

***Powtoon* Interactive Media with a Problem Based Learning Model on Student Learning Outcomes and Interests in Plane figure**

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Abstract

The lack of appropriate use of models, methods, strategies and media applied by teachers is the background of this research. Based on field studies, this happened to fourth-grade students at Mentari Elementary School, which is an elementary school in Kartasura District. There are several learning media whose use is not maximized so that automatic learning will be more teacher-centered. This can result in low student learning outcomes and interest. The objectives of this research is determining the effect of *Powtoon* interactive media with the Problem Based Learning model on the learning outcomes and interest of fourth grade students in elementary school plane figure material. Quasi-experimental design with a Control Group Pretest and Posttest Design is method used in this research. The sampling technique used is Cluster Random Sampling technique. The techniques to collect the data are observation, tests, questionnaires and documentation. Data analysis techniques used include normality test, homogeneity, t test and ANOVA test. From the research results it was found that the t-test showed the value of Sig. (2-tailed) <0.05 and the ANOVA test shows a Sig. 0.008 <0.05, it can be concluded that Ho is rejected and Ha is accepted. Therefore, there is an influence of *Powtoon* interactive media with the Problem Based Learning model on student learning outcomes and interest in plane figure material at Mentari Elementary School.

Keywords: Interactive Media, *Powtoon*, Problem Based Learning Models, Learning Outcomes, Student Interest.

Abstrak

Kurang tepatnya penggunaan model, metode, strategi dan media yang diterapkan guru menjadi latar belakang penelitian ini. Berdasarkan studi lapangan, hal tersebut terjadi pada siswa kelas IV SD Mentari yang merupakan salah satu sekolah dasar di Kecamatan Kartasura. Ada beberapa media pembelajaran yang belum maksimal pemanfaatannya sehingga otomatis pembelajaran akan lebih berpusat pada guru. Hal ini dapat mengakibatkan rendahnya hasil dan minat belajar siswa. Tujuan penelitian ini adalah untuk mengetahui pengaruh media interaktif *Powtoon* dengan model Problem Based Learning terhadap hasil belajar dan minat siswa kelas IV pada materi bangun datar sekolah dasar. Metode yang digunakan dalam penelitian ini adalah desain quasi eksperimen dengan Control Group Pretest and Posttest Design. Teknik pengambilan sampel yang digunakan adalah teknik Cluster Random Sampling. Teknik pengumpulan datanya adalah observasi, tes, angket dan dokumentasi. Teknik analisis data yang digunakan meliputi uji normalitas, homogenitas, uji t dan uji ANOVA. Dari hasil penelitian diketahui bahwa uji t menunjukkan nilai Sig. (2-tailed) < 0,05 dan uji ANOVA menunjukkan Sig. 0,008 < 0,05 maka dapat disimpulkan Ho ditolak dan Ha diterima. Oleh karena itu, terdapat pengaruh media interaktif *Powtoon* dengan model Problem Based Learning terhadap hasil belajar dan minat siswa pada materi bangun datar di SD Mentari.

Kata Kunci : Media Interaktif, *Powtoon*, Soal

Kata kunci: Media Interaktif, *Powtoon*, Model Problem Based Learning, Hasil Belajar, Minat Siswa.

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INTRODUCTION

One of the subjects taught in elementary school is mathematics (Dwijayani, 2019). Mathematics learning has a role as a supporter of science, technology, and contributes to solving life's problems (Sodiq & Trisniawati, 2020). Based on the Ministry of National Education in

(Istarani, 2016) the purpose of teaching math is to educate and enhance students' numeracy abilities, fundamental mathematical knowledge, and rational, critical, cautious, creative, and disciplined attitudes. However, a lot of students believe that math is a subject that is challenging to grasp and study.

