IMPLEMENTATION OF PROBLEM-BASED LEARNING MODEL TO IMPROVE THE FIFTH-GRADE STUDENTS' LEARNING OUTCOMES AT SDN GUNUNG GEDE ON THE DATA PROCESSING LEARNING

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PENERAPAN MODEL PEMBELAJARAN BERBASIS MASALAH UNTUK MENINGKATKAN HASIL BELAJAR SISWA KELAS V DI SDN GUNUNG GEDE PADA PEMBELAJARAN PENGOLAHAN DATA

ARTICLE HISTORY	ABSTRACT
	Abstract: *This paper is a Classroom Action Research (PTK) conducted collaboratively between researchers and collaborators, which aims to improve students' learning outcomes in mathematics learning subjects on data processing learning in class VA at SDN Gunung Gede by applying the Problem-Based Learning (PBL) model. The research subjects involved 38 students, which consist of 16 male and 22 female students. Data collection techniques in the research used five instruments, namely learning implementation assessment, changes in student activity, tests or students' learning outcomes, interviews, and documentation. The data analysis technique used was quantitative and qualitative analyses. Based on the research results, it can be concluded that learning with the PBL model can improve students' learning outcomes. Learning outcomes in cycle 1 were 66% of the total students who complete and increased in cycle II to 87%. While the average score results of student activity observation in cycle I were 74 and increased in cycle II to 91.4. The quality of the learning process in cycle I likewise was 78% and in cycle II increased to 96%. Thus, the implementation of the PBL model can improve the students' learning outcomes on mathematics learning subjects in data processing learning in class VA at Gunung Gede Elementary School in Bogor.*

Keywords: *students' learning outcomes, problem-based learning (PBL) model, data processing learning*

Abstrak: *Artikel ini merupakan Penelitian Tindakan Kelas (PTK) yang dilakukan secara kolaboratif antara peneliti dan kolaborator yang bertujuan untuk meningkatkan hasil belajar siswa pada mata pelajaran matematika materi pengolahan data di kelas VA SDN Gunung Gede dengan menggunakan model Pembelajaran Berbasis Masalah (PBL). Subjek penelitian melibatkan 38 siswa, yang terdiri dari 16 siswa laki-laki dan 22 siswa perempuan. Teknik Pengumpulan data dalam penelitian menggunakan lima instrumen yaitu penilaian pelaksanaan pembelajaran, perubahan aktivitas siswa, tes atau hasil belajar siswa, wawancara, dan dokumentasi. Teknik analisis data yang digunakan adalah analisis kuantitatif dan kualitatif. Berdasarkan hasil penelitian dapat disimpulkan bahwa pembelajaran dengan model PBL dapat meningkatkan hasil belajar siswa. Hasil belajar pada siklus 1 sebanyak 66% dari total siswa tuntas dan meningkat pada siklus II menjadi 87%. Sedangkan hasil observasi aktivitas siswa pada siklus I memperoleh nilai 74 dan meningkat pada siklus II menjadi 91,4. Begitu pula dengan kualitas proses pembelajaran pada siklus I memperoleh nilai sebesar 78% dan pada siklus II meningkat menjadi 96%. Maka, penerapan model PBL dapat meningkatkan hasil belajar siswa pada mata pelajaran matematika materi pengolahan data kelas VA Sekolah Dasar Gunung Gede Kota Bogor.*

Kata Kunci: *hasil belajar siswa, model pembelajaran berbasis masalah (PBL), pembelajaran pengolahan data* |

INTRODUCTION

Basic education is the level shown for elementary school (SD) and junior high school (SMP) students. Students at the elementary school level must take a number of subjects or themes. One of the subjects that must be taken by elementary school students is mathematics. The government made mathematics a compulsory subject in schools. This is a form of government attention in educating the people of Indonesia. Mathematics is a science that deals with ideas or concepts that are processed with reasoning, to develop and train someone to think logically, analytically, systematically, reasoning, critically, creatively, to solve a problem (Zagoto, & Dakhi, 2018). Patterns, structures, spaces, and changes in learning mathematics can also make students think more creatively, systematically, logically, and critically (Lase, Mendrofa, & Ndraha, 2022).

Many mathematical concepts are used in everyday life, for example the concepts of addition, subtraction, multiplication and division. Other examples include counting many objects, measuring height, measuring weight, and so on. Several examples of the application of these mathematical concepts have become evidence that mathematical concepts are often used and useful in everyday life. Thus, mathematics needs to be understood and mastered by all levels of society, including elementary school students as the successors of the Indonesian nation.

In practice, mathematics education in elementary schools is still far from the predetermined goals. It is undeniable, in realizing the learning objectives to be achieved there are obstacles that are found during the learning process. Based on the results of observations carried out at one of the State Elementary Schools in the city of Bogor, some data were obtained as follows: 1) Lack of active student participation during the learning process; 2) Lack of students' skills in solving math problems; 3) Some students have not been able to solve math problems in the form of word problems.

