Application of The Treffinger Model to Improve Learning Outcomes In Science Lessons

[1]Iin Mahlia Fitriana*, [2]Edy Herianto, [3]Siti Istiningsih
[123]Program Studi Magister Pendidikan Dasar, Universitas Mataram, NTB, Indonesia

Article Info	ABSTRACT
  Corresponding Author Iin Mahlia Fitriana Universitas Mataram, Nusa Tenggara Barat, Indonesia *E-mail: *iinmahliafitriana@gmai.com*	*This research aims to determine the effect of implementing the video-assisted treffinger model on energy material changing the form of science learning at SDN 3 MEREMBU. From the results of observations of the material, changes in shape are relatively low. To overcome this, a video-assisted Treffinger learning model was applied. The research method used is quantitative, the research design is Pre-Experimental Design type one group pretest-posttest Design. This research was conducted on one experimental class group which was not randomly selected. From this research, it can be seen that there has been an increase in the average, namely from 58.17 (pretest) to 70.33 (posttest). The results of the normality test on energy changes learning outcomes obtained a pretest and posttest significance value of 0.063<0.065 so the data was said to be normally distributed. Meanwhile, the output results of the paired sample T test show a sig value. (2-tailed) of 0.000. Based on the basis of decision making on the paired sample T test if sig. (2-tailed) < 0.05 then H0 is rejected and Ha is accepted. In the data above the sig value. (2-tailed) of 0.000 < 0.05 indicates a better effect. In the interpretation table, the R square coefficient of 0.80-1.000 is included in the very strong category so it can be concluded that the video-assisted Treffinger model has a very strong influence on learning outcomes for class 4 science energy changes material. subjects at SDN 3 Merembu Bengkel for the 2023/2024 academic year.*

Introduction

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, nation and state (National Education System Law Number 20 of 2003). Education is the main foundation in developing individual potential and abilities. In the current era of globalization and technological advances, it is important for the education system to prepare and increase students' knowledge so that they are not left behind. One way to increase students' knowledge in science subjects is the teacher's efforts to use appropriate learning media and learning models. Science at the elementary school level aims to teach students about the basic principles of science, experimentation and observation of natural phenomena. However, conventional approaches often tend to limit students' creativity and initiative in understanding scientific concepts.

From the results of observations, researchers found that students had low scores on the material changing forms, due to learning that was less fun, less creative, less use of media so that students were sleepy, unfocused and bored when receiving learning. Therefore, researchers are interested in finding solutions so that students' understanding increases, learning is fun and better. Researchers tried to use the video-assisted treffinger learning model. The treffinger model is learning that involves skills in encouraging a creative learning process (Bulan, 2020; Juniar & Sapri, 2021; Ni'mah, 2022; Nurhasanah, 2017). Meanwhile, according to Shoimin (2014), the Treffinger learning model is a model that handles creativity directly and provides practical suggestions on how to achieve integration (Aris Shoimin, 2017; Noor, 2022).

According to Munandar in Sohimin, the Treffinger model consists of the following steps: a). Stage I: Basic tools or creativity techniques include divergent thinking skills and creative techniques, to develop flexibility of thinking; b). Stage II: Practice with process, which provides opportunities for students to apply the skills learned in stage I in practical situations; and c). Stage III: Working with real problems, namely applying the skills learned in the first two stages to challenges and in the real world.

To support the Treffinger learning model, this research uses the help of learning videos. According to Mahadewi (2012) states that "video is defined as any electronic media format that is used to stimulate students' thoughts, feelings and interest in learning through showing videos or ideas, messages and moving image information" (Rezkyana et al., 2023) . Learning videos also have a very important role, especially in learning, because they can attract students' attention so they can foster learning motivation, clarify the meaning of teaching materials so they are easy for students to understand, teaching methods are more varied and students do more learning activities.

