APPLICATION OF THE MODEL *PROBLEM BASED LEARNING* TO IMPROVE LEARNING OUTCOMES IN MATHEMATICS SUBJECT ADDING AND SUBTRACTING WHOLE NUMBERS

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ABSTRACT
This research is a collaborative classroom action research designed with the aim of knowing the learning outcomes of class IV students at SDN Julang, Bogor City regarding the application of the model.problem based learning in mathematics subjects, the material is addition and subtraction of whole numbers up to 1,000. This type of research is collaborative classroom action research which consists of 2 cycles. The subjects of this research were class IVA students. The results of this research show an improvement in the learning process, changes in student behavior and learning outcomes. Cycle I learning process with a percentage of 96 % then cycle II increased with a percentage of 97%, changes in attitudes of students in cycle I with a percentage of 88%, then cycle II with a percentage of 94% and the learning completion results of cycle I students were 48% which were completed, then cycle II increased by 92% which were completed . All aspects studied increased from cycle I to cycle II. Thus, it can be concluded that the application of the P modelroblem Based Learning can improve the learning outcomes of class IVA students at SDN Julang, Bogor City.

INTRODUCTION

Education has an important position for humanity. Education is one way of forming human abilities to be used in solving problems that arise in an effort to create a better future.. Education means the stages of institutional activities (such as schools and madrasas) which are used to perfect individual development in mastering knowledge. According to (Arifudin, 2020) the education process can take place formally and non-formally. This does not limit the scope related to the meaning of learning.Education according to Law Number 20 of 2003 concerning the national education system, education is a conscious and planned effort to create an atmosphere study and process learning so that participants educate actively develop potential himself to have strength religious spirituality, self-control, personality, intelligence, noble character, and skills needed by himself, society and the country.

Educational objectives are the basic point for determining where education will be achieved, who will be the subject and object of education and what results will be achieved so that it will be clear what processes and paths must be followed to realize these educational objectives (Arifudin,

2018). In the educational process, the position of teachers and students is very important to achieve the expected quality.

One of the efforts to face the times in the 21st century is to create quality human beings who are ready to face challenges. The efforts made are to continue to upgrade ourselves, study science, including mathematics, so that everyone is able to calculate and solve problems. Heryanto, et al. (2022) also stated that mathematics is a very important field of study for students to master, because mathematics lessons are closely related to everyday life. So learning mathematics cannot be learned once but requires time to be studied repeatedly because mathematics deals with numbers and formulas. Mathematics is a basic science that can be used as a tool to solve problems in various sciences. One of the characteristics of mathematics is that it has abstract objects which can cause students to experience difficulties in understanding mathematical concepts. Factors that influence the success of students in mastering mathematics learning, especially in elementary schools, depend on the teacher who teaches. A teacher must have effective and enjoyable teaching strategies so that learning outcomes in mathematics subjects can be more optimal. The choice of learning model also greatly influences student learning outcomes. Therefore, teachers must be smart in choosing the learning model that will be used so that it is more meaningful, according to the needs of students, and in accordance with the material being taught to achieve learning goals and maximum results.

Based on the results of observations in class IV.A of SDN Julang, Bogor City, mathematics learning is still relatively low. The KKM that has been determined is 75, the lowest score is 30 and the highest score is 90. Of the 25 students, 20% have reached the KKM, while the other 80% have scored below the KKM. A lesson can be said to be successful if at least 75% of students have completed the study. This happens because mathematics learning tends to still use the lecture model in presenting the material. This is what causes many students to consider the mathematics learning process to be a difficult and unpleasant lesson, resulting in low mathematics learning outcomes.

This low mathematics learning outcome is caused by several factors, including the use of inappropriate models, so that students only memorize rather than understand the material, students also tend to be passive in learning and students have difficulty in achieving learning goals. Therefore, there needs to be reforms carried out by teachers to improve learning outcomes in mathematics subjects so that results can improve and be maximized.