Based on the results of the initial data observations above, it can be concluded that there are obstacles encountered during the learning process, one of which is environmental conditions that do not support students to receive lessons well. For example, in terms of classroom management and the use of less varied learning models. This can be one of the factors that causes a decrease in the quality of learning in the classroom which has an impact on activity and low student learning outcomes. Only a few students achieved the Minimum Completeness Criteria (KKM) which had been determined based on the target student learning outcomes, namely 85% of students who achieved the KKM. Of the 38 students who achieved completeness, only 2 students with a percentage of 5.2%, and those who did not achieve completeness were 36 students with a percentage of 94.7%.

Completeness is seen from the KKM determined by the class teacher, which is 75. Based on these data, it can be concluded that the teacher's performance during the learning process has a considerable influence on student learning activities and outcomes. The learning process in data processing material needs attention for improvement because the learning outcomes obtained by most students have not yet reached the KKM. For this reason, teachers must be wise in managing the class and using learning models that can develop problem-solving skills by being given problems that require students to think creatively.

The problems found after observation at one of the State Elementary Schools in Bogor City require several actions or solutions to be

corrected. Efforts that can be made to overcome the problems above are one of them by applying the problem-based learning model as a step to be able to improve student learning outcomes, especially in learning mathematics in data processing materials. This is because PBL raises problems as a first step in gathering and integrating new knowledge. The PBL learning model makes authentic problems the focus of learning which aims to enable students to solve these problems, so that students are trained to think critically and think at a higher level. Based on research conducted by Ariana (2022) the problem-based learning model can improve students' critical thinking skills which have an impact on improving student learning outcomes. In line with Bareno's research (2021) shows that learning by applying problem based learning can improve integrated thematic learning outcomes for class IV.

By applying the PBL learning model it is hoped that it can make students more active and learning becomes more meaningful because students are directly involved in the learning process meaning that students active role in the learning process so as to improve learning outcomes, especially in data processing material. Therefore this research is entitled "Implementation of the Problem Based Learning Model to Improve Learning Outcomes of Class V Students at SDN Gunung Gede in Learning Data Processing".

LITERATURE REVIEW
Learning outcomes

Learning outcomes are achievements achieved by students academically through exams and assignments, activeness in asking questions, and answering questions that support the acquisition of these learning outcomes Dakhi (2020: 468). While Teti (2015: 104) says that learning outcomes are changes that result in humans being able to change in their attitudes and behavior which tend to stay from the cognitive, affective, and psychomotor domains. In line with this, Bloom (Thobroni, 2015) said learning outcomes include cognitive, affective

and psychomotor abilities. Assessment of learning outcomes has certain assessments, namely: 1) Psychomotor domain, the psychomotor domain is a domain related to physical activity; 2) The Cognitive Domain, the cognitive domain is closely related to students' thinking abilities; 3) The Affective Domain, the affective domain includes student behavior (Wulan & Rusdiana, 2015:27). It can be concluded that learning outcomes are changes in behavior that are permanent both in terms of cognitive, affective and psychomotor obtained by students after going through a series of learning activities in the form of learning experiences.

Problem Based Learning Learning Model

Susanti, A. E, & Suwu, S. E. (2016) argues that Problem Based Learning (PBL) is learning that can develop students' critical thinking skills, through asking and answering questions, analyzing and solving problems both individually and in groups. In line with this opinion, Rahmadani and Anugraheni (2017) said that PBL emphasizes problem-solving activities in learning. Anjelna Putri (2018: 23) says the PBL learning model is a learning model whose implementation starts with explaining learning objectives, students are involved in problem solving, discussing problems, then presenting them and at the end of the activity the teacher helps students to reflect on learning material.

In practice, PBL has advantages, Rahayu, Saputra, & Susilo (2019: 451) mentions the advantages of the PBL model in helping students gain new knowledge by finding solutions to solve problems, and providing opportunities for students to apply the knowledge they have in the real world. . It can be concluded that the problem-based learning model is a learning model that presents problems in learning so that it can foster students' critical thinking skills.

RESEARCH METHODS

This research uses a type of classroom action research (CAR). Arikunto (2015: 2) states

that PTK is action research conducted in class with the aim of improving and enhancing the quality of learning practices. The main objective in this study is to improve student learning outcomes in mathematics subject data processing materials using the Problem Based Learning (PBL) learning model.

