

Implementation of Problem Based Learning With Play Money Media to Improve Arithmetic Understanding of Elementary School Students

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Abstract

This study aims to improve the understanding of the concept of arithmetic operations of elementary school students through the application of Problem Based Learning (PBL) learning model assisted by toy money media. This study used a Classroom Action Research (PTK) design conducted in two cycles. The research subjects consisted of 30 fourth grade students who were selected by purposive sampling. Data were collected through written tests (pre-test and post-test), observations, and interviews. The results showed a significant increase in student understanding, with an average pre-test score of 60.3 increasing to 75.5 in the first cycle, and 88.7 in the second cycle. In addition, student activity in learning also increased from 65% in the first cycle to 85% in the second cycle. The PBL model with play money media proved to be effective in motivating students, increasing involvement in group discussions, and facilitating understanding of the concept of arithmetic operations in a real-life context. This study recommends the application of similar methods in other mathematics topics to support students' understanding and skills more broadly.

Keywords: *PBL, Arithmetic Operations, elementary.*

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INTRODUCTION

Education is one of the factors that determine the quality of human resources [1]. The community achievement index in Indonesia is still low, both from health, economy, and education. In order to improve the index of community achievement, education is one of the important factors that must be developed. One reflection of the quality of education in schools is the learning outcomes achieved by students in those schools [2]. Low literacy and numeracy should be a serious concern.

Mathematics is one of the educational sciences that fundamentally develops in people's lives and is needed in the development of science and technology [3]. The role of a teacher as a motivator and learning facilitator that can facilitate students in the implementation of teaching and learning activities [4]. In order to improve Numeracy and literacy skills, teachers are required to be able to innovate in teaching. One of them is innovating in mathematics lessons to improve students' Numeracy skills.

One of the subjects given to students at school is mathematics. This subject is a subject that is always given both from basic education, secondary education and even up to higher education [5]. Numeracy skills will be tiered and mutually

supportive, so learning mathematics in elementary school is the basic foundation of students in forming Numeracy skills.

Problem-based learning model is a learning model that presents contextual problems that stimulate students to learn [6]. The syntax or learning steps in the Problem Based Learning (PBL) model are as many as 5 steps which briefly are problem orientation, organisation, guidance, development, and evaluation [7]. PBL is a learning strategy that is driven by a problem. Problems can be a challenge or description of difficulty, results that are difficult to understand, or unexpected events where there are interesting elements that require solutions or explanations [8]. The PBL model is also a place for learners to develop critical thinking and advanced thinking skills [9].

The use of alternative media is one type of differentiation in learning, especially media differentiation. by incorporating differentiated learning as recommended in the independent curriculum which is a form of classroom learning process tailored to the diversity of learning needs of each learner [10].

Some of the causes of boring Maths Learning include; the use of inappropriate approaches, models, methods, media, during learning. The implementation of learning methods that are less diverse causes students to be easily bored in teaching and learning activities, so that the focus of students' learning is less when teaching and learning activities take place [11]. Lack of media use in learning. While according to Deby Sinaga (2025) educational game media can serve as an effective substitute for improving educational standards, overcoming students' boredom, and helping them understand difficult mathematical concepts [12].

Based on the opinions of experts, it can be concluded that contextual learning is learning that relates to the surrounding circumstances [13]. The importance of linking mathematics learning with everyday life gave birth to various approaches or learning models that make problems in everyday life as an introduction or stimulus at the beginning of learning [14]. Educators must understand the various types of teaching materials available. Materials that can be used to reinforce learning can be used to encourage students' attention, focus, curiosity, and perseverance in their learning activities to achieve learning objectives [15].

The use of games in learning mathematics can make a positive contribution to students' interest and motivation in mathematics [16]. educational games are all forms of games designed to provide educational experiences or learning experiences to the players, including traditional and modern games that are given educational and teaching content [17].

Toy money media is one type of contextual teaching media, toy money media is very similar to the money that students use every day in transactions [18]. Social arithmetic in mathematics learning studies things that are directly related to buying and selling, profit and loss, and everything related to trade [19]. According to L. Azizah (2024) using the role playing learning model with the help of folding money can provide practical experience in using mathematics in the context of everyday life [20].

Based on the discussion from various sources, this research was carried out to observe the application of the Problem-based learning model with the help of

toy money to improve arithmetic operation skills in elementary school students.

METHODS

This study aims to improve the understanding of the concept of arithmetic operations of elementary school students through the application of the Problem Based Learning (PBL) learning model using toy money media. The following are the details of the research method used Research Materials The material taught is the concept of basic arithmetic operations, including addition, subtraction, multiplication, and division, which are relevant to everyday life, such as calculating transactions using money. Research Subjects/Materials The research subjects were fourth grade students at a public primary school. The number of students involved was 30, which was selected based on the availability of adequate classes for the application of the PBL method. Research Tools The tools used include student worksheets (LKS) designed in accordance with the PBL approach, toy money media as learning aids, evaluation instruments in the form of test questions to measure understanding of the concept of arithmetic operations, observation sheets to assess student involvement during the learning process.

