Problem-Solving Learning used By Realia Media to Enhance Students' Undertanding of Mathematical Concepts Class V SDN 6 Blangpidie

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Abstract

The purpose of this study was to determine the increase in teacher activity, student activity, and student conceptual understanding through the application of problem solving learning models and realia media in class V of SDN 6 Blangpidie. The research method used was Classroom Action Research with 28 fifth grade students. Data collection were used observation and test. Based on the results of the analysis of teacher activity sheet data in cycle I, namely 78.57 (good), in cycle II it increased to 89.28% (very good) and continued to enhance in cycle III to 95.23% (very good). The results of the analysis of student activity sheet data in cycle I were 76.19% (good) in cycle II it increased to 84.52% (very good), and continued to increase in cycle III to 94.04% (very good). The results of the students' conceptual understanding test in cycle I were 72.91% (good), then increased in cycle II to 81.99% (good) and continued to increase in cycle III to 89.72% (very good) and had determined classical completeness. In concluded, the application of the Problem Solving Model and Realia Media can increase effectiveness students' mathematical concept understanding.

Keywords: Concept, Realia, Problem-solving

Abstrak

Tujuan penelitian yaitu untuk mengetahui peningkatan aktivitas guru, aktivitas siswa, dan pemahaman konsep siswa melalui penerapan model pembelajaran *problem solving* dan media realia di kelas V SDN 6 Blangpidie. Metode penelitian yang digunakan adalah Penelitian Tindakan Kelas dengan subjek penelitian siswa kelas V yang berjumlah 28 siswa. Teknik pengumpulan data dilakukan melalui observasi dan tes, sedangkan teknik analisis data menggunakan rumus persentase sesuai dengan kriteria keberhasilan yang telah ditentukan. Berdasarkan hasil analisis data lembar aktivitas guru pada siklus I yaitu 78,57 (baik), pada siklus II meningkat menjadi 89,28% (baik sekali) dan terus mengalami peningkatan pada siklus III menjadi 95,23% (baik sekali). Hasil analisis data lembar aktivitas siswa pada siklus I yaitu 76,19% (baik) pada siklus II meningkat menjadi 84,52% (baik sekali), dan terus mengalami peningkatan di siklus III menjadi 94,04% (baik sekali). Hasil tes pemahaman konsep siswa pada siklus I yaitu 72,91% (baik),

kemudian meningkat pada siklus II menjadi 81,99% (baik) dan terus mengalami peningkatan di siklus III menjadi 89,72% (baik sekali) dan sudah memenuhi ketuntasan klasikal. Dapat disimpulkan bahwa aplikasi Model *Problem Solving* dan Media Realia dapat meningkatkan pemahaman konsep matematika siswa.

Kata kunci: Media Realia, Pemahaman Konsep, *Problem Solving*

1. INTRODUCTION

Understanding mathematical concepts is a competency that students gain through thinking activities. According to Kilpatrick, this understanding helps students avoid big mistakes when solving problems (Misrina 2022). Understanding mathematical concepts is an individual's ability to convey back the knowledge learned, both orally and in writing.

Mistakes in understanding basic mathematical concepts make it difficult for students to learn addition, subtraction, multiplication, and division. Teachers must address this in two steps: first, teach mathematical principles correctly; second, provide varied learning activities, not just memorizing (Nida Jarmita 2015).

To create interesting learning in mathematics, the problem-solving learning model is one model that can be applied (Al Kusaeri 2019). Its approach has ability given practical knowledge for young student that has risking out to face life with all the problem and due to has highly optimisctic goal (Al Fadhil 2020). This idea aligns with the views of Miftahul Huda, who states that problem-solving is more often applied in mathematics learning (Adisyah Evanie Dakwah 2022). According to Polya, it's an intellectual activity where students utilize their knowledge to find solutions to the problems they face (Billy Alexa Belvian 2021).

Using media in learning enriches meaning and helps students enhance concepts. Media realia, real objects from the student's environment. Inefficient learning methods often cause difficulty in understanding the material. Therefore, it is necessary to adopt new approaches and relevant media to trigger student interest and learning outcomes.

The results of interviews with teachers on October 2, 2023, at SDN 6 Blangpidie showed a monotonous learning process and minimal variation in methods and media. Teachers predominantly use blackboards and rarely use learning media.

