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Implementation of Problem Based Learning Model in Improving Learning Outcomes Mathematics Fourth Grade Elementary School Students

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Abstract
The mathematics learning outcomes of students in elementary schools are still not optimal, especially in terms of understanding concepts and problem solving. This study aims to determine the implementation of the Problem Based Learning (PBL) learning model in improving the mathematics learning outcomes of grade IV elementary school students. This research was conducted at SDN Tolonggeru in the 2023/2024 academic year. The subjects of the study were 31 grade IV students. The method used was quantitative, with a classroom action research (CAR) approach using data collection techniques through planning, implementation, observation, and evaluation. The results of the study showed that the application of the PBL learning model was able to improve the mathematics learning outcomes of elementary school students. Students were seen to be more active in the learning process and were able to work together in solving the given mathematics problems. Thus, the implementation of the PBL model is considered effective in improving mathematics learning outcomes at the elementary school level. This study is expected to be a reference for educators in choosing the appropriate learning approach to improve the quality of mathematics learning.
Keywords: *Problem Based Learning Model, Learning Outcomes, Elementary School*

Abstrak
Hasil belajar matematika peserta didik di sekolah dasar masih belum optimal, terutama dalam hal pemahaman konsep dan penyelesaian masalah. Penelitian ini bertujuan untuk mengetahui implementasi model pembelajaran Problem Based Learning (PBL) dalam meningkatkan hasil belajar matematika peserta didik kelas IV sekolah dasar. Penelitian ini dilaksanakan di SDN Tolonggeru pada tahun ajaran 2023/2024. Subjek penelitian adalah 31 peserta didik kelas IV. Metode yang digunakan adalah kuantitatif, dengan pendekatan penelitian tindakan kelas (PTK) menggunakan teknik pengumpulan data melalui perencanaan, pelaksanaan, observasi, serta evaluasi. Hasil penelitian menunjukkan bahwa penerapan model pembelajaran PBL mampu meningkatkan hasil belajar matematika peserta didik sekolah dasar .Peserta didik terlihat lebih aktif dalam proses pembelajaran dan mampu bekerja sama dalam menyelesaikan permasalahan matematika yang diberikan. Dengan demikian, implementasi model PBL dinilai efektif dalam meningkatkan hasil belajar matematika di tingkat sekolah dasar. Penelitian ini diharapkan dapat menjadi rujukan bagi pendidik dalam memilih pendekatan pembelajaran yang sesuai untuk meningkatkan kualitas pembelajaran matematika.
Kata kunci: *Model Problem Based larning, Hasil Belajar, Sekolah dasar*

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INTRODUCTION

Basic education is foundation main in system education national, where the stage This become key in form character, skills, and intelligence participant educate in a way comprehensive (Yasin, 2021). At the level this, students is at in development period rapid and tending cognitive Study in a way active when environment Study support and encourage development potential himself optimally (Rozak, 2021; Safarah & Wibowo, 2018; Sugiana, 2018). Therefore that, education base own role strategic in give birth to a smart, creative, responsible generation responsible, skilled, productive, and own morals noble (Ndasung, 2021; Suswandari, 2018). In Indonesia, education base is part from education must nine years and become stages beginning in system education formal (Aristin & Azizah, 2018).

In the phase this , participants educate introduced with various eye lessons, including mathematics, which aims develop ability think logical, analytical, systematic, critical, and creative (Yestiani & Zahwa, 2020; Farida et al., 2019; Nasution et al., 2020). Mathematics Alone is science that is deductive and abstract , using formal symbols for convey concepts complex in a way hierarchical (Ristanty & Pratama, 2022; Simangunsong, 2021). Mastery mathematics since early important Because can form ability thinking and skills breakdown problem in life everyday (Hasibuan et al., 2021; Mangelep , 2018; Nisa et al., 2021).

However This is the reality on the ground show that results Study mathematics student school base Still classified as low . Based on results observation at SDN Tolonggeru, found that learning mathematics Still tend teacher-centered, with approach conventional which places teachers as the only one source information. In this process, teachers are more Lots transfer knowledge in a way direct without give enough space for student For think critical and active. As a result, students tend only memorize formula without understand draft base from formation formula said. Condition This cause student not enough motivated, passive in learning, as well as many have gained value below Criteria Minimum Completion Criteria (KKM). If not quick handled, condition This can lower quality learning mathematics and inhibit achievement objective learning in a way overall.

