



## Statistical Data Board on Mathematical Problem-Solving

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**Abstract:** The ability of mathematical problem-solving is a required ability for students in solving mathematical problems, other academic problems, or even daily life. This research is motivated by a lack of primary school students' problem-solving ability. The research was conducted to investigate the influence of statistical data board learning media on the mathematical problem-solving ability on data processing material for fourth-grade students in primary school. This research employed a quantitative approach by involving 73 fourth-grade students in one of the primary schools in Sumedang Regency as the research subjects and analyzing the data using a t-test. The research results revealed that the significance value obtained by the students was  $< 0.05$ . Therefore, it indicated that statistical data board learning media had an influence on mathematical problem-solving on data processing material.

**Keywords:** Learning Media, Statistical Data Board, Mathematical Problem-Solving, Primary School.

**How to Cite:** Fatimah, N., & Suryadi, D. (2021). Statistical Data Board on Mathematical Problem-Solving. *The 3<sup>rd</sup> International Conference on Elementary Education*, 3(1), 100-104.

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### INTRODUCTION

Mathematics is a branch of subjects that is broad in scope and includes several competencies, the teaching of mathematics to elementary school students aims to make mathematical concepts understood from an early age, as only said by Rustiana (2014, p. 2) "Mathematics is a universal science that underlies development. Modern technology in education in Indonesia has an important role in various scientific disciplines and develops human thinking. Mathematics can develop logical, systematic, and accurate thinking. This is due to the hierarchical, dynamic and generative nature of mathematics". Besides, it is expected to improve logical and systematic thinking processes, develop reasoning power, train to solve problems encountered in everyday life and prepare students to face the changing times that continue to increase.

The learning process that does not involve students actively in the learning process is one of the causes of the low ability to solve mathematical problems. This is similar to the opinion of Burais (2016, p. 7) "The learning that has been taking place in this school applies the expository method. The learning method begins with the teacher explaining the material and giving examples of questions then the students work on practice

questions. This will result in students' reasoning abilities not developing, as a result of low mathematics learning outcomes. Therefore, teachers need to develop learning methods, one of which is by using interesting learning media.

One way to make it easier for students to receive learning is to use learning media. Learning media is an intermediary in the form of learning resources or physical vehicles that contain instructional material that students can use to support learning activities (Prabowo, 2013, p. 1). We must have known that learning that takes place in the classroom tends to use less attractive learning media, of course, this is very influential on the success of learning, the use of monotonous learning media will affect various aspects that exist in students, one of which is low the ability to solve problems within them. According to Hamalik (Arsyad, 1997, p. 16), learning media has a lot of influence on students' psychological, the use of learning media is very helpful for the effectiveness of the process of delivering learning content and helping improve understanding.

One of the successes of a learning activity is inseparable from the quality of human resources in schools. One of the most influential human resources in schools is the



teacher, Sutopo (2006, p. 5). One of the basic elements of educational development is the teacher. For this reason, the importance of developing the abilities of a teacher is part of the teacher's obligation to form quality students.

The results of field observations conducted by researchers at one of the SDITs in Sumedang District showed that the students' problem-solving abilities were still quite low. This can be seen from the average value of student learning outcomes which is still below the Maximum Completion Criteria (KKM) determined by the school, namely 70. Only 40% of students complete, the rest are still below the KKM. In the learning process at that time the teacher did not use learning media at all. Wahyudin (1999, pp. 191-192) who argues that one of the tendencies that cause several students to fail to master well the subjects of mathematics is due to students not using reasoning and logic in solving given mathematical problems or problems. then the learning media is very necessary for mathematics lessons.

The problem-solving ability of each student is of course different, for that, an educator must be able to determine the right learning media so that it can attract students' attention so that they can participate in learning in the classroom properly. By using appropriate learning media, the teacher will be assisted in delivering material to students so that students can more easily understand mathematical concepts. The learning media used in this research is the statistical board (PANTIK). According to Turidho, et al (2015) statistical boards are used to assist in data processing materials such as finding the mean, mode, and median. Making learning media for statistical boards is also very easy with materials that are around our homes.