During the learning process, the dominant role of the teacher (teacher-centered) causes a lack of student involvement, which results in boredom. When the teacher explains the material on the blackboard, some students still have difficulty understanding,

so one sub-material can take 2-3 meetings. Additionally, students often have difficulty completing exercises correctly and on time. Their habit of preferring to work alone hinders discussion and brainstorming in group assignments.

From an interview on 2 October 2023 at SDN 6 Blangpidie, it was found that class V mathematics learning was still low, especially in complex fraction material. Many students do not understand the concept of fractions in general, so the use of real media is expected to build an understanding of this concept.

In fraction operations material, especially the conversion between mixed fractions and improper fractions, students often face difficulties. When dividing fractions, some students forget to flip the fractions before multiplying. Based on observation data, there are 7 students in the very good category, which shows a quick and deep understanding of concepts. A total of 6 students are in the good category, with a good understanding of the concept but needing more time. The sufficient category includes 10 students who need more time to understand the material. Finally, 5 students were in the poor category, showing very limited understanding and requiring special attention.

The problem-solving model was chosen because students will solve problems independently or in groups. The teacher will give a problem, then the students will find their solution. This encourages students to think actively and communicate with friends, as well as use realia media for more effective learning.

Previous studies confirm that problem-solving models and realia media are effective in deepening students' understanding of concepts. For example, Misrina's research entitled "The Influence of the Problem-Solving Model on Elementary School Students' Ability to Understand Mathematical Concepts" revealed that students who used it model understood mathematical concepts better than students who used the direct learning model (Misrina 2022).

Research by Akhsin Amrulloh, Sukamto, and Husnul Hadi entitled "Application of it Model Assisted by Magic Calculator Media" shows the effectiveness of this model in improving understanding of mathematical calculations in class V students at SD N Wonopolo 02 Semarang (Akhsin Amrulloh 2019).

2. LITERATURE REVIEW

A. *Problem Solving* Model

The learning model is an important element in the learning process that helps achieve the desired results. Taufiqur Rahman said that a learning model is a unique way that educators use to organize and implement learning methods, methods, and techniques. Educators must adapt this model to students' conditions and learning styles to achieve the best learning results (Taufiqur Rahman 2018). One effective learning model is problem-solving. According to Djamarah and Zain, this method uses a scientific approach to solve problems effectively (Syaiful Bahri Djamarah dan Aswan Zain 2002).

According to Taufiqur Rahman, IT is the process of finding solutions to unsolved problems. The steps include: presenting a problem, identifying patterns or rules, as well as exploring, investigating, and finding solutions by students both in groups and individually (Taufiqur Rahman 2018).

According to Askari, as quoted by Suyitno, it is a learning method that develops students' critical thinking abilities. Effective questions in learning must meet four criteria: (1) students do not know how to solve them, (2) students have studied the prerequisite material, (3) it can be achieved by students, and (4) students are motivated to solve the problem (Aris Sohimin 2014). According to Lestari, it learning model involves students actively training them to face challenges and find solutions (Fani Karmita Sari dan Lidia Oktamarina 2022).

According to Polya, there are four steps that can be taken to solve problems, namely: (1) understanding the problem, (2) planning problem-solving, (3) implementing problem-solving planning, and (4) checking/reviewing the completeness of its. (G. Polya 1973). The steps and indicators of model Polya:

Table 2.1. Steps and Indicators of Polya Model

No	Steps of Polya	Indicators
1.	Problem comprehending	Students determine what is known about the problem and what is being asked.
2.	Problem solving planning	Identifying appropriate problem solving strategies to resolve the problem
3.	Carry out problem solving planning	Carry out problem solving according to what has been planned
4.	View/recheck the	Check whether the results obtained are in

	completeness of the problem solving	accordance with the provisions and There are four important things that can be used as guidelines in carrying out this stage, namely: a) Match the results obtained with what is stated. b) Interpret the answers obtained. c) Identify whether there are other ways to get a solution to the problem. d) Identify whether there are answers or other results that meet the requirements.

(Sumber: (Risma Astutiani 2019)

B. Media Realia

The term "media" comes from Latin, namely the plural of "medium," which means intermediary (Afifah 2019; Azizah, E. N., Koesmadi, D. P., & Widyaningsih 2021; Septy Nurfadhillah dan 4A Pendidikan Guru Sekolah Dasar 2021). Sadiman revealed that the media acts as a message bridge between the sender and the recipient. (Arief S. Sadiman 2012). According to Gusti Nyoman and Yohanna, realia media functions to visualize lesson information from teachers to students, so that messages can be understood quickly and accurately (Fani Karmita Sari dan Lidia Oktamarina 2022; Gusti Nyoman Pardomuan dan Yohanna Ristua 2023; Pupung Puspa Ardina 2019).