One of efforts that can be made done For overcome problem the is with implementing a more effective learning model innovative and student-centered, such as the Problem Based Learning (PBL) model . This model is approach learning that emphasizes the problem-solving process problem in a way active and collaborative, good in a way individual and groups (Laili et al., 2019; Nurhikmayati & Sunendar, 2020; Wahyuni, 2019). PBL encourages student For become learner independent, active in the discussion process groups , as well as involved direct in search solution based on relevant data and information (Phasa, 2020; Hazanah & Zuryanty, 2020). With Thus, PBL does not only increase understanding draft mathematics, but Also develop independence learning and ability think critical students (Anita et al., 2020; Suari, 2018; Tabroni et al., 2022).

In addition, the application of the PBL model is also known capable create atmosphere learning that is fun and challenging, so that student pushed For more active, brave convey opinion, and not fully depends on the teacher (Anugraheni, 2018; Irwan & Mansurdin, 2020; Nasrul, 2018). Students can to hook learning with life real as well as capable apply knowledge gained in context daily life (Marwati et al., 2020). Some study previously has prove that the PBL model is effective in increase results study in various eye subjects, including social studies and mathematics (Suarni , 2017; Widayanti & Nur'aini , 2020; Wardani & Putri, 2021). However , studies that specifically specific highlight implementation of the PBL model in increase results Study mathematics student fourth grade school base Still limited. Therefore that, research This focused For to study effectiveness application of the Problem Based Learning

model in increase results Study mathematics participant educate class IV, as effort contribution in repair quality learning at the level school base .

METHOD

Study quantitative This is study action classes (PTK) that are implemented in two cycle (Nurhalim, 2000). Every cycle consists of from four stages, namely: planning, implementation action, observation, and evaluation. Planning stage done with analyze problems and needs Study students. In addition, researchers also prepared device learning like Plan Implementation Learning (RPP), teaching materials, and instrument evaluation. After the stage planning, continued with implementation action as effort improvements and enhancements results learning. During the learning process ongoing, researchers do observation to activity students and teachers with use sheet observation . Every cycle consists of from two meetings and ended with giving test results Study .

Observation done in a way direct during the learning process For record activity learning, engagement students, as well as response student to implementation of the Problem Based Learning (PBL) model. After implementation action, researcher do reflection based on results observation and evaluation, for to study success and obstacles during cycle ongoing. If found constraint in cycle I, then will searching for alternative formulated solutions become plan actions in cycle II.

Study This implemented at SDN Tolonggeru in March 2024, year 2023/2024 academic year . Subject study there are 31 participants educate class IV, consisting of of 19 students women and 12 students male. This class chosen Because average mark mathematics obtained previously classified as low and below Criteria Minimum Completion Criteria (KKM). Object study is results Study mathematics through implementation of the Problem Based Learning (PBL) learning model. Data collection was carried out with use test in the form of question filling consisting of of 20 grains questions. Each question given weight value 2, so score maximum is 40. Test results Study given to each end cycle with objective For measure understanding student to material that has been taught .

Data analysis was performed in a way descriptive quantitative, with count mean and percentage values completeness study. Percentage results Study Then converted use criteria Evaluation Reference Benchmark (PAP) scale 5, as in Table 1.

Table 1. Criteria Assessment of Learning Outcomes Based on PAP Scale 5

No	Percentage (%)	Learning Outcome Criteria
1	90 – 100	Very high
2	80 – 89	Tall
3	65 – 79	Currently
4	55 – 64	Low
5	≤ 54	Very Low

Study considered succeed if at least 85% of participants educate reach results learning above the KKM. If the target is achieved at the end cycle, then study can discontinued. However, the PBL learning model remains recommended For Keep going used in learning mathematics use increase quality and results Study student.

RESULTS AND DISCUSSION

RESEARCH RESULTS

Study action class This aim For increase results Study mathematics participant educate fourth grade at Tolonggeru Elementary School through Implementation of the Problem Based Learning (PBL) model. Activities started with implementation cycle I, which includes two meetings. Learning process implemented based on PBL steps that

have been designed in Plan Implementation Learning (RPP). At the end cycle , given test consisting of 20 questions stuffing with weight of each question by 2, so the total score maximum is 40.

