International Conference on Lesson Study
Universitas Muhammadiyah Gresik
Proceeding International Conference on Lesson Study
Universitas Muhammadiyah Gresik
E-ISSN : xxxx-xxxx
DOI : ……
Vol 1 No 1: Fostering a Learning Community Engagement Though a Lesson Study

Problem-Based Learning Models (PBL) in Mathematics Learning: Improve Young Learner Students Learning Outcomes

Haifaturrahmah Haifaturrahmah [1], Erniwati Erniwati[2], Hidayati Hidayati[3], Hidayati Hidayati[3]

[1,2,3] Universitas Muhammadiyah Mataram 1;Indonesia
[4] Universitas Muhammadiyah Malang 1; Indonesia

ARTICLE INFO

Keywords:

keyword 1; PBL Models
keyword 2; Mathematics
keyword 3; Young Learner

ABSTRACT

The learning technique known as problem-based learning (PBL) concentrates on the intellectual mentality of students in resolving a variety of issues in order to identify a concept or generalization that can be applied in the field. As a result, learning will be much more enjoyable for the pupils in this situation. Based on it, the purpose of the research is to analyze the improvement of the students outcomes by applying PBL Models in Mathematics Learning at the young learners especially at the first grade students at SDN 38 Mataram. On that occasion, the qualitative method especially the action research as the research design was held to conduct it. According to the findings of this research that has been accomplished, the young learners students learning outcomes have risen. The scores of 60% and 85% were given for the student learning activities in cycles I and II, respectively. For the second cycle, a score of 87.5% was gathered, and a score of 71.87% was obtained for the learning outcomes of students utilizing multiple-choice questions and essays. By using a cooperative learning paradigm that is based on group investigations, student learning results can be improved.

Corresponding Author:
Hidayati Hidayati
Universitas Muhammadiyah Mataram 1; Indonesia hidayatinail73@gmail.com

INTRODUCTION

According to Indonesia's Ministry of Education and Culture's Regulation Number 22 of 2006 regarding the Content Standard for Primary and Secondary Education, math instruction is given to encourage students' use of logical, analytical, systematic, critical, and creative thinking abilities as well as their

ability to collaborate (Nurlaily et al., 2019). As a result, the learners can have the skills to acquire, manage, and apply the information to thrive in a setting that is always changing, uncertain, and competitive(AL Ahmad & Sirjani, 2020). Through the process of learning, such competences are attained in the form of heightened knowledge, skills, and attitude development. According (Iswara & Sundayana, 2021) to the rule, problem-solving is a key component of learning mathematics. Every level of education requires the teaching of mathematics, particularly in the early grades. Early math mastery is required. Because learning mathematics can help young people improve their capacity to think critically, creatively, logically, and systematically as well as enhance their capacity to work with groups . The curriculum can be changed as part of the ongoing, unabated endeavor to raise the standard of education in Indonesia. The government approved the 2013 curriculum to force in 2014. Implementing the 2013 curriculum is a strategy for dealing with future demands from the Indonesian populace and globalization and one of the models is problem based learning.

Problem-based learning, according to Duch et al,(Febriana & Indarini, 2020) is a type of learning that begins by posing challenges and questions that motivate students to find answers. The ability to acquire mathematics is referred to as mathematical intelligence, and (Ariani, 2020) outlined how problem-based learning is a closely linked learning paradigm that is student-centered and capable of boosting this ability. (Mulyanto et al., 2018), (Kaharuddin, 2019) , and (Nufus & Mursalin, 2020)) describe the problem-based learning principles as students actively seeking their own solutions to the challenges presented by the teacher, leaving the teacher merely acting as a mediator and facilitator to assist students in effectively constructing their knowledge.

(Ajai & Imoko, 2015) previous research indicates that there is an important variance in post-test results of mathematics students based on learning models, with post-test results of mathematics students who follow the PBL model learning becoming higher than conventional model. In accordance with previous findings by (Fatade et al., 2014), there is a substantial difference from post-test mathematics results of students in Nigeria based on the type of learning model used; post-test mathematics results of students who apply PBL model learning are higher than that of students in control groups. Based on the results of prior study by (Matematika & Sekolah, n.d.)Masliq, 2023), there is a major disparity between the scientific learning outcomes of fifth grade pupils at Primary School Depok determined by their critical thinking capabilities. So based on the phenomenon, the researcher than interested to conduct the research especially for the first grade students at SDN 38 Mataram by applying the PBL Models to create the students critical thinking in learning mathematics.

