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Problem-based learning model with Smart Apps Creator media: Effect on students' fraction problem-solving abilities

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ABSTRACT

Problem solving ability is one of the goals and important elements that students must master during the mathematics learning process. With this in mind, the aim of this research is to test the effectiveness of implementing the Problem Based Learning model assisted by Smart Apps Creator media in developing students' abilities in solving problems regarding fractions in class V. This research took the form of quasi-experiment with a Nonequivalent Control Group Design. The number of students who were the object of this research was 185 students from class V of SDN in Gugus Kenanga, central java province of Indonesia. The sampling method for this research was carried out using a purposive sampling technique. The data collection method were observations and test. The technique for data analysis was carried out using two techniques, namely quantitative analysis and inferential statistics. It was found that there was real difference in students' ability to solve fraction problems between students who use the Problem Based Learning model using the Smart Apps Creator application and students who use the Problem Based Learning model without using media. From these findings, it can be concluded that there is a significant influence in using the Problem Based Learning model with the help of Smart Apps Creator media in developing the abilities of class V students.

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Introduction

Education is a forum that aims to make human life better, nobler, and smarter so that it can encourage a brighter future (Malikah, 2022). The education obtained at school is one of the main foundations for students to improve their abilities and knowledge. Research conducted by Fitria et al. (2022) found that educational programs effectively improved the quality of human resources. The implementation of education in schools involves teachers, students, curriculum, and infrastructure. The interactions that exist in education are between teachers and students, which can be in the form of teaching and learning activities or learning processes. In this situation, teachers need to make learning plans regularly and refer to the curriculum (Firmansyah et al., 2023). The curriculum is something complex and multimedia which is the basis of the learning experience and is a very important thing in education that must be evaluated regularly, innovatively, dynamically, and continuously to keep up with current developments (Cholilah et al.,

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2023). The curriculum has an important role in the education system because it not only sets learning goals that must be achieved, but also provides the understanding needed to design learning activities. The curriculum currently being implemented is the independent curriculum.

The independent curriculum is one of the latest policies launched by the Indonesian Ministry of Education and Culture, Research and Technology (Febrianningsih & Ramadan, 2023). In learning, the independent curriculum directs more to the students (Indarta et al., 2022). The Indonesian Ministry of Education and Culture, Research and Technology, Nadiem Makarin, explained that the first step in implementing curriculum policies related to the concept of independent learning is to innovate with educators before implementing it with students. Apart from that, Nadiem Makarim also explained the importance of teacher competency at various levels. The role of teachers is very significant in the world of education, especially for students at the elementary school level (Saputra Siagian et al., 2023). Because at this level, students are still vulnerable to boredom and boredom. Students tend to think of this period as a playing period.

The teaching methods used by teachers contribute a significant impact on students' learning achievements, both in terms of students' knowledge, skills, and attitudes (Munawir et al., 2022). Teachers must have the ability to convey lesson material effectively to their students. Teachers need to show creativity in creating a pleasant classroom environment so that the learning process can run successfully (Abidah et al., 2022). A good classroom atmosphere will create good teaching and learning interactions, but the classroom atmosphere will not always run well continuously. Therefore, teachers must be precise in choosing the learning models and media that will be used.

Accuracy in determining learning models and media can help teachers create learning situations that are more interesting and less boring for students, as well as facilitate interaction in the classroom to achieve the desired learning goals. The learning model guides teachers in carrying out the teaching and learning process in the classroom. Apart from learning models, the use of learning media that allows interaction also plays a very important role in the teaching and learning process. The use of innovative and creative learning media in the classroom can encourage students' interest and curiosity and can increase students' motivation in the teaching and learning process (Wulandari et al., 2023).

