



# The Effect of Using Powtoon Animation Learning Media on Solar System Material on the Learning Outcomes of Class VI Elementary School Students

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**Abstract:** The research aims to examine the significant influence of using Powtoon learning media on the learning outcomes of class VI students at SDN 21 Muntok. Sampling used the purposive area sampling method and obtained two classes, namely VI A experimental class and VI B as the control class with each class containing 25 students. The research uses data collection techniques through post-tests in the form of multiple choice and descriptive questions, observation, documentation and interviews. The data obtained was analyzed using statistical tests which included normality tests, data analysis using the Paired Samples t-Test. Based on hypothesis testing calculations carried out using the t-test. Validity and reliability test results for all question items show valid and reliable results. The results of the normality test for learning outcomes are normally distributed, followed by using the Paired Samples t-Test, the results of the t-test for learning outcomes are at a sig value of  $0.00 < \alpha (0.05)$ , so reject  $H_0$ . So it can be concluded that there is an influence of the application of Powtoon learning media on student learning outcomes in class VI elementary school solar system material.

**Keywords:** Learning outcomes; Powtoon learning media; Solar system

## Introduction

Natural Sciences (IPA) is a science that studies various natural indications which include facts, concepts, theories, opinions and laws through a series of research that has been proven (Laili et al., 2022). Science learning places more emphasis on direct experience, so that students will experience process development and will later be able to develop their scientific attitudes (Wulandari et al., 2016). The aim of science learning is to build and improve students' scientific behavior, so that students' science process skills can grow, students must be active during learning (Oktafiani et al., 2020). Teachers' technological literacy is still relatively low, so students pay less attention to the teacher when explaining (Laili et al., 2022). And learning activities that are still controlled by the teacher will not pressure students to think (Khanafiyah et al., 2013). Learning process conditions that seem monotonous will be boring for students and cause little material to be remembered. If this happens continuously, the result is that student

learning outcomes will decrease (Jayanti et al., 2019). Teachers as facilitators in learning must be smart in making learning more meaningful for students (Laili et al., 2022).

Learning outcomes are a success that students get from their learning results, and whether students are successful or not in learning can be known through evaluation or measurement (Setiyowati et al., 2019). The level of student success can be expressed in the form of points obtained from test results in several subjects. Most learning outcomes are grouped into three aspects, namely the cognitive aspect, which is an aspect that can increase knowledge, the affective aspect is connected to students' attitudes, and the psychomotor aspect is connected to students' skills (Sari et al., 2020).

The low learning outcomes obtained by students in Indonesia are caused by a number of factors, for example regarding the learning media used (Mangngi et al., 2022). The lack of use of learning media and the use of students' books as learning resources makes the learning process less interesting and influences students' level of

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learning motivation to be low, thus affecting the learning outcomes obtained (Suidah et al., 2018).

One of them at SDN 21 Muntok, after interviews were conducted with several science teachers at the school, was that the use of learning media was less than optimal, where teachers only used textbooks and sometimes used PPT. So students find it difficult to understand the material and their learning outcomes are less than optimal (Zaintika et al., 2021). From initial observations it was found that the learning outcomes obtained from each class were classified as low or below the KKM. Because the learning media applied at these schools is less varied. So students become passive and reluctant to answer questions, and when asked a question they just remain silent

The average percentage of teachers regarding learning media with criteria that always limits is 79%, always faces obstacles in accessing the internet properly at 82%, always experiences obstacles in operating computers at 81%, always faces obstacles in using certain applications when carrying out learning at 78 %, and often experience obstacles when using various learning media (Noprinda et al., 2019). Therefore, learning media is needed that is able to describe abstract concepts into more real ones (Permatasari & Rosdiana, 2018). One alternative to illustrate this concept is to use interactive learning media (Sugiharto et al., 2022).

Powtoon media is designed to improve student learning outcomes, learning providers who provide extra time during learning, as well as helping students who experience misconceptions about abstract material, so that later they can improve student learning outcomes (Fitriyani et al., 2022). Because Powtoon has several features in it such as animation in the form of handwriting, adjusting cartoon images, changing media transition effects as desired, as well as a timeline that is easy to set (Mendrova, 2022). With these features, students can better understand lessons and arouse students' enthusiasm for learning, learning that attracts attention will influence increased interest in learning and student learning outcomes (Ariyanto et al., 2018). Apart from that, the additional use of Powtoon media in learning can increase students' understanding, so that a good learning situation is created during the teaching and learning process and student learning outcomes will also increase (Suwastini et al., 2022).

