

Effectiveness of Mathematics Learning Using Scientific Approaches Assisted by Powerpoint Media

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Abstract

This research is a pre-experimental research with one-group pretest-posttest design that aims to determine the effectiveness of statistical learning through the scientific approach assisted by PowerPoint media. The population of this research is the eighth-grade students even semester of 2017/2018 academic year, which consists of 10 classes. The sampling technique is cluster random sampling. Data about the feasibility of learning and student activities were obtained by using an observation sheet, data about students' responses to learning were obtained using a questionnaire sheet, and to find out the learning outcomes of statistical material a learning achievement test was used. Analysis of the data used is descriptive analysis to describe the implementation of learning, student activities, student responses, and student learning outcomes and inferential analysis to test the research hypothesis. The results showed that: (1) the implementation of learning using the Scientific Approach assisted by Powerpoint media for 5 meetings in the excellent category, (2) student activities in the very effective category, (3) students' responses to learning tended to be positive, (4) learning outcomes students achieve mastery learning 87.88%, an average value of 78.58. Thus from the results of the study it can be concluded that Mathematics Learning with the Scientific Approach assisted by Powerpoint media in Sorong City Junior High School Students on statistical material is effective in improving student learning outcomes.

Keywords: Effective; Scientific; Power point.

INTRODUCTION

Innovation in learning has a major effect on the achievement of the success of learning objectives in the classroom (Mulyono. et al., 2020; & Trisnawati, 2020). The use of the learning approach has a significant effect on student success. The scientific approach is one of the learning approaches that is highly recommended in the 2013 curriculum. Learning with a scientific approach is a learning process designed to stimulate students to be able to actively build their own knowledge through the stages of observing, asking questions, gathering information, associating / reasoning, and communicating. Scientific learning is learning that

adopts scientific steps in building knowledge through scientific methods (Sariningsih & Gida, 2016). Besides the scientific approach is considered important in learning, because in addition to developing knowledge can also develop students' attitudes and skills (Untayana & Idris, 2016). Therefore the expected learning conditions created are directed to encourage students to find out from various sources through observation, and not just being told.

In addition to the learning approach, learning media also have an important role in teaching success. Learning media can prevent students from experiencing boredom in learning because it only focuses on the blackboard so students can better understand and be motivated in learning (Sundayana, 2016; & Siti Eliyah. et al., 2018). One of the learning media that can support learning is powerpoint. Powerpoint is one software specifically designed to be able to display multimedia programs with an attractive, easy to use and relatively inexpensive (Suprianto. Et al., 2016). PowerPoint has features that not only present text, but also images, animations, sound effects, songs, graphics and films that can trigger children's focus and avoid boredom. Powerpoints are easily created and replaced according to the material to be taught.

Scientific learning is learning that requires students to be able to construct their knowledge in learning through 5 learning steps, namely observing, asking questions, gathering information, reasoning, and communicating. For students to be able to collect information properly, learning media are needed that can support the learning process. Powerpoint is one of the learning media that can support, facilitate and make students interested in observing the learning material properly. Power points have several advantages, namely that they are easy to create and replace content by teachers to suit all material. its appearance with various images, colors, audio, and video can provide enthusiasm and interest for students in listening and understanding learning. This has been proven by research conducted by Eka & Saleh (2019) entitled *The Influence of a Scientific Approach with PowerPoint media on the Mathematical Disposition of Students of SMP Negeri 6 Bengkulu City*, which states that there is an effect of applying a scientific approach assisted by PowerPoint media on the ability of mathematical disposition. the first treatment of mathematical disposition was 66.1%. Based on the description above, then the researchers conducted research on "the effectiveness of learning mathematics with a scientific approach assisted by powerPoint media in class VIII F SMP Negeri 2 Sorong ". This research is limited to statistical material.

RESEARCH METHOD

The population in this study were all eighth grade students of SMP N 2 Sorong City in the 2017-2018 academic year consisting of 10 parallel classes. The ability to grade 10 is homogeneous. With class VIII F as a research sample.

This research is categorized as a pre-experimental design research with one-group pretest-posttest design, namely research with one experimental class. The class is given a pretest, then given a treatment using a scientific approach assisted by powerpoint media, then given a posttest to see the effectiveness of the treatment given. The research design scheme is presented in the following table:

Table 1 Research Design

<i>Pre-Test</i>	<i>Treatment</i>	<i>Post – Test</i>
O ₁	T	O ₂

Source: (Sugiyono, 2015)

With:

- T : treatment with scientific approach
O₁ : pre-test score
O₂ : post-test score

The instrument used in this study is the teacher activity observation sheet is an instrument used to collect data about the implementation of learning, student activity observation sheet is used to capture student activities during mathematics learning, student questionnaire response sheet is used to obtain information from students about the implementation of mathematics learning with using a scientific approach assisted by powerpoint media, and learning outcomes tests in this study were developed in the form of a description in accordance with the material. While the learning tools used namely the lesson plan (RPP) are made based on the syntax of learning with a scientific approach, student worksheets made in this study are in accordance with the application of the scientific approach, and the student book is a student handbook used in learning with a scientific approach to the material class VIII statistics.