In teaching and learning activities in class, one of the subjects that students do not like is mathematics. Mathematics is often seen as one of several subjects that are considered difficult by students, this is due to students' lack of understanding of mathematical concepts (Nurdianti et al., 2021). However, Mathematics is a subject that has an important role and contribution to the world of education (Lestari & Andinny, 2023). Mathematics subjects are mandatory for all students from elementary school, middle school, and high school to college (Zulva et al., 2022). By participating in mathematics learning, students can develop the ability to think logically, analytically, systematically, critically, and creatively, and the ability to work together (Zulva et al., 2022). One of the goals of learning mathematics is to achieve the ability to solve problems.

Problem-solving ability is an important element that must be mastered by students during the mathematics learning process (Kusumaningrum et al., 2022). Every student is expected to have problem-solving abilities. Through problem-solving activities, students are encouraged to have creative, reasoning abilities and be able to think at a high level so that the final results can help students develop other mathematical abilities.

Based on the results of observations and interviews with class V teachers at SDN Gabus 4 and SDN Gabus 2, problems were found in mathematics learning, including first, low participation and enthusiasm of students when participating in mathematics learning; second, the mathematics learning carried out is still teacher-centered; third, lack of availability of interactive learning media; fourth lack of use of IT-based learning media; fifth, the average UAS score in the 2023/2024 odd semester is still low, especially for

students' ability to solve problems involving addition and subtraction of ordinary fractions and mixed fractions with different denominators.

In overcoming this problem, one solution is to apply an interactive media-based learning model that allows students to be actively involved in the learning process. Using creative and innovative learning models and media can create a pleasant learning experience and prevent boredom in the learning process. One step that can be taken is to implement the model Problem Based Learning with the help of the media Smart Apps Creator.

Model Problem-Based Learning is a model where at the beginning of learning a problem is given that must be solved by students through investigation using a problem-solving approach (Zainal, 2022). In applying the model of Problem-Based Learning, the initial step is to involve students in group work. Students will conduct investigations, identify problems, and find solutions with guidance from the teacher (Zulva et al., 2022). By applying the model of Problem-Based Learning, students will be faced with the challenge of learning independently in finding ideas or solutions to given problems (Zainal, 2022). The teacher's role is only limited to being a facilitator during the learning process so that it can increase students' active participation and involvement. Khotimah and Nawir (2023) explains that Smart Apps Creator is a program that helps in creating applications mobile for platforms Android and iOS without requiring programming knowledge. Smart Apps Creator can create interactive learning media easily without coding and the system works like using Microsoft PowerPoint. Smart Apps Creator can also be used to create various types of applications mobiles such as multimedia, learning, marketing, games, and so on.

This research received support from relevant previous research. For example, a study by Kusumaningrum et al. (2022) found that using the model Problem-based learning with the help of the Trigo application has succeeded in improving students' abilities in answering trigonometry mathematical problems. In addition, research by Juliantini et al. (2020) also found that there were differences in mathematical problem-solving abilities between students who used the learning model Brain-Based Learning with concrete media and students who did not use it. Other research conducted by Asido (2022) also shows that the learning model Problem-Based Learning Using the Musi board is effective in improving the learning achievement of fourth-grade elementary school students in the greatest common factor material.

Learning by applying the Problem-Based Learning model can improve students' mathematical problem-solving abilities. The Problem-Based Learning model is one of the learning models that is very suitable to be applied in mathematics learning. Applying the Problem-Based Learning model can help students improve their mathematical problem-solving abilities. However, currently, there has been no research regarding the implementation of the Problem-Based Learning model assisted by Smart Apps Creator media in mathematics learning to develop mathematical problem-solving abilities, especially in fractions. Based on these, this research is intended to analyze the effect of implementing the Problem-Based Learning model using Smart Apps Creator media in developing fraction problem-solving abilities in fifth-grade students at State Elementary Schools in Gugus Kenanga, Ngrampal District, Sragen Regency.