Based on the description of problem identification that has been described, the formulation of the problem can be taken as follows: 1) Is the mathematics problem-solving ability of students who use PANTIK learning media better than students who use conventional learning media?, 2) Is there an effect of the use of PANTIK media on ability Math Problem Solving?

## METHODS

This research is a quantitative study that was carried out using experimental research methods. Experimental research is an experimental activity that aims to determine a symptom or effect that arises as a result of certain treatments or it can be said to see the effect of independent variables on the dependent variable of the study. The experimental method was carried out to find out how the influence of the independent variable on the dependent variable in controlled conditions (Sugiyono 2018, p. 111). Besides, this experimental research is used to measure a variable against other variables directly and can test the hypothesis of a causal relationship (Abidin, 2011, p. 112).

The experimental research method used in this study is Quasi-Experimental Design and the design used is Non-Equivalent Control Group Design, in which the design has a pretest, treatment, and post-test. In this study, there was an experimental class and a control class. Both were given a pretest and post-test which distinguished only in the experimental class the students were treated using PANTIK learning media, while in the control class using conventional learning media.

The selection of research samples was not carried out randomly (Sugiono 2018, p. 138; Creswell 2016, p. 228). Grade VI student of one of the integrated Islamic elementary schools in Sumedang city for the 2020/2021 academic year. The sample of this research consisted of 2 samples, namely the experimental class and the control class, the experimental class namely the VI class of brothers, and the control class namely the VI class of brothers. Class VI brothers consist of 38 students while class VI brothers consist of 35 students. The reason for taking the population in that class is because the material is class VI material and the number of students is almost the same. The instrument chosen by the researcher, namely the pre-test and post-test regarding problem-solving has previously been validated by expert validators. Besides, it is also necessary to carry out several tests such as validity, reliability, the difficulty level of



the items, and differentiation. The data analysis technique in this study used parametric inferential statistics. This data analysis calculation uses the help of the *SPSS 23.0 for Windows program*.

### RESULTS AND DISCUSSION

Based on research conducted in grade VI one of the SDITs in Sumedang Regency, several data have been obtained that indicate the success or failure of our research. The

sample of students in this study were 73 students consisting of the experimental class, namely 38 students of the VI class and the control class, namely the VI class of Ikhwan, totaling 35 students. Initial data on student abilities were obtained from the pretest applied to the experimental class and the control class. The following is the data on the initial ability of the experimental and control class students in Table 1.

**Table 1.** Data for the pretest and post-test

Data	Class	N	Mean	Min	Max	St. Deviation
Pre-Test	Experiment	38	17.63	0	35.00	9:13
	Control	35	18:43	0	40.00	10.96
Posttest	experiment	38	70.66	50	95.0	12.95
	control	35	60.86	30	90.0	13:08

From these data, it can be seen that the mathematical problem-solving ability of students before being given treatment at lower than the experimental class students' initial abilities in the control class. The data shows that the average difference between the experimental class and the control class is 0.8. However, we can see from the data above, after the treatment there is a significant difference in the mean value, namely with a 9.8 higher result in the experimental class whose learning uses PANTIK learning media. After that, it was continued by testing the research hypothesis to find out whether the average mathematical problem-solving ability of students who were given learning action using PANTIK media was better than the mathematical problem-solving abilities of students who learned conventional learning. Based on the data analysis test, it is known that the post-test scores in the experimental and control classes are normally distributed and have homogeneous variants. Furthermore, the post-test mean difference test was carried out. The difference test that is done is a parametric statistical test, test independent samples with the help of SPSS Software Version 23.0 for Windows. Below is a table of the mean difference test results from the post-test results:

**Table 2.** Data of Mean Difference Test Results Data *Post-Test* Solving

Data	Independent-Samples T-Test		Information
	T	Sig (2-tailed)	
<i>Post-test</i>	0.828	0.002	H <sub>0</sub> Rejected

