

# Comparative Analysis of Learning Outcomes of Implementing PowerPoint and Pictures as the Learning Media

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## ABSTRACT

Student's learning outcomes can be varied based on different factors. One of these factors is the learning media. This study aims to determine the differences in student learning outcomes by using Powerpoint and picture media in 4th grade Public Elementary School 40 Bengkulu City. The method used is a comparative quantitative research design with nonequivalent control group design. The sample of this research were 2 classes, namely 4<sup>th</sup>-A with 20 students, and 4th B with 20 students. The sampling technique used in this study was the total sampling technique. The data collection technique is done by using observation instruments, tests, documentation, and interviews. The data analysis technique used the t-test. Based on the results, there are significant differences between the Powerpoint learning media and picture media on student learning outcomes in the fourth-grade science learning of Public Elementary School 40 of Bengkulu City. This can be proven by testing the hypothesis by using the independent sample  $t_{\text{test}}$  with the separated variance formula, namely  $(2.27) > t_{\text{table}} (2.02)$ .

**Keywords:** Learning outcome comparison, Learning media, Implementation of learning media.

## 1. INTRODUCTION

In the learning process, teachers are required to be an inspirational, innovative, creative, and productive person who can create a positive student orientation and an active, fun learning process for their students to feel comfortable in the classroom. The creation of maximum learning outcomes in terms of cognitive, affective, and psychomotor is also necessary. To create it, an effective learning is needed. In creating effective learning, teachers need media to create an interesting learning activity. Media is a tool that can help teachers and students in the learning process [1]–[5]. Students can understand the material presented by the teacher easily. In addition, the teacher is easy to explain or to convey the material being taught. Students will be very attentive and not lazy to follow lessons if the lessons in class are fun. In the subject of Natural Sciences, the role of the media is very important as a tool to increase the student's motivation, to reduce miscommunication, and to make the concepts presented become concrete so that the students can have a better understanding, in accordance with students' thinking levels.

The implementation using learning media in the form of motion pictures, powerpoint, and other pictures can improve science learning outcomes for students [6]–[9]. Attractive visuals will make students excited and pay full attention to media based on visuals which is put on display [1], [10], [11]. For schools that already have adequate facilities, powerpoint media are often used in learning to increase student concentration [12], [13].

Based on the preliminary observations and direct interviews in the field on May 24, 2019 with teachers of Public Elementary School 40 Bengkulu city related to the use of instructional media, it was not found the application of media in the learning process. Most teachers delivered the material only by speech. When learning conducted this speech method. This school has not been able to apply technology-based learning media that displays visual learning. Limited facilities and infrastructure do not discourage teachers from teaching

## 2. RESEARCH METHOD

The type of research is a comparative research to compare the similarities or differences of two or more

facts and properties of the object under study based on a particular research framework [14]–[16]. Comparative research is a kind of descriptive research that seeks to find answers fundamentally about causal relationships by analyzing the factors that cause the occurrence or appearance of a particular phenomenon. The hypothesis in comparative research uses the comparative hypothesis, which is a temporary answer to the formulation of comparative problems. In this formula, the variables are the same but the population and sample are different. Comparative research is a type of research used to compare between two groups or more of a certain variable [17], [18].

Quantitative research emphasizes its analysis on numerical data processed by statistical methods. This study used the Nonequivalent Control Group research design. The design is almost the same as the pretest-posttest control group design, but the sample group 1 and sample group 2 cannot be chosen randomly. The form of this design can be seen in table 1.

Table 1. Research Design

Grade	Pretest	Intervention	Posstest
Grade A	O1	X	O2
GradeB	O3	X	O4

Explanation:

X = Powerpoint and Picture Media

O1 = Pre-test score for sample A

O2 = Post-test score for sample A.

O3 = Pre-test Score for sample B

O4 = Post-test score for sample B

This research was conducted at Public Elementary School 40 Bengkulu City in July - September 2019. The participants were the students of 4 grader that consisted of 20 in class A and 20 in class B. The sampling technique was total sampling technique. So that the number of samples and population are the same. The data were collected by using observation instrument, documentation of image and document, learning outcomes tests, and interviews. Interviews were conducted to strengthen data interpretation analysis. The learning outcome test research instrument has a grid as attached in table 2.

Table 2. Instrument Grid

Basic Competence	Indicator	Item number	Total
Describing the respiratory organs and their functions in animals and dispose of animals based on their respiratory system	? Describe the respiratory system in animals	2,3,4,9,10,12,	9
	? Describe the respiratory apparatus in animals	14,17,20 1,5,7,13,16,18	6
	? Grouping animals based on their respiratory system	8,11,15,19,6	5

The learning outcome test instrument grid in Table 2 is a product of the validity results of 25 items to 20 items only. Thus, there are 5 invalid items. A series of tests were carried out such as validity and reliability tests.

