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SYSTEMATIC LITERATURE REVIEW: A PROBLEM-BASED LEARNING APPROACH TO THE APPLICATION OF MATHEMATICS LEARNING AT PRIMARY SCHOOL AGE

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ABSTRAK

Abstrak: Penelitian ini dilatarbelakangi beragamnya hasil temuan pada penerapan pembelajaran berbasis masalah, beberapa studi menunjukkan hasil yang positif sedangkan studi lainnya kurang konklusif dan sebagian besar penelitian berfokus pada berbagai jentang pendidikan, sehingga diperlukan penelitian untuk memahami secara mendalam tentang model PBL pada siswa sekolah dasar. Penelitian ini bertujuan untuk mengidentifikasi tren model PBL berdasarkan jenis metode penelitian, tahun penelitian, domain materi, klasifikasi kelas, dan hasil penelitian mengenai penerapan PBL yang dilakukan pada mata Pelajaran matematika di sekolah dasar dari tahun 2020-2024. Metodologi penelitian ini yaitu Systematic literatur review (SLR). Hasil penelitian menunjukan bahwa penerapan PBL pada pembelajaran matematika di sekolah dasar selama periode 2020-2024 menunjukkan adanya tren dengan jenis metode penelitian menggunakan pendekatan kuantitatif sebanyak 7 artikel, tahun 2020 dengan persentase 33% terjadi penelitian tertinggi, domain materi menunjukkan lima artikel fokus pada kemampuan pemecahan masalah, klasifikasi kelas penelitian PBL terbanyak dilakukan pada kelas 4 dan 5, dan terakhir terdapat 14 penelitian menujukkan hasil penelitian yang berhasil, dan satu penelitian tidak menemukan perbedaan signifikan antara PBL dan model pembelajaran lain(belum berhasil). Secara keseluruhan, tren penelitian menunjukkan adanya konsensus bahwa PBL memiliki potensi besar untuk meningkatkan kualitas pembelajaran matematika di sekolah dasar.

Abstract: *This research is motivated by the diverse findings on the application of problem-based learning; some studies show positive results while other studies are less conclusive, and most of the research focuses on various ranges of education, so research is needed to understand in-depth the PBL model in elementary school students. This study aims to identify trends in PBL models based on the type of research method, year of research, material domain, class classification, and research results regarding the application of PBL conducted in mathematics subjects in elementary schools from 2020-2024. This research methodology is a Systematic literature review (SLR). The results showed that the application of PBL in mathematics learning in elementary schools during the period 2020-2024 showed a trend with the type of research method using a quantitative approach in as many as seven articles, the year 2020 with a percentage of 33% occurred the highest research, the material domain showed five articles focused on problem-solving skills, the classification of PBL research classes was primarily conducted in grades 4 and 5, and finally, 14 studies were showing successful research results. One study did not find significant differences between PBL and other learning models (unsuccessful). Overall, the research trends show a consensus that PBL has excellent potential to improve the quality of mathematics learning in elementary schools.*

A. BACKGROUND

The curriculum set by the government currently runs education in Indonesia at all school levels. This is by the Minister of Education, Culture, Research and Technology Regulation Number 12 of 2024 concerning Curriculum in Early Childhood Education, Primary Education, and Secondary Education (Permendikbudristek., 2024). The current curriculum in Indonesia is the Merdeka Curriculum. The Merdeka Curriculum offers opportunities to

design learning that is more relevant and meaningful to students. The Merdeka Curriculum emphasizes the importance of developing critical thinking, creative, and problem-solving skills, which are very applicable to mathematics learning. (Dewi Rahayu & Yasin, 2024).

Learning mathematics in elementary school is the basis for students' cognitive (Safari & Maulida Rahmalia, 2024). However, in reality, math subjects are usually some things students consider scary. This happens because many students still have difficulty understanding mathematical concepts; besides, the learning system is still conventional, and learning has not been linked to everyday life. (Sunarto et al., 2021). These learning problems emerge due to the lack of teachers' understanding of designing and implementing learning models to link learning with everyday life. Learning models can describe learning procedures, learning environments, and the use of other learning tools that are systematically arranged so that they can describe a step-by-step learning activity (Hendracita, 2021). Therefore, to overcome these problems, one solution is to choose an appropriate learning model for teaching and learning mathematics.