Method

The study focuses on a project-based learning model with smart Apps Creator media towards students' problem-solving ability adopts a qualitative approach. The quantitative approach is a scientific approach that uses data in the form of numbers or statements that can be assessed (Ma'wa & Hidayat, 2023). This type of research is experimental research. Experimental research is a research method specifically used to identify the variables involved and the relationship between one variable and another (Priadana & Sunarsi, 2021). This experimental quantitative research aims to test the

effectiveness of implementing the Problem-Based Learning model assisted by Smart Apps Creator media as an independent variable on the ability to solve fraction problems as the dependent variable. This research uses a Nonequivalent Control Group Design. In practice, this research involved two classes, namely the experimental class and the control class. In the experimental class, researchers used the Problem-Based Learning model using Smart Apps Creator media as a learning method. Meanwhile, in the control class, researchers used the Problem-Based Learning model without using media.

This research uses the population of the State Elementary School in Kenanga Group, Ngrampal District, Sragen Regency, which includes eleven elementary schools consisting of four State Elementary Schools in Cork, three State Elementary Schools in Klandungan, three State Elementary Schools in Karangudi, and one Integral Elementary School with a total number of 185 students. The sampling method used in this research is purposive sampling. Purposive sampling is a sample selection method that is chosen deliberately based on the researcher's considerations which are related to the research objectives and have special characteristics required in the research (Sihotang, 2023). The students taken as samples in this research were class V students at SD Negeri Gabus 2 with a total of 23 students and class V students at SD Negeri Gabus 4 with a total of 18 students. SD Negeri Gabus 2 is the class used for the experiment while SD Negeri Gabus 4 is the control class. There are two methods used to collect data, namely observation and tests. The test phase is carried out in two stages, namely the initial test and the final test. The test was used to compare whether there was a difference in the average value in the experimental group and the control group. The test question grid can be seen in Table 1.

Table 1. Test Question Grid

Question Indicator	Problem Solving Indicator	Cognitive Level
Presented with a story problem about social activities, students can nominate many residents who have contributed to social activities.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4
Presented with a picture, students can conclude the amount of change in the story.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4
Presented with a story problem, students can solve the results in the story.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4
Presented with story questions about Aunt's shopping activities, students can conclude the total purchases Aunt brought home.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4
Presented with a story problem, students can conclude how many bottles are needed in the story.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4

Question Indicator	Problem Solving Indicator	Cognitive Level
Presented with story questions about buying and selling activities, students can conclude the selling price in the story.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4
Presented with a story about Uncle Andi's shopping activities at the market, students can select the total purchases Uncle Andi brought home.	1. Understand the problem. 2. Plan and select problem solving strategies. 3. Implement the plan. 4. Check again the results obtained	C4

This research implemented both quantitative analysis and inferential statistical analysis. Analysis prerequisite tests need to be carried out before parametric statistical tests are carried out. The normality test and homogeneity test are analysis requirements tests. The normality and homogeneity tests were carried out with the help of SPSS version 20. The paired sample T-test was used in hypothesis testing to compare the average pretest and post-test scores of each class. Next, the test will be carried out using the independent sample T-test method to check whether there is an influence of variable X on variable Y.

Results

This research was conducted to determine the effectiveness of implementing the Problem-Based Learning model assisted by Smart Apps Creator media through student learning outcomes in the form of pretest and posttest score data. The pretest score is used to measure students' initial abilities before being given treatment, while the posttest score is used to determine whether there is an increase in students' abilities in solving fraction problems after being given treatment. Data on pretest and posttest results for class V students can be seen in Table 2.

Table 2. Results Pretest and Posttest

No	Information	Pretest		Posttest	
		Control	Experiment	Control	Experiment
1	Number of Students	18	23	18	23
2	Average	41,83	49,35	67,39	83
3	Highest Score	57	74	94	97
4	Lowest Score	20	23	29	54

Referring to Table 2, it can be seen that there is a slight difference in the average initial ability between the control class and the experimental class. The data shows that the previous test results in the control class had an average value of 41.83, while in the experimental class, the average value was 49.35. After implementing a learning model that uses media as assistance, there is a significant difference between the post-test results of the two classes. The posttest score for the control class was 67.39, while the experimental class had an average score of 83. This shows that the average score for the experimental class was higher than the average score for the control class. The percentage of learning completeness in the pretest score in the experimental class increased by 78%, increasing from 13% to 91% in the posttest results. Then, there was an increase of 61% in the percentage of learning completeness in the pretest score in the control class from 0% to 61% after the posttest results.

