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Implementing the Problem-Based Learning Model Supported by Canva-Based Animated Videos on Fourth-Grade Students' Learning Outcomes in Plane Geometry Characteristics

Putri Azzahra[1], Fadila Suciana[2]
[1, 2] Department of Elementary School Teacher Education, Faculty of Education, Universitas Negeri Padang, Padang, Indonesia

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ABSTRACT

Purpose of the study: This study aims to examine the effect of implementing the Problem-Based Learning model supported by Canva-based animated videos on fourth-grade students' learning outcomes in plane geometry.

Methodology: This study used a quantitative method with a quasi-experimental design, specifically the nonequivalent control group design. The sample was selected through purposive sampling, consisting of fourth-grade students from State Elementary School 15 Simarasok as the experimental group 27 students and State Elementary School 03 Sungai Angek as the control group 27 students. The research instrument was a multiple-choice objective test.

Main Findings: The analysis results showed that the mean score of the experimental group was 72.86, while the control group scored 60.03. The hypothesis test using an independent samples t-test indicated a significance value of $0.006 < 0.05$ and a t-value greater than the t-table ($2.850 > 2.00665$). Therefore, it can be concluded that the Problem-Based Learning model supported by Canva-based animated videos has a significant effect on fourth-grade students' learning outcomes in plane geometry.

Novelty/Originality of this study: The novelty of this study lies in the implementation of the Problem-Based Learning model combined with Canva-based animated videos in teaching plane geometry. This approach promotes contextual, interactive, and visual learning to address the abstract nature of the material, thereby improving students' engagement, conceptual understanding, and learning outcomes at the elementary school level.

Corresponding Author:
Fadila Suciana,
Department Of Elementary School Teacher Education, Faculty of Education, Padang State University,
Jalan Prof. Dr. Hamka, Air Tawar, Padang, Indonesia
Email: fadilasuciana@fip.unp.ac.id

1. INTRODUCTION

Mathematics is a compulsory subject in elementary school and plays an important role in daily life. Through mathematics learning, students can develop skills in counting, measuring, and applying concepts to solve contextual problems [1], [2]. In addition, mathematics helps develop critical, logical, systematic, and creative thinking, as well as collaboration in problem-solving [3]-[5]. However, according to Reza and Masniladevi [6], many students still perceive mathematics as a difficult and boring subject. This is mainly due to teacher-centered instruction, where the teacher dominates the explanation of the material and provides examples, while students are less actively involved. As a result, students tend to be passive, less motivated, and their understanding of the material is not optimal.

One important topic in fourth-grade mathematics is the characteristics of plane geometry, which include shapes such as squares, triangles, trapezoids, and others. Understanding this material requires students to recognize shapes visually. However, in practice, many students experience difficulties because they have not directly seen or interacted with these shapes, making the concepts abstract and hard to understand. According to Almi et al. [7], limited visualization makes it difficult for students to relate plane geometry concepts to real-life situations, which affects their learning outcomes. Therefore, appropriate learning models and engaging, contextual media are needed to support students' understanding.

Learning outcomes are indicators of students' success in understanding the material after participating in the learning process. According to Putri and Muhammadi [8], learning outcomes refer to the abilities acquired by students after learning. Meanwhile, Fitri et al. [9], state that learning outcomes can be seen from students' ability to remember and apply knowledge in everyday life.

Based on initial observations in four elementary schools in Cluster 2 of Baso District, several problems were identified. The learning process is still teacher-centered, resulting in one-way instruction. Students tend to be passive, not actively engaged, and not well trained in critical thinking because most concepts are directly delivered by the teacher. As a result, students' conceptual understanding is not optimal. This is in line who emphasize that conceptual understanding is essential for solving mathematical problems [10]. In addition, student participation in asking questions and expressing opinions is uneven, and group discussions are not yet effective, as some students remain passive and rely on their peers. This condition indicates differences in students' levels of understanding and leads to less meaningful learning. According low student engagement hinders the development of problem-solving skills [11]. On the other hand, the use of innovative learning models and interactive media is still limited, making the learning process monotonous and heavily dependent on textbooks. This affects students' interest, understanding, and learning outcomes. In line state that low learning outcomes are caused by students' limited understanding of the material [12].