One of the appropriate learning models for teaching and learning mathematics is the Problem-based learning model. The learning model is considered one of the practical approaches to increase students' motivation and understanding of mathematics. (Rahmananda et al., 2024). The problem-based learning model is a learning approach where students work on authentic problems to compile their knowledge, develop inquiry and higher-level thinking skills, and develop independence and self-confidence. (Trianto, 2011). This problem-based learning model has characteristics that encourage students to actively seek solutions to real-world problems through a scientific approach, cooperation, and producing actual work. (Ardianti et al., 2021). PBL is supported by constructivist learning theory, which emphasizes the importance of students' active role in building their knowledge (Harefa et al., 2024).

So far, several studies have discussed problem-based learning models in mathematics subjects, which are influenced by factors such as the level of education, the field of study, and the specific objectives of each study. One is SLR research conducted by Mia Andani, who examined 10 articles published in 2010-2021 on PBL in mathematics learning in elementary schools. Her study showed an increase in the achievement of mathematics learning objectives after implementing PBL. (Andani et al., 2021). However, research discussing trends in applying PBL in mathematics learning in elementary schools is still limited. So, there is a need to conduct a literature study that identifies Trends in the Application of the PBL Model in Mathematics Learning with the Merdeka Curriculum in Elementary Schools from 2020-2024. Based on this, this systematic literature review aims to identify trends in PBL models based on the type of research method, research year, material domain, class classification, and research results regarding the application of mathematics learning in elementary schools from 2020-2024.

B. RESEARCH METHODS

A systematic Literature Review is a method used to collect data to evaluate research related to the topic under study. (Triandini et al., 2019). The method in this study uses SLR (Systematic Literature Review), which is carried out in several organized stages (Maddux et al., 2021), including 1) Formulation of Research Questions by formulating clear and specific research questions. 2) Literature Search, by searching scientific literature with keywords that match the research question and using relevant databases, such as scientific journals, conferences, and other scientific sources. 3) Data Selection, conducting literature selection based on predetermined inclusion and exclusion criteria. 4) Data Extraction, collecting information from the selected literature, including study design, sample, methods, and key findings. 5) Study Quality Evaluation, evaluating the methodological quality of each study included in the SLR. 6) Analysis and Synthesis, analyzing and synthesizing findings from the literature included in the SLR. 7) Report writing compiles an SLR report that includes a description of the methodology, key findings, and conclusions. 8) Identify Research Gaps by identifying potential gaps in existing research and formulating recommendations for further research. 9) Updating, periodically updating the SLR to ensure relevance and address research questions that may evolve (Wada et al., 2024).

Through these stages in conducting SLR, researchers carry out several stages, starting from choosing the field of study to be researched, followed by searching for literature studies on Google Sholar by utilizing the Publish or perish program on the search page with the keyword "PBL learning model, mathematics, elementary school" with the 2020-2024 limitation. The next stage of the search results shows many articles, so researchers choose which articles are under the research topic. A comprehensive search on Google Scholar from 2020 to 2024 resulted in 200 article titles. A total of 185 articles were excluded for several reasons: 1) The research article was not conducted at the elementary level, 2) it was not a math subject, and 3) the type of research was not included in Qualitative, Quantitative, and Rnd. After selection based on the relevance of the topic, year of publication, and research methods, 15 articles fit the criteria.