Next, a prerequisite analysis test is carried out which includes a normality test and a homogeneity test. The decision is based on the following criteria: if the sig value is greater than 0.05, then the null hypothesis is accepted, or it can be concluded that the data is normally distributed. However, if the sig value is less than 0.05, then the null hypothesis is rejected, or it can be concluded that the existing data is not normally distributed. The results of the normality test can be seen in Table 3.

Table 3. Normality Test Results

	Normality Test		
	Kolmogorov-Smirnova		
	Statistic.	df	Sig.
Pretest Control	.189	18	.088
Posttest Control	.145	18	.200
Pretest Experiment	.093	23	.200
Posttest Experiment	.152	23	.180

Based on the data listed in Table 3, the normality test results for the sig value for 1) Pretest control class were 0.088 > 0.05; 2) Control class posttest of 0.200 > 0.05; 3) Experimental class pretest of 0.200 > 0.05; and 4) Experimental class posttest of 0.180 > 0.05. Therefore, it can be concluded that the distribution of pretest and posttest scores in the control class and experimental class is normal because the normality test results meet the requirements, namely a sig value > 0.05. After that, homogeneity testing was carried out. The homogeneity test results can be seen in Table 4.

Table 4. Homogeneity Test Results

Homogeneity Test	**Sign.**	**Conclusion**
Pretest	0,665	Homogen
Posttest	0,107	Homogen

The homogeneity test in this study was carried out using the ANOVA test using the SPSS version 20 program. The results of the posttest homogeneity test for the two classes were 0.107 > 0.05. So, H_0 acceptable or the variance is homogeneous. The results of data analysis show that the experimental class and control class have samples that follow a normal distribution and have homogeneous variance. Thus, hypothesis testing could be carried out. Hypothesis testing in this research uses the T-test and determination test which is used to determine the extent of the influence of implementing the Problem-Based Learning model using Smart Apps Creator media in developing the abilities of class V students in solving fraction problems. The t-test in this study used the SPSS version 20 application. The results of the t-test can be seen in Table 5.

Table 5. Paired Sample T-Test Results

	Paired Differences					**t**	**df**	**Sig. (2-tailed)**
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest-Posttest Experiment	-33,652	9,048	1,887	-37,565	-29,739	-17,836	22	,000
Pretest-Posttest Control	-25,556	12,999	3,064	-32,020	-19,091	-8,341	17	,000

Based on Table 5, the sig value is obtained. (2-tailed) is 0.000 < 0.05, so it can be concluded that there is a difference in the average pretest and posttest results in the experimental class and control class. After carrying out the t-test, an independent t-test was then carried out. The independent t-test was used to determine the difference in the average pretest and posttest scores in the control class and experimental class. In this test, the SPSS version 20 application was used. The results of the independent t-test can be seen in Table 6.

Table 6. Independent T-Test Results

	Mean	N	Std. Deviation	Std. Error Mean
Pretest Experiment	49,35	23	12,416	2,589
Posttest Experiment	83,00	23	11,414	2,380
Pretest Control	41,83	18	12,201	2,876
Posttest Control	67,39	18	18,743	4,418

Based on the results of the independent t-test in Table 6, it was found that the average pretest score for the experimental class increased from 49.35 to 83.00 in the average post-test score. The average pretest score for the control class was from 41.83 to 67.39 and the average post-test score. This is reinforced by the sig results. (2-tailed) that the average posttest score for the experimental class and control class is 0.000 < 0.05, which means there is a difference in the average posttest results between the control class and the experimental class. The results of the analysis show that the use of the Problem-Based Learning model with the help of the Smart Apps Creator media is more effective than the use of the Problem-Based Learning model without the help of the media in developing the fraction problem-solving abilities of fifth-grade elementary school students in Gugus Kenanga, Ngrampal District, Sragen Regency.