Based on the problems described above, it is necessary to implement a learning model that can address these issues, one of which is the Problem-Based Learning model. The Problem-Based Learning model is effective because it directly involves students in connecting the material with their surrounding environment, thereby having a positive impact on learning outcomes and making the learning process more enjoyable [13], [14]. In addition, Nurmartyah & Ahmad [15], state that Problem-Based Learning helps students understand concepts through real-life problems while also developing problem-solving skills. Thus, this model provides more meaningful learning experiences and supports improved learning outcomes. According Islamiati and Masniladevi [16], Problem-Based Learning offers direct learning experiences through problem-solving activities. This who found that Problem-Based Learning can increase students' engagement and learning outcomes [17]. Furthermore, Problem-Based Learning helps develop critical thinking, problem-solving, and collaboration skills [11], [18]. Through contextual and meaningful learning, Problem-Based Learning also enhances students' understanding and learning motivation [19].

In addition to learning models, instructional media also play an important role in increasing students' engagement and supporting learning outcomes. Accordin the use of media can transform passive learning into more active learning [20]. Technology-based media, especially digital media, are considered effective because they attract students' interest and improve the quality of learning [21], [22]. One effective medium is animated video, which combines visual and audio elements, making learning more engaging and easier to understand. Animated videos can increase motivation and help students understand concepts, especially in mathematics, which is often considered difficult and boring [23]-[25]. In addition, the appropriate use of media can facilitate students' understanding and create a more enjoyable learning environment [26]. The advantages of animated videos lie in their ability to present material attractively, increase enthusiasm, and simplify the understanding of abstract concepts [27], [28]. Therefore, the use of animated videos can support more effective, interactive learning and positively impact students' learning outcomes. In this study, the animated videos were created using Canva. According Canva is a design platform that provides various features for creating contextual visuals and animated videos [29]. This is supported by Ref. [30], who state that Canva helps teachers present material in an engaging way and facilitates conceptual understanding. In addition emphasize that Canva is easy to use and effective as a learning medium [31].

However, previous studies have generally examined the effectiveness of the Problem-Based Learning model or the use of animated videos separately. Limited studies have specifically investigated the integration of the Problem-Based Learning model supported by Canva-based animated videos in elementary mathematics learning, particularly in the topic of plane geometry characteristics. In addition, few studies focus on fourth-grade students as research subjects. Therefore, a specific and measurable research gap exists in examining the combined effect of these variables on students' learning outcomes.

The novelty of this study lies in the integration of the Problem-Based Learning model with Canva-based animated videos as an innovative digital learning medium in elementary mathematics learning. This study not only combines learning models and media but also applies them specifically to the teaching of plane geometry characteristics for fourth-grade students, which has not been widely explored in previous research.

This research is important to conduct because elementary students often experience difficulties in understanding abstract mathematical concepts, especially in plane geometry. Without appropriate learning models and media, students tend to be passive and have low learning outcomes. Therefore, the implementation of innovative and interactive learning approaches is urgently needed to create meaningful learning experiences and improve students' understanding.

Therefore, the implementation of appropriate learning models and media is expected to help students understand mathematics more easily and improve their learning outcomes. This study is in line with the research which showed a positive effect of the Problem-Based Learning model supported by animated videos on students' learning outcomes [32]. Based on the problems described above, the researcher is interested in conducting a study entitled: "Implementing the Problem-Based Learning Model Supported by Canva-Based Animated Videos on Fourth-Grade Students' Learning Outcomes in Plane Geometry Characteristics".

2. RESEARCH METHOD

This study is a quantitative research with an experimental type, using a quasi-experimental design in the form of a nonequivalent control group design. Quantitative research is an approach that uses numerical data and statistical analysis to test research hypotheses [33]. A quasi-experimental design is a research method used to examine cause-and-effect relationships between variables without fully randomizing the research subjects [34]. In the nonequivalent control group design, the research subjects are not randomly assigned to the experimental and control groups. The research design is presented in the following table:

Table 1. Nonequivalent Control Group Research Design

Class	Pre-Test	Treatment	Post-Test
Experimental	O_1	X	O_2
Control	O_3	-	O_4

Description:

- X = the experimental class that was taught using a Problem-Based Learning model supplemented with Canva-based animated videos.
- \- = No treatment (Conventional Instruction). The control group was taught using the learning conditions typically employed by teachers, namely a variety of lecture methods.
- O_1 = Pre-Test (students' learning outcomes prior to using the Problem-Based Learning model supplemented with Canva-based animated videos)
- O_2 = Post-Test (Students' learning outcomes after using a Problem-Based Learning model supplemented with Canva-based animated videos)
- O_3 = Pre-Test (students' learning outcomes before using the conventional approach)
- O_4 = Post-Test (students' learning outcomes after using the conventional approach)

The sample was selected using purposive sampling, as this study required careful consideration in choosing participants who were appropriate to the research objectives, with the expectation that they could effectively address the research problem. The population consisted of four fourth-grade classes from public elementary schools in Cluster 2 of Baso District, Agam Regency, totaling 90 students. The selected sample included 27 students from State Elementary School 15 Simarasok as the experimental group and 27 students from State Elementary School 03 Sungai Angek as the control group.

The research instrument was an objective test in the form of 30 multiple-choice questions. Before being used to measure students' learning outcomes, the test items were first tried out on students outside the sample group (pilot group). The results of the try-out were then analyzed to obtain valid and reliable items to be used in the pre-test and post-test. The test items were analyzed through several procedures, including validity, reliability, discrimination index, and difficulty level.

The validity of the test items was analyzed using the Pearson Product Moment correlation formula. An item was considered valid if the calculated correlation coefficient (r-count) was greater than the r-table value at a significance level of 0.05. Meanwhile, the reliability of the instrument was tested using Cronbach's Alpha formula. The instrument was considered reliable if the reliability coefficient (α) was greater than 0.70.

In addition, the test items were further analyzed in terms of discrimination index and difficulty level. The discrimination index was used to determine the ability of each item to distinguish between high-ability and low-ability students, while the difficulty level was used to classify items into easy, moderate, or difficult categories. Only items that met the criteria of validity, reliability, appropriate discrimination index, and acceptable difficulty level were selected for use in the pre-test and post-test.

Before conducting data analysis and hypothesis testing, prerequisite tests were carried out on the data from both the experimental and control groups. These included the normality test using the Kolmogorov–Smirnov test and the homogeneity test using Levene's test. The hypothesis was tested using the independent samples t-test. The data analyzed using the t-test must be normally distributed and homogeneous.

3. RESULTS AND DISCUSSION

3.1 Pre-test and Post-test scores for the experimental and control classes

The implementation of the Problem-Based Learning model supported by animated videos in the learning process shows a significant effect on students' learning outcomes. Based on the analysis of the pre-test and post-test data from both the experimental and control groups, there are differences in learning outcomes between the two groups.

The mean pre-test score of the experimental group was 49.16, while the control group had a mean score of 50.88. Meanwhile, the mean post-test score of the experimental group was 72.86, compared to 60.03 in the control group. The comparison of pre-test and post-test scores between the experimental and control groups can be seen in the following table:

Table 2. Comparison of Pre-Test and Post-Test Scores Between the Experimental Group and the Control Group

Class	Average Value		increase
	Pre-Test	Post-Test	
Experimental class	49,16	72,86	23,7
Control class	50,88	60,03	9,15

Based on the table above, a comparison of the pre-test and post-test scores can be seen in the following figure:

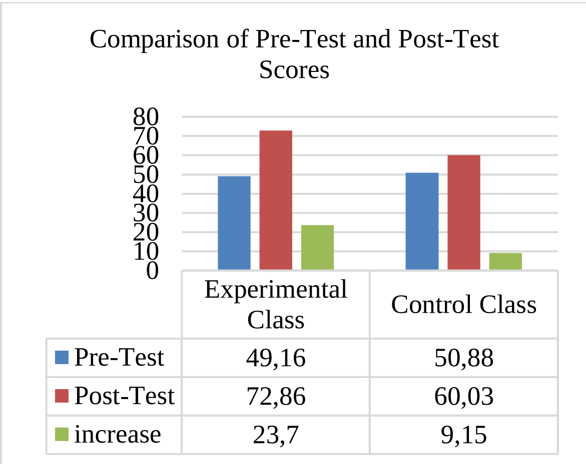

Figure 1. Comparison of pre-test and post-test scores between the experimental class and the control class

3.2 Normality test

The normality test of the pre-test data for the sample classes was conducted using the Kolmogorov Smirnov test with the help of IBM SPSS 31. Based on the Kolmogorov–Smirnov test conducted on the pre-test and post-test scores of both the experimental and control groups, the results of the normality test can be seen in the following table:

Table 3. Normality Test for Pre-Test and Post-Test Data

Class	pre-test normality	post-test normality
Experimental Class	0.321	0.134
Control Class	0.134	0.400

Based on the table, the significance value is greater than 0.05, so it can be concluded that the sample is normally distributed.