C. RESULTS AND DISCUSSION

1. Journal identification

Based on the results of systematic literature identification, 15 scientific articles relevant to this research topic were found. These articles will be the basis for further analysis to identify research trends. The following is an analysis table of the 15 articles:

Table I Results of Article Analysis

No.	Author name & Title	Year & Results	Methods & Material
1.	(D. Lestari et al., 2021) "Pengembangan LKS Matematika Berbasis *Problem Based Learning* untuk Siswa Sekolah Dasar"	2021 Class 4 Effective result	RnD Material Flat Buildings
2.	(Pranata et al., 2021) "Pengembangan LKS Matematika Berbasis *Problem Based Learning* pada Materi Bangun Datar Sekolah Dasar"	2021 Class 4 Effective result	RnD MaterialFlat Buildings
3.	(Effendi et al., 2021)"Pengembangan LKPD Matematika Berbasis Problem Based Learning di Sekolah Dasar".	2021 Class 5 Effective result	RnD Material GCD and LCM
4.	(Izzah et al., 2023) "Pengembangan E-Modul Matematika Berbasis *Problem Based Learning* Untuk Memecahkan Masalah Matematika Materi Kecepatan Dan Debit Di Sekolah Dasar".	2023 Class 5 Effective result	RnD Material Speed and Discharge
5.	(F. Lestari et al., 2021) "Pengembangan Bahan Ajar Matematika Berbasis Problem Based Learning Pada Siswa Sekolah Dasar"	2021 Class 5 Effective result	RnD material Statistics
6.	(Arfianto et al., 2022) "Kelayakan Buku Lembar Kerja Peserta Didik Berbasis *Problem Based Learning (PBL)* pada Pembelajaran Tatap Muka Terbatas di Sekolah Dasar".	2022 Class 5 Effective result	RnD Material fractional number operations
7.	(Lailatun Nur Kamalia Siregar et al., 2023) "Implementasi Metode Problem-Based Learning (PBL) Dalam Pembelajaran Matematika Di SD Pelangi"	2024 Effective result	Qualitative Material Problem-solving ability
8.	(Pransisca Ayu, 2023) "Penerapan Model Problem Based Learning Terhadap Hasil Belajar Siswa Pada Mata Pembelajaran Matematika Kelas 3 Di SD As-Sunnah Assalafiyyah	2023 Class 3 Effective result	Qualitative Material Numbers

	Suralaga Kecamatan Suralaga".		
9.	(S. Lestari & Winanto, 2022) "Efektivitas Model Pembelajaran *Inquiry* dan *Problem Based Learning* terhadap Kemampuan Memecahkan Masalah Matematika Siswa Sekolah Dasar"	2022 Class 5 Ineffective results	Quantitative *Quasi-experimental Research Number* counting operation *material*
10.	(Sapoetra & Hardini, 2020) "Efektivitas Model Pembelajaran *Problem Based Learning* Ditinjau dari Kemampuan Pemecahan Masalah Matematika di Sekolah Dasar"	2020 Class 4 Effective result	Quantitative Material Fractions
11.	(Sasy Ayudya et al., 2020) "Efektivitas Model *Problem Based Learning* Dan *Think Pair Share* Ditinjau Dari Kemampuan Berpikir Kritis Siswa Kelas 5 Dalam Pelajaran Matematika Dasar".	2020 Class 5 Effective result	*Quasi-experimental -design* Beam and cube vol material
12.	(Dewantari & Djami, 2022) "Efektivitas Penggunaan Model *Problem Based Learning* Berbantuan *Grocery Shopping* Dalam sMeningkatkan Kemampuan Pemecahan Masalah Matematika Siswa Pada Materi Pecahan".	2020 Class 4 Effective result	*Quasi Experimental Design* Material Fractions
13.	(Masliah et al., 2023) "Keefektifan Model Pembelajaran *Problem Based Learning* (PBL) terhadap Kemampuan Literasi dan Numerasi Peserta Didik di Sekolah Dasar"	2020 Effective result	*Quasi-Experimental*
14.	(Maryatih et al., 2023) "Keefektifan Penerapan Model Pembelajaran *Problem Based Learning* (PBL) Muatan Pelajaran Matematika Materi Satuan Waktu Mayaratih di Kelas III SD".	2023 Class 3 Effective result	*quantitative experiment* Material Unit of Time
15.	(Chalis & Ariani, 2020) "Pengaruh Model *Problem Based Learning* (PBL) Terhadap Hasil Belajar Pecahan di Sekolah Dasar".	2020	*quasi-experiment* Material Pacahan