METHODS

Classroom action research (PTK) was used in this study. The location and look of the group of participants in the experiment or the subject of the action are defined in the research setting. On 29 first-grade young children, this PTK was conducted. One of the observers, the school's mathematics teacher, was in this research. To analyze the data, the following formula is:

a. Analyzing student behavior using the following formula:

$$\text{Value} = \frac{\text{Number of observable aspects}}{\text{Number of all observed aspects}} \times 100\%$$

b. Learning Results

1. Utilized formula to calculate average score

$$M = (\sum X)/n$$

M = Mean (Average)

$\sum X$ = represents the grade each student received.

n =Many data, or

.

2. Formulas can be used to calculate the student completeness scores.

100% = (number of scores received) / (highest score)

$$KI = \frac{number\ of\ scores\ received}{highest\ score} \times 100\ \%$$

KI stands for Individual completeness.

Traditionally, completion is determined

KK = P/N x 100%

Information:

KK = (%) Classical Completion

N = Total number of students P = Many students scored >75.

FINDINGS AND DISCUSSION

The finding of observation sheets and questions presented to students indicated a substantial rise in activity and learning outcomes. Researchers applied a study II cycle in the research they were doing. Before encouraging the student to apply the problem-based learning (PBL) model, the teacher conducts a pretest to measure the student's basic proficiency with the subject matter. In the pretest, it was found that the value of 37.5% was categorized is "less" category. The results improve and are quite excellent for cycle I after the educator implements the problem-based learning (PBL) approach, and for cycle II, the teacher takes a new pretest to assess whether the learners are still remembering the previous material. The findings of the second cycle pretest, which provided a value of 68.75%, were quite good. The results of data analysis in the first cycle's employing a cooperative learning model of the group investigation type to improve student activities and learning outcomes produced a score of 60% for student learning activities and a score of 71.87% for student learning outcomes using tests in the form of 10-number multiple-choice questions and 5-number essays. Based on the findings of the prior research, there are still a few confusions in the learning process.

Cycle II was implemented using a cooperative learning model type of group investigation to improve student activities and learning outcomes, and a score of 85% was obtained for student learning activities and a score of 87.5% for student learning outcomes using 15-number multiple-choice questions and 5-number essay questions. There is no need to proceed on to the next cycle for each test because it has seen a significant improvement. The following table shows the comparison of test results students aactivities and learning outcomes throughout two cycles.

Tabel 1.1 The co,parison of the students learning outcomes in each of cycle

No	Aspect	Cycle I		Cycle II	
		Pretest	Postest	Pretest	Postest
1	Mean	69.91	76.56	75.63	82.19
2	Modus	75	80	80	85
3	Standart Deviation	6.567	4.826	3.966	6.082
4	Varians	43.120	23.286	15.726	37.0

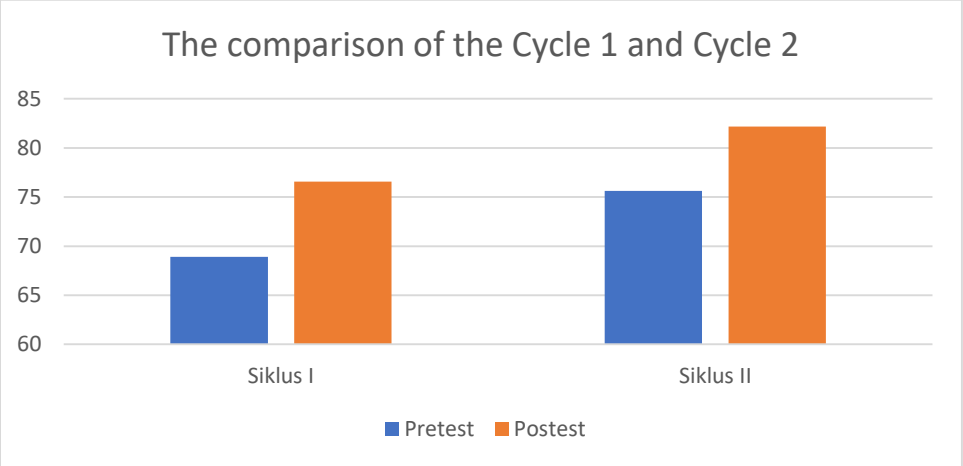
.

Tabel 1.2 The Comparison between the students activities and students learning outcomes

No	Aspect	Cycle I	Cycle II
1	Students Activities	60%	85%
2	Students learning outcomes	71,87%	87,5%

In accordance with analyses and study findings, learning through the employing of problem-based learning (PBL) models can improve student learning outcomes. With the problem-based learning (PBL) strategy, students create learning and problem-solving a priority while completing activities provided by their teachers in regard to the subject matter they have been given.