Discussion

Application of the model Problem-Based Learning using the help of media Smart Apps Creator is a very effective way of learning because it can improve students' ability to solve problems. This evidence can be seen from the academic achievements of students in the control class and experimental class. Use of methods Problem-Based Learning with the help of the media Smart Apps Creator can develop students' critical thinking skills because, at the beginning of learning, they are given a problem that they must solve, which in the end will improve their learning outcomes. Application of the model Problem-Based Learning focuses on students so that the learning process becomes significant. Students will feel more motivated, enthusiastic, and focused when learning is carried out in an exciting and interactive atmosphere.

The comprehensive explanation comes from Sofyan et al. (2017), which explains that model Problem-Based Learning has several characteristics. First, learning is based on questions or problems; second, learning focuses on students. In this context, the teacher's role is as a supporter, while students can work together; third, can strengthen students' abilities in working in groups or teams; fourth, learning centered on the problem context; fifth, learn through an interdisciplinary approach. Interdisciplinary is a form of learning that aims to develop a disciplined attitude. Interdisciplinary requires students to carry out reading and writing activities, collect and analyze information, as well as think and perform calculations.

Sofyan et al. (2017) claimed that there are 5 steps in the application of the model Problem-Based Learning namely the stage of orientation of students towards the problem. At this stage, students are taught about existing problems. The teacher states the learning

targets to be achieved, first, the teacher explains the learning implementation plan such as the equipment or materials needed, and encourages students to participate actively in solving problems; second, organize groups of students so they can learn. The teacher directs students in recognizing, determining, and planning learning activities related to the situation at hand; third, directing individual and group exploration. During this stage, the teacher provides assistance to students in collecting as much information or related data as possible, encouraging them to carry out experiments to obtain explanations of solutions to existing problems, collect data, formulate hypotheses, and solve the problem; fourth, develop and present the results of the work. At this stage, the teacher assists students in planning and preparing appropriate work, such as making reports and carrying out demonstrations; fifth, analysis and evaluation of the problem-solving process. At this stage, the teacher will assess students' learning progress in understanding the material that has been taught. The teacher will also ask the groups to present the results of their work and provide information regarding the material that will be discussed at the next meeting.

Research that inline to the study has been carried out by Sapoetra and Hardini (2020). This research confirms that the learning model Problem-Based Learning succeeded in improving students' abilities to solve problems in mathematics learning. A systematic study also conducted by Zubaidi and Zuhri (2024), that indicates the use of learning models Problem Based Learning by using media Powerpoint Interactive teaching of adding numbers 1 to 20 at SDN Bugangan 03 produces positive results. Research conducted by Supriono et al. (2023) showed that the Problem-Based Learning learning model assisted by Question Cards had a significant effect on the mathematical problem-solving abilities of fifth-grade students at SD Inpres Paccerakkang. Oktabia and Djami, (2022) also confirmed that the Problem-Based Learning model assisted by Grocery Shopping is more effectively used to improve mathematical problem-solving abilities in class IV fraction material.

In a very advanced era like today with the rapid progress of internet technology, teachers need knowledge and expertise in using this technology (Musdar et al., 2023). In creating a pleasant classroom atmosphere, teachers must choose the right learning methods, models, and media according to the subject matter to be taught (Putu et al., 2021). In teaching, the role of the teacher is very important and has a big influence on the learning process (Anggraeni et al., 2022). As a center or source of knowledge for students, teachers are expected to prepare everything related to the learning process. One important aspect is implementing learning models and media. By using the Problem-Based Learning model and using Smart Apps Creator media as a tool, teachers at Public Elementary Schools in Gugus Kenangan, Ngrampal District, Sragen Regency can increase the excellence of learning in class V. The application of the Problem-Based Learning model using Smart Apps Creator media significantly influences the results of student learning, which results in real change. The learning outcomes of class V students experienced a significant increase in pretest and posttest scores. The implementation of learning at Gugus Kenanga State Elementary School, Ngrampal District, Sragen Regency using the Problem-Based Learning model with the help of Smart Apps Creator not only focuses on the subject matter given to class V students but also provides an understanding of the use of this media. This aims to ensure that students can also gain knowledge about new educational technology. The learning media used in this research is a type of educational media that can be accessed online or offline without requiring an internet connection. The application of the Problem-Based Learning model with the help of Smart Apps Creator media in class V of State Elementary Schools which are members of the Kenanga Cluster, Ngrampal District, Sragen Regency, has proven successful in increasing students' abilities in solving fraction problems.