2. The use of research methods in the implementation of PBL in mathematics subjects in elementary schools

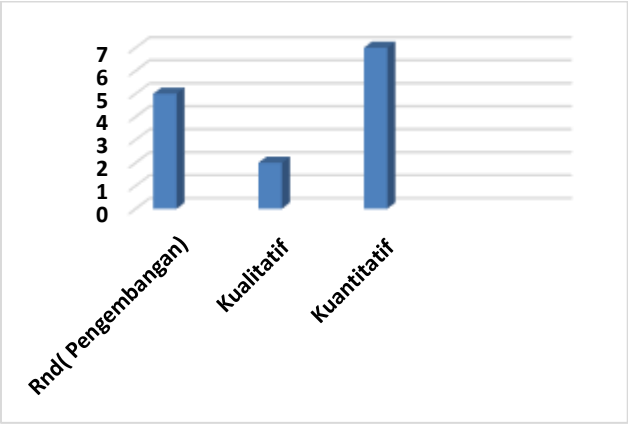

Diagram 1 Research Methods of 15 Articles

Based on the diagram presented, quantitative research is dominant in the study of implementing Problem-Based Learning (PBL) in primary schools. The number of quantitative studies is significantly higher than the number of qualitative studies and development research (RnD). This indicates that researchers are more focused on numerically measuring the impact of

PBL on student learning outcomes and are more interested in empirically measuring the impact of PBL implementation on student learning outcomes.

However, qualitative research and RnD also significantly contribute to developing our understanding of PBL. Qualitative research helps us understand how students and teachers experience the learning process with PBL, presented as an in-depth description of the learning process that occurs when PBL is implemented. At the same time, RnD research produces innovative learning models. Overall, this diagram shows that research on PBL in mathematics learning in primary schools has grown rapidly, with the main focus on quantitatively measuring the effectiveness of PBL.

3. Year of research

The year of research that implements the PBL model in mathematics subjects in elementary schools.

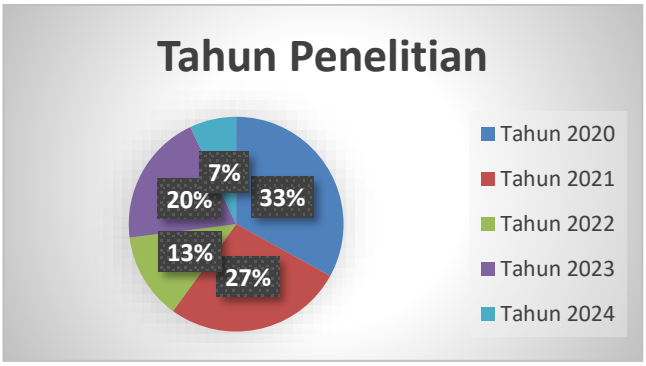

Diagram 2 Percentage of Research Year

The pie chart above shows the distribution of research implementing the problem-based learning (PBL) model in elementary school mathematics over some time. It can be seen that researchers' interest in studying PBL in this field fluctuates from year to year.

Most of the research was conducted in 2020, with a percentage of 33%, indicating a significant increase in interest in that year to explore further the potential of PBL in mathematics learning at the elementary level. This could be influenced by several factors, such as educational policies supporting the implementation of PBL or the increasing number of teachers and researchers who realize the benefits of PBL.

After experiencing a peak in 2020, the number of studies tended to decline in 2022 (13%). However, in 2023, research interest increased again (20%) before declining slightly in 2024 (7%). This fluctuation indicates that researchers' interest in PBL is still relatively high, although not always consistent from year to year. Overall, this diagram shows that PBL is a learning model that attracts the attention of researchers in the context of learning mathematics in primary schools. Despite fluctuations, interest in PBL remains relatively high, especially in recent years. This indicates that there is excellent potential for PBL to continue to be developed and applied in learning practices in elementary schools.

