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THE EFFECT OF CANVA-ASSISTED PROBLEM BASED LEARNING MODEL TO IMPROVE LEARNING OUTCOMES: A CASE ON DATA PRESENTATION

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ABSTRACT

Mathematics is an important subject as it enhances critical thinking, problem-solving skills, and contributes to the advancement of science and technology. However, many students perceive it as a difficult subject, which hinders their interest and performance in learning mathematics. Traditional teacher-centered teaching methods and the lack of engaging learning media contribute to this issue. The purpose of this study is to examine the difference in learning outcomes between students taught using the Problem-Based Learning (PBL) model assisted by interactive media Canva and those taught using the Inquiry-Based Learning (IBL) model assisted by interactive media Canva, focusing on data presentation material in seventh-grade students at MTs. Negeri 1 Bone Bolango. This study employed an experimental research method with a Post-test Only Control Group Design. Two treatment groups were used: the experimental group and the control group. The research participants were 24 students from class VII.2 and 23 students from class VII.3. Data were collected through posttests. The intervention involved using the PBL model integrated with Canva as an interactive learning tool. The results were analyzed using paired sample t-tests to determine significant differences in learning outcomes. The results indicate a significant improvement in students' learning outcomes after the implementation of the PBL model with Canva assistance. The average posttest score increased from 52,17 to a higher value, suggesting better understanding and engagement. In conclusion, the use of the Canva-assisted PBL model effectively improves students' learning outcomes in mathematics, particularly in data presentation topics. This approach can serve as a valuable tool to promote active, student-centered learning in mathematics education.

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INTRODUCTION

Mathematics is one of the disciplines that can enhance thinking and argumentation skills, contribute to solving everyday problems and in the workplace, as well as support the

development of science and technology (Gompi et al., 2022: 3288). Mathematics is generally perceived by students as a difficult subject. Until now, many students still face difficulties and feel afraid to learn mathematics. This is due to monotonous teaching methods or the lack of enjoyment in learning mathematics (Mulyati & Evendi et al., 2020: 65). The teaching and learning of mathematics is still teacher-centered. Meanwhile, the learning process is implemented conventionally (Mbagho et al., 2021: 122). The low interest and motivation of students in learning mathematics will affect their learning outcomes. In schools, these learning outcomes can be seen from the students' mastery of the subject matter they are studying (Novianti et al., 2020: 60).

Learning outcomes can be used as a measure to determine the level of success of students in knowing and understanding a subject, usually expressed in grades, either as numbers or letters (Hasan et al., 2020: 13). Students who succeed in learning are those who achieve the learning objectives (Acmel, 2018). Through learning outcomes, students can determine the level of success they have achieved after undergoing the learning process (Abdullah et al., 2020: 37). Learning outcomes can serve as a motivator for students to improve their knowledge and act as feedback to enhance the quality of education (Fathan et al., 2019: 37).

For junior high schools, both public and private, in 2016, there were 53,660 educational units with an average mathematics exam score of 50.24. In 2017, with 54,774 educational units, the average mathematics exam score was 50.31. Meanwhile, in 2018, with 55,708 educational units, the average mathematics exam score was 43.34, which falls into the "below average" category (Puspendik, 2018). Therefore, there is a need for more varied teaching models and interactive media with a touch of technology to support the learning process in achieving learning objectives in delivering learning material and also in improving learning outcomes.

Problem-Based Learning (PBL) is a teaching model that helps students develop thinking skills, problem-solving skills, and fosters student independence (Bound & Felleti in Ramlawati et al., 2017: 3). The Problem-Based Learning (PBL) model is a student-centered learning model that presents students with various problems encountered in real life, and students try to solve these problems (Meilasari et al., 2020: 196). In line with (Rahmadani & Anugraheni, 2017, as cited in Aswina et al., 2023: 502), the learning within PBL connects to real life. PBL is a different way for students to actively participate in their education and improve their critical thinking skills. Teaching with the PBL model changes the direction of learning interactions, allowing students to engage actively in classroom activities (Ariyanti, 2017).

The Problem-Based Learning (PBL) model assisted by the interactive learning media Canva is expected to be one of the tools for improving students' learning outcomes. According to (Citradevi, 2023: 271), Canva is a graphic design application that is easy to use, practical, and free. Canva can help provide easy services for educators and students related to creating educational content with just a stable internet connection.