Conclusion

From the data analysis that has been carried out, it can be concluded that there is a significant difference in the average pretest and posttest scores in the experimental class and control class. Apart from that, it was also found that there was a significant difference in the fraction problem-solving abilities of class V students at State Elementary Schools in Gugus Kenanga, Ngrampal District, Sragen Regency between classes that applied the Problem-Based Learning model with the help of Smart Apps Creator media and classes that applied the Problem-Based Learning model. Without the help of the media. So, it can be concluded that the application of the Problem-Based Learning model assisted by Smart Apps Creator media can improve the ability to solve fraction problems. From these conclusions, several suggestions can be made, including; first, teachers can use the findings of this research as a solution or alternative in improving students' abilities in solving fraction problems, namely by implementing the Problem-Based Learning model with the help of Smart Apps Creator media. In implementing the Problem-Based Learning model using Smart Apps Creator media, it is recommended that teachers make prior preparations by understanding the syntax of the learning model used, understanding the content of the lesson to be taught, preparing interactive teaching materials, arranging interesting icebreakers or games, and providing questions to test students' understanding of the material being taught; second, it is recommended that future researchers use this research as a reference to develop further understanding in the field being researched, as well as conduct similar research with different variables to find new findings related to the application of the Problem-Based Learning model with the help of Smart Apps Creator media.

References

Abidah, Aklima, & Razak, A. (2022). Tantangan Guru Sekolah Dasar dalam Menghadapi Era Society 5.0. *Jurnal Ilmiah Profesi Pendidikan*, *7*(2c), 769–776. https://doi.org/10.29303/jipp.v7i2c.498

Anggraeni, P. N., Ismaya, E. A., & Rondli, W. S. (2022). Peran Guru Dan Orang Tua Dalam Pembelajaran Daring Pada Pandemi Covid-19 Di SDN Karaban 01. *Jurnal Ilmu Sosial Dan Pendidikan (JISIP)*, *6*(2), 2598–9944. https://doi.org/10.36312/jisip.v6i1.3056/http

Asido, B. T. (2022). Pengaruh Model Problem Based Learning Berbantuan Media Papan Musi Terhadap Hasil Belajar Pada Materi Faktor Persekutuan Terbesar. *Jurnal Pengajaran Sekolah Dasar*, *1*(1), 87–95. https://doi.org/10.56855/jpsd.v1i1.106

Cholilah, M., Gratia Putri Tatuwo, A., Prima Rosdiana, S., & Noor Fatirul, A. (2023). Pengembangan Kurikulum Merdeka Dalam Satuan Pendidikan Serta Implementasi Kurikulum Merdeka Pada Pembelajaran Abad 21. *Sanskara Pendidikan Dan Pengajaran*, *01*(02), 57–66. https://doi.org/10.58812/spp.v1.i02

Febrianningsih, R., & Ramadan, Z. H. (2023). Kesiapan Guru dalam Pelaksanaan Kurikulum Merdeka Belajar di Sekolah Dasar. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(3), 3335–3344. https://doi.org/10.31004/obsesi.v7i3.4686