Basically, learning mathematics is not enough to memorize, but must be understood and internalized. Therefore, in all learning processes, students must actively participate in mastering the material to improve student learning outcomes and interest. As line with the Hermawan (2020) statement which said that one of the principles of classroom management is the teacher's way of involving students to participate actively in learning activities. The same was conveyed by (Isjoni, 2016) which states that learning activities must involve student participation, then in learning students must be active. The entire series of education can be used as a process of guidance and teaching for each individual (Masithoh, 2018). In order to grow into a responsible, knowledgeable and independent human figure (Setyawan et al., 2017). Therefore, every human being definitely needs education (Firman et al., 2018).

The findings from observations at Mentari Elementary School indicate that a large number of pupils are still uninterested in studying mathematics, which contributes to the low learning outcomes. Pre-research findings showed that 91.3% of student scores fell short of the Minimum Completeness Criteria. This is due to factors, namely (1) lack of communication between instructors and students; (2) the inappropriateness of the use of models, methods, strategies and media applied by teachers so that pupils tend to be less interested in participating in ongoing studying, as evidenced by the results of pre-research analysis related to interest in learning questionnaires in fourth grade students which show that 8.6% very good, 47.8% good, 30.4% sufficient, 13.04% less; (3) lack of maximum creativity of instructors in creating learning media so that it affects the results and interest in learning.

Where learning outcomes can be interpreted as an ability that is obtained by students after carrying out learning activities, whether it concerns attitudes, knowledge, or skills (Susanto, 2016). Furthermore (Nurrita, 2018) stated that learning outcomes are specific student capabilities that have been attained following the completion of learning activities by evaluating students' knowledge, attitudes, and skills along with behavioral changes. Therefore it can be concluded from some of the statements above that learning outcomes are the achievement of learning objectives achieved through learning experiences that are proven from the results of written and non-written assessments carried out.

Meanwhile, interest is a combination of desire and will that can develop if there is motivation. Interest in learning also leads to higher achievement and learning outcomes and vice versa, a lack of interest in learning will also result in low learning outcomes. According to (Djaali, 2014) Interest is a feeling of wanting to know, learn, admire or own something. In line with the opinion of (Sujanto, 2013) interest is something unintentional concentration that is born with his will and which depends

on his talent and environment.

The results of observations at Mentari Elementary School are that there are still a lot of students that are not really interested in studying, because they are less interested in the learning model and media used by the instructors. The teacher's ability to use technology can also create learning success (Wahyono, 2019). So that researchers want to use the chosen learning model, namely Problem Based Learning (PBL) and the selected media is *Powtoon* media. According to (Ramlawati et al., 2017) A learning approach called problem-based learning centers on actual situations and can assist students in developing their problem-solving abilities. Meanwhile, based on (As'ari, 2017) stated that PBL Model is a teaching strategy created to help students learn crucial information that will enable them to solve problems effectively and develop their own teaching strategy.

Determining factor for student success in learning other than the learning model is the appropriate media used by the instructors in learning and teaching activities. Because every student has the right to get satisfaction in the learning process, especially in the provision of material (Alannasir, 2016). Tools used in learning as well as a means to convey messages from learning resources to learning recipients is called by learning media (Rusnilawati et al., 2018). *Powtoon* is one of the learning media that can help students improve their learning outcomes and interest. *Powtoon* Animation learning media is a web-based technology application which is used to create learning videos that assist teachers in making presentations during the learning process (Elmawati et al., 2021). Therefore, a good learning process is able to bring up an effective learning process (Jundu et al., 2019).

Difficulties in learning mathematics in elementary school students can occur in any material, including plane figure material (Wandini, R.R., & Sinaga, 2019). According to (Daniati, 2020) Plane figure material is material that discusses shapes with flat surfaces including rectangles, squares, triangles, etc. Every plane figure can be calculated the circumference and area. However, what becomes difficult for students is that students often forget the formulas for the circumference and area of each plane figure and sometimes it is difficult to determine the elements of each plane figure.

From this explanation, the research aims to help teachers and fourth grade students at Mentari Elementary School in overcoming problems related to student outcomes and interest in plane figure material by applying learning using PBL model and *Powtoon* interactive media. In accordance with the description above, the researcher wants to examine whether there is any influence of *Powtoon* interactive media with the PBL model on fourth grade pupils' learning outcomes and interest in plane figure material at Mentari Elementary School.