Analysis of the data used is descriptive analysis to describe the implementation of learning, student activities, student responses, and student learning outcomes and inferential analysis to test research hypothesis. With the following hypothesis: Hypothesis Mayor and Hypothesis Minor. (1) Hypothesis Mayor :TSTS type cooperative model with a scientific approach assisted by effective powerpoint media to be applied in mathematics learning in class VIII of SMP N 2 Sorong. (2)Hypothesis Minor: (a)Hypothesis Minor 1: The average student learning outcomes after applying the cooperative model TSTS type with a scientific approach assisted by powerpoint media is greater than 69.9.

To test statistically, this hypothesis is formulated as follows: H₀ : $\mu \leq 69,9$ against H₁ : $\mu > 69,9$. (b). Hypotesis Minor 2: The average gain of student learning outcomes after applying the TSTS type cooperative model with a scientific approach assisted by powerpoint media is greater than 0.29. For statistical testing, this hypothesis is formulated as follows: H₀ : $\mu_g \leq 0,29$ melawan H₁ : $\mu_g > 0,29$. (c) Hypotesis Minor 3: Mastery learning students by applying the TSTS type of cooperative learning model with a scientific approach assisted by powerpoint media is classically greater than 0.749. To test the hypothesis of 'Classical Students Completion More than 74.9%', the inferential statistics used were proportion test. The statistical hypothesis for the purposes of statistical tests is formulated as follows: H₀ : $\pi \leq 0,749$ against H₁ : $\pi > 0,749$, with: π : parameters of mastery learning classical. The statistic use is statistic z with formula (Ilyas, B & Tiro, M.

A: 2007): $z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1-\pi_0)}{n}}}$, the criteria of testing are: If $z > z_{(0,5-\alpha)}$, so H₀ rejected and
If $z \leq z_{(0,5-\alpha)}$, so H₀ accepted.

RESULTS AND DISCUSSION

A. Descriptive analysis

The research data analyzed descriptively in the form of learning implementation data, student activities, student responses, average pre test - post test and average gain. For data on the implementation of learning, student activities and responses can be seen in table 2 as follows:

Table 1 Average Observation and Questionnaire results

No	Aspec	Average	Category
1	Learning Implementation	3,73	Very Good
2	Student Activities	3,74	Very Effective
3	Student Responses	3,26	Tend Positive

Table 1 shows about the average results of observations of the implementation of learning that are categorized very well, this means that each of the steps of scientific learning in class is done very well.

Student activities in scientific learning also seem to be very effective in the category, this can be interpreted that the scientific approach assisted by powerpoint media is very effective in supporting student activities in learning. Scientific learning steps consisting of observing, asking, gathering information, associating / reasoning, and communicating can trigger students to be more active in the teaching and learning process (Windy Zarina Agustina. et al., 2016; & Trisnawati, 2017).

While the results of the questionnaire responses of students to the scientific approach assisted by power points, worksheets, and books students get an average response that tends to be positive, this shows that students have good acceptance of the learning applied. This is in line with the application of the scientific approach to the fifth grade students of SD Negeri 12/30 Kanaungan, Pangkep Regency who received a "positive" response or to the categories (Happy, New, Interesting, and Yes); (Nur Alamsyah, 2016).

While the average results of pre-test, post-test and gain from the application of the scientific approach assisted by PowerPoint are shown in table 3 below:

Tabel 2 Averages of *Pre test*, *Post Test* dan Gain Result

No	activities	average	category
1	<i>Pre-Test</i>	27,18	Very low
2	<i>Post-Test</i>	78,58	Medium
3	Gain	0,72	High

Table 2 shows the differences that are markedly higher than the average pre-test and post-test values with the average gain reaching a high category. This can be interpreted that the application of a scientific approach assisted by powerpoint

media increases the learning outcomes of Grade VIII F students in statistical material. The success of improving learning outcomes is due to the application of a scientific approach in the classroom that is very good, which causes students to be more active in learning, students construct their own knowledge through learning steps in a scientific approach so that students' experience and understanding of the material become good (Untayana & Idris, 2016; & Trisnawati, 2017). Powerpoint media also has an equally important role in learning, because the application of powerpoint media makes it easier for students to understand the material, especially those related to pie charts. Powerpoint also makes the atmosphere more interesting and avoids boredom from students because it only focuses on the blackboard, so that students' attention to the material becomes better (Sundayana, 2016; & Siti Eliyah. Et al., 2018).