Based on this, efforts need to be made to change the learning process by looking for learning models that suit the conditions and needs of students. One way is by using a model *Problem Based Learning*. According to (Djonomiarjo, 2020) Learning model *Problem Based Learning* is a cooperative learning model that requires students to be active and motivate students so that they can support and help each other in mastering the subject matter being studied. In the learning model *Problem Based Learning* Students do not just listen, take notes and memorize the material presented by the teacher, but are expected to be able to think critically, search, process data and communicate in the learning process. So that learning can be in favor of students (*Student Center*). According to (Nandhita, 2018:24) learning model *Problem Based Learning* is learning that focuses on students learning and being faced with real life problems that will be solved through all the knowledge they have. Learning model *Problem Based Learning* is learning that emphasizes the process of full student involvement to be able to discover the material being studied and relate it to everyday life. *Problem Based Learning* aims to introduce students to authentic and meaningful problem situations that can be used for research. In models *Problem Based Learning,* Real and relevant problems are used as a starting point to acquire new knowledge. Learning model *Problem Based Learning* has the syntax: (1) orienting students to problems, (2) organizing students to learn, (3) guiding individual and group experiences, (4)

developing and presenting work results, and (5) analyzing and evaluating the problem solving process.

Therefore, based on the description above, the researcher intends to conduct research in terms of improving student learning outcomes in mathematics subjects for class IV.A with the title" Model Implementation *Problem Based Learning* To Improve Learning Outcomes in Mathematics Subjects, Addition and Subtraction of Whole Numbers at SDN Julang, Bogor City.

Based on the background of the problem described above, the problem formulation can be taken as follows: What is the application of the Learning Model *Problem Based Learning* in mathematics subjects in class IV of SDN Julang can the material on addition and subtraction of whole numbers improve student learning outcomes?
How to improve mathematics learning outcomes in addition and subtraction of whole numbers in class IV with the Learning Model *Problem Based Learning* ?

The aim of this research is to find out a description of the process of implementing the learning model *Problem Based Learning* so that it can improve the learning outcomes of class IVA students at SDN Julang, Bogor City and determine the increase in student learning outcomes through the application of learning models P*roblem Based Learning* for class IVA students at SDN Julang, Bogor City.

METHOD

This type of research is Collaborative Classroom Action Research (PTKK) using the Kemmis and Mc research design model. Taggart. This research was carried out in the odd semester of the 2023/2024 academic year. The subjects of this research were class IVA students at SDN Julang, Tanah Sareal District, Bogor City, consisting of 25 students. The object of research is the learning outcomes of students. Data collection techniques use observation and interviews. Data were analyzed descriptively and presented in the form of tables and graphs.

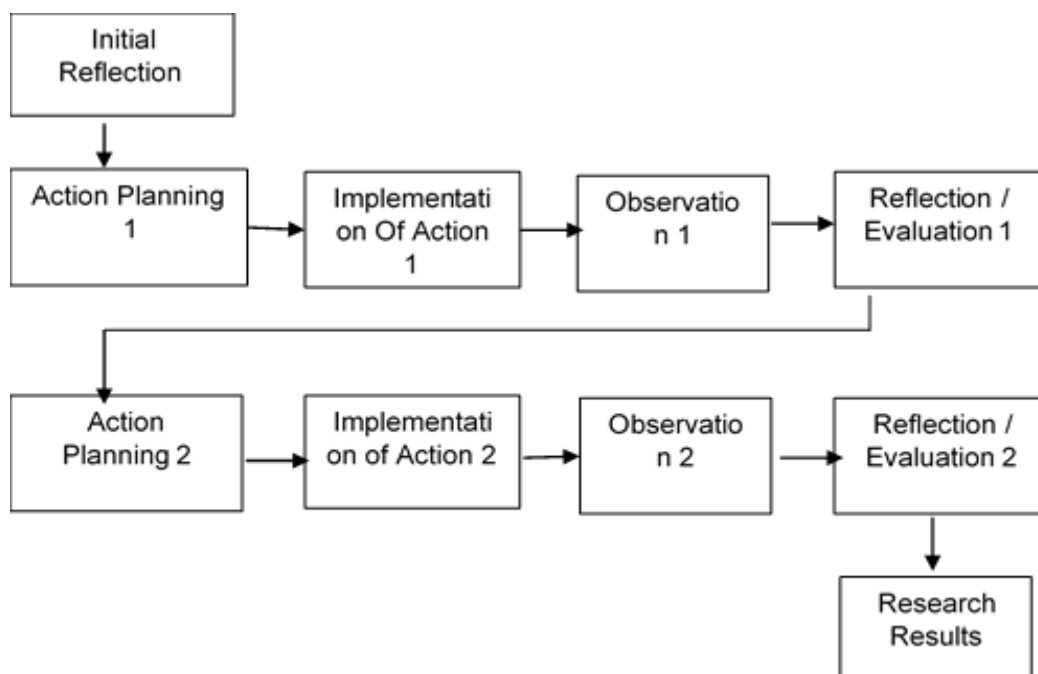The following is a picture of action planning for cycle I and cycle II

Fig 1 Image of the PTK design chart for the Ministry of National Education's modified model from the Kemmis and Taggart Model.