METHOD

The type of this research is quantitative research, or planned research that places a strong emphasis on analyzing data quantitatively. For the purpose of generating reliable data, quantitative

research is conducted methodically. This research employed a quasi-experimental design, also known as a quasi-experimental design with control group pretest and posttest.

Table 1. Research Design

Class	Early Test	Action	Final Test
Experimental	O ¹	X ¹	O ²
Control	O ¹	X ²	O ²

Information:

O¹ = Pretest

O² = Post-test

X = Experimental class

X² = Control class

The implementation of this study contained of 3 stages, that is the preparation, implementation and reporting stages of the results. The preparation stage in this study includes designing learning devices to be used in research. In the implementation stage, this study was held in three times. At the first meeting, pretest questions were given to the control and experimental classes. The second meeting was the provision of plane figure material using interactive *Powtoon* media and the PBL model to the experimental class. The third meeting was giving posttest questions to the control and experimental classes. Furthermore, at the reporting stage, the researcher processes the data obtained in accordance with the hypothesis.

The number of primary schools in Kartasura District is eight. The primary school used for this study was Mentari Elementary School with 280 population. The samples in this study were 23 students of 4A class as an experimental class and 21 students of 4B class as a control class. The sampling technique is by Cluster Random Sampling. While the data acquisition techniques in this research were taken from observation, tests, questionnaires and documentation. Observation aims to observe mathematics learning activities in the 4 grade of Mentari Elementary School. The tests in this research used pretest and posttest in the control and experimental class. The questionnaire in this research was used to determine students' interest in learning. Furthermore, at the documentation stage, it includes lesson plans, school profile information sheets which are used to find out the names of Mentari Elementary School students and teachers as well as photos used as evidence of the implementation of this research.

Table 2. Test Questions Grid

Lesson: Mathematics				
Basic Competencies	Question Indicator	Cognitif Level	Question form	Question Number
3.9 Explain and determine the perimeter and area of squares, rectangles, and triangles as well as the relations	Presented questions students are able to describe problems in calculating and determining the perimeter of squares, rectangles and triangles.	C4	Multiple Choice	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 20
			Essay	22, 23, 24, 25

between squared and square roots	Presented questions students are able to interpret how to calculate and determine the area of squares, rectangles and triangles.	C5	Multiple Choice	12,13,14,19,21
			Essay	21

Table 3. Interest Questionnaire Grid

Indicator	Information	Statement		Number of Items
		Positive	Negative	
Feeling happy	Opinions of students about learning mathematics	3,4,5	1,2	5
	Students' impressions of mathematic teachers			
	The feelings of students while participating in mathematics learning			
Attention	Students' attention when following mathematics study	7,9,10	6,8	5
	Students' attention when discussing mathematics learning			
Interest	Curiosity of pupils when following in mathematics study	13,14,16	11,12,15	6
	Acceptance of pupils when given assignments or homework by the teacher			
Student engagement	Awareness about studying at home	17,18,19	20	4
	Student activities after and before entering school			
Total number				20

In this study the next stage is to test the validity and reliability. Validity and reliability tests were held before the study is done. The validity test is used to evaluate the validity of the learning outcomes test instrument and the student learning interest questionnaire. Testing the validity of the instrument was carried out by distributing questionnaires and tests to 23 students. The number of items is 20 questions and the number of items in the questionnaire statement is 20 items. The validity of the instrument is measured based on the criteria which states $r_{count} > r_{table}$, so the instrument is said to be valid. Test the validity of the questions using a significance level of $\alpha = 5\%$ with $n = 23$ and a r_{table} of 0.431, 20 items are declared valid. In multiple choice questions, valid questions are found in numbers 1,2,3,4,5,6,7,8,10,11,12,13,14,15,18,20 and invalid in numbers 9,16,17, 19. Whereas in the valid essay questions there are numbers 21,23,24,25 and invalid at number 22. Meanwhile, in the validity test of the interest in learning questionnaire using a significance level of $\alpha = 5\%$ with $n = 23$ and r_{table} of 0.431 it is stated that 20 questionnaire statements valid.