The results of previous research, (1) The results of research conducted by Sumiati (2022), namely the science learning results of class IV students at SD Negeri 54 Lubuklinggau after implementing the Treffinger learning model have been significantly completed. The average score of the students' final test was 20 students and the percentage of students who completed it, with the title Application of the Treffinger Model to Class IV Science Learning Outcomes at Sd Negeri 54 Lubuklinggau (Sumiati et al., 2022). (2) Research conducted by Siti Aisyah (2019) entitled "Application of the Treffinger Learning

Model Assisted by Sparkol Videoscribe Software to Improve Students' Mathematical Understanding" based on the findings of this research, the Treffinger learning model assisted by Sparkol Videoscribe software can be used as an alternative to improve mathematical understanding students (Widayanti & Aisyah, 2019). (3) Rezkyana, Nursalam Nursalam, Sulfasyah Sulfasyah (2023) with the title The Influence of the Treffinger Learning Model Assisted by Audio - Visual Video Media on the Ability of Higher Order Thinking Skills in Social Studies Learning and Self-Efficacy of Class IV Elementary School Region II Students, Simbang District, Maros Regency. The Treffinger learning model influences the HOTS thinking ability in social studies learning for Class IV Elementary School students through the application of the Treffinger learning model assisted by audio visual video media. This is based on the table of equal variances assumed to obtain a Sig value. $0.005 < 0.05$, and can also be seen from the average critical thinking skills of the Treffinger learning model is 60.00 (Rezkyana et al., 2023).

Based on the explanation above, the researcher raised the title Application of the Video-Assisted Treffinger Model in Energy Material and Changes in the Form of Science Lessons at SDN 3 Merembu.

Method

The research conducted by researchers is quantitative research. The research design used was Pre-Experimental Design type one group pretest-posttest design. This research was conducted on one experimental class group which was not chosen randomly. The experimental class was previously given a pretest to determine initial conditions or abilities in changing the form of science lesson material. The results of the treatment can be known more accurately, because it can be compared with the conditions before the treatment and after the treatment. The treatment given to students was in the form of learning using the video-assisted treffinger model and at the end of the experiment a posttest was given to determine the effect of the video-assisted treffinger model.

Table 1. One Group Pretest-Posttest Design Research Design (Sugiono, 2014)

Group	Pretest	*Perlakuan*	Posttest
Experiment	O1	X	O2

Information:

O1: Giving an initial test (pretest) to the experimental class using the Treffinger model assisted by video.

O2: Giving a final test (posttest) to the experimental class using the video-assisted treffinger model.

X: Learning in the experimental class uses the Treffinger model by implementing two treatments.

Population is all members of a group of people, events or objects who live together in a place and are planned targets for conclusions (Fauzi, 2018; Prof. Dr. Sugiyono, 2020; Sugiyono, 2015; Trisnani & Utami, 2022) . The population in this study were all students at SDN 3 Merembu for the 2023/2024 academic year. The data collection techniques used include: Observation, Tests and Documentation. Instrument testing involves validity and reliability used to test respondents. The next step is to carry out prerequisite tests using normality and homogeneity tests using SPSS 16.0 for Windows. If the data shows homogeneity of variance, the next process is to carry out hypothesis testing, specifically using the Paired Sample t Test with SPSS 16.0 for Windows support. Paired sample t test or

paired t-test is a hypothesis testing method where the data used is not independent (in pairs). The characteristic most often found in paired cases is that one individual or research object is subjected to 2 different types of treatment. Even though they used the same individuals, researchers still obtained 2 types of sample data, namely data from the first treatment and data from the second treatment..

Result and Discussion

1. Instrument data analysis

Before distributing the test questions. The researcher tested the validity of the instrument, of the 29 questions tested there were 8 questions that were invalid. Then 20 valid questions were used for the pretest and posttest, to make it easier for researchers to process student scores.

Next, the researcher carried out an analysis test using computer statistical package for social science (SPSS) for Windows evaluation version 25 software, after obtaining the research data. The results of the reliability test are as follows:

Table.2 Reliability statistics

Cronbach's Alpha	N of Items
.928	29

The Cronbach's Alpha value in the table above is 0.946. Based on Putri's opinion (2015), an instrument is said to be reliable or consistent in measuring if Cronbach's Alpha is greater than 0.60. The results above show that 0.946 > 0.60 so that the instrument can be said to be reliable and included in the satisfactory category so that the instrument can be used to collect data during research.

2. Test the Analysis Prerequisites

In the analysis prerequisite test, only the data normality test was carried out because this research used paired samples originating from the same individual or research object so it could be assumed to be homogeneous.

The following are the results of the data normality test using Shapiro-Wilk because the data is less than 50.