Other research data collection uses observation sheets. This instrument serves to strengthen data interpretation when statistical data processing has been carried out from learning outcomes tests. Observation points can be seen in table 3. Interviews were conducted randomly to several students simultaneously and randomly. This activity is carried out before and after the learning outcome test is carried out. The reason for this interview was that the analysis of the learning outcomes test could be strengthened in its interpretation. The points being interviewed were students' readiness to take the test of learning outcomes, spirit to following the test and learning, readiness of writing instruments, etc.

Table 3. Observation Point

No	Score item	Category	Score Quota
1	Introduction	Opening media, Using media	20%
2	Core activities	Entering Material, Setting Pictures, Attention to the class during the learning	60%
3	Closing activities	Closing the media	20%
Total			100%

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

In this study there were two tests carried out, namely the pre-test and post-test, while the results obtained are displayed in the form of a frequency table in table 4.

Table 4. Distribution of frequency Learning Outcome  
Pretest 4<sup>th</sup> A Grade

No	Score of Pre-test	Category	Frequency	%
1	57.48 up	Up / High	2	10 %
2	37.52-57.48	Middle	15	75%
3	37.52 down	Down / low	3	15 %
<b>Total</b>			<b>20</b>	<b>100 %</b>

Explanation:

Column 1 is a number

Column 2 is the range of pretest grades for 4<sup>th</sup> Grade students

Column 3 is the range category

Column 4 is the number of students who got this score

Column 5 is (%) known data from  $\frac{\text{total frequency}}{\text{total students}} \times 100$

Based on the analysis, it can be concluded that in 4<sup>th</sup> Grade A, there are: 2 students in the upper / high group (10%), 15 students in the middle group (75%), and 3 students in the lower / low group (15%).

As for the frequency distribution table of the results of the 4<sup>th</sup> B pretest students can be seen in table 5

Table 5. Distribution of frequency Learning Outcome  
Pretest 4<sup>th</sup> B Grade

No	Score of Pre-test	Category	Frequency	%
1	55,98 up	Up / High	3	15%
2	29,32-55,98	Middle	14	70%
3	29,32 down	Down / low	3	15 %
<b>Total</b>			<b>20</b>	<b>100 %</b>

Explanation:

Column 1 is a number

Column 2 is the range of pretest grades for 4<sup>th</sup> Grade students

Column 3 is the range category

Column 4 is the number of students who got this score

Column 5 is (%) known data from  $\frac{\text{total frequency}}{\text{total students}} \times 100$

From the analysis it can be concluded that in 4<sup>th</sup> B Grade, there are: 3 students in the upper / high group (15%), 14 students in the middle group (70%), and 3 students in the lower / low group (15%).

Giving post-test questions is carried out at the end of the lesson to determine the student's ability to accept the lessons that have been learned or after students are given treatment with the aim of measuring the student's final results in science learning. The results of the posttest scores that have been carried out are shown in the frequency distribution table in tables 6 and 7.

Table 6. Distribution of frequency Learning Outcome  
Posttest 4<sup>th</sup> A Grade

No	Score Post-test	Category	Frequency	%
1	86.94 up	Up / High	3	15 %
2	62.56-86.94	Middle	13	65%
3	62.56 down	Down / low	4	20 %
<b>Total</b>			<b>30</b>	<b>100 %</b>

Explanation:

Column 1 is a number

Column 2 is the range of posttest grades for 4<sup>th</sup> Grade students

Column 3 is the range category

Column 4 is the number of students who got this score

Column 5 is (%) known data from  $\frac{\text{total frequency}}{\text{total students}} \times 100$

Table 7. Distribution of frequency Learning Outcome  
Posttest 4<sup>th</sup> B Grade

No	Score Post-test	Category	Frequency	%
1	78,43 up	Up / High	4	20 %
2	52,57-78,43	Middle	12	60%
3	52,57 down	Down / low	4	20 %
<b>Total</b>			<b>20</b>	<b>100 %</b>

Explanation:

Column 1 is a number

Column 2 is the range of posttest grades for 4<sup>th</sup> Grade students

Column 3 is the range category

Column 4 is the number of students who got this score

Column 5 is (%) known data from  $\frac{\text{total frequency}}{\text{total students}} \times 100$

From this analysis it can be concluded that in 4<sup>th</sup> B Grade, there are: 4 students in the upper / high group (20%), 12 students in the middle group (60%), and 4 students in the lower / low group (20%).

After obtaining various pretest and posttest scores, the next step is to perform statistical calculations as a prerequisite test, namely testing the normality of the data and testing the homogeneity of the data. After that, test the research hypothesis to see if there are differences in learning outcomes using powerpoint media and pictures media in science subject's 4<sup>th</sup> Grade Public Elementary School 40 Bengkulu City. The "t" test is run on this calculation with stages 1) looking for the mean of variables X and Y, 2) looking for the standard deviation of the values of variables X and Y, 3) looking for the variance of variables X and Y, and the last is 4) looking for an interpretation of the "t" which the final result is 2.27.