The research conducted by (Butar et al., 2022) titled "The Influence of the Problem-Based Learning (PBL) Model on Mathematics Learning Outcomes" shows that there is an impact of the PBL model on students' learning outcomes.

The research conducted by (Aniswita et al., 2021) titled "The Influence of the Problem-Based Learning Model on Mathematics Learning Outcomes of Seventh-Grade Students at SMP N 1 V Koto Kampung Dalam Padang Pariaman for the 2019/2020 Academic Year" demonstrates that the use of the PBL model effectively maximizes students' learning outcomes. This is shown by the average final test score of the experimental class, which was 76.68, much higher than the control class score of 64.76.

Furthermore, a study conducted by Meylinda et al. (2024) titled "The Effect of Problem-Based Learning (PBL) Model Assisted by Canva-Based Animation Media on Physics Learning Outcomes in High School on the Topic of Parabolic Motion" concluded, based on statistical analysis, that the implementation of the Problem-Based Learning (PBL) model assisted by Canva-based animation media had a significant effect on students' learning outcomes in physics.

The main purpose of this study is to investigate the impact of the Problem-Based Learning (PBL) model, assisted by interactive media such as Canva, on students' learning outcomes in mathematics, specifically in the topic of data presentation. The study aims to assess whether integrating this teaching model with modern technology can enhance students' understanding, engagement, and overall academic performance.

At MTs. Negeri 1 Bone Bolango, after conducting a mathematics daily test, it was found that students' learning outcomes were still low, with many students scoring below the Criteria for Mastery of Learning Objectives (KKTP). This is supported by the results of the daily test of seventh-grade students, with a total of 188 students.

Table 1. Students' Daily Test Scores (2024)

Category	**Number of Students**
Students who meet the criteria (≥ 70)	26 Students
Students who do not meet the criteria (< 70)	162 Students
Total number of students	188 Students
Average students score	52,17

It can be seen that there are 26 students who meet the Criteria for Mastery of Learning Objectives (KKTP), and 162 students who do not meet the KKTP. Based on interviews and direct field observations, the researcher found that the low learning outcomes are caused by several factors: (1) The students' interest in learning, which still needs to be improved, (2) Difficulty in maintaining concentration while learning, (3) Many students have not memorized multiplication tables, (4) The teaching is still dominated by the lecture method, which often becomes a barrier to creating active and interactive learning, (5) The use of learning media, which has not yet been prioritized, also often causes low student interest and understanding, and this affects students' learning outcomes.

Therefore, a more varied teaching model and interactive media with a touch of technology are needed to support the learning process in achieving learning objectives in the delivery of learning material and improving learning outcomes. To achieve educational goals and the skills required in today's era, which demand students to have critical thinking skills, interpersonal skills, the ability to adapt well, and scientific skills that will later be needed in the workforce, an appropriate teaching model is required. One of these models is the Problem-Based Learning (PBL) model (Djonomiarjo, 2020: 41). The Problem-Based Learning (PBL) model assisted by interactive learning media such as Canva is expected to be one of the tools to improve students' learning outcomes. The Canva application is widely used by teachers because it already contains templates, images, videos, and audio that can be utilized in interactive learning media (Fauziah et al., 2022: 9).

Based on the background above, the researcher is interested in conducting research on the mathematics learning outcomes of seventh-grade students at MTs. Negeri 1 Bone Bolango using the Problem-Based Learning (PBL) Model. The title of the research to be conducted by

the researcher is "The Effect of Using the Problem-Based Learning Model Assisted by Interactive Media Canva on Data Presentation Material for Seventh Grade at MTs. Negeri 1 Bone Bolango."