4. Material Domains studied

The research that has been conducted shows significant interest in certain areas of mathematics. Five articles focused on problem-solving, demonstrating the importance of this skill in learning mathematics. Two articles specifically examined the concept of flat buildings, while one each discussed critical thinking skills, GCD and LCM, statistics, and numbers. From these diverse topics, there is an effort to understand better how students master basic mathematical concepts and how they apply this knowledge in problem-solving. This indicates a need to continue developing effective learning strategies in these areas.

The results of this study provide a clearer picture of the areas in mathematics learning that still need more attention. With many studies focusing on problem-solving skills, it shows that this is one of the most crucial aspects of mathematics learning. In addition, research on specific concepts such as flat building, GCD LCM, and statistics provide valuable insights into the challenges and opportunities in teaching these topics. With a more substantial research base, it is hoped that more effective learning interventions can be developed to improve student achievement in mathematics.

5. Research class

Based on the review of several studies, there is an increasing interest in studying the application of Problem-Based Learning (PBL) in mathematics learning in primary schools, especially in the middle grades. The data shows

two research articles focusing on grade 3, four on grade 4, and eight on grade 5. The increase in the number of studies on grade 5 indicates greater attention to the effectiveness of PBL in helping students master more complex mathematical concepts. This aligns with the assumption that grade 5 students generally have a stronger foundation of mathematical understanding, so PBL can be utilized to develop their critical thinking and problem-solving skills.

This increased research interest in the middle grades indicates that PBL has excellent potential to improve the quality of mathematics learning. By providing students with opportunities to learn through authentic problem-solving, PBL can help them build a deeper understanding of mathematical concepts and increase their motivation and engagement in learning. The focus of research at different grade levels also points to efforts to understand how PBL can be adapted to the characteristics of students' cognitive development at each growth stage.

6. Research Results

A comprehensive analysis of 15 research articles on applying Problem-Based Learning (PBL) in mathematics learning in elementary schools yielded interesting findings. A total of 14 out of 15 studies showed positive/effective results, where PBL proved effective in improving concept understanding, problem-solving skills, and critical thinking skills. However, one study showed different results. The study found no significant difference between the students using PBL and the group using the inquiry learning model; research that does not show a substantial difference between PBL and the inquiry model does not necessarily conclude that PBL is impractical. There may be other factors that influence the results of the study.

These mixed results indicate that various factors, such as student characteristics, learning materials, learning design, and implementation quality, influence the successful implementation of PBL. Overall, however, the research findings suggest that PBL has excellent potential to improve the quality of mathematics learning in primary schools.

D. CONCLUSIONS AND SUGGESTIONS

Examining the application of Problem-Based Learning (PBL) in mathematics learning in elementary schools from 2020-2024 shows a trend with the type of research method using a quantitative approach. As many as seven articles here indicate researchers' interest in seeing numerical data in using the PBL model in mathematics learning. Most studies use a quantitative approach to empirically measure the impact of PBL on student learning outcomes.

In 2020, the highest percentage of research was 33% compared to the following 3 years. However, interest in PBL remains high, indicating that this learning model is still the focus of researchers' attention.

In the material domain, five articles focus on problem-solving skills. This aligns with the Merdeka Curriculum, which emphasizes developing critical thinking, creativity, and problem-solving skills relevant to mathematics learning.

The class classification of PBL research is mainly carried out in grades 4 and 5; this shows that research is generally directed at high grades. Indicates a significant interest in studying the PBL learning model to help students master mathematical concepts that are more complex and relevant to everyday life.

Based on the research results, 14 studies showed successful results, and one study found no significant difference between PBL and other learning models (unsuccessful). This indicates the need for continuous efforts to seek empirical evidence of the advantages of PBL and the development of best practices in its application in the classroom. Overall, the research trends show a consensus that the PBL learning model has great potential to improve the quality of mathematics learning in primary schools.

The results of this study suggest that more in-depth research needs to be done to identify factors that influence the success of PBL. In addition, it is necessary to develop more comprehensive research instruments and compare PBL with other learning models. The application of PBL also needs to be extended to diverse mathematics materials, lower grade levels, and integration with technology. Thus, our understanding of the potential and challenges of PBL will deepen.

