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Analysis of the Effect of Powtoon Application Interactive Learning Media on Mathematics Learning Ability of Elementary School Students

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Abstract: This study aims to see the positive and significant effect of interactive learning media on the application of powtoon in developing the learning abilities of fourth-grade students at SDN Pekayon 12 in learning mathematics. This study used the Tru-Experiment research method, using a post-test-only design. The samples came from Class IV A and B, with 27 students in Class A and 24 in Class B. Research instruments are measuring tools to do something and research tools to collect data as processed materials. One instrument makes it easy to measure, collect, compare and process. Whether or not a research instrument is determined by its validity and reliability. Instrument validity is the accuracy with which you measure what you want to measure, and reliability reflects variable data correctly and does not deviate from the actual situation. The instrument is valid if it can provide reliable data consistent with the actual situation. Instruments are said to be reliable when they can reveal reliable data. The results of this study indicated an effect of interactive learning media on the application of powtoon on students' learning abilities in learning mathematics in class IV SDN Pekayon 12. This was evidenced by the data of the Validity Test, Reliability Test, Normality Test (Lillifors Test), Homogeneity Test (Fisher's Test) and T-Test.

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Introduction

The rapid development of science and technology makes life easier and faster. One of the most influential aspects of science and technology can be seen in education (Ahmad et al., 2018). Seeing the current situation, education in Indonesia needs to utilize this knowledge and technology. It can be seen from the low quality of education, especially at the Elementary School (SD) level. The low quality of education in Indonesia can be caused by various factors, including the quality of teachers who need to meet the requirements, inadequate facilities, and less-than-optimal learning activities (Suryana, 2020).

The results of observations made at SDN Pekayon 12 show that students' learning ability in learning mathematics still needs to improve. There needs to be more participation and interest from students during mathematics learning activities because mathematics is considered difficult and boring, causing the learning to take place to be less effective and making students' opportunities to think critically and act creatively lost. It makes students less able to provide the expected feedback on what they have learned. Hence, students' mathematics learning outcomes also experience a decrease or become low because they exceed the KKM limit provided by the school, which was 75.

In 2022, the pandemic period in Indonesia had not ended. It has caused all kinds of activities or activities in Indonesia not to be fully recovered, one of which is teaching and

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

learning activities in schools. From the existence of these limited learning activities, some problems exist in student learning activities. In order to deal with existing problems and to see changes in students' learning abilities in learning mathematics, researchers seek to use interactive learning media that are new but easy to manufacture, creative & innovative, cheap and require little time. However, the results are effective and efficient in learning (Anjarsari et al., 2020). The definition of learning media according to Musfiqon (2016), "Learning media is a tool that functions to explain parts of the whole learning program that are difficult to explain verbally" (Cahyadi, 2019). Audio-visual media is commonly called learning videos. Video is a medium that can be used to convey messages from learning. In video media, there are two unified parts, namely video, and audio (Prasetia, 2016). According to Suherman, "Learning media can be in the form of PowerPoint, which includes audio and visuals to make it look more new"(Prasetia, 2016).

Learning media was used by teachers as a tool during the learning process in the classroom, which was deliberately planned and able to communicate learning messages that occur to students in order to achieve learning objectives effectively. Learning devices used during learning affect learning effectiveness and provide students with new learning experiences (Fatikh, 2019). The existence of learning media, it can make learning activities more lively to make students not bored and more active in learning activities. So that is why researchers use Powtoon learning media in mathematics lessons in order to create a new learning atmosphere so that it can help students learn activities. Students learning ability in mathematics will also gradually improve because this application can be used as a learning medium in activities to understand mathematics. Flat shape mathematics subjects are made with the help of the Powtoon application and interspersed with games so that students' learning abilities can develop and students can solve the questions the teacher gives (Sabilla et al., 2020).

“Mathematics is a science that observes and prioritizes absurd objects in deductive thought processes. Learning mathematics requires a variety of abilities according to cognitive, affective, and psychomotor” (Setiawan & Sulistiani, 2019). So, mathematics teaches students to think logically and calculate the numbers given to them properly and correctly according to their understanding. Mathematics learning is carried out in a systematic or structured way to get the right results, not in an arbitrary way. "The ability to learn mathematics is the ability of students when conveying mathematics material both through speech and writing; students' ability to learn mathematics can be grown by learning activities at school, such as teaching and learning activities in mathematics. Everything happens because mathematics is the science of logic which can foster students' learning abilities. Therefore mathematics has an essential role in the growth of their mathematics learning abilities”(Hodiyanto, 2017).