3.3 Homogeneity test

The homogeneity test of the pre-test data for the sample classes was conducted using Levene's test with the assistance of IBM SPSS 31. The criterion for homogeneity is that the data are considered homogeneous if the significance value is greater than 0.05. Based on Levene's test conducted on the pre-test and post-test scores of both the experimental and control groups, the results of the homogeneity test can be seen in the following table:

Table 4. Homogeneity Test for Pre-Test and Post-Test Data

Homogenitas Pre-Test	Homogenitas Post-Test
0.650	0.541

Based on the table, the significance value is greater than 0.05; therefore, it can be concluded that the sample data have homogeneous variance.

3.4 Hypothesis testing

The hypothesis test was conducted to determine the effect of the learning model on plane geometry in fourth grade at State Elementary School 15 Simarasok and State Elementary School 03 Sungai Angek. The analysis used was the t-test with the assistance of IBM SPSS 31. Based on the results of the normality and homogeneity tests conducted on the pre-test and post-test scores in both the control and experimental groups, the data were found to be normally distributed and to have homogeneous variance. Therefore, the data met the requirements for hypothesis testing.

a. If the calculated t-value ($t_{(calculated)}$) ≥ t-table ($t_{(table)}$), then H_a is accepted and H_0 is rejected.

b. If the calculated t-value ($t_{(calculated)}$) ≤ t-table ($t_{(table)}$), then H_a is rejected and H_0 is accepted.

Table 5. T-Test Calculation Result

Information	*Post-Test*	
	Experimental	Control
N	27	27
Average	72,86	60,03
t_{count}	2.850	
t_{table}	2.00665	

The calculation results show that the calculated t-value is greater than the t-table (2.850 > 2.00665). Based on the decision criteria of the t-test, H_0 is rejected and H_a is accepted. Therefore, it can be concluded that there is a significant effect of implementing the Problem-Based Learning model supported by Canva-based animated videos on fourth-grade students' learning outcomes in plane geometry.

In both the experimental and control groups, an initial assessment of students' abilities was conducted through the administration of a pre-test consisting of 15 multiple-choice questions with four options (a, b, c, and d). The test items had been previously tried out and analyzed for validity, reliability, discrimination index, and difficulty level. The pre-test was administered in the first meeting to determine the equivalence of students' abilities in both groups. The pre-test scores were then subjected to prerequisite tests, namely the normality test and homogeneity test, to determine whether the data were normally distributed and homogeneous. Based on the pre-test results, the experimental group 27 students obtained a highest score of 73.37 and a lowest score of 13.34, with a mean score of 49.16. Meanwhile, the control group 27 students obtained a highest score of 73.37 and a lowest score of 13.34, with a mean score of 50.88.

At this stage, the learning process in both the experimental and control groups was carried out in accordance with the lesson plans prepared by the researcher. Each group received treatment over three meetings. The material taught in both groups focused on the characteristics of plane geometry. The implementation of the treatment in the experimental and control groups is described below:

Learning in the experimental classroom (implementation of a problem-based learning model using canva-based animated videos). In learning that applies the Problem-Based Learning model supported by Canva-based animated videos, students are required to solve problems provided by the teacher and work collaboratively in groups. As a result, during the final test, students achieved good scores. The Problem-Based Learning model encourages students to think critically in solving problems, actively collaborate in groups, express their ideas freely, and relate real-life experiences to the learning material [35], [36]. In addition, the use of Canva-based animated videos helps present the material in a more engaging way and makes it easier for students to understand abstract concepts [37].

The implementation of learning in the experimental group followed the steps of the Problem-Based Learning model as proposed by Ekayanti [38], which include: (1) orienting students to the problem, (2) organizing students, (3) guiding individual and group investigations, (4) developing and presenting the results, and (5) analyzing and evaluating the problem-solving process. Through these steps, students were actively engaged and enthusiastic during the learning process. The material was well-structured, beginning with problem orientation, followed by group discussions and presentations. The learning process was also supported by Canva-based animated videos that are engaging, innovative, effective, and efficient, in line with 21st-century digital learning [39].The Problem-Based Learning model is believed to have advantages in stimulating students to be proactive in solving problems, deepening conceptual understanding, integrating knowledge, recognizing the value of learning, appreciating others' opinions, and interacting effectively in groups [40].