To measure the level of consistency of an instrument, the reliability test is carried out. The reliability test requirements are declared reliable if $r_{count} > r_{table}$. The reliability test results of the pupils interest questionnaire using a significance level of $\alpha = 5\%$ with $n = 23$ and a r_{table} of 0.431

obtained $r_{count} = 0.773$ in the multiple-choice test of learning outcomes and $r_{count} = 0.658$ in the essay test of learning outcomes. While the reliability test results of the interest in learning questionnaire using a significance level of $\alpha = 5\%$ with $n = 23$ and r_{table} of 0.431 obtained $r_{count} = 0.861$. So, it can be concluded that all items in the two instruments are declared valid and meet the requirements.

The data that has been obtained the following step is analyzing the data. The sequence of data analysis includes: normality test, homogeneity test, hypothesis test, and multiple classification anava test. To find out whether the instruments used in the study were normally distributed or not, the normality test was carried out. Furthermore, to find out whether the instruments used in the research were homogeneous or not, the homogeneity test was carried out. After the data is declared normal and homogeneous, the following step is hypothesis testing and anova testing to find out the comparison between the use of interactive *Powtoon* media and the PBL model with textbook-assisted contextual learning.

RESULT AND DISCUSSION

According to the analysis of study results in the fourth grade of Mentari Elementary School, the results of calculating data in solving problems on plane figure material and students' interest in mathematics, the results of which were good and increased were accepted by students who received treatment using *Powtoon* interactive media and the Problem Based Learning model. While students who did not get treatment, their scores were still lacking and could not improve properly. The normality test results are shown in the statement that this study meets the $sig. > 0.05$ then the data is normally distributed.

Table 4. Normality Test

Variable	Sig.	Information
Experimental Pre-Test Learning Outcomes	0,447	Normal
Experimental Post-Test Learning Outcomes	0,437	Normal
Control Pre-Test Learning Outcomes	0,429	Normal
Control Post-Test Learning Outcomes	0,550	Normal
Interest in Learning Pre-Test Experiment	0,906	Normal
Interest in Learning Post-Test Experiment	0,189	Normal
Interest in Learning Pre-Test Control	0,501	Normal
Interest in Learning Post-Test Control	0,725	Normal

Based on Table 4. which contains the normality test results in the experimental class using interactive *powtoon* media and the PBL model and the control class using textbook-assisted contextual study has a $sig. > 0.05$. Therefore, it can be said that both the experimental class and the control class have a normally distributed. The objective of the homogeneity test is determining whether the two groups have the same variance or not. If it has a $sig. > 0.05$, then the group can be said to be homogeneous.

Table 5. Homogeneity Test

Variable	Nilai Sig	Information
Pre-Post Experiment Results	0,577	Homogeneous
Interest in Pre-Post Experiments	0,270	Homogeneous
Post-test Experiment-Control Results	0,667	Homogeneous
Interest in Post-test Experiment-Control	0,245	Homogeneous

Based on Table 3. related to the homogeneity test results containing a Significance (Sig.) Based on Mean > 0.05 so that the experimental class and control class's variance of the pretest posttest data can be claimed to be homogeneous.

Based on the prerequisite analysis test, The two groups' collected data were deemed to be homogenous and normally distributed. The paired t-test data analysis method or the paired sample t-test will be used to assess the hypothesis in the following phase. The aims of Hypothesis testing using paired t-test is determining the conditions before and after the treatment in the class being tested.