**Method**

The research was carried out at SDN 21 Muntok on class VI students on solar system material in the even semester of the 2022/2023 academic year. The sample selection used the purposive area sampling method, namely determining the sample based on specific criteria for the object that the researcher hoped for (Marginingsih, 2017). The criteria addressed are that the sample used must be homogeneous and have

recommendations from the teacher. Researchers used two classes as samples, namely the control class (X2) and the experimental class (X1). The experimental class was given learning treatment using Powtoon media, while the control class was not given learning treatment using Powtoon media (but used PPT).

The quasi-experimental research design is that the researcher does not carry out randomization in determining research group subjects (Yusuf, 2016). The researcher used two classes as samples and the design used was a post-test only control design, where the post-test was held after learning was carried out to determine the effect of the treatment. The post-test only control design research design can be seen in Table 1.

**Table 1.** Research Design

Class	Treatment	Posttest
Experimental	X <sub>1</sub>	O1
Control	X <sub>2</sub>	O2

Source: (SPSS data processing Version 26,2023)

The data collection technique uses a multiple choice test containing 10 questions. Apart from that, observations take the form of sheets given to observers to make observations during the learning process, documentation related to photos of activities during the research, as well as interviews with science teachers at the school regarding learning activities, methods, models and media commonly used during learning.

Data analysis techniques use measurement of learning outcomes, especially in the cognitive or knowledge domain. After the results are obtained, they are then categorized into the percentage of completeness in accordance with the K13 guidelines which have been adjusted to the minimum completeness criteria (KKM) at the school, namely 70. The percentage of completeness is shown in Table 2.

**Table 2.** Percentage of Completeness

Value	Completeness
≥ 70	Complete
< 70	Not Finished

Source: (SPSS data processing Version 26,2023)

Furthermore, the post-test data that has been obtained will be analyzed using the paired sample t test to determine whether or not learning after using interactive media has an influence on student learning outcomes. The data must be tested for normality first before carrying out the t-test to decide which test will be used next. The following is the research flow:

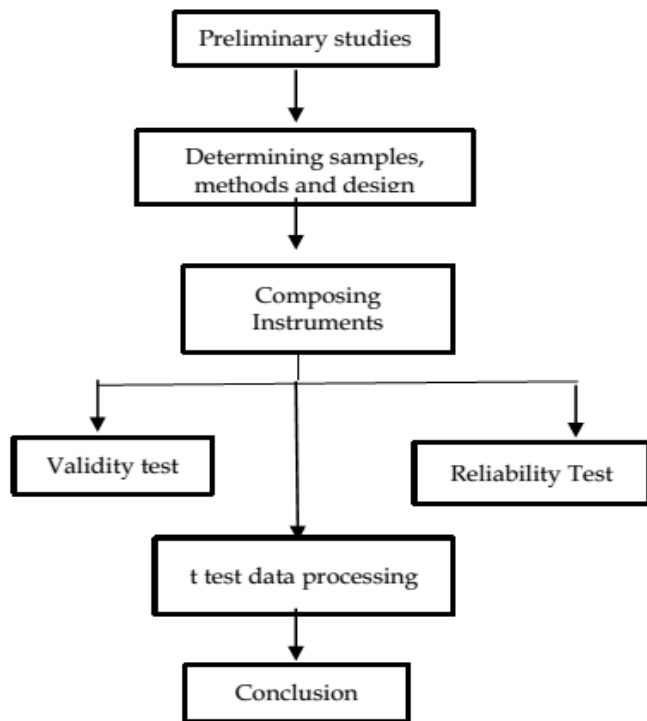


Figure 1. Research flow

## Result and Discussion

The method used in this article is quantitative research. The examination model used is a pre-test and post-test using a Likert scale estimate. The population in this logic work is class VI students at SDN 21 Muntok, totaling 50 students, by taking samples using a purposive examination procedure so that the number of tests is 25 students from class VI A and 25 class B. This concentration is for one purpose only. class to be given inspirational treatment. Information collection uses 10 question items to measure student learning outcomes. Formed into an inspirational testing instrument that is estimated using a Likert scale.