The learning process in the control group used a conventional teaching approach. Students' participation in asking or answering questions was very low. Since the instruction was dominated by the teacher, students appeared bored and did not gain meaningful learning experiences. As a result, students tended to be passive during the lessons. According to Purnomo et al. [41], the characteristics of conventional learning include: (1) teacher-centered instruction, (2) passive learning, (3) limited interaction among students, (4) absence of cooperative groups, and (5) sporadic assessment. This approach limits students' creative thinking, which leads to weaker understanding of the material. During the learning process in the control group, some students were also not fully engaged, which contributed to lower learning outcomes compared to those in the experimental group.

The post-test was administered to determine the effect of the treatment in both the experimental and control groups. The post-test consisted of 15 multiple-choice questions and was given during the final meeting in both groups. The results were used to examine whether there was an effect of applying the Problem-Based Learning model supported by Canva-based animated videos in the experimental group compared to conventional teaching in the control group. After data analysis, the experimental group (27 students) achieved a highest score of 100 and a lowest score of 40.02, with a mean score of 72.86. Meanwhile, the control group (27 students) obtained a highest score of 86.71 and a lowest score of 13.34, with a mean score of 60.03. These findings indicate that the learning outcomes of students in the experimental group were higher than those in the control group. Based on the t-test analysis, the significance value was $0.006 < 0.05$, and the calculated t-value was greater than the t-table ($2.850 > 2.00665$). Therefore, H_0 is rejected and H_a is accepted, indicating that the implementation of the Problem-Based Learning model supported by Canva-based animated videos has a significant effect on students' learning outcomes in plane geometry for fourth-grade elementary school students.

The novelty of this study lies in the integration of the Problem-Based Learning model with Canva-based animated videos as an innovative digital learning medium in elementary mathematics learning. Unlike previous studies that examined these variables separately, this research combines both approaches specifically in teaching the characteristics of plane geometry to fourth-grade students. This integration provides a new perspective on how learning models and digital media can be used simultaneously to enhance students' understanding.

The findings of this study have important practical implications for educational practice. Teachers can apply the Problem-Based Learning model supported by Canva-based animated videos to create more interactive, engaging, and student-centered learning environments. Schools are encouraged to support the integration of digital learning media by providing adequate facilities and training for teachers to improve instructional quality and students' learning outcomes, particularly in mathematics.

Theoretically, this study contributes to constructivist learning theory by providing empirical evidence that integrating problem-based learning with digital media enhances students' learning outcomes. It also strengthens multimedia learning theory by demonstrating the effectiveness of combining visual and auditory elements in facilitating students' conceptual understanding. However, this study has several limitations. First, the sample involved only two schools, which may affect the generalizability of the findings. Second, the duration of the treatment was relatively short, consisting of only three meetings. Third, this study focused only on cognitive learning outcomes and did not examine other aspects such as affective and psychomotor domains. Therefore, future research is recommended to involve a larger sample size, a wider range of schools, a longer intervention period, and more diverse variables.

CONCLUSION

Based on the results of the data analysis and discussion, it can be concluded that students taught using the Problem-Based Learning model supported by Canva-based animated videos achieved higher learning outcomes than those taught using conventional methods in plane geometry for fourth-grade elementary school students. This is supported by the results of the t-test using IBM SPSS 31 at a 5% significance level, which showed a significance value of $0.006 < 0.05$, and the calculated t-value was greater than the t-table ($2.850 > 2.00665$). Therefore, H_0 is rejected and H_a is accepted, indicating that the implementation of the Problem-Based Learning model supported by Canva-based animated videos has a significant effect on students' learning outcomes. Based on these findings, teachers are recommended to implement the Problem-Based Learning model supported by Canva-based animated videos to create more interactive and meaningful learning experiences. Schools are encouraged to support the integration of digital learning media by providing adequate facilities and training for teachers, while students should be actively involved in problem-solving activities to enhance their critical thinking and collaboration skills. Furthermore, future research is recommended to involve a larger sample size and a wider range of schools to improve the generalizability of the findings. Future studies may also consider longer treatment durations and explore additional variables such as students' motivation, critical thinking skills, and collaborative abilities, as well as examine the effectiveness of similar learning models and digital media in different subjects or educational levels.