Table 1. Improvement in Learning Outcomes Mathematics Fourth Grade Students

Cycle	Percentage of Learning Outcomes (%)	Category
Cycle I	72.78	Currently
Cycle II	88.88	Tall
Improvement	**+16.10**	

Evaluation results of 31 participants educate show that the average value results Study reach 72.78 %, which according to criteria Evaluation Reference Benchmark (PAP) is in the category moderate. Although thus, the results reflection to implementation cycle I shows existence a number of obstacles, such as lack of habit participant educate in do discussion group, dominance Work individual in settlement tasks, and lack of understanding to scheme learning based applied problems.
For repair condition said, is done improvements in cycle II, with focus on improvement interaction and work the same in group. Teachers are more active in guide and encourage participant educate For each other share opinion, work the same in finish problems, and foster a sense of responsibility answer group. With a more strategic directed, learning in cycle II is running more effective.

At the end cycle II, results test show existence improvement significant. The average result Study in a way classical reach 88.88 %, which includes in category high. Based on results observation and reflection, visible that participant educate start show involvement active in Work group, able understand channel learning with good, and shows attitude cooperative in the learning process mathematics.

In a way overall, it happened improvement results Study amounting to 16.10% of cycle I to cycle II. This is show that effective application of the Problem Based Learning (PBL) model in increase understanding concepts and results Study mathematics participant educate class IV. Therefore that, approach This can made one of alternative relevant learning strategies for increase quality learning mathematics at the level school base.

DISCUSSION

Study action classes held aim For to study improvement results Study mathematics student through Implementation of the Problem Based Learning (PBL) model. Measurement results show that in a way classical, occurs significant improvement, namely from 72.78% in cycle I to 88.88% in cycle II. The increase of 16.10 % reflect the effectiveness of the PBL model in push involvement active student in the learning process.

The PBL model is approach learning that emphasizes breakdown problem real as means for build knowledge students. In the process, students pushed For Work same, mutual depends, and discuss use reach objective learning (Phasa , 2020; Sianturi et al., 2018). This model also trains student face problem open (ill-structured), as well get used to they for ask and find solution in a way independent (Anita et al., 2020; Hazanah & Zuryanty, 2020).

The implementation of PBL is very in accordance with characteristics learning mathematics that emphasizes ability think logical, critical, and systematic. Through method this, students No only understand draft mathematics but also able to apply it in

life everyday. This also supports development skills 21st century like think critical thinking, creativity, collaboration, and communication (Adirakasiwi & Warmi, 2018).
Findings in study This reinforced by studies previously shown improvement results Study eye social studies and mathematics lessons at the elementary level school base after implementation of the PBL model (Suarni, 2017; Widayanti & Nur'aini, 2020; Wardani & Putri, 2021). With Thus, PBL is proven become an effective learning model For increase results learning and engagement students, in particular in learning mathematics in school base.

Figure 1. Graph Improving Learning Outcomes Mathematics

CONCLUSION

Based on results study action classes conducted in two cycle, can concluded that application of learning models *Problem Based Learning* (PBL) is capable increase results Study Mathematics student Grade IV of Tolonggeru Elementary School. Improvement This seen from acquisition average value of results Study in a way classical that experienced increase from 72.78% in cycle I to 88.88% in cycle II, with difference improvement by 16.10%. The application of the PBL model provides room for student for more active discuss, work The same in groups, as well as understand material learning through breakdown problem contextual. This is show that the PBL learning model does not only increase understanding draft mathematics students, but also develop skills 21st century like think critical thinking, collaboration, communication, and creativity. With Thus, PBL is recommended as alternative effective learning models for increase results learning, especially in learning Mathematics at the level school base.

REFERENCES

Adirakasiwi, A. G., & Warmi, A. (2018). Software Usage Cabri 3D In Learning Mathematics Efforts to Improve Ability Visualization Spatial Mathematical Student. Journal Syllogism: Study of Science Mathematics and Its Learning, 3(1), 28. https://doi.org/10.24269/js.v3i1.972 .

Anita, Y., Nur, M., & Nasir, M. (2020). Integrated Problem Based Learning Science, Technology, Engineering, and Mathematics (STEM) Learning Literacy Environment Students. Bioedukasi (Journal of Biology Education), 11(2), 105. https://doi.org/10.24127/bioedukasi.v11i2. 3278.

Anugraheni, I. (2018). Meta- Analysis of Problem Based Learning Model in Increase Skills Think Critical Thinking in Elementary School. A Journal of Language, Literature, Culture, and Education Polyglot, 14(1), 9–18. https://ojs.uph.edu/index.php / PJI/article/view/789.

Aristin, R., & Azizah, RN (2018). Implementation Nine- Year Compulsory Education Policy in East Kaduara Village, Sumenep, Madura. Journal Reformation, 8(2), 120. https://doi.org/10.33366/rfr.v8i2.1099.