METHOD

Metode yang digunakan dalam penelitian ini adalah metode penelitian eksperimen. Menurut Arifin, Z (2020: 3), metode penelitian eksperimen digunakan untuk mengetahui pengaruh perlakuan tertentu. Desain yang digunakan adalah Post-test Only Control Group Design, yang melibatkan dua kelompok perlakuan: kelas eksperimen dan kelas kontrol. Di kelas eksperimen, digunakan model Problem-Based Learning (PBL) yang dibantu oleh media interaktif Canva, sementara di kelas kontrol digunakan model Inquiry-Based Learning (IBL) yang dibantu oleh media interaktif Canva. Penelitian ini dilakukan pada semester genap, tepatnya dari tanggal 28 April hingga 5 Mei 2025, di MTs. Negeri 1 Bone Bolango pada kelas tujuh, yang terdiri dari delapan kelas. Teknik pengambilan sampel yang digunakan adalah Simple Random Sampling, dan dua kelas dipilih: kelas eksperimen, kelas VII.2, dengan 24 siswa, dan kelas kontrol, kelas VII.3, dengan 23 siswa.

Data yang dikumpulkan dalam penelitian ini adalah hasil belajar siswa di ranah kognitif. Teknik pengumpulan data yang digunakan adalah tes akhir (Post-test) dalam bentuk soal esai. Tes ini diberikan untuk mengukur hasil belajar siswa pada materi penyajian data. Sebelum tes hasil belajar diberikan kepada siswa, instrumen terlebih dahulu diuji validitas dan reliabilitasnya. Uji validitas instrumen melibatkan dua tahap: validitas ahli (validitas konstruk) dan validitas empiris menggunakan rumus Pearson Product-Moment, sedangkan uji reliabilitas menggunakan rumus Cronbach's Alpha.

Teknik analisis data yang digunakan dalam penelitian ini meliputi analisis statistik deskriptif (rata-rata, median, modus, dan deviasi standar) dan analisis statistik inferensial. Analisis inferensial meliputi uji normalitas menggunakan uji Liliefors dan uji homogenitas varians menggunakan uji kesetaraan dua varians (uji F). Setelah semua prasyarat terpenuhi, data diuji menggunakan uji t untuk menentukan perbedaan signifikan dalam rata-rata hasil belajar siswa yang diajarkan dengan model PBL yang dibantu media interaktif Canva, dibandingkan dengan rata-rata hasil belajar siswa yang diajarkan dengan model IBL yang dibantu media interaktif Canva.

RESULTS AND DISCUSSION

Results

The data collected from the research are the mathematics learning outcomes of students, in this case, the final test in the form of an essay, conducted after the learning process, focusing on the cognitive domain. The experimental class, VII.2, consists of 24 students, and the control class, VII.3, consists of 23 students. The complete results of the learning outcomes for both groups are presented in the following table:

Table 2. Description of Learning Outcomes Data

Data	Class	N	Min. Score	Max. Score	Mean ($\bar{X}$)	Median (Me)	Modus (Mo)	St Dev (S)
Post-test	E	24	44	91	71,5	72,5	72,3	12,22
	K	23	13	91	61,5	61,5	51	21,85

Based on Table 2 above, it can be seen that the average score of the experimental class is higher, at 71.5, compared to the control class, which has an average score of 61.5.

Description of Post-test Data in the Experimental Class

Based on the test results from 24 students, the maximum score obtained was 91, and the minimum score was 44. The average score (Mean) is 71.5, the median score is 72.5, and the most frequent score (Mode) is 72.3. Based on these data, a frequency distribution table can be created as shown below:

Table 3: Frequency Distribution of the Post-test in the Experimental Class

Class Interval	Frequency (fi)	Midpoint (Xi)	Cumulative Frequency	Percentage (F relative)
44 – 51	2	47,5	2	8%
52 – 59	3	55,5	5	13%
60 – 67	2	63,5	7	8%
68 –75	8	71,5	15	33%
76 – 83	4	79,5	19	17%
84 – 91	5	87,5	24	21%

Based on Table 3, it can be seen that 7 students, or 29%, obtained scores below the average, and 17 students, or 71%, obtained scores above the average. For a clearer view of the data distribution based on frequency, the data in Table 4.2 is presented in the form of a histogram below:

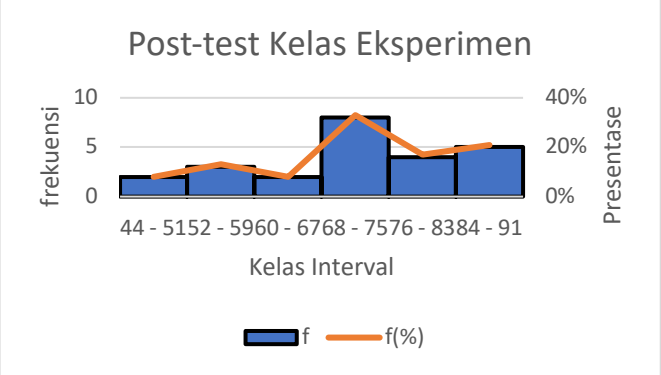

Figure 1: Histogram of Mathematics Learning Scores Using the Problem-Based Learning Model Assisted by Interactive Media Canva

Description of Post-test Data in the Control Class

Based on the test results from 23 students, the maximum score obtained was 91, and the minimum score was 13. The average score (Mean) is 61.5, the median score is 61.5, and the most frequent score (Mode) is 51. The calculation results will be presented in the appendix. Based on this data, a frequency distribution table can be created as shown below:

Table 4. Frequency Distribution of the Post-test in the Control Class

Class Interval	**Frequency (fi)**	**Midpoint (Xi)**	**Cumulative Frequency**	**Percentage (F relative)**

13-26	2	19,5	2	9%
27-40	2	33,5	4	9%
41-54	5	47,5	9	22%
55-68	4	61,5	13	17%
69-82	5	75,5	18	22%
83-96	5	89,5	23	22%

Based on Table 4, it can be seen that 13 students, or 57%, obtained scores below the average, and 10 students, or 43%, obtained scores above the average. For a clearer view of the data distribution based on frequency, the data in Table 4.3 is presented in the form of a histogram below:

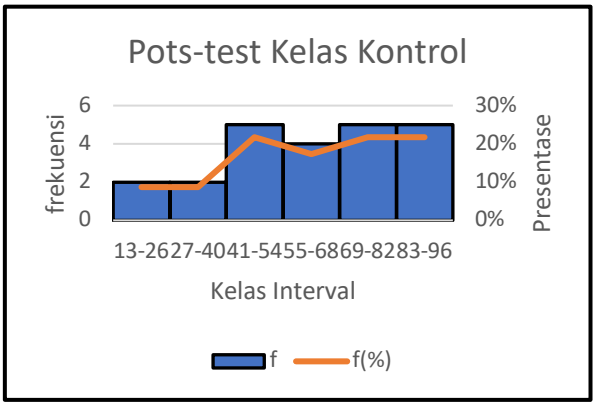

Figure 2. Histogram of Mathematics Learning Scores Using the Inquiry-Based Learning Model Assisted by Interactive Media Canva

Data Normality Test

In this study, the data normality test was conducted using the Liliefors test with the following testing criteria: H_0 is accepted if $L_{Hitung} < L_{Tabel}$, and H_0 is rejected if $L_{Hitung} > L_{Tabel}$. The significance level (α) chosen is 0.05. A summary of the results can be seen in the table below:

Table 5. Data Calculation Results (Liliefors Test)

Class	Data	N	L_{Hitung}	L_{Tabel}	Criteria
Eksperimen	Post-test	24	0,059975872	0,180854	H_0 Accepted
Kontrol	Post-test	23	0,103210819	0,184744	H_0 Accepted

The table 5 above shows that the value of L_{Hitung} from both data sets is smaller than L_{Tabel}, so H_0 is accepted, meaning that both data sets come from a normal distribution.

Homogeneity of Variance Test

Since this study uses two classes, the formula used is the test for equality of two variances (F-test). A summary of the results can be seen in the table below:

Table 6. Homogeneity of Variance Calculation Results (F-Test)

Data	Class	N	Variance	F_{hitung}	F_{tabel}	Criteria
Post-test	Eksperimen	24	166,3025362	0,324208957	2,025	Accept H_0
	Kontrol	23	512,948617			Accept H_0

Based on the calculation results in Table 6, where it shows that the value of F_{hitung} from the experimental class and control class data is smaller than F_{tabel}, so H_0 is accepted, meaning that the post-test results in the experimental and control classes used as samples in this study have homogeneous variances.