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REFERENCES

[1] M. Rahayu and Masniladevi, "The effect of using sparkol videoscribe media on learning outcomes of factors and multiples of numbers in classrooms IV SDN Gugus IV Surantih," *J. Pendidik. Tambusai*, vol. 4, no. 3, pp. 2239–2249, 2020, doi: 10.31004/jptam.v4i3.702.

[2] A. Arrafi and Masniladevi, "Implementation of the Indonesian realistic mathematics education approach (pmri) as an effort to improve mathematics learning outcomes in SD," *J. Basic Educ. Stud.*, vol. 3, no. 2, pp. 750–774, 2020.

[3] Elfiyani, "Systematic literature review: Problem-based learning model in elementary school mathematics education," *Asian J. Early Child. Elem. Educ.*, vol. 2, no. 3, pp. 187–205, 2024, doi: 10.58578/AJECEE.v2i3.2989

[4] W. Malfani and M. Zainil, "Implementation of the project based learning (PJBL) model on mathematics learning outcomes in elementary schools," *J. Basic Educ. Stud.*, vol. 3, no. 2, pp. 703–717, 2020, [Online]. Available: https://ejurnalunsam.id/index.php/jbes/article/view/2908/2008

[5] S. Ahmad and J. K. Siregar, "The effect of the lattice method on learning outcomes of multiplication of whole numbers using the PBL model in grade IV of elementary school," *Indo-MathEdu Intellectuals J.*, vol. 5, no. 3, pp. 3922–3933, 2024, doi: 10.54373/imeij.v5i3.1444.

[6] W. S. Reza and Masniladevi, "The effect of using nail-on board learning media on learning outcomes of perimeter and area of flat shapes in grade IV of elementary school 08 Nan Limo Mudiak," *J. Pendidik. Tambusai*, vol. 5, no. 2, pp. 4531–4536, 2021, doi: /10.31004/jptam.v5i2.1596.

[7] J. J. N. Almi, M. D. Ramadhan, and Kowiyah, "Analysis of constraints in learning plane shapes in elementary schools: Challenges for teachers and students," *J. Arjuna Publ. Ilmu Pendidikan, Bhs. dan Mat.*, vol. 2, no. 6, pp. 380–384, 2024, doi: 10.61132/arjuna.v2i6.1366.

[8] A. Y. Putri and Muhammadi, "Improving student learning outcomes in integrated thematic learning with problem based learning model in class IV SDN 07 Lubuk Alung," *J. Basic Educ. Stud.*, vol. 4, no. 1, pp. 228–236, 2021, doi: 202101/JoBESV4I1/2711.

[9] Y. Fitri, Desyandri, and Y. Erita, "Improving science learning outcomes of fourth grade elementary school students: Application of a constructivist approach," *Didakt. J. Ilm. PGSD FKIP Univ. Mandiri*, vol. 08, no. 02, pp. 2982–2992, 2022.

[10] A. Rahma and Masniladevi, "The Influence of the discovery learning model on the understanding of the concept of multiplication and division of fractions in fifth grade elementary school students," *e-Jurnal Inov. Pembelajaran Sekol. Dasar*, vol. 8, no. 8, pp. 75–84, 2020, doi: 10.24036/e-jipsd.v10i2.10406.

[11] S. Ahmad, D. Aryanti, and R. Kurniawan, "Problem based learning (PBL) learning model in thematic learning in elementary schools," *Elem. Sch. J.*, vol. 13, no. 2, pp. 213–225, 2023, doi: 10.24114/esjpgsd.v13i2.46491.

[12] A. Meidianti, N. Kholifah, and N. I. Sari, "Students' ability to understand mathematical concepts in mathematics learning," *J. Ilm. Mhs. Pendidik. Mat.*, vol. 2, no. 2, pp. 134–144, 2022.

[13] R. H. Handayani and Muhammadi, "The influence of the problem based learning model on student learning outcomes in integrated thematic learning in grade V of elementary school," *e-Journal Inov. Pembelajaran SD*, vol. 8, no. 5, pp. 78–88, 2020, doi: 10.24036/e-jipsd.v9i2.9780.