Based on this definition, the ability to learn mathematics can be understood as the result of students in learning and learning activities that students can measure as their abilities. Mathematics learning is carried out in class IV of SDN Pekayon 12, namely learning mathematics with the subject matter "Building Flat." The indicators of the ability to learn mathematics used in this study are divided into five categories, that is: (1) Understanding the concept of flat shapes, explaining the relationship between the sides of flat shapes, and applying them flexibly, accurately, appropriately, and precisely. (2) Conclusions about patterns and functions of mathematical planes to make proofs and explain statements related to each mathematical plane. (3) Problem-solving includes the ability to understand problems, mathematical design models, complete models, and interpret the resulting solutions. (4) Use

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Email: paedagogy@undikma.ac.id

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

symbols, pictures, or other media to convey ideas to clarify situations or problems. (5) Evaluate the usefulness of mathematics in life using problem-solving (Kue et al., 2022).

One way to improve learning abilities in Mathematics subject matter in Flat Shape material is using media in the learning process, making it easier for teachers to deliver material and stimulate students to arouse learning enthusiasm. Learning media has many uses, such as overcoming limitations (space, time, and sensory power); appropriate and varied audiovisual learning media can help children become more active in learning activities (Kelas, 2018). Therefore, audiovisual learning media can be used in all circumstances, such as in online and offline learning situations. Teachers must be able to sort and choose suitable media to achieve the expected learning objectives. So, the media used in this research is audiovisual learning media from the media or powtoon applications (Olagbaju & Popoola, 2020).

The Powtoon animation application originates from the web. It is used to create media with animated features, such as animation for writing, image animation, better moving effects, and easy timeline control (Trina et al., 2017). The powtoon application is a media that can use audio and visuals. Powtoon is also a web-based online application with excellent animation features to make tasks via video. Powtoon is an application that can be used as a fun learning tool with a combination of visual and audio media (Ariyanto et al., 2018). Powtoon is one of the interactive learning media that teachers often use as teaching aids in learning activities. Powtoon is a learning media shaped like PowerPoint, with pictures and writing. However, apart from pictures, text, and sound, Powtoons can include audio and add motion animation, cartoon animation, hand gesture animation, livelier transition effects, and timeline settings. It is effortless to have objects, backgrounds, and music so that users can make videos using the already available features (Fitriyani, 2019).

Powtoon learning media provides several benefits to students during learning activities, that is : (1) Learning activities will be more interesting for students because the appearance of the PowerPoint learning media does not only display writing and pictures. So that students can be more enthusiastic about learning activities. (2) Subject matter taught with the help of powtoon learning media will make it easier for students to understand its meaning so that they are more masterful and achieve learning goals. (3) Students can carry out more learning activities because they listen to the teacher's explanation and other activities such as observing the material displayed through powtoons, demonstrations, and action learning media. (4) Powtoon media can overcome the limitations of space, time, and range of vision. Reality, films, frames, and pictures can replace too many objects. Powtoon media can handle moving too slow or too fast (Khairul Anam, 2016).

Based on the findings of the problem in the field, no teachers at SDN Pekayon 12 used engaging learning media such as Powtoon to help students learn activities. Because almost all the teachers at SDN Pekayon 12 were old, they needed to be more creative in applying instructional media, especially audio-visual learning media, which requires a computer or laptop device to make the media. Besides that, the teacher's lack of knowledge about software applications, such as Powtoon, made it difficult for teachers to make learning media through web-based applications. Because of these factors, students become less enthusiastic about teaching and learning activities. Thus, making the learning abilities of students less satisfactory. This study aims to analyze the effect of the interactive learning media application Powtoon on the mathematics learning abilities of fourth-grade students at SDN Pekayon 12.

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Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

Research Method

This study used a quantitative research approach with an accurate experiment method. The population used was grade IV students at SDN Pekayon 12, Class IV A became the Experiment Class, where this class used audio-visual learning media and Class IV B became the Control Class without being given treatment. The initial abilities of the two classes were seen from the results of the Mathematics PTS scores to determine students' initial abilities. The research design used was experimental in the form of a post-test-only control design. Data collection was conducted through a test of 25 multiple-choice questions with assessment criteria 0 – 1. The questions used had been tested for validity and reliability, and the results of calculating the instrument's reliability obtained r count = 0.827 and r table = 0.388. Because r count > r table, the instrument is reliable, making it feasible to use for research.

This study used audio-visual learning media. The first stages of work in this study were the preparation stage. It was done by finding research samples, preparing subject matter, compiling learning tools in lesson plans and worksheets, making learning media from Powtoon a combination of learning videos and power points, and compiling research instruments and testing them. Then, the implementation stage included giving treatment to the experimental class and, after that, giving the post-test final ability test of Mathematics subjects regarding Flat Shapes material.