B. Analysis Inferensial

1. Normality Test

Student learning outcomes data were tested with normality testing for posttest data and students normalized gain data obtained that the student learning outcomes normality test data obtained $p\text{-value} = 0.200$ for the Kolmogorov-Sminov normality test. P-value greater than $\alpha = 0.05$ means the learning outcome data comes from normally distributed data.

2. Hypotesis Test

A scientific approach assisted by effective powerpoint media to be applied in mathematics learning in class VIII F of SMP N 2 Sorong. To test the hypothesis also formulated H_0 dan H_1 as follows:

H_0 : The scientific approach assisted by powerpoint media is not effective to be applied in mathematics learning in class VIII F SMP N 2 Sorong

H_1 : A scientific approach assisted by effective powerpoint media to be applied in mathematics learning in class VIII F of SMP N 2 Sorong

Major hypotheses in this study will be tested based on the results of testing minor hypotheses. The results of testing the minor hypotheses in this study are as follows:

1) Result of Hypotesis Minor 1 Test

$H_0 : \mu_1 \leq 69,9$ against $H_1 : \mu_1 > 69,9$

where: μ_1 = The parameters of the average score of student learning outcomes, the results of testing the minor hypothesis 1 can be seen in table 2.

Table 3 Result of Minor Hypothesis 1 *One-Sample Test*
One-Sample Test

Test Value = 69.9			
t	Df	Mean Difference	95% Confidence Interval of the Difference

			Sig. (2- tailed)		Lower	Upper
posttest	5.760	32	.000	8.67576	5.6075	11.7440

Based on table 3 seems that $p\text{-value} < 0,001 < \alpha = 0,05$ so H_0 rejected while H_1 daccepted for hypotesis minor 1.

2) Hipotesis Minor 2

The minor hypothesis 2 is related to the average normalized gain of students taught with a scientific approach to students of class VIII F of Sorong City Middle School 2 must be greater than 0.29. For the purposes of statistical testing, a working hypothesis is formulated as follows:

$H_0 : \mu_g \leq 0,29$ against $H_1 : \mu_g > 0,29$

Where μ_g = paramether of score average gain ternormalisation students.

The results of testing the minor hypothesis 2 can be seen based on table 3 about the normalized gain value. Hypothesis testing using SPSS 20 using the following one-sample t test:

Table 4 Result of Hypothesis Minor 2 *One-Sample Test*
One-Sample Test

Test Value = 0.29						
	t	df	Sig. (2- tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
n_gain	48.557	32	.000	.42667	4088	4446

Based on table 4 seen that $p\text{-value} < 0,001 < \alpha = 0,05$ so H_0 rejected while H_1 accepted for hypotesis minor 2.

3) Hypotesis Minor 3

To test the hypothesis 'Students Over Classical 74.9%', the inferential statistics used are

proportion test.

The statistical hypothesis for the purpose of statistical tests is formulated as follows:

$H_0 : \pi \leq 0,749$ against $H_1 : \pi > 0,749$, with:

π : Parameters of mastery classical learning.

Statistic z obtained is $z = 1,67$, with $z_{table} = (0,5 - \alpha) = 0,45 = 1,645$. Seen that 1,67 bigger than $z_{table} = 1,645$, cause $z_{count} > z_{table}$, so H_0 rejected. Because H_0 rejected, so H_1 accepted. The application of a scientific approach assisted by powerpoint media in the classroom will produce a positive and effective process in classroom learning.

CONCLUSION

The activity of implementing the learning process by using a scientific approach assisted by powerpoint media is very appropriate and effective. Student activities in achieving statistical learning with a scientific approach assisted by powerpoint media are in the very effective category. The class when learning becomes very lively and active with the steps of learning in a scientific approach, students try to solve the problems given which they will present in front of the class, thereby spurring students to be active in learning. Student responses in Statistics learning with a scientific approach assisted by powerpoint media are in the positive tendency category. Seen when students actively communicate the findings to each other friends, so that all students have a role that they must be responsible for each of them. The average score of students' mathematics learning outcomes in Statistics learning with a scientific approach assisted by powerpoint media achieves an average score of 78.58 with around 87.88% of students meeting the minimum completeness criteria (KKM) so that learning reaches classical completeness. All students can understand each problem given, each student has a role so that each student tries to solve the problem that is given which they will share with other friends and will be presented in class, thus encouraging students to work.

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