Before being consulted with the  $t_{\text{table}}$ , it was determined first df or db =  $(N_1 + N_2) - 2 = (20 + 20) - 2 = 38$ . Based on the calculation, when consulted with the

$t_{table}$  with df 38 (40-2) at a significant level of 5% that is 2.02. Thus,  $t_{count} > t_{table}$  (2.27 > 2.02) which means that the working hypothesis ( $H_a$ ) in this study is accepted. there found the differences in student learning outcomes using powerpoint learning media and pictures media. While  $H_o$  was rejected which explain there was no difference in student learning outcomes using powerpoint media and pictures media. So, in this research we can say that there is a difference.

### 3.2. Discussion

Learning is a process of communication and interaction as a form of educational effort by conditioning the learning process in students. Learning media is anything that is used to transmit messages and can stimulate students' thoughts, feelings, attention and willingness so as to encourage a deliberate, purposeful, and controlled learning process.

So, in the learning process a teacher must be required to be inspirational, innovative, creative, productive which can create active and enjoyable learning activities for students so that students feel comfortable in class. According to Levie and Lentz, learning media functions to influence the cognitive, affective, and psycho-motoric students [19].

With an indication of the importance of using learning media when the teacher teaches which will affect student learning outcomes. This leads to the conclusion that in learning carried out students who are assisted by good, creative and fun media will lead them to be able to understand the lesson easily. Students who understand the lessons that have been studied correctly will have good learning outcomes, because the material provided by the teacher will be better understood by these students with the application of the latest, creative and fun media.

In this study, two learning media in class A conducted learning using powerpoint learning. Powerpoint is a presentation aid, usually used to explain something that is summarized and packaged in a powerpoint slide, so that readers can more easily understand our explanations through visualization that is summarized on the slide. At first, the teacher explains the material per - slide with powerpoint media, contains pictures and writing related to the material to be presented so that students will easily understand and students will not feel bored. This can be seen from the students' mean score which showed improvement from 47.5 (pretest) to 74.75 (posttest). In class B, learning is carried out using pictures learning media which is a visual media that can only be seen, but does not have an audio or sound element. pictures media is a picture related to subject matter that is useful for conveying messages from teachers to students.

The learning process begins with the teacher explaining the material with the help of picture media and students listening to the material conveyed by the

teacher through pictures. This can also be seen from the results of the average value which shows an improvement from 42.5 (pretest) to 65.5 (posttest).

The study concluded that there were significant differences between students who were taught by using powerpoint media and pictures media through the results of t test calculations. Based on the analysis t test results obtained with a t value of 2.27, greater than t table 2.02 at a significant level of 5%. Thus the researchers concluded that the working hypothesis ( $H_a$ ) in this study was accepted. In other word, there were differences in student learning outcomes by using Powerpoint and pictures as the learning media. While  $H_o$  was rejected, there was no difference in student learning outcomes using powerpoint media and pictures media. The two learning implementations can be summarized in Table 8.

Table 8. Mean Score Learning Outcome Comparison

No	Implementation Learning Media	Mean score Pre-Test	Mean score Post-Test	Difference
1	Powerpoint	47.5	74.75	27,25
2	Pictures	42.5	65.5	23

From table 8 it is known that the biggest difference and the largest mean score of learning outcomes is learning by implementing powerpoint as a learning media. In 1 learning hour, in appearance, more powerpoint were shown to students because producing them was easier than pictures that had to be printed in a printing shop first. In one powerpoint display, there is more information on scientific knowledge than pictures. This is because the pages in powerpoint are wider. Purwanto, Baker and Prayitno use Powerpoint as a medium that helps improve student learning outcomes because they think it is easier to produce and are used to using the software. In addition, the movements made by PowerPoint are smoother and can be adjusted for the periodization of the appearance of certain materials / image [20][21][22].

Powerpoint has fulfilled four functions of learning media, especially visual media, namely: (1) the function of attention, visual media is the core, interesting, and directs the attention of learners to concentrate on the content of the lesson related to the visual meaning displayed or accompanying the text of the subject matter; (2) affective function, visual media can be seen from the level of enjoyment of learners when learning to read pictorial text. Visual images or symbols can inspire emotions and attitudes of learners; (3) Cognitive function, visual media reveals that visual symbols facilitate the achievement of goals to understand and hear information or messages contained in images; and (4) compensatory functions, visual media provide context for understanding text to help learners who are weak in reading to organize information in the text and reminds him of it [23]. Currently the use of PowerPoint

can be used in any platform including the iPad [24], making it suitable as the first step in introducing technology to students to learn science [25][26].

#### 4. CONCLUSION

Based on the results, it can be concluded that there are differences in science learning outcomes by using powerpoint media and pictures media for fifth grade students of Public Elementary School 40 Bengkulu City. Evidenced by the test results "t" obtained  $t_{\text{count}} = 2.27$  while  $t_{\text{table}}$  with df 38 at a significant level of 5%, namely 2.02. Thus  $t_{\text{count}} > t_{\text{table}}$  ( $2.27 > 2.02$ ) which means that the working hypothesis ( $H_a$ ) in this study is accepted, that is, there are differences in student learning outcomes using powerpoint learning media and drawing media.

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