A research instrument is a measuring tool for doing something and collecting data as processed material. One instrument makes it easy to measure, collect, compare and process (Marliani, Siagian, 2017). Whether or not a research instrument is reasonable is determined by its validity and reliability. Instrument validity is the accuracy with which we measure what we want to measure, and reliability reflects variable data correctly and does not deviate from the actual situation. An instrument is considered valid if it can provide reliable data consistent with the actual situation. An instrument is reliable when it can reveal reliable data (Syamsuryadin & Wahyuniati, 2017).

Analysis techniques are attempts to systematically search for and organize archives and improve the results of observations or interviews. The researcher understands the case under study and presents it as findings to others. Based on this understanding, the analysis must be continued to find meaning (Rijali, 2019). The analysis technique in this study starts from the normality test using the Liliefors test. The homogeneity test uses Fisher's test and finally tests the hypothesis using the t-test. The T-test is a statistical test used to test the truth or falsity of the null hypothesis that there is no significant difference between two samples taken from the same population (Swarjana, 2022).

Results and Discussion

Validity Test

Validity is an index number that shows how far the question instrument on the questionnaire can measure the variable under study. The validity test was carried out through the correlation between the acquisition of each question item and the total score (Amanda et al., 2019). Following are the validity test results:

Table 1. Validity Test

No.	Description	Person Corelation	r table	Research Result
1	X1	-0,05926526	0,388	Invalid
2	X2	0,12135033	0,388	Invalid
3	X3	0,148464675	0,388	Invalid
4	X4	0,475370063	0,388	Valid

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

5	X5	0,638594675	0,388	Valid
6	X6	0,213889786	0,388	Invalid
7	X7	0,62802748	0,388	Valid
8	X8	0,61249112	0,388	Valid
9	X9	0,393808841	0,388	Valid
10	X10	0,360661471	0,388	Invalid
11	X11	0,408446526	0,388	Valid
12	X12	0,24792256	0,388	Invalid
13	X13	0,720934396	0,388	Valid
14	X14	0,389089982	0,388	Valid
15	X15	0,473710831	0,388	Valid
16	X16	0,217446352	0,388	Invalid
17	X17	0,093032677	0,388	Invalid
18	X18	0,053182156	0,388	Invalid
19	X19	0,111403582	0,388	Invalid
20	X20	0,540080124	0,388	Valid
21	X21	0,494173731	0,388	Valid
22	X22	0,404245939	0,388	Valid
23	X23	0,475370063	0,388	Valid
24	X24	0,431688881	0,388	Valid
25	X25	0,475370063	0,388	Valid
26	X26	0,410660002	0,388	Valid
27	X27	0,436449598	0,388	Valid
28	X28	0,583220165	0,388	Valid
29	X29	-0,001671388	0,388	Invalid
30	X30	-0,059265261	0,388	Invalid
31	X31	0,447935114	0,388	Valid
32	X32	0,071108725	0,388	Invalid
33	X33	-0,164820953	0,388	Invalid
34	X34	0,561246666	0,388	Valid
35	X35	-0,155743593	0,388	Invalid
36	X36	0,54101534	0,388	Valid
37	X37	0,540080124	0,388	Valid
38	X38	0,599543921	0,388	Valid
39	X39	0,471572699	0,388	Valid
40	X40	0,479688368	0,388	Valid

Based on the content validity test criteria by measuring the level of validity of the questions, the Biserial Point correlation formula is used, and the indicator is valid if r count > r table (0.388). From the 40 questions about the statement of Mathematics learning outcomes, 15 questions are declared invalid after calculating their validity, and 25 questions are valid questions to be used as research instruments.

Reliability Test

A reliability *test* is an index test that shows how much a measuring device can be trusted or relied upon to measure research variables, even though it is done many times (Hakim et al., 2021). The following result of reliability test using KR20 formula:

Table 2. Reliability Test

r count	N
0,827	26

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
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Email: paedagogy@undikma.ac.id

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

The calculation of reliability with the KR-20 formula with a significant level is 5%. Calculations can be said to be reliable if $rhitung > rtabel$. The coefficient value obtained is 0.807 at a significant level $\alpha = 0.05$ and n = 26. From the results of the calculation of the reliability test, the r count > r table is 0.827 > 0.388. Therefore, it can be concluded that scientific learning outcomes on energy materials are reliable and appropriate for research.