Table 6. Test of T-Test

Variable	t	Sig.	Keterangan
Hypothesis 1 (Pre-Post Result)	-28.258	0.000	Ha accepted
Hypothesis 2 (Pre-Post Interest)	14.831	0.000	Ha accepted

Based on Table 6. related to the results of the paired t-test containing tcount values of -28.258 and 14.831 with Sig. (2-tailed) < 0.05 , then H_0 is rejected and H_a is accepted. Paired t-test was used to test the pretest posttest hypothesis in the class that was given treatment in the form of the use of *Powtoon* interactive media and the Problem Based Learning model. On Table 6. shows that the tcount value is -28.258 and 14.831 with Sig. $0.000 < 0.05$ so, it can be concluded that hypothesis 1 has a significant effect on the use of *Powtoon* interactive media with the Problem Based Learning model on student learning outcomes compared to before using it. Meanwhile, in hypothesis 2 there is a significant effect of the use of *Powtoon* interactive media with the Problem Based Learning model on student learning interest compared to before using. Table 7. shows the results of the ANOVA test calculations. In this study, the ANOVA test was used to determine whether there was a significant influence between interactive *powtoon* media and the Problem Based Learning model on student learning outcomes and interest.

Table 7. Anova Test

Variable	F	Sig.	Information
Hypothesis 3 (Post-test Interest and Results)	164.495	0.000	Ha accepted

According to Table 7. related to the ANOVA test results, the F value was 164,495 Sig. $0.008 < 0.05$ then H_a is accepted and H_0 is rejected, so hypothesis 3 can be summed up that there is a significant effect of the use of *Powtoon* interactive media with the PBL model on pupils learning outcomes and interest compared to before using.

Discussion

According to (Sani, 2014) the steps of the learning process using the *Powtoon* interactive media and the PBL model on the plane figure material for the fourth grade of Mentari Elementary School, namely:

Syntax 1 (Student orientation on the problem)

- a. The teacher invites students to observe plane figures on the *PowerPoint* video slides that are showing.



Figure 1. *Powtoon* Learning Media

- b. The teacher gives questions to students regarding the animated *Powtoon* video that has been broadcast. "Tell me, are there objects that are plane figure around us?"
 - c. The teacher invites students to pay attention to material regarding the perimeter and area of a square shape that is displayed on the LCD.
 - d. The teacher invites students to observe a picture in the form of a plane figure.
 - e. The teacher asks students about how to calculate the perimeter and area of plane figures.
2. Syntax 2 (Organizing students to study)
- a. The teacher divides students into several groups.
 - b. Each group is distributed Student worksheet 1 which will be done on together with their group mates.
3. Syntax 3 (Guidance and Investigation of students)
- a. The teacher gives an explanation regarding the steps for working on the student's worksheet.
 - b. Students carry out discussions with groups to solve difficulties correlated to the perimeter and area of a square.



Figure 2. Group Discussion Student Activities

- c. The teacher goes around observing students in discussion and gives students the opportunity to ask questions regarding things they do not understand.
5. Syntax 4 (Develop and Serve Results)
- a. Each group writes down the group discussion results on the sheet.
 - b. Each group presents the results of the group discussion in turn.
 - c. Other groups respond to the results of the presentation from the group that is presenting.
 - d. The teacher invites students to conclude the results of the different methods of each group.
6. Syntax 5 (Analyze and Evaluate The Problem-Solving Strategy Process)
- a. The teacher provides reinforcement of student work by clarifying several misconceptions during the learning activities.

Furthermore, the *YouTube* video link is distributed to class groups so that students can study and deepen the material that has been presented. After the learning activities are completed, the researcher asks students to fill out a questionnaire related to students' learning interests whose instruments have been tested for validity and reliability.

7. Student Learning Outcomes Applying *Powtoon* Interactive Media with PBL Models

According to the calculation of the t-test data analysis on Table 6. obtained tcount value - 28.258 with Sig. equal to $0.000 < 0.05$ then H_0 is rejected and H_a is accepted so that student learning outcomes in fourth grade flat shapes material after using *Powtoon* interactive media with the PBL model are better than previous one. Then it is proven that there is a significant influence on student learning outcomes.