This exam was directed to SDN 21 Muntok by researchers using a purposive examination procedure. The sample used was 25 students from a student population of 25 students taken from class VI at SDN Pacing. The implementation was carried out during 1 meeting. Before learning begins, a pre-test is given and after treatment, a post-test is given.

### Data Processing

#### Descriptive Analysis

The data is analyzed using SPSS, so that data that has been tabulated in Excel can be directly transferred to the t-test statistical formula. Sudjana (2013: 47) said that to create a list of frequency distribution tables with the same class length, first carry out the following processing.

Table 3. Descriptive Analysis

Analysis data	Minimum	Maximum	Average ( $\bar{x}$ )	Standard deviation
Pre Exp	15	59	3.68	12.27
Post Exp	73	93	84.24	5.615
Pre-Con	10	57	32.68	11.831
Post Con	59	80	67.92	5.515

Source: (SPSS data processing Version 26,2023)

### Validity and Reliability Test

In this research, students' learning outcomes were measured before and after learning, namely Pre-Test and Post-Test. Data analysis uses descriptive analysis techniques. The results of the analysis are shown in Table 1. Measurement of student learning outcomes aims to test the effectiveness of the Powtoon media that has been used during learning. The measurement data were analyzed using descriptive statistics. The average pretest score for the control class was 32.68, while the average post-test score for the control class was 67.92. For the experimental class the pretest score was 34.68 while the average post-test score was 84.24 which shows an increase. So, it can be concluded that there are differences in learning outcomes before and after in the experimental class and the control class. According to the results above, the highest score was obtained in the experimental class. This means that learning using PowerPoint media is more effective than using PowerPoint media.

Validity test uses the Pearson Correlation method. Question items are said to be valid if the Pearson coefficient is more than the r-table. Apart from that, it can be seen from the significance value, if the significance value is less than  $\alpha$  (0.05) then the question item is considered valid. Following are the results of the validity test for each question item for all variables (Riduwan, 2012). The validity test is intended to find out whether the instrument used really measures what it is supposed to measure. Validity is tested through Confirmatory Factor analysis. If  $R_{count} > 0.50$  the question item is valid (Ghozali, 2004). Validity testing is carried out using the product moment correlation formula. The calculated r is obtained from the SPSS version 26 output results, this value is then compared with the table r value from the statistics book. Complete validity testing can be seen in Table 1.2 which shows that all those used to measure the items used in this study have a correlation coefficient that is greater than the r-table, where for a sample of 25 students at SDN 21 Muntok class VI C with using different classes with 10 questions, the r-table value is 0.396 with a significance level of 0.05 or 5%. The resulting calculated r-value is presented in Table 4. These results show that all of these indicators are valid.

**Table 4.** Pre-Test Validity Test Results Critical Thinking Skills

Question Items	R <sub>table</sub>	Person Correlation	Information
1	0.396	0.68	Valid
2	0.396	0.54	Valid
3	0.396	0.53	Valid
4	0.396	0.81	Valid
5	0.396	0.43	Valid
6	0.396	0.72	Valid
7	0.396	0.40	Valid
8	0.396	0.45	Valid
9	0.396	0.51	Valid
10	0.396	0.54	Valid

Source: (SPSS data processing Version 26,2023)

Based on the table above, all question items have valid items because  $R_{count} > R_{table}$ . This means that the instrument is able to measure what is desired and is able to reveal the data studied accurately.

**Table 5.** Posttest Validity Test Results for Critical Thinking Skills

Question Items	R <sub>table</sub>	Person Correlation	Information
1	0.396	0.56	Valid
2	0.396	0.83	Valid
3	0.396	0.53	Valid
4	0.396	0.81	Valid
5	0.396	0.49	Valid
6	0.396	0.62	Valid
7	0.396	0.50	Valid
8	0.396	0.56	Valid
9	0.396	0.57	Valid
10	0.396	0.83	Valid

Source: (SPSS data processing Version 26,2023)

Based on the table above, all question items have valid items because  $R_{count} > R_{table}$ . This means that the instrument is able to measure what is desired and is able to reveal the data studied accurately. Based on Table 3, the results of the validity test on all learning outcome variable items with a total of 10 items each show that the Pearson coefficient value is more than the r-table (0.396) and the significance value is less than  $\alpha$  (0.05). So all question items in the questionnaire to represent all variables in this research are valid. Then proceed with the reliability test, namely the reliability or consistency or trustworthiness value of a measuring instrument. Researchers used the Cronbach's Alpha method to test the reliability value of each item from all variables. A variable is said to be reliable if it provides a Cronbach's Alpha value  $> 0.70$ . Following are the results of the reliability test.