Normality Test

According to Ghozali (2018), the normality test aims to test whether the residuals have a normal distribution. The normality test uses post-test values through the Liliefors test. The normality test with the Lilliefors test is non-parametric. The Lilliefors test is also a refinement of the Lilliefors formula so that it simplifies (Usmadi, 2020).

With the following hypothesis, that is :

If $D_{count} < D_{tanle}$ then H_0 is accepted

If $D_{count} > D_{table}$ then H_0 is rejected

Table 3. Normality Test

Group	Tcount	Dk	Ttable	Description
Experiment	0,139	5	0,173	Normal
Control	0,098	5	0,173	Normal

From the table above Tcount < Ttable stated to be normally distributed.

Final Data Homogenity Test

A homogeneity test was carried out to determine whether the two data were homogeneous and had the same variance. The homogeneity test used the F-test formula. Fisher F test is used to test the variance of the two data groups by calculating the variance of data group 1 with the variance of data group 2 and then comparing it with Ftable based on the level of confidence and degrees of freedom of data groups 1 and 2 (Artha & Intan, 2021).

Table 4. Homogeneity Tes

No.	Class	F count	F table	Criteria
1.	IV A	1,726	1,988	Homogen
2.	IV B			

Criteria test H0 is accepted, if Fcount < Ftable with α = 5%.

From the table above Fcount < Ftable stated to be homogen distribution.

The Difference Test in The Means of The Final Data

Table 5. T – Test

	Variable 1	*Variable 2*
Mean	67,40740741	53
Variance	783,6353276	453,9130435
Observations	27	24
Pooled Variance	628,8677249	
Hypothesized Mean Difference	0	
Df	49	<- DF / DEGREES OF FREEDOM
t Stat	2,047899307	<- T COUNT VALUE
P(T<=t) one-tail	0,02297439	P VALUE IF IN DI SPSS / MINITAB
t Critical one-tail	1,676550893	T TABLE VALUE
P(T<=t) two-tail	0,04594878	P VALUE IF IN DI SPSS / MINITAB
t Critical two-tail	2,009575237	T TABLE VALUE

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Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: paedagogy@undikma.ac.id

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

Table 5 above, regarding the T-test, shows that if the P value is less than 0.05, the hypothesis is significant. The table shows that the P value is 0.02297, which means less than 0.05. So the hypothesis is significant.This study uses students' PTS results as initial data. Class IV-A's average value is 62.00, and class IV-B's is 45.09. T count = 0.0451 and T table = 0.0653, it can be seen that tcount <ttable, which means that the two classes have the same conditions and can be used as research classes.

The experimental and control classes were given different treatments when learning; the experimental class used audio-visual media using an Animaker, and the control class did not. The two classes were then given a post-test, then the results were calculated and processed into data, and the average learning outcomes of the experimental class were 67.40, and that of the control class was 53. T count = 0.088 and T table = 0.173. T count < T table, it can be stated that there is an influence on learning outcomes between students who receive teaching with Powtoon audio-visual learning media and student learning outcomes who receive teaching with Microsoft PowerPoint.

Audio-visual learning media has a good impact on the situation when the learning process takes place so that students become more active, the level of focus on learning becomes better, and there is an increase in student achievement in Mathematics content. Based on the data obtained, there is an increase in student learning outcomes. The average value of the learning outcomes of the two classes is compared, then there is a very significant difference. The interactive learning media of the Powtoon application affects student learning outcomes in Mathematics class IV material Flat Shapes.

Conclusion

The conclusion obtained from the results of this study was that there was a significant influence of the interactive learning media of the powtoon application on the learning abilities of students in mathematics in class IV SD. It is proven based on the results of the normality test, homogeneity test, and hypothesis testing in the experimental class. It is seen based on PTS scores and post-tests that researchers have done. With the interactive learning media application powtoon, students are more enthusiastic and actively involved in learning mathematics because the learning process is interesting and fun. The application of interactive media is included in the process of using media with the design of learning materials used by teachers in the learning process, which is a factor that influences the success of learning by using appropriate media so that students feel comfortable and easily understand the material. Learning activities with interactive learning media using the powtoon application are excellent and practical to implement in elementary schools.

Recommendation

Recommendations submitted based on the results of this study are; (1) for schools, it is hoped that they will have learning media that are much better so that students can use them as a support in the learning process of students using learning media. It is hoped that they can support improving the quality of mathematics learning in schools. (2) for teachers, it is hoped that they will be able to monitor children's learning abilities during learning activities, and this powtoon application interactive learning media can improve the quality of learning mathematics in schools.

Vol. 10 No. 1 : January 2023
E-ISSN: 2722-4627
pp. 268-276

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