The results of the study show that strong learning outcomes are associated with student learning interest, which is corroborated by prior research., this indicates a positive relation between interest and student learning outcomes (Dianawati, 2018). *Powtoon* media can improve the effectiveness of learning, the interest and motivation of student learning will certainly affect learning outcomes, especially in the cognitive field (Fajar et al., 2017). Building students' cognitive abilities requires a long process (Faqiroh, 2020b). Therefore, it requires learning media that is feasible to use in terms of several aspects (Nata & Putra, 2021). Besides that, previous research also proved that

applying PBL model was able to increase the mathematics learning outcomes of elementary school students (Fauzia, 2018).

8. Student Learning Interest in Applying *Powtoon* Interactive Media with a PBL Model

According to the calculation of the t-test data analysis on Table 6. the tcount value is 14.831 with Sig. equal to 0.000 <0.05 then H_0 is rejected and H_a is accepted so that students' learning interest in fourth grade on plane figure material after using *Powtoon* interactive media with the PBL model is better than previous model. Therefore, it is proven that pupils' enthusiasm in learning is significantly influenced.

Powtoon learning media and education go hand in hand; without the correct learning media, the learning process will not go as planned, which also has an impact on student interest in their studies (Fadilah et al., 2022). The application of the PBL model exposes pupils to a problem so that they are motivated to seek answers repeatedly until they find a solution to the problem. Therefore, being able to increase students' confidence in their abilities. Increasing students' self-confidence in their abilities can foster students' interest in being more active and participatory in the learning process because students feel challenged to complete each task given by the teacher (Saputro, 2021). This opinion is supported by other studies, the results of which show that there is an influence of the PBL model on learning outcomes, problem solving abilities and students' interest in learning (Herlinda et al., 2017).

8. Student Learning Outcomes and Interests Applying *Powtoon* Interactive Media with PBL Models

According to the calculation of the ANOVA-test data analysis on Table 7. obtained an F value of 164,459 with Sig. equal to 0.000 <0.05 then H_0 is rejected and H_a is accepted so that students' learning interest in fourth grade in plane figure material after using *Powtoon* interactive media with the PBL model is better than previously. Therefore, it is proven that there is a significant influence on student learning outcomes and interest.

The opinion is commensurate with (Sakti & Napsawati, 2021) which states that learning media based on the *Powtoon* application can develop students' imaginations thereby increasing learning outcomes. Therefore, It has been demonstrated that using media in the classroom makes it simpler for children to comprehend learning maths. (Nata & Putra, 2021). Learning that uses the PBL model can raise high enthusiasm and perseverance in solving a problem (Sulistiyani, 2018). The PBL model is not only useful and meaningful for achieving academic achievement by understanding and mastering the subject matter well, but also has some real potential to solve problems empirically (Faqiroh, 2020a).

Students can study more effectively and with greater excitement by using *Powtoon* learning materials. A stimulating learning environment can impact students' learning interests and lead to better learning outcomes for them (Ariyanto et al., 2018). So, the use of *Powtoon* media can be a reference in the learning process, because the *Powtoon* media developed is considered feasible and increases student motivation in the learning process (Sanjaya et al., 2021). By using the Problem

Based Learning model, students' interest in learning a concept will increase, this interest will affect student learning outcomes, because students will easily remember what they have learned (Odeh, 2021). Based on this explanation, It can be stated that adopting the *Powtoon* interactive media model in conjunction with the PBL paradigm has a substantial impact on student learning results and interest.

According to the data results, this research displays that *Powtoon* interactive media with a PBL model is feasible to be applied in learning. The feasibility of *Powtoon* can be seen from several aspects. First, the material is presented interactively in a language that students can easily understand. Second, the appearance is attractive, so that the resulting product also has better image, animation, video, sound and music quality compared to other products (Hariadi, 2018). In line with the opinion of (Massana, 2020) The advantages of *Powtoon* are that it can create interactive learning, generate interactive learning, produce media that includes all the senses, practical use, the media produced is varied so that it can arouse students' enthusiasm. The PBL approach has the benefits of making subjects simpler for students to understand, motivating them to actively participate in their education, and enhancing their creativity in communicating their ambitions (Lestari, 2020).

CONCLUSION

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