The dependent variable in this research is the learning outcomes, while the independent variables in this research are the material on the arithmetic operations of adding and subtracting whole numbers up to 1,000 and the model P*roblem Based Learning*.

Data collection regarding learning outcomes takes the form of objective tests which were previously tried out to test the validity, distinguishing power, reliability and difficulty level of the questions. Learning outcomes are measured by scores through a posttest on the arithmetic operations material for adding and subtracting whole numbers up to 1,000.

RESULTS AND DISCUSSIONS

In collaborative classroom action research activities starting from pre-cycle research activities, researchers make observations or observations of schools and students of grade IV.A SDN Julang Tanah Sareal District Bogor City which aims to collect school objective data (school profile) and classes that will be used as research subjects.

The research began with pre-cycle data collection and then continued to cycle I and cycle II until the research success criteria for completing classical learning outcomes were at least 75%.

Based on the results of data processing, the research results can be summarized as follows:

Table 1 Recapitulation of Cycle I and Cycle II Research Results

Aspects Observed	Cycle Yield (%)				Information
	Cycle I	Meaning	Cycle II	Meaning	
Learning Process	96 %	Very Good	97 %	Very Good	Increased 1%
Changes in Behavior that Appear in Students	88 %	Good	94 %	Very Good	Increased 6 %
Completenesss of Learning Outcomes	48 %	Enough	92 %	Very Good	Increased 44 %
Average Value of Learning Outcomes	69 %	Enough	90 %	Very Good	Increased 21 %

Based on the table above, it can be seen that all aspects of research have increased. In cycle 1 the learning process assessment reached a score of 96% with very good interpretation, in cycle II learning improvements were carried out so that the learning process score increased to 97% with a very good category. Behavioral changes in students also increased, in cycle 1 reaching an average of 88% with good interpretation. And after improvements were made in cycle II, the value of changes in student behavior increased to 94% with very good interpretation. Aspects of learning outcomes have also improved. In cycle 1, the complete learning outcomes of class IV.A students only reached 48%, which exceeded the KKM. then experienced an increase of 44% in cycle II to 92% and had exceeded the KKM. The recapitulation of research results from cycle 1 and cycle II can be depicted in the diagram below:
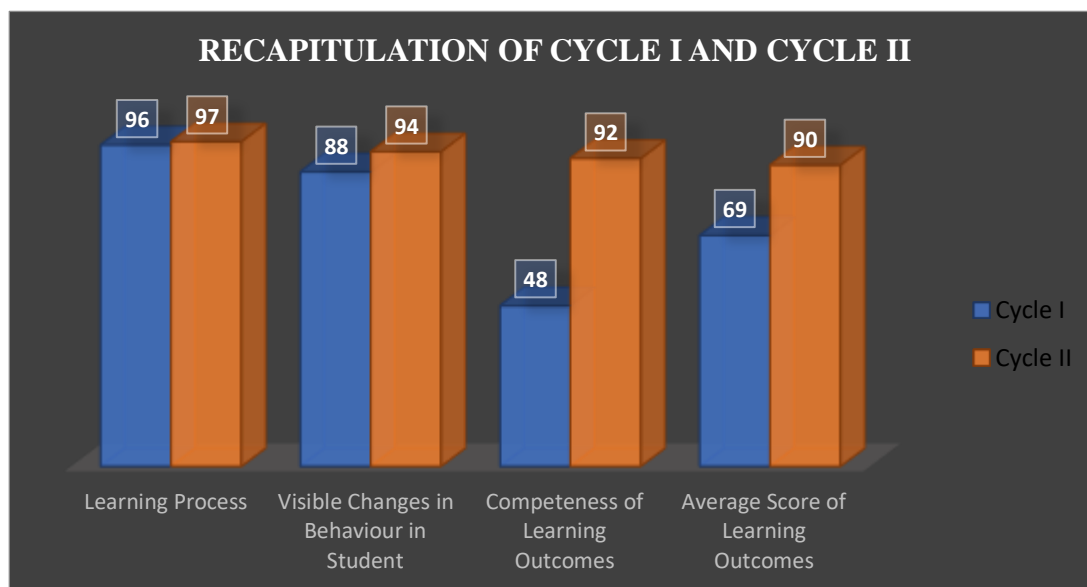
fig 2. Recapitulation of Cycle I and Cycle II Research Result