Hypothesis Testing

A two-sample t-test was conducted on the experimental class and control class data to examine the effect of learning using the Problem-Based Learning model assisted by interactive media Canva on students' learning outcomes in the topic of Data Presentation. The calculation results of the two-sample t-test are as follows:

Table 7. Hypothesis Testing

Group	Average	Variance	Dk	t_{hitung}	t_{tabel}
Eksperimen	72,71	166,30	24 + 23 – 2 = 45	2,3229	1,67943
Kontrol	60,30	512,95			

Based on the table 7 above, the value of t_{hitung} = 2.3229 was obtained, while the t_{tabel} = 1.67943 with degrees of freedom (dk) = 45, and the significance level used in this study is α = 0.05. By comparing t_{hitung} with t_{tabel}, it can be concluded that $t_{hitung} > t_{tabel}$, so H_0 is rejected and H_1 is accepted. It can be concluded that the difference in the average learning outcomes of students on the topic of Data Presentation, taught using the Problem-Based Learning model assisted by Interactive Media Canva, is higher than the average learning outcomes of students taught using the Inquiry-Based Learning (IBL) model assisted by Interactive Media Canva.

Discussions

This study aimed to examine the impact of Problem-Based Learning (PBL) assisted by interactive media (Canva) on the learning outcomes of seventh-grade students in the topic of data presentation. The results show that students taught with the PBL model had significantly higher scores compared to those taught with Inquiry-Based Learning (IBL). This finding directly addresses the main research question: Does the use of PBL with Canva enhance learning outcomes in data presentation?

The results indicate that the PBL model, combined with interactive media tools like Canva, significantly boosted students' understanding and mastery of mathematical concepts related to data presentation. The mean score of the experimental group was 71.5, compared to the control group's mean score of 61.5, demonstrating a clear advantage of PBL in this context. This suggests that the hands-on, problem-solving approach encouraged by PBL may foster deeper engagement and understanding, which aligns with previous studies that advocate for more interactive and student-centered learning models (Aniswita et al., 2021; Butar et al., 2022).

From a scientific perspective, the interpretation of these results lies in the active learning principles embedded within PBL. By facing real-world problems and using Canva to visualize and solve these problems, students likely developed critical thinking skills and a more practical understanding of mathematical concepts. This finding is consistent with the literature, which emphasizes the effectiveness of PBL in developing problem-solving skills and its positive influence on student learning outcomes (Rahmadani & Anugraheni, 2017).

When comparing these findings with the work of other researchers, such as Fauzia (2018) and Meilasari & Yelianti (2020), the results align with their claims that PBL can significantly enhance students' academic performance, particularly when supported by interactive tools. However, the current study also highlights a significant improvement in students' scores when interactive media like Canva is integrated into the learning process, a factor that may have been underexplored in earlier studies.

In contrast, the students in the IBL group showed less improvement, with a mean score of 61.5. This difference underscores the limitations of more traditional learning models, which may not provide the same level of student engagement or problem-solving opportunities. These findings suggest that while IBL is beneficial in certain contexts, it may not be as effective in fostering the skills needed for data presentation and analysis as PBL with interactive media.

In summary, this study provides strong evidence that the PBL model, especially when integrated with interactive media tools like Canva, leads to superior learning outcomes in the material of data presentation. The findings not only support the hypothesis that PBL enhances student learning but also suggest that further research could explore how the integration of specific media types can further improve learning outcomes in other mathematical topics.

CONCLUSION

This study concludes that the implementation of the Problem-Based Learning (PBL) model supported by interactive media Canva results in better learning outcomes on the Data Presentation material compared to the Inquiry-Based Learning (IBL) model using similar media. The hypothesis test results show a significant difference, as evidenced by t_{hitung} of 2.3229, while the t_{tabel} is 1.67943, $t_{hitung} > t_{tabel}$ the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. Therefore, it can be concluded that the PBL model is more effective in improving the mathematics learning outcomes of seventh-grade students at MTs Negeri 1 Bone Bolango. In line with what was stated by Wardani & Putri (2021), the use of the Problem-Based Learning (PBL) model can improve students' learning outcomes.

Based on these findings, it is recommended that teachers consider using the Problem-Based Learning (PBL) model as an alternative teaching method, given its positive impact on students' learning outcomes. Students are encouraged to maintain their active participation in every learning process, regardless of the model used. Furthermore, other researchers are encouraged to explore the application of the PBL model to different topics in order to gain a more comprehensive understanding of the effectiveness of this model in improving students' learning outcomes.

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