**Table 6.** Pre-Test Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.738	10

Source: (SPSS data processing Version 26,2023)

Based on Table 6, the results of the Pre-Test reliability test can be seen that the Cronbach's Alpha value for all variables is more than 0.70. So it can be concluded that all question items from all variables are reliable or consistent. Because all items for each variable are valid and reliable.

**Table 7.** Post-Test Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.734	10

Source: (SPSS data processing Version 26,2023)

Based on Table 7, the results of the post-Test reliability test can be seen that the Cronbach's Alpha value for all variables is more than 0.70. So it can be concluded that all question items from all variables are reliable or consistent. Because all items for each variable

*Normality Test*

The researcher tested normality using the Shapiro Wilk test, because the sample in the study was less than 30. The hypothesis underlying the data normality test was:

$H_0$ : Data is normally distributed

$H_1$ : Data is not normally distributed

The following are the results of the normality test of the learning motivation variable.

**Table 8.** Data Normality Test Results

Variable	Class	Shapiro Wilk test statistics	Sig. value
Learning outcomes	Experiment	0.986	0.970
	Control	0.955	0.321

Source: (SPSS data processing Version 26,2023)

Based on Table 8, it shows that changes in learning outcomes have a significance value of more than  $\alpha$  (0.05), so the decision to accept  $H_0$  is obtained. It can be concluded that the learning outcome variables are normally distributed. Then the analysis can be continued using the t-test.

*T-test*

In this section we will review whether there are significant differences in the two tests. After applying the Powtoon media, the analysis uses statistical testing, namely the Paired Samples t-Test, where the aim is to compare the values of samples that are not paired with each other. Paired samples t-test is used to test whether the mean of a variable is statistically significantly different when compared with the known mean value as an assumed or hypothesized value. In this study, we wanted to find out whether the average learning outcome scores were different or not. The hypothesis in this research is:  $H_0$  = There is an influence of the application of Powtoon learning media on solar system material on the learning outcomes of class VI elementary school students.  $H_1$  = There is no influence of the

application of Powtoon teaching media on solar system material on the learning outcomes of class VI elementary school students

The following are the results of the paired sample t-test t-test analysis

**Table 9.** Paired Sample t-Test Results

Variable	t-statistics	Sig. value
Learning outcomes	17.57	0.000

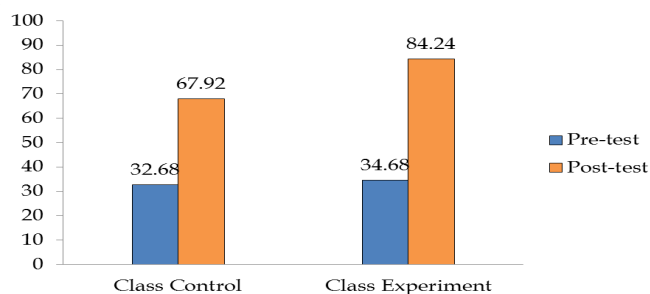
Source: (SPSS data processing Version 26,2023)

Based on Table 9, the results of the t-test on learning outcomes show a significance value of less than 0.05, so reject  $H_0$ . Based on the test results in the equal variances assumed section, it appears that the value of Sig. (2-tailed)  $< \alpha$  is  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of Powtoon media in the solar system material on the learning outcomes of class VI elementary school students.

*Discussion*

From the description of this research, researchers used pre-test and post-test learning outcomes in the experimental class and control class. The aim of learning using Powtoon media is to help train students' cognitive abilities. Before researchers carry out research, researchers first validate the research instruments needed during learning. From the validator's opinions and suggestions, it can be concluded that the entire research instrument prepared by the researcher has reached the valid validation category. Then test the validation of the questions and reliability. The results of the items tested were valid and reliable.