Azhari, B. , & Irfan, A. (2019). Model- Eliciting Activities in Analyzing Creativity Solution Problem Mathematics for Mathematics Education Students at PTKIN Aceh. Al Khawarizmi : Journal of Education and Learning Mathematics , 2(1), 1. https://doi.org/10.22373/jppm.v2i1.4495 .

Badjeber, R., & Purwaningrum, JP (2018). Developing Higher Order Thinking Skills in Learning Mathematics in Middle School. Senior Teacher: Journal of Education and Learning , 1(1), 36–43. https://doi.org/10.31970/gurutua.v1i1.9 .

Datreni, NL (2022). Learning model problem based learning improves results Study mathematics student grade III school base . *Journal of Educational Action Research* , 6(3), 369-375.

Farida, N. , Hasanudin , H., & Suryadinata , N. (2019). Problem Based Learning (PBL) – QR Code in Improving Learning Outcomes Mathematics Students . AKSIOMA: Journal of Mathematics Education Study Program , 8(1), 225–236. https://doi.org/10.24127/ajpm.v8i1.1894.

Hasibuan, A. M. , Fatmawati , F., Pulungan , SA , Wanhar , FA , & Yusrizal , Y. (2021). Increase Interest Study Mathematics Student with Using the Snowball Throwing Method on Grade VI Students of PAB 15 Klambir Lima Private Elementary School. ESJ Journal (Elementary School Journal), 11(2), 197–188. https://doi.org/10.24114/esjpgsd.v11i2.28866 .

Hazanah, & Zuryanty. (2020). Improving Learning Outcomes Student Using the PBL Model in Learning Thematic Integrated Class IV Elementary School Journal Elementary Education Science, 8(4). http://ejournal.unp.ac.id/students/index.php/pgsd/article/view/9069 .

Irwan, V., & Mansurdin. (2020). Application of Problem-Based Learning Model in Improving Learning Outcomes Thematic Integrated Education in Elementary Schools . Tambusai Journal of Education, 4(3), 2097–2107. https://doi.org/10.31004/jptam.v4i3.686.

Kadir, F., Permana, I., & Qalby, N. (2020). The Influence of Student Learning Styles on Physics Learning Outcomes at PGRIMAROS Senior High School. Karst: Journal of Physics Education and Its Applications, 3(1), 91–95. https://Doi.Org/10.46918/Karst.V3i1.538

Juniarti, NKR, Margunayasa, IG, & Kusmariyatni, N. (2020). The Relationship Between Parenting Styles and Self-Concept with Competence Knowledge Mathematics Student. Journal Scientific Elementary School, 4(1), 17.https://doi.org/10.23887/jisd.v4i1.24273.

Laili, I., Ganefri, & Usmeldi . (2019). Effectiveness Development of Project-Based Learning E-Modules for Installation Subjects . Journal Scientific Education and Learning , 3(3), 308. https://doi.org/10.23887/jipp.v3i3.21840.

Mangelep, NO (2018). Learning Website Development Mathematics Realistic For Student School Intermediate First . Mosharafa : Journal of Mathematics Education , 6(3), 431–440. https://doi.org/10.31980/mosharafa.v6i3.331.

Marwati, I., Amiruddin, & Kaimuddin, LO (2020). Implementation Problem Based Learning Model for Improving Learning Outcomes Students in Grade V of SDN 7 Konda. Journal of Elementary Education, 4(1). https://doi.org/10.36709/jobpgsd.v4i1.14397 .

Muskania, R., & Zulela . (2021). Reality Digital Transformation of Education in Elementary Schools During the Covid-19 Pandemic. Indonesian Journal of Elementary Education, 6(2), 155–165. https://doi.org/10.29407/jpdn.v6i2.15298 .

Nurhalim, K. 2000. PTK Implementation Procedures. Semarang State University.

Nainggolan, M., Tanjung, DS , & Simarmata , EJ (2021). The Influence of Model SAVI Learning on Learning Outcomes Mathematics Students in Elementary School. Journal Basicedu, 5(4), 2617–2625. https://doi.org/10.31004/basicedu.v5i4.1235 .

Zega, C., Telaumbanua, A., & Zebua, Y. (2022). Application of the Direct Instruction Learning Model to Improve Student Learning Outcomes. Educatum: Journal of Educational Sciences, 1(1), 102–108. https://doi.org/10.56248/educatum.v1i1.40