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REFERENCES

Andani, M., Haki Pranata, O., & Hamdu, G. (2021). Systematic Literature Review: Problem-based Learning Model in Elementary School Mathematics Learning. *PEDADIDAKTIKA: JURNAL ILMIAH PENDIDIKAN GURU SEKOLAH DASAR*, *8*(2), 404–417. http://ejournal.upi.edu/index.php/pedadidaktika/index

Ardianti, R., Sujarwanto, E., & Surahman, E. (2021). Problem-based Learning: What and How. *DIFFRACTION: Journal for Physics Education and Applied Physics*, *3*(1), 27–35. http://jurnal.unsil.ac.id/index.php/Diffraction

Arfianto, A., Sutama, S., & Fathoni, A. (2022). Feasibility of Problem-based Learning (PBL)-based Learner Worksheet Book for Limited Face-to-Face Learning in Elementary School. *Jurnal Basicedu*, *6*(1), 656–663. https://doi.org/10.31004/basicedu.v6i1.1985

Chalis, G. A., & Ariani, Y. (2020). Pengaruh The Effect of Problem-Based Learning (PBL) Model on Fraction Learning Outcomes at School. *Jurnal Pendidikan Tambusai*, *4*(3), 2936–2944.

Dewantari, O., & Djami, C. B. N. (2022). The Effectiveness of Using Problem-Based Learning Model Assisted by Grocery Shopping in Improving Students' Mathematical Problem Solving Ability on Fraction Material. *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *5*(2), 40–49. https://doi.org/10.30605/proximal.v5i2.1832

Dewi Rahayu, A., & Yasin, M. (2024). Penerapan Kurikulum Merdeka dalam Application of Merdeka Curriculum in Mathematics Learning to Improve Students' Critical Thinking and Problem-Solving Skills in the 21st Century Era. *Research Gate*, 1–11. https://www.researchgate.net/publication/385286045

Effendi, R., Herpratiwi, H., & Sutiarso, S. (2021). Development of Mathematics LKPD based on Problem-Based Learning in Elementary School. *Jurnal Basicedu*, *5*(2), 920–929. https://doi.org/10.31004/basicedu.v5i2.846

Harefa, E., Ruslan Afendi, A., Karuru, P., Sulaeman, Verawati Wote, A. Y., Stenlly Patalatu, J., Azizah, N., Sanulita, H., Yusufi, A., & dkk. (2024). TEACHING AND LEARNING THEORY (1st ed.). PT. Sonpedia Publishing Indonesia. www.buku.sonpedia.com

Hendracita, N. (2021). Elementary learning model (2nd ed.). Multikreasi Press.

Izzah, A., Kusmaharti, D., Yustitia, V., Studi Pendidikan Guru Sekolah Dasar, P., Pedagogi dan Psikologi, F., & Buana Surabaya, A. (2023). Development Of Problem-Based Learning-Based Math E-Modules To Solve Mathematical Problems On Speed And Discharge Materials In Elementary Schools. *4*(2). https://doi.org/10.46306/lb.v4i2

Lailatun Nur Kamalia Siregar, Nurul Dinda Aulia, Sayang Pasaribu, Azwar Siregar, Ardila Salisa Adristi, Putri Novia Ramayani Siregar, & Salsa Fadilla. (2023). Implementation of Problem-Based Learning (PBL) Method in Mathematics Learning at Pelangi Elementary School. *Jurnal Arjuna : Publikasi Ilmu Pendidikan, Bahasa Dan Matematika*, *2*(1), 132–139. https://doi.org/10.61132/arjuna.v2i1.468

Lestari, D., Friansah, D., & Egok, A. S. (2021). Development of Problem-Based Learning Based Mathematics LKS for Elementary School Students. *Jurnal Basicedu*, *5*(4), 2231–2240. https://doi.org/10.31004/basicedu.v5i4.1164