The time for conducting the research was from February 2023 to March 2023 at Gunung Gede Public Elementary School, Bogor City, with 38 students as the subject of the VA class, consisting of 16 male students and 22 female students. CAR is carried out in two cycles, each cycle lasting for one meeting held in the classroom. The research instruments used were interviews, observation of teacher performance, and observation of student activity. The implementation of learning assessment and changes in student behavior gets a very good interpretation if the score obtained is 80-100, a good interpretation if the value obtained is 61-80, an adequate interpretation if the value obtained is 41-60, a poor interpretation if the value obtained is 21-40 and interpretation is very less if the value obtained is 0-20.

The design used in this PTK is using the Kemis and Mc spiral model. Taggart. As explained by Kemmis and Taggart (Wiriaatmadja, 2005) the stages of this spiral model consist of planning (plan), action (act), observation (observe), and reflection (reflect). After reflection, it is followed by re-planning. For more details, the spiral model proposed by Kemmis and Taggart can be seen in Figure 1.
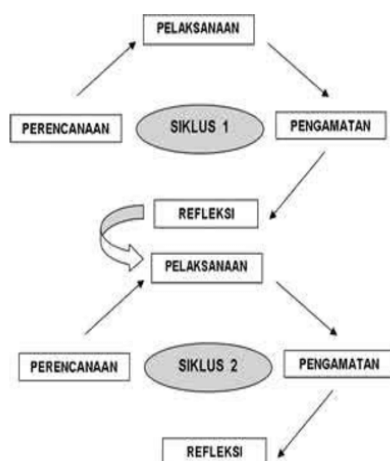

Figure 1. Kemmis and Mc Taggart Spiral Model (Wiriaatmadja, 2005)

RESULTS AND DISCUSSION

This research lasted for two cycles to fix the learning problems that occurred. By going through four stages, namely planning, action, observation, and reflection.

RESULTS

Description of Research Results Data Cycle 1

The results of observations of collaborators 1 and collaborators 2 in cycle 1 can be seen in table 1.

Table 1. Data from Research on the Implementation of Cycle 1 Learning

Kolaborator	score (%)	Interpretation
I	77	Good
II	79	Good
Total	156	-
Average	78	Good

Table 1 shows that the implementation of learning in cycle I obtained an average value of 78% with good interpretation. This can be seen from the results of the assessment of collaborator I who gave a value of 77% with a good interpretation and collaborator II who gave a value of 79% with a good interpretation. This shows that the teacher's performance results are in the good category according to the minimum achievement indicator of 61-81% with good interpretation. However, in order to increase teacher performance, improvement is needed in cycle II. While the activity of changing student behavior in cycle I can be seen in table 2.

Table 2. Results of Changes in Student Behavior that Appear in Cycle I

Group	Kolaborator		Subtotal	Average	Interpretation
	I	II			
1	67	70	137	68,5	Pretty good
2	72	76	148	74	Pretty good
3	83	84	167	83,5	Good
4	73	73	146	73	Pretty good
5	70	72	142	71	Pretty good
Total	365	375	740	370	-
Average	73	75	148	74	Pretty good

Based on table 2 it can be explained that the average of all groups in behavior change gets an average value of 74 with a fairly good interpretation. This average can be increased again by carrying out the learning process in cycle II. The purpose of cycle II is expected to be a better change of student activity in learning. As for the completeness of student learning outcomes can be seen in table 3.

Table 3. Completeness of Cycle I Learning Outcomes

Mastery Learning Outcomes	Students	Persentage
Complete	25	66%
Not Complete	13	34%
Total	38	100%

Based on the assessment of learning outcomes in cycle I above, data were obtained from 38 students who achieved KKM totaling 25 at 66% and those who had not reached KKM totaling 13 at 34%. The average value obtained in the first cycle assessment is 73.8. The average value is below the KKM, this shows that the completeness of classical learning outcomes has not yet reached the minimum research success indicator of 85% with a KKM of 75. Description of Research Results Data Cycle II. The results of the implementation of learning in cycle II can be seen in table 4.

Table 4. Results of the Assessment of Cycle II Learning Implementation

Kolaborator	Score (%)	Interpretation
I	95	Very Good
II	97	Very Good
Total	192	-
Average	96	Very Good

Based on table 4 it is known that the quality of learning implementation in cycle II has increased. In cycle II, it obtained an average score of 96% with a very good interpretation. This can be seen from the results of the assessment of collaborator I who gave a score of 95% with very good qualifications and collaborator II who gave a score of 97% with very good qualifications.

Other activities observed by collaborators were student activities during the learning process and student activities during the learning process in cycle II can be seen in table 5.