Firmansyah, Mhd. Z., Sa'duh, S., Hasibuan, R. P., & Gusmaneli, G. (2023). Meningkatkan Kualitas Pendidikan di Indonesia: Peran Sentral Pilar-Pilar Pendidikan dalam Membentuk Generasi Unggul. *AL-IMAM: Journal on Islamic Studies, Civilization and Learning Societies*, *4*, 57–66. https://doi.org/10.58764/j.im.2023.4.43

Fitria, I., Pancahayani, S., Sulistiya, M., Zulmi, F., Tri Anggono, D., Imam Ma, M., Millenio Aramsa Putra, O., & Helmy Dary Descams, R. (2022). Pengembangan Sumber Daya Manusia Pada Sektor Pendidikan Anak Gunung Sari ULU. *Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 123. https://journal.itk.ac.id/index.php/pikat/index

Indarta, Y., Jalinus, N., Waskito, W., Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi Kurikulum Merdeka Belajar dengan Model Pembelajaran Abad 21 dalam

Perkembangan Era Society 5.0. *Edukatif : Jurnal Ilmu Pendidikan*, *4*(2), 3011–3024. https://doi.org/10.31004/edukatif.v4i2.2589

Juliantini, L. S., Jampel, N., Diputra, K. S., & Pendidikan Guru, P. (2020). Pengaruh Model Pembelajaran Brain Based Learning Berbantuan Media Konkret Terhadap Kemampuan Pemecahan Masalah Matematika Siswa Kelas IV SD. *TSCJ: Thinking Skills and Creativity Journal*, *3*(1), 8–14. https://doi.org/10.23887/tscj.v3i1.24304

Khotimah, H., & Nawir, M. (2023). The Effect of Android-Based Learning Using Smart Apps Creator (SAC) on Students' Integrated Science Interest. *Jurnal Kependidikan*, *17*(1), 71–82. https://doi.org/10.30863/didaktika.v17i1.4421

Kusumaningrum, T. T., Wanabuliandari, S., & Sumaji. (2022). Efektivitas Model Problem Based Learning Berbantuan Trigo App Dalam Pencapaian Kemampuan Pemecahan Masalah Matematis Siswa. *Seminar Nasional Pendidikan Matematika FKIP Universitas Muria Kudus*, 118–127. https://conference.umk.ac.id/index.php/snapmat/article/view/388

Lestari, I., & Andinny, Y. (2023). Kemampuan Pemecahan Masalah Matematika melalui Disposisi Matematika. *Griya Journal of Mathematics Education and Application*, *3*(3), 507–514. https://mathjournal.unram.ac.id/index.php/Griya/indexGriya

Musdar, M., Kalsum, U., & N, A. R. (2023). Peningkatan Kemampuan Literasi Digital Menggunakan Teknologi Quizizz Dalam Penerapan Best Practice di Satuan Pendidikan PPM AL IKHLAS. *Jurnal Abdi Insani*, *10*(3), 1689–1697. https://doi.org/10.29303/abdiinsani.v10i3.1100

Malikah, S. (2022). Konsep Pendidikan Abad 21: untuk Pengembangan Sumber Daya Manusia SMA. *JIIP (Jurnal Ilmiah Ilmu Pendidikan)*, *5*(7), 2609–2614. http://Jiip.stkipyapisdompu.ac.id

Ma'wa, J., & Hidayat, A. (2023). Meningkatkan Aktivitas Belajar dan Kemampuan Berpikir Kritis Siswa pada Muatan IPA Menggunakan Model Pembelajaran Batanam. *Jurnal Kiprah Pendidikan*, *2*(3), 278–284. https://doi.org/10.33578/kpd.v2i3.195

Munawir, Salsabila, Z. P., & Nisa, N. R. (2022). Tugas, Fungsi dan Peran Guru Profesional. *Jurnal Ilmiah Profesi Pendidikan*, *7*(1), 8–12. https://doi.org/10.29303/jipp.v7i1.327