Real media are everyday physical objects around students that can be used as teaching materials in classroom learning. Real objects that can be used as realia media must be original and intact and of the actual size so that students can easily recognize them by a certain name. Real media can be real objects that are modified through cutting or preservation, and can also be inanimate or living objects. If real media cannot be presented in class, then students can observe the media directly through educational visits. (Abdul Wahab 2021).

The following is a picture of realia media that researchers use during the learning process using the problem-solving model.

Gambar 1. Media Realia Apple Fruit

Gambar 2. Media Realia Orange Fruit

Gambar 3. Media Realia Chocolate Wafer

Gambar 4. Media Realia Rope

C. Comprehending Concept

According to Novitasari, understanding means the ability to capture meaning and express it in one's own words. Students are considered to understand the material if they can explain it in their own words, not just from books. (Seyma Cicek 2017; Siti Ruqoyyah 2020).

Klipatrick et al. say that understanding concepts means understanding concepts, operations, and relationships. Sanjaya added that this also includes mastery of the material and application according to student understanding. (Misrina 2022).

According to the Ministry of National Education in Wardhani, it is explained that the indicator that students understand the concept is being able to (Siti Mawaddah dan Ratih Maryanti 2016)

1) Restate a concept.

2) Classify objects according to certain properties by the concept.

3) Provide examples and non-examples of a concept.

4) Presenting concepts in various forms of mathematical representation.

5) Develop necessary or sufficient conditions for a concept.

6) Using and utilizing and choosing certain procedures or operations.

7) Apply concepts or algorithms to problem solving.

Assessment of students' mastery of the concepts being taught is carried out based on indicators compiled by the PPPG Mathematics Team, which measure students' progress in learning mathematics. (Seyma Cicek 2017):

1) Students' ability to summarize the core material studied.
2) Students' skills in grouping objects according to character according to ideas.
3) Students' ability to recognize the difference between relevant and non-relevant examples.
4) Students' ability to present and explain concepts with pictures, diagrams, or symbols.
5) Students' ability to analyze important terms in concepts or material.
6) Students' ability to choose the correct steps to solve the problem. Students' ability to apply concepts to solve everyday problems.

Understanding mathematical concepts is the main goal of learning. The indicators applied in this research are: (1) Presenting concepts in various forms of mathematical representation. (2) Using and utilizing and selecting certain procedures or operations, and (3) Applying concepts or algorithms in problem-solving.

3. METHOD

This research is Classroom Action Research, namely research carried out in classrooms with a focus on improving or enhancing learning processes and practices. (Suharsimi Arikunto 2012). According to Wibawa, classroom action research is research that raises real problems faced by teachers in the field (Basuki Wibawa 2004).

This research aims to address problems that arise in the classroom, increase teachers' real participation in their professional development, and deepen students' understanding of mathematical concepts by utilizing its learning model and realia media.

In this classroom action research, the researcher applies the Kemmis and McTaggart model. According to Kemmis and Mc Taggart, classroom action research is a form of collective self-reflection carried out by participants in social situations to improve the reasoning and fairness of these practices as well as the situation in which these practices are carried out. (Afi Parnawi 2022).

In his planning, Kemmis applies a spiral system of self-reflection which starts with planning, acting, observing, and reflecting, and also re-planning is the basis of a problem-solving approach. (Taufiqur Rahman 2018).

The subjects of this research were students in class V of SDN 6 Blangpidie, totaling 28 students consisting of 18 male students and 10 female students. To make data collection and data analysis easier, this research uses instruments in the form of teacher and student activity observation sheets and test question sheets. The data analysis technique used is descriptive statistics.

4. RESULTS AND DISCUSSION

1. Teacher Activity and Learning

The Problem-Solving learning model and realia media in each cycle showed an increase of 10.71% between cycle I and cycle II, and 5.95% between cycle II and cycle III.
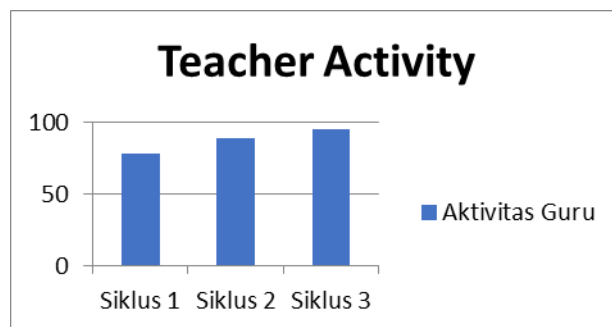