Table.3 Pretest and Posttest Data Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
before treatment	.222	30	.001	.934	30	.063
after treatment	.156	30	.060	.935	30	.065
a. Lilliefors Significance Correction						

The results of the normality test on energy change learning outcomes obtained pretest and posttest significance values, namely 0.063>0.065, so the data is said to be normally distributed.

3. Hypothesis Testing

After testing the data prerequisites, hypothesis testing is then carried out. Hypothesis testing in this research was carried out in two ways, namely:

1) Paired sample t-test

Hypothesis analysis in this research uses a paired sample t test with the help of SPSS. The results of data analysis with SPSS version 25 obtained the following output:

Table.4 Paired samples statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	before treatment	58.17	30	13.162	2.403
	after treatment	70.33	30	12.726	2.323

Looking at the descriptive statistics, it is clear that there is a difference between the average score before treatment, namely 58.17 (pretest) and the score after treatment, namely 70.33 (posttest) using the video-assisted treffinger model. From this data it can be seen that after the video-assisted Treffinger model was applied to students, student learning outcomes in the material on energy changes increased.

Because the average value of student learning outcomes in the Pretest was 58.17 < Post Test 70.33, it can be interpreted descriptively that there is a difference in the average learning outcomes of energy changes between before and after treatment. Next, to prove whether the difference is really real (significant) or not, we need to interpret the results of the paired sample t test contained in the "Paired Samples Test" output table below.

Table.5 Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	before treatment after treatment	-12.167	3.130	.572	-13.336	-10.998	-21.288	29	.000

From the results of the paired sample T-test output using SPSS version 25 above, the sig value is known. (2-tailed) of 0.000. Based on the basis of decision making in the paired sample T-test if the sig. (2-tailed) < 0.05 then H0 is rejected and Ha is accepted. In the data above, the sig value. (2-tailed) of 0.000 < 0.05 so it can be concluded that there is a significant difference between the results of the pretest and posttest, which means that it shows that there is an influence of the video-assisted treffinger model in improving learning outcomes in the material on shape-changing energy in grade 4 science lessons at SDN 3 MEREMBU workshop for the 2023/2024 academic year.

2). Simple Linear Regression Test.

Next, a simple linear regression test was carried out using the SPSS version 25 application. From the results of the simple linear regression test calculations, the following output was obtained:

Table.6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.971ᵃ	.943	.941	3.185

a. Predictors: (Constant), setelah perlakuan

Based on the criteria for simple linear regression test guidelines, it is determined that if the data analyzed uses only one independent variable, the calculation result used is the R Square value. Therefore, the calculation result used is R square because in this study there is only one variable.

From the SPSS 25 output above, it is known that the R Square value is 0.943 or 94.3%. This shows that the percentage influence of the independent variable on the dependent variable is 94.3%, while the remainder can be influenced by other variables outside the research.

Based on the coefficient interpretation criteria table as stated in the interpretation table, the R square coefficient of 0.80-1.000 is included in the very strong category (Sugiyono: 2009). So it can be concluded that the video-assisted Treffinger model has a very strong influence on the learning outcomes of energy change material in the 4th grade science subject at SDN 3 MEREMBU in the Labaapi workshop for the 2023/2024 academic year.

Conclusion

Based on the research above, it can be concluded that the students' learning outcomes in class 4 form-changing energy material that were given treatment were higher than when they had not been given treatment, the average score after treatment was 70.33 (posttest), whereas before treatment the average score was 58. 17 (pretest). Meanwhile, the results of the paired sample T-test above show the sig value. (2-tailed amounting to 0.000). The basis for decision making in the paired sample T-test is if the sig value. (2-tailed) < 0.05 then H0 is rejected and Ha is accepted. In the data above, the sig value. (2-tailed) of 0.000 < 0.05 so it can be concluded that there is a significant difference between the pretest and posttest results, which means that it shows that there is an influence of the video-assisted treffinger model in improving learning outcomes in the material of shape-changing energy. And the results of the Simple Linear Regression Test analysis show that the R Square value is 0.943 or 94.3%. This shows that the percentage influence of the independent variable on the dependent variable is 94.3%. Meanwhile, the rest can be influenced by other variables outside the research. Based on the interpretation criteria table, R square 0.80-1.000 is included in the very strong category. So it can be concluded that the application of the video-assisted Treffinger model has a very strong influence in improving learning outcomes on form-changing energy material in grade 4 science subjects at SDN 3 Merembu for the 2023/2024 academic year.

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