Table 5. Results of the Assessment of Changes in Student Behavior Cycle II

Group	Kolaborator 1	Kolaborator 2	Sub Total	Average	Interpretation
1	89	90	179	89,5	Good
2	91	92	183	91,5	Very Good
3	93	94	187	93,5	Very Good
4	92	92	184	92	Very Good
5	90	91	181	90,5	Good
Total	455	459	914	457	-
Average	91	91,8	182,8	91,4	Very Good

Based on the table above, it can be explained that the results of observing changes in student behavior in cycle II showed that 2 groups entered into good qualifications and three groups entered into very good qualifications. Overall, the average assessment of changes in student behavior in cycle II is 91.4 with a very good interpretation. Meanwhile, student learning outcomes in cycle II can be seen in table 6.

Table 6. Completeness of Cycle II Learning Outcomes

Mastery Learning Outcomes	Students	Persentage
Complete	33	87%
Not Complete	5	13%
Total	38	100%

Based on the table above, it can be seen that the completeness of student learning outcomes in cycle II has increased compared to the completeness of student learning outcomes in cycle I, and has exceeded the research success criteria, namely, there are 33 students who have achieved the minimum completeness criteria (KKM) or equal to 87 % complete, while students who have not completed as many as 5 students or by 13%. The average score obtained in the second cycle assessment has also exceeded the KKM for mathematics subjects on data processing, namely 83.9. This shows that the research was successful.

To find out the increase in research results in cycle I and cycle II, a recapitulation of research results is made as shown in table 7.

Table 7. Recapitulation of Cycle I and Cycle II Research Results

Aspects studied	Learning Outcome				Description
	Average				
	Cycle I	Categories	Cycle II	Categories	
Quality of Implementation of Learning	78%	Good	96%	Very good	Advance 18%
Behavior Changes Appear in Students	74	Pretty good	91,4	Very good	Advance 17,4
Completeness of Learning Outcomes	66%	Not yet	87%	Complete	Advance 21%
Average	73,8	Not enough	83,9	Complete	Advance 10

Based on the table above, it can be seen that all aspects studied have increased. In the first cycle the assessment of learning implementation reached a score of 78% in the good category, in the second cycle learning improvements were carried out so that the learning implementation value increased to 96% in the very good category.

DISCUSSION

This research was conducted on VA class students at Gunung Gede State Elementary School, Bogor City, in mathematics with data processing materials. Data collection in this study was carried out using several instruments, namely the quality assessment instrument of learning implementation, the instrument for changing student activities, the instrument for testing or student learning outcomes, the instrument for interviewing students and documentation.

Based on the results of the research, it was found that the implementation of actions in cycle I and cycle II had shown an improvement in action, both from teacher activities and student activities. In the first cycle the assessment of the implementation of learning achieved a score of 78% with a good interpretation, and in the second cycle learning improvements were carried out so that the value of the implementation of learning increased to 96% with a very good interpretation. Likewise, the quality of learning implementation increased, changes in student activity in cycle I reached a value of 74 with an adequate interpretation, and after improvements were made in cycle II, the value

of changes in student activity increased to 91.4 with a very good interpretation.

Another research aspect that has also experienced an increase is student learning outcomes. In the first cycle, the learning outcomes of class VA students at Gunung Gede Public Elementary School classically only reached 66%, then it increased in cycle II to 87%, so the research was completed in cycle II because the research was successful.

Several factors influence learning outcomes besides the application of learning models, namely internal factors and external factors. Internal factors are the process of teaching and learning activities that can change student behavior which includes motivation, concentration, and reactions. Motivation can emerge if students have the effort and willingness to improve themselves and learn better (Ricardo & Meilani, 2017; Syafrida, 2018).

In addition, the increase in learning outcomes that has been stated above cannot be separated from a teacher who uses the problem based learning (PBL) learning model. The PBL learning model is a learning model that can improve students' problem-solving abilities, so students can assess their own ability to solve problems for the better. This is because in this PBL model students have to find solutions and they will also be trained to solve problems. The problems presented in the learning process reflect real problems encountered in everyday life (Hendriana, 2018; Safithri et al., 2021).

The problem-based learning learning model is suitable to be applied because it has many advantages including: (1) the problem-

based learning learning model can increase student activity in full, both physically and mentally, (2) the problem-based learning learning model can make students learn not by memorizing, but proceed from student experience in real life, (3) class in problem based learning as a place to solve a problem in the field, (4) subject matter constructed by the students themselves under the guidance of the teacher.

The results of this study are reinforced by previous findings which state that the problem-based learning model influences student learning outcomes in elementary schools (Afifah et al., 2019; Kristiana & Radia, 2021; Suari, 2018).

CONCLUSIONS AND RECOMMENDATIONS

The application of the problem-based learning (PBL) learning model can be an effective solution because it is able to make learning activities more interesting by inviting students to solve problems so that students' interest is formed to play an active role during learning. In addition, the application of the PBL learning model can improve mathematics learning outcomes in data processing material for the VA class at Gunung Gede State Elementary School, Bogor City, for the 2022/2023 academic year.

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