Here is a comparison graph of student learning outcomes that you may use to acquire more details:



According to the research's findings, student learning outcomes significantly and substantially improved. This is inline with the research conducted by Yusniati, H., and Muh Yusuf in 2016, especially regarding cycles I and II (64.41% and 90.0%, respectively), as well as the research done on these researchers in accordance with the outcomes, which were equally raised. The research was conducted in line with the hypothesis put forward, which indicates that the application of the problem-based learning (PBL) model can improve the learning outcomes of grade 1 B students at SDN 38 Mataram along with the application of the PBL model is capable of having an impact on those outcomes.

CONCLUSION

Based on the findings of the research and discussion, it can be stated that applying a cooperative learning model of the group investigation type can improve student activities and learning outcomes. The findings of the research that has been done indicate an increase in student activity and learning outcomes. Cycle I student learning activities achieved a score of 60%, and Cycle II student learning activities acquired a score of 85%. A score of 71.87% was acquired for the first cycle of the learning outcomes of students using multiple-choice questions and essays, while a score of 87.5% was obtained for the second cycle.

.

ACKNOWLEDGMENTS:

I would like to express my gratitude to the Rector of the University of Muhammadiyah Mataram who has provided the opportunity and contributed funds in participating in the implementation of this research activity. Thanks to LPPM, Dean and all parties involved in implementing research activities, either directly or indirectly.

CONFLICTS OF INTEREST

The authors declare no conflict of interest."

REFERENCES

AL Ahmad, A., & Sirjani, R. (2020). Optimal placement and sizing of multi-type FACTS devices in power systems using metaheuristic optimisation techniques: An updated review. Ain Shams Engineering Journal, 11(3), 611–628. https://doi.org/10.1016/j.asej.2019.10.013

Ajai, J. T., & Imoko, B. I. (2015). Literature about gender and academic performance in mathematics exist with different views and findings. International Journal of Research in Education and Science (IJRES), 1(1), 45–50.

Ariani, R. F. (2020). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Siswa SD Pada Muatan IPA. Jurnal Imiah Pendidikan Dan Pembelajaran, 7(1), 422–432.

Fatade, A. O., Arigbabu, A. A., Mogari, D., & Awofala, A. O. A. (2014). Investigating Senior Secondary School Students' Beliefs About Further Mathematics in a Problem-Based Learning Context. Bulgarian Journal of Science and Education Policy, 8(1), 5–46. http://0-search.proquest.com.cataleg.uoc.edu/education/docview/1514835842/fulltextPDF/B858B82445A9454CPQ/3?accountid=15299%5Cnhttp://search.proquest.com.ezp.lib.unimelb.edu.au/docview/1514835842?accountid=12372%0Ahttp://sfx.unimelb.hosted.exlibrisgroup.co

Febriana, T., & Indarini, E. (2020). Komparasi Pembelajaran Problem Based Learning (PBL) dan Problem Solving terhadap Kemampuan Berpikir Kritis Matematis Siswa Sekolah Dasar. Jurnal Basicedu, 4(4), 1016–1020. https://doi.org/10.31004/basicedu.v4i4.494

Iswara, E., & Sundayana, R. (2021). Penerapan Model Pembelajaran Problem Posing dan Direct Instruction dalam Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa. Plusminus: Jurnal Pendidikan Matematika, 1(2), 223–234. https://doi.org/10.31980/plusminus.v1i2.1258

Kaharuddin, A. (2019). Effect of Problem Based Learning Model on Mathematical Learning Outcomes of 6th Grade Students of Elementary School Accredited B in Kendari City. International Journal of Trends in Mathematics Education Research, 1(2), 43–46. https://doi.org/10.33122/ijtmer.v1i2.14

Matematika, P., & Sekolah, D. I. (n.d.). M a s l i q. 3(November 2023), 1040–1047.

MULYANTO, H., Gunarhadi, G., & Indriayu, M. (2018). The Effect of Problem Based Learning Model on Student Mathematics Learning Outcomes Viewed from Critical Thinking Skills. International Journal of Educational Research Review, 3(2), 37–45. https://doi.org/10.24331/ijere.408454

Nurlaily, V. A., Soegiyanto, H., & Usodo, B. (2019). Elementary school teacher's obstacles in the implementation of problem-based learning model in mathematics learning. Journal on Mathematics Education, 10(2), 229–238. https://doi.org/10.22342/jme.10.2.5386.229-238

Nufus, H., & Mursalin, M. (2020). Improving Students' Problem Solving Ability and Mathematical Communication through the Application of Problem Based Learning. Electronic Journal of Education, Social Economics and Technology, 1(1), 43–48. https://doi.org/10.33122/ejeset.v1i1.8

.

Sundayana, R., Herman, T., Dahlan, J. A., & Prahmana, R. C. I. (2017). Using ASSURE learning design to develop students' mathematical communication ability. World Transactions on Engineering and Technology Education, 15(3), 245–249.