This research uses three aspects that will be examined, including the process of implementing learning, visible changes in student behavior and improving learning outcomes. In the process of implementing cycle I learning with the model in *Problem Based Learning* the results of the assessment of learning implementation with an average score of 96% and have exceeded the success indicator of 75% which is classified as very good. These results are influenced by several activities included in the model P*roblem Based Learning* which are implemented quite well, such as in the implementation of apperception, initial activities, core activities, closing activities, activities in the model syntax *Problem Based Learning,* evaluation activities, follow-up and reflection sections, however, according to the collaborators, there are several things that must be paid attention to, namely providing special guidance to special students, conditioning students who are not optimal, managing time, so that there are still students who cannot be conditioned well. . Meanwhile, the implementation of the learning process in cycle II is an improvement from cycle 1. The researcher has corrected the deficiencies in cycle 1. The improvements include providing guidance to each student, conducting ice breaking, individual and group exercises and reflecting together so that the students more active and the learning process is more meaningful. These improvements have improved the assessment of the learning implementation process in the classroom. This increase can be seen from the average value given by collaborators, namely 97%. Then regarding the visible changes in student behavior. In cycle 1 the average value of visible changes in student behavior was 88%. Improving the quality of learning influences changes in student behavior. The learning atmosphere is fun and full of group collaboration because students are directed to have a communicative attitude in expressing opinions, be creative and responsible in carrying out tasks given by the teacher, and also create comfort during the learning process. This makes students more interested in being actively involved in learning. Aspects of changes in student behavior have also improved for the better. In cycle II the average value of changes in student behavior was 94% with very good interpretation and had exceeded the success indicator of 75%. In cycle 2 there was an increase in students. There were 23 out of 25 students who reached the KKM.

In accordance with the results of this research, the use of learning models is very important in improving student learning outcomes. Huda, N., & Syafmen, W. (2021) students obtain learning outcomes which are the result of an interaction of learning actions, namely experiencing a process to improve their mental abilities and teaching actions, namely teaching students. One of the learning models used is the Problem Based Learning Model, where this model can improve learning outcomes, learning motivation, learning activities, and make the class atmosphere more

interesting and enjoyable. In line with this, Kusnandar (2019) expressed his opinion about the Problem Based Learning (PBL) learning model which provides conditions for improving thinking and analysis skills and solving problems in everyday life so that it will create a culture of thinking in students, as well as a problem learning process. Based Learning also requires students to play an active role in learning activities that are not only limited to the teacher so that it can improve student learning outcomes on the learning material presented (Sumantri, M. S., & Satriani, R. (2016). It's just that in certain problems, of course this learning model has shortcomings, namely: 1) this model requires getting used to in its implementation, because students are required to concentrate fully and have high creative power; 2) the learning process requires quite a long time; 3) students who do not have security related to the problems discussed will find it more difficult to learn; and 4) sometimes teachers have difficulty in asking students trigger questions, so teachers prefer to directly tell what is meant (Kurniasih and Berlin, 2016). Study provides an overview of learning motivation with student learning outcomes, especially on learning motivation that can affect learning outcomes in students' mathematics subjects (Nugraha, D. Y., & Nugraha, D. (2021).

In addition to observing the results of classroom implementation assessments of learning implementation, researchers also carried out observations of students' attitudes and skills during learning activities. Similarly, as stated by Sudjana (2016) is that in essence, student learning outcomes are changes in behavior in a broad sense including the cognitive, affective and psychomotor fields. The improvement of student learning outcomes in this study shows one of the positive impacts of the benefits and importance of collaboration with the community in the learning process (Santoso, S., Lukitasari, M., & Hasan, R. 2022), Ishartono, at all, (2022).

CONCLUSION AND SUGGESTION

Based on the research results, it can be concluded that implementing learning by applying the Problem Based Learning model can improve the learning outcomes of class IVA students at SDN Julang, Bogor City. This was proven in the learning process in cycle I which got a score of 96%, then in cycle II there was an increase of 1%, namely 97%, which means very good. The changes in behavior seen in students also increased by 6%, in cycle I they got results of 88%, then in cycle II they got results of 94%. Completeness of learning outcomes also increased by 44% from 48% in cycle I and increased to 92% in cycle II. Apart from that, there was an increase in the average value of learning outcomes, namely 21%, in cycle I the results obtained were 69% and in cycle II, namely 90%.

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