Nurdianti, R., Prihantoro, C. R., & Nuryadin, I. (2021). Kemampuan Literasi Matematika Siswa SD Melalui Metode Team quiz berbantuan Media Konkret ditinjau dari Kemampuan Awal Matematika. *Jurnal Ilmiah Pendidikan Profesi Guru*, *4*(3), 457–466. https://doi.org/10.23887/jippg.v4i3

Oktania, & Djami, C. B. N. (2022). Efektivitas Penggunaan Model Problem Based Learning Berbantuan Grocery Shopping dalam Meningkatkan Kemampuan Pemecahan Masalah Matematika Siswa pada Materi Pecahan. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *5*(2), 40–49. https://doi.org/10.30605/proximal.v5i2.1832

Priadana, S., & Sunarsi, D. (2021). *Metode-Penelitian-Kuantitatif*. Pascal Books.

Putu, I., Febrianto, N., Dessy, P., Wahyuni, S., & Sugihartini, N. (2021). Pengembangan Media Pembelajaran Multimedia Interaktif pada Kelas XI Mata Pelajaran Biologi dengan Materi "Sistem Sirkulasi pada Manusia dan Sistem Pencernaan Makanan" di SMA Negeri 2 Singaraja. *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informatika (KARMAPATI)*, *10*(3). https://doi.org/10.23887/karmapati.v10i3.36888

Sapoetra, B. P., & Hardini, A. T. A. (2020). Efektivitas Model Pembelajaran Problem Based Learning ditinjau dari Kemampuan Pemecahan Masalah Matematika di Sekolah Dasar. *Jurnal Basicedu*, *4*(4), 1044–1051. https://doi.org/10.31004/basicedu.v4i4.503

Saputra Siagian, D., Salsabila, E., & Wiraningsih, E. D. (2023). Hubungan model discovery learning dengan strategi konflik kognitif terhadap kemampuan pemecahan masalah matematika siswa. *Griya Journal of Mathematics Education and Application*, *3*(1), 159–174. https://mathjournal.unram.ac.id/index.php/Griya/indexGriya

Sihotang, H. (2023). *Metode Penelitian Kuantitatif*. http://repository.uki.ac.id/id/eprint/13063

Sofyan, H., Wagiran, Komariah, K., & Triwiyono, E. (2017). *Problem Based Learning dalam Kurikulum 2013*. *News. Ge. Yogyakarta: UNY*.

Supriono, L. O., Sukmawati, S., & Baharullah, B. (2023). Pengaruh Model Problem Based Learning Berbantuan Question Card Terhadap Kemampuan Pemecahan Masalah Matematika Siswa Kelas V SD Inpres Paccerakkang. *Jurnal Ilmiah Profesi Pendidikan*, *8*(1), 279–287. https://doi.org/10.29303/jipp.v8i1.1137

Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, *05*(02), 3928–3936. https://doi.org/10.31004/joe.v5i2.1074

Zainal, N. F. (2022). Problem Based Learning pada Pembelajaran Matematika di Sekolah Dasar/ Madrasah Ibtidaiyah. *Jurnal Basicedu*, *6*(3), 3584–3593. https://doi.org/10.31004/basicedu.v6i3.2650

Zubaidi, A. A., & Zuhri, M. S. (2024). Upaya Meningkatkan Hasil Belajar Peserta Didik Menggunakan Model Pembelajaran Problem Based Learning (PBL) Berbantuan PowerPoint Interaktif pada Mata Pelajaran Matematika Kelas 1 SDN Bugangan 03. *Jurnal Pendidikan Tambusai*, *8*(1), 11874–11880. https://doi.org/10.31004/jptam.v8i1.14183

Zulva, M., Turmuzi, M., & Saputra, H. H. (2022). Pengaruh Model Problem Based Learning (PBL) Berbantuan Media Si Bula (Stik Bilangan Bulat) Terhadap Hasil Belajar Matematika Siswa SD Kelas IV SDN 18 Cakranegara Tahun Ajaran 2021/2022. *Jurnal Ilmiah Profesi Pendidikan*, *7*(2c), 812–820. https://doi.org/10.29303/jipp.v7i2c.627