Lestari, F., Egok, A. S., & Febriandi, R. (2021). Development of Mathematics Teaching Materials Based on Problem-Based Learning for Elementary School Students. *Jurnal Basicedu*, *5*(1), 394–405. https://doi.org/10.31004/basicedu.v5i1.628

Lestari, S., & Winanto, A. (2022). Effectiveness of Inquiry and Problem-Based Learning Models on Mathematics Problem Solving Ability of Elementary School Students. *Jurnal Basicedu*, *6*(6), 9967–9978. https://doi.org/10.31004/basicedu.v6i6.4203

Maryatih, Sukamto, & Wijayanti, A. (2023). The Effectiveness of the Application of Problem-Based Learning Model (PBL) on Mathematics Subject Matter of Unit of Time in Class III Elementary School. *Jurnal Pendidikan Tambusai*, *7*(2), 11478–11484.

Masliah, L., Nirmala, S. D., & Sugilar, S. (2023). The Effectiveness of Problem-Based Learning Model (PBL) on Literacy and Numeracy Skills of Students in Elementary School. *Jurnal Basicedu*, *7*(1), 1–10. https://doi.org/10.31004/basicedu.v7i1.4106

Permendikbudristek Nomor 12 Tahun 2024 (2024).

Pranata, D. P., Frima, A., & Egok, A. S. (2021). Development of Mathematics Worksheets Based on Problem-Based Learning on Flat Building Material in Elementary School. *Jurnal Basicedu*, *5*(4), 2284–2301. https://doi.org/10.31004/basicedu.v5i4.1183

Pransisca Ayu, K. Z. P. S. (2023). Application of Problem-Based Learning Model to Student Learning Outcomes in. *INNOVATIVE: Journal Of Social Science Research*, *3*.

Rahmananda, T., Haryadi, R., & Darma, Y. (2024). Mathematical Understanding Ability through Innovation of Learning Video Based on Problem-Based Learning Model. *MATHEMA JOURNAL E-ISSN*, *6*(1), 2024.

https://ejurnal.teknokrat.ac.id/index.php/jurnalmathema/article/viewFile/3154/1346

Safari, Y., & Maulida Rahmalia, S. (2024). The Importance Of Basic Math Concepts In Elementary School. *Karimah Tauhid*, *3*(9), 9847–9855. https://ojs.unida.ac.id/karimahtauhid/article/view/14671/5797

Sapoetra, B. P., & Hardini, A. T. A. (2020). The Effect of Problem-Based Learning Model in Mathematics Problem Solving Ability in Elementary School. *Jurnal Basicedu*, *4*(4), 1044–1051. https://doi.org/10.31004/basicedu.v4i4.503

Sasy Ayudya, M., Sri Rahayu, T., Satya Wacana, K., & Jawa Tengah, S. (2020). The Effectiveness Of Problem-Based Learning And Think Pair Share Models In Terms Of Critical Thinking Skills Of Grade 5 Students In Elementary Mathematics. *Jurnal Pendidikan Tambusai 272*, *4*(1).

Sunarto, M. T., Putri Y, S., Ar-Rahiiqil Mahtuum, Z., Siagian, G. T., & Afrilianto, M. (2021). Improving Mathematical Comprehension Ability of Junior High School Students through Contextual Approach. *Mosharafa: Jurnal Pendidikan Matematika*, *10*(1), 85–94. http://journal.institutpendidikan.ac.id/index.php/mosharafa

Triandini, E., Jayanatha, S., Indrawan, A., Putra, G. W., & Iswara, B. (2019). Systematic Literature Review Method to Identify Platforms and Methods of Information System Development in Indonesia. *Indonesian Journal of Information Systems (IJIS*, *1*(2), 63–77. https://www.google.com

Trianto. (2011). Designing Innovative-Progressive Learning. Kenana Prenada Media Group.

Wada, F. H., Pertiwi, A., Hasiolan, M. I. S., Rahman, A., & dkk. (2024). AJAR METHODOLOGY RESEARCH (1st ed.). PT. Sonpedia Publishing Indonesia. https://www.researchgate.net/publication/377223521