Research Design This study used a Classroom Action Research (PTK) design consisting of two cycles. Each cycle includes planning, implementation, observation, and reflection stages. Sampling Technique The sampling technique used was purposive sampling, where the selected class was a class that had difficulty in understanding arithmetic operations based on the results of previous evaluations. Research variables include independent variables, Problem Based Learning learning model with toy money media. The dependent variable is students' understanding of the concept of arithmetic operations.

Data Collection Techniques Data were collected through written tests (pre-test and post-test) to measure the improvement of students' understanding, direct observation during the learning process to assess students' activities, and interviews or questionnaires to get feedback from students and teachers.

Data Analysis Data analysis was conducted quantitatively and qualitatively, where test data was analysed using descriptive statistics to see the increase in average scores, observation sheets and interviews were analysed qualitatively to evaluate the effectiveness of the implementation of the learning model. Statistical Model Used The statistical model used to analyse quantitative data is t-test to see the significant difference between pre-test and post-test results.

RESULTS AND DISCUSSION

Learning Steps

Introduction (15 Minutes) The teacher explains the learning objectives and introduces the toy money media. Students are asked to share their experiences related to money in daily life.

Material Delivery (15 Minutes) The teacher explains the concept of counting operations to be learnt, such as addition, subtraction, multiplication, and division, using play money. The teacher shows examples of problems using play money to illustrate each counting operation.

Core Activities (30 Minutes) ; Contextual Problem Solving (PBL): Each group is given a problem involving arithmetic operations and play money (e.g. calculating the total price of items purchased, determining the remaining money after a transaction, or calculating how many items can be purchased with a certain amount of money). Group Discussion: Students work in groups to solve the problem, discuss the steps used, and develop a solution strategy. Presentation of Discussion Results: Each group presents their discussion results and solutions in front of the class. The teacher provides feedback and clarification.

Closure (10 minutes) ; The teacher invites students to reflect on the learning that has been done. Provide homework to test further understanding related to arithmetic operations in the context of daily life.

Learning Assessment

Process Assessment: Observation of students' ability to discuss and collaborate in groups. And Assessment of students' activeness in solving problems using play money media.

Product Assessment: Evaluation of group discussion results and presentation of solutions.

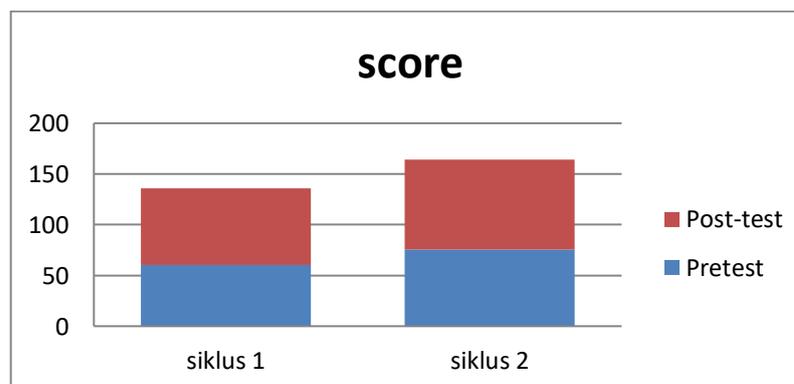
Task Assessment: Individual tasks that test students' understanding of the arithmetic operations that have been learnt.

Concept Understanding Test Results The test results showed a significant increase in students' understanding of the concept of arithmetic operations. The following is the average data of pre-test and post-test results:

Table 1: comparison of pretest and posttest

cycle	average Pretest	average Post-test	Improved (%)
1	60,3	75,5	25,2
2	75,5	88,7	17,5

The data above shows that the application of the PBL model with play money media successfully improved students' understanding. The biggest increase occurred in cycle 1 because students began to understand the new learning method.



graph 1 : Illustrates the comparison of pre-test and post-test results

Graph of Test Results The following graph illustrates the comparison of pre-test and post-test results in each cycle of Student Activity Observation Results. Cycle 1 65% of students were active in group discussions and using play money media. Cycle 2 Student activity increased to 85%, showing higher engagement. Observations also noted that students were more confident in presenting group discussion results after the second cycle.

The increase in student understanding is due to the PBL approach that encourages students to think critically and solve real problems, making the material easier to understand. This finding supports the results of previous research by Arends (2012) which states that PBL is effective in improving concept understanding and critical thinking skills.

In cycle 1, students needed more time to understand the concept of problem-based learning. Teachers should provide more structured guidance at the beginning of the application of the PBL model.

CONCLUSION

The application of Problem Based Learning (PBL) learning model assisted by play money media is proven to be effective in improving elementary school students' understanding of arithmetic calculation operations. The study was conducted through two cycles of Classroom Action Research showing a significant increase in students' average score from 60.3 (pre-cycle) to 75.5 (cycle 1), and increased again to 88.7 in cycle 2. As well as an increase in learning from 65% in cycle 1 to 85% in cycle 2.

This success is influenced by the PBL approach which encourages students to think critically and solve contextual problems that are directly related to everyday life, thus making learning more meaningful and fun. Toy money media helps students understand arithmetic concepts concretely and contextually, increasing motivation, engagement and confidence in the learning process. Thus, this method is recommended to be applied in other mathematics topics to broaden students' understanding and skills thoroughly.

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