between 2 groups of paired data on an ordinal scale or interval but with an abnormal distribution

2. Homogeneity Test

Based on levene statistical data, it can be seen that the significance value > 0.05 which means homogeneous data. Therefore, it can be concluded that the data variance for the data of the experimental class and the control class is the same or homogeneous.

3. Hypothesis Test

The hypothesis test in this study uses the Mann Whitney test. The Mann-Whitney test aims to find out whether there is a difference in the average of two free samples. The Mann-Whitney test is used as an alternative to the t-test independent test, i.e. the study data is not normally distributed. The results of the calculation of the Mann-Whitney test can be seen in the table below. The basis for decision-making is as follows:

- If the value < 0.05 , then there is an influence of the Differentiated learning model on the mathematical problem-solving ability of Class V students of Amaliyah Sunggal Private Elementary School
- If the score ≥ 0.05 , then there is no effect of the Differential learning model on the mathematical problem-solving ability of Grade V students of Amaliyah Private Elementary School

The following is a table of the results of the calculation of the Mann Whitney test

using SPSS 26.0 for Windows in this study:

Hasil Uji Hipotesis

Test Statistics ^a	
	Hasil Kemampuan PMM
Mann-Whitney U	151.000
Wilcoxon W	476.000
Z	-3.075
Asymp. Sig. (2-tailed)	.002
a. Grouping Variable: Kelas	

Based on the Mann Whitney Test table above, it can be seen that the Sig.(2-tailed) value is 0.002. Where $0.002 < 0.05$, it can be said that there is a significant (real) influence. Based on this, it was obtained that the H0 hypothesis was rejected and Ha was accepted. So that the conclusion was obtained that "the differentiated learning model has an effect on the mathematical problem-solving ability of grade V students of Amaliyah Sunggal Private Elementary School"

4. CONCLUSION

Based on the results of the research conducted by the researcher, it can be concluded that the mathematical problem-solving ability of students in the control class is still relatively low. This is evidenced by the average post-test score of class V students is 70. Then, the mathematical problem-solving ability of students in the experimental class by applying the Differentiated learning model was seen to be higher compared to the control class. This is evidenced by the average score of the post-test of the experimental class, which is 80. Therefore, judging from the results of the hypothesis test in this study, the significance value is 0.002 where $0.002 < 0.05$. So that the results of the hypothesis test in this study are the effect of the application of the Differential learning model on the mathematical problem-solving ability of grade V students of Amaliyah Sunggal Private Elementary School.

Referensi

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