[14] Y. Marni and Desyandri, "Pengembangan media poliomino pada pembelajaran jaring-jaring kubus dan balok melalui project based learning di SD," *Didakt. J. Ilm. PGSD FKIP Univ. Mandiri*, vol. 08, no. 02, pp. 2421–2430, 2022, doi: 10.36989/didaktik.v8i2.552.

[15] Nurmartiyah and S. Ahmad, "Pengaruh model problem based learning terhadap hasil belajar perkalian dan pembagian pecahan di kelas V SD," *J. Basic Eduction Stud.*, vol. 4, no. 1, pp. 98–109, 2021, doi: 10.24036/e-jipsd.v10i3.10451.

[16] A. Islamiati and Masniladevi, "The influence of the problem based learning model on learning outcomes of multiplication and division of fractions in grade V of public elementary schools 21 Payakumbuh," *J. Basic Educ. Stud.*, vol. 4, no. 2, pp. 317–328, 2021, doi: 10.37905/aksara.5.1.39-46.2019.

[17] J. E. Putri and M. Zainil, "Pengaruh model problem based learning (PBL) terhadap hasil belajar siswa pada pembelajaran tematik terpadu kelas IV SDN 09 Pasaman Kabupaten Pasaman Barat," *J. Basic Educ. Stud.*, vol. 4, no. 1, pp. 3115–3125, 2021,

[18] R. Dwindiarti, M. Arafik, and D. Suprianti, "Model problem based learning (PBL) untuk meningkatkan hasil belajar matematika tentang pengukuran waktu di kelas II SDN Tamanasri," *JISIP (Jurnal Ilmu Sos. dan Pendidikan)*, vol. 5, no. 4, pp. 1063–1068, 2021, doi: 10.58258/jisip.v5i4.2538.

[19] D. Azura and Masniladevi, "Pengaruh model problem based learning(PBL) Terhadap hasil belajar penyajian data kelas V sekolah dasar," *J. Edu Res.*, vol. 6, no. 2, pp. 2154–2162, 2025, doi: 10.47827/jer.v6i2.1038.

[20] Adelina and Masniladevi, "Pengembangan Media Pembelajaran Berbasis Google Classroom Pada Materi Volume Bangun Ruang Untuk Meningkatkan Hasil Belajar Di Kelas V SD," vol. 4, no. 1, pp. 1906–1914, 2021.

[21] A. Mutmainnah and R. Andika, "Pemanfaatan Media Wordwall terhadap Evaluasi Pembelajaran Matematika di Sekolah Dasar," *Sinar Dunia J. Ris. Sos. Hum. dan Ilmu Pendidik.*, vol. 3, no. 3, pp. 175–190, 2024, doi:

10.58192/sidu.v3i3.2447.
[22] L. Ariani and M. Zainil, “Pengaruh model project based learning (PjBL) terhadap hasil belajar keliling dan luas bangun datar kelas IV SD,” *e-Jurnal Inov. Pembelajaran SD*, vol. 8, no. 5, pp. 193–200, 2020,
[23] M. L. A. Lello, J. M. H. Nenohai, and O. E. Nubatonis, “Penerapan model problem based learning berbantuan video animasi untuk meningkatkan hasil belajar siswa kelas VIII SMP reformasi plus noelbaki,” *Fraktal J. Mat. Dan Pendidik. Mat.*, vol. 4, no. 2, pp. 1–7, 2023, doi: 10.35508/fractal.v4i2.12266.
[24] D. Widyahabsari, K. A. Aka, and W. I. Zaman, “Media video animasi materi bangun ruang,” pp. 587–594, 2023, doi: 10.29407/bqcgdq78
[25] A. Ruswan et al., “Application of animated video as an interactive learning media for elementary school students (literature study),” Innov. J. Soc. Sci. Res., vol. 4, no. 1, pp. 1468–1476, 2024, doi: 10.31004/innovative.v4i1.8021.
[26] D. Mauliana, Adrias, and F. Suciana, “The role of learning media in mathematics subjects in elementary schools,” *J. Ilm. Mat. Kebumian dan Angkasa*, vol. 3, no. 2, pp. 94–102, 2025, doi: 10.62383/bilangan.v3i2.469.
[27] D. K. Mashuri and Budiyono, “Development of animated video learning media for volume of solid figures material for grade V elementary school,” *Jpgsd*, vol. 8, pp. 1–11, 2020,
[28] L. Afrilia, Neviyarni, D. Arief, and R. Amini, “Effectiveness of animated video-based learning media to increase learning motivation of fourth grade elementary school students,” *J. Cakrawala Pendas*, vol. 8, no. 3, pp. 710–721, 2022, doi: 10.31949/jcp.v8i3.2559.
[29] Y. Rusdiana, R, K. Putri, W, and K. Sari, V, “Training on making learning media using Canva for teachers of SMPN 1 Tegalampel Bondowoso,” *J. Pengabdi. Magister Pendidik. IPA*, vol. 4, no. 3, pp. 209–213, 2021, doi: 10.29303/jpmpi.v3i2.952.
[30] F. Rahmawati and I. R. W. Atmojo, “Analysis of 21st century digital learning video media using the Canva application in science learning,” *J. Basicedu*, vol. 5, no. 6, pp. 6271–6279, 2021, doi: https://doi.org/10.31004/basicedu.v5i6.1717.
[31] A. Fariha, A. Solihah, and D. M. M. Nur, “Utilization of animated video media based on the Canva application to improve students’ motivation and learning achievement,” RUKASI J. Ilm. Perkemb. Penedidikan dan Pembelajaran, vol. 02, no. 03, pp. 120–128, 2025, doi: 10.70294/mta99h51.
[32] A. Rahmadayani, M. Rudini, and H. Marto, “The effect of implementing the Problem Based Learning (PBL) model based on Powtoon animated videos in improving mathematics learning outcomes,” *Pendas J. Ilm. Pendidik. Dasar*, vol. 10, no. 02, pp. 316–328, 2025, doi: 10.23969/jp.v10i02.23920.
[33] M. Waruwu, “Educational research approaches: qualitative research methods, quantitative research methods and mixed method research methods,” *J. Pendidik. Tambusai*, vol. 7, no. 1, pp. 2896–2910, 2023, doi: https://doi.org/10.31004/jptam.v7i1.6187.
[34] G. Anantasia and S. R. Rindrayani, “Quasi experimental research methodology,” Adiba J. Educ., vol. 5, no. 2, pp. 183–192, 2025.
[35] N. Melina and Masniladevi, “The effect of the problem based learning (PBL) model on learning outcomes of FBB and KPK in grade IV SDN cluster 5 Sutera district.,” *J. Pendidik. Tambusai*, vol. 4, no. 3, pp. 2502–2507, 2020, doi: https://doi.org/10.31004/jptam.v4i3.736.
[36] W. H. Pilka and S. Ahmad, “Problem Based Learning as a model to improve problem solving skills in elementary schools,” J. Pendidik. Tambusai, vol. 4, no. 2, pp. 1347–1360, 2020, doi: 10.31004/jptam.v4i2.601.
[37] F. Hilmiyati, A. G. Nafsi, and Sabri, “The development of Canva based animated videos to improve critical thinking skills elementary/islamic elementary school studenst in science classes on human digestive system materials,” *Al-Aulad J. Islam. Prim. Educ.*, vol. 7, no. 1, pp. 28–37, 2024, doi: 10.15575/al-aulad.v7i1.28770.
[38] I. Ekayanti, “The influence of problem based learning (PBL) learning model on science learning motivation in elementary schools,” *Soc. Humanit. Educ. Stud. Conf. Ser.*, vol. 4, no. 6, pp. 1314–1321, 2021, doi: 10.20961/shes.v4i6.70560.
[39] D. Yuliana, A. Baijuri, A. A. Suparto, S. Seituni, and S. Syukria, “Utilization of the Canva application as a creative, innovative, and collaborative learning video media,” *J. Pendidik. Teknol. Inf. dan Komun.*, vol. 6, no. 2, pp. 247–257, 2023, doi: 10.37792/JUKANTI.V6I2.1025.
[40] F. K. Amris and Desayandri, “Integrated thematic learning using the Problem Based Learning model in elementary schools,” J. Basicedu, vol. 5, no. 4, pp. 2171–2180, 2021, doi: 10.31004/basicedu.v5i4.1170.
[41] A. Purnomo et al., I*ntroduction to Learning Models, Cetakan 1*. NTB: Yayasan Hamjah Diha, 2022.