Based on table 2 above, the results of the mean difference *post-test test* of mathematical problem-solving abilities *students* obtained the Sig. (2-tailed) of 0.005. Result sig. (1-tailed) obtained a value of 0.001 < 0.05, so H<sub>0</sub> is rejected, so it can be concluded that the mathematical problem-solving ability of students whose learning uses PANTIK media is better than the mathematical problem-solving abilities of students who learn conventional learning. The improvement of students' mathematical problem-solving abilities in the experimental class and the control class can be seen from the score analysis *N-Gain*. Statistical calculations *N-Gain* were performed using the SPSS Version 22 application, which is presented in the following table:



Data	Class	N	Mean	Std. Deviate ion	Min	Max
N-Gain	Experiment	38	0.64	0.17	0.29	0.9 3
	Control	35	0.51	0.18	0.00	0.8 9

**Table 3.** Descriptive Statistics *N-Gain* Mathematical Problem-Solving Ability

in Table 3, it can be seen that the average of N-Gain mathematical problem-solving abilities students in the experimental class 0.13 is greater than the average value of N-Gain in the control class. At a glance, it can be concluded that the increase in students' mathematical problem-solving abilities in the experimental class is better than in the control class, but statistical tests are still needed.

Based on testing the data analysis requirements, it was known that scores *the N-Gain were* students 'normally distributed and varied homogeneously. Then the difference test used is the parametric statistical test t-test of independent samples with the help of SPSS Software Version 23.0 for Windows. The following is a summary of the results of the mean difference test N-Gain using the test independent sample t which is presented in the following table:

**Table 4.** Data of Mean Difference Test Results of N-Gain Mathematical Problem Solving

Data	Independent- Samples T-Test		Information
	T	Sig (2- tailed)	
N -Gain	3.132	0.003	H <sub>0</sub> Rejected

Based on table 4, the test results mean difference of N-Gain students' mathematical problem-solving ability, obtained by the Sig. (2-tailed) of 0.003. Result sig. (1-tailed) obtained a value of 0.0015 < 0.05 then H<sub>0</sub> is rejected, so it can be concluded that the increase in mathematical problem-solving abilities of students whose learning using PANTIK media is better than the improvement of mathematical problem-solving abilities of students who learn conventionally.

## CONCLUSIONS

The mathematical problem-solving ability of students whose learning uses PANTIK media is better than students whose learning is conventional. This can be seen from the results of the mean value difference post-test test using the Independent Sample T-Test-test resulting in a significant value of < 0.05, with a result of 0.01, so that H<sub>0</sub> is in; Furthermore, namely the increase in mathematical reasoning of students whose learning using PANTIK is better than the increase in mathematical reasoning of students whose learning is conventional. This can be seen from the results of the

average score post-test, which is 9.8 higher in the experimental class whose learning uses PANTIK media. Apart from being seen from the results of the average score post-test, the increase in students' mathematical reasoning can also be seen from the results of the mean difference test N-Gain. The test for the difference in the mean value of N-Gain using the Independent Sample T-Test resulted in a significant (2-tailed) value of 0.0015 < 0.05 so that H<sub>0</sub> was rejected; 3) The application of PANTIK teaching aids in mathematics makes students and teachers active in the teaching and learning process. This can be seen from the results of the student observation sheet, which shows the percentage results that increase every day so that it reaches an average value of 90.4%, which means the scale of student activeness interpretation is very strong. Meanwhile, the results of the teacher's observation sheet show the average percentage of 88.1%, this shows that the scale of teacher activeness interpretation is very strong.

Based on the implementation and research results obtained, the researcher proposes several suggestions, including For teachers, learning using PANTIK can be used by



teachers in delivering statistical material because students can be actively and enthusiastically involved in the teaching and learning process. For further researchers, they should: 1) Modify the PANTIK props so that they can be used in group data in statistical materials; 2) Prepare a companion to observe each student; 3) Able to improve the shortcomings of PANTIK teaching aids by achieving the KKM target. REFERENCES

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