The results obtained from the data above are that there is an influence of the application of Powtoon media in the solar system material on learning outcomes in class VI elementary school. After testing the hypothesis using the t test of 0.001. After testing the hypothesis, there is an influence between the two variables with the coefficient of determination of the influence of applying Powtoon media to the solar system material on learning outcomes in class VI elementary school. Based on the results of data processing, graphic results of student learning outcomes can be seen before and after learning.



**Figure 2.** Learning outcomes graph (source: excel 2023 data processing)

Based on figure 2, it can be seen that learning outcomes increased before using Powtoon media. The measurement data were analyzed using descriptive statistics. The average pretest score for the control class was 32.68, while the average post-test score for the control class was 67.92. For the experimental class the pretest score was 34.68 while the average post-test score was 84.24 which shows an increase. So, it can be concluded that there are differences in learning outcomes before and after in the experimental class and the control class. According to the results above, the highest score was obtained in the experimental class. This means that learning using PowerPoint media is more effective than using PowerPoint media.

So, it can be concluded that there are differences in learning outcomes before and after learning using Powtoon media. The results of the Validity Test show the results  $r = 0.396 < (0.05)$  so that everything shows valid results so from the dependability test if the value is  $> 0.70$ , the value is reliable, to be precise 0.755, from the consequences of the legitimacy test and unwavering quality, all factors are solid because everything matters for each variable.

Then a normality test was carried out before solving using the t-test, the results of the regularity test for the inspired price were  $0.970 > \text{value } (0.05)$ . This value shows that the independent factor is more important than the large value, so the variable value is usually adjusted. then use the t-test. Based on the test results in the equal variances assumed section, it appears that the Sig (2-tailed)  $< \alpha$  value is  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of Powtoon learning media on solar system material on learning outcomes in class VI elementary school.

The conclusion is that there is a significant difference in the average value of student learning outcomes between the two classes. Because the score obtained by the experimental class was higher than the control class, it was concluded that learning using the interactive media Powtoon had a significant effect on student learning outcomes. Based on the post-test scores and statistical test results obtained, it can be said that learning using the Powtoon learning media has proven to be efficient and has an influence on student learning outcomes.

Powtoon is known as software in the form of animation and can be accessed online via a website which can help users easily and quickly create presentations or videos in the form of animation, and can be done by manipulating objects, inserting various images, music and sound recordings from its users. The use of powtoon is able to attract students' attention in the learning process. Because Powtoon supports a learning process that requires a real depiction of abstract material concepts (Sukajaya et al., 2021). The various animations provided on Powtoon will attract students' attention to

focus more and understand learning. The powtoon application gives students the freedom to determine learning themes and the material is presented using language that is easier to understand. Next, research from Gede (2021) the media developed is fit for use with a good category. So that the instructional video media based on the powtoon application on the material of the solar system deserves to be used as a reference in overcoming the problem of the lack of innovative media which has an impact on the low motivation students to participate in the learning process.

Based on the results obtained after the research took place, several facts were discovered. Packaging the material in the form of animated videos and good relationships between teachers and students will influence improved learning outcomes. Apart from that, students' enthusiasm in participating in the learning process can also improve learning outcomes, and it is known that the use of interactive Powtoon media in learning will influence improving learning outcomes.

By using the Powtoon learning media, students become more active in asking, answering and solving problems shown in the animated videos. Even though they both follow in learning, it can be seen from the student learning results (post-test) obtained by the experimental class which was given learning treatment using Powtoon media which received a much higher score when compared to the control class which only used conventional learning, namely using PPT. This is because students are more enthusiastic about participating in learning because of the use of media which makes them feel more interested.

## Conclusion

Based on the results of the research and data processing that has been carried out, it can be concluded that there is an influence of the application of Powtoon learning media on solar system material on the learning outcomes of class VI elementary school students. Based on the test results in the equal variances assumed section, it appears that the value of  $\text{Sig.}(2\text{-tailed}) < \alpha$  is  $0.001 < 0.05$ . So, the decision taken is to reject  $H_0$  and the final conclusion is that there is an influence of the application of Powtoon learning media on the solar system material on the learning outcomes of class VI elementary school students.

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## Author Contributions

Istiqomah, Conceptualized the research ide, designed of methodology, analyzed data, management and coordination

responsibility. Banu, Literatur review and provided critical feedback the manuscript.

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## Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study.

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