Diagram Observation Teacher Activity I, II and III Cycle

The diagram above shows that the results of observations of teacher activities in managing learning in cycle I obtained a figure of 78.57% (good). Teachers have a crucial role in creating a conducive learning atmosphere in the classroom. her must have ability to design, manage, evaluate, and determine good learning methods, strategies, and models to improve student learning achievement. (Ngalim Purwanto 2007). The difference action each cycle that teacher do it essential to emphasize word problem doing process in action to rehearse problem solving phase and to minimize some errors when student take action to solve the problem as well, with observe and facilitate comprehensive from teacher in each group (Sumartini 2018; Yantoro, Syari 2017)

In cycle II, teacher activity in managing learning increased with a percentage reaching 89.28% (very good). Teachers need to improve the way they convey moral and motivational messages to students at the end of learning so that they are active and

focused on learning. Conveying moral and motivational messages is very important because it will increase students' interest and initiative to continue studying diligently.

This opinion is in line with Sardiman's view which states that motivation is a series of efforts to provide certain conditions so that someone wants and wants to do something, and if he doesn't like it, he will try to eliminate that feeling (A.M Sardiman 2001).

Furthermore, cycle III showed an increase of up to 95.23% (very good). Efforts to increase teacher activity in cycle III have been carried out optimally and succeeded in achieving the expected aspects. This happens because every step in the learning process has been carried out well by the RPP that has been prepared.

Table 4.1. The Elaboration in Detail Result of Teacher Activity Cycle I, II and III

Teacher Activities	Cycle I	Cycle II	Cycle III
Cases	• Teacher face problem management the time because of much materies to elaborate • Teacher leakness to supervise students when asking problem that could not comprehend • Teacher leakness to assist student defining problem	The teacher's ability to manage time and class when explaining the material has been much better. The teacher's ability to guide and direct students when formulating problems is also good. However, it is necessary to improve the way of conveying moral and motivational messages to students at the end of learning so that they are active in learning.	Teachers are able to apply the Problem Solving learning model and realia media.
Strategies and Teacher Activities	• In the next meeting, the teacher divide the material to be taught only two sub-materials, namely dividing ordinary fractions by ordinary fractions and dividing ordinary fractions	The next meeting the teacher must be more enthusiastic and straightforward in giving moral messages and motivation to	

	by natural numbers so that the time allocation is sufficient and students do not get bored.	students to be active and focused on learning.	
Action	• the teacher must be able to encourage students to ask questions by linking the material to questions that are difficult for them to solve.	Giving moral messages can be linked to the values of everyday life.	

2. The Process of Student's Activity

The increase that occurred from cycle I to cycle II was 8.33% and cycle II to cycle III was 9.52%.
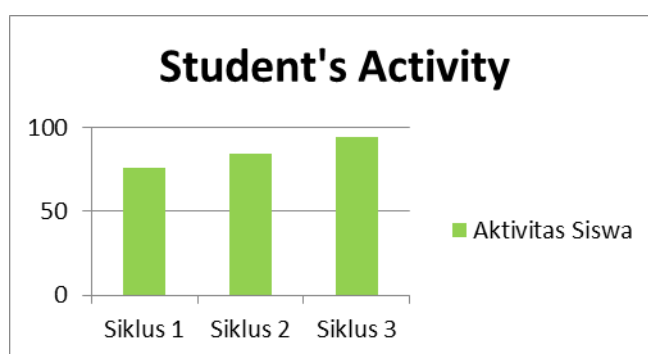

Diagram Observation Student's Activity I,II and III Cycle II

The results of observations of student activities during the learning process in cycle I received a score of 76.19% (good). In cycle II, there was an increase reaching 84.52%, and continued growth in cycle III with a percentage of 94.04% (very good).

Table 4.2. The Elaboration in Detail Result of Student's Activity Cycle I, II and III

Student's Activities	Cycle I	Cycle II	Cycle III
Discovering	Students still pay less attention to teachers when explaining the concept of fractions through realia media. Students still pay less attention and listen to the teacher's explanation	Most students are able to ask questions and summarize the material. Students are also able to pay attention to the teacher's explanation	Students can learn the material well and are more active in learning.

	regarding the fraction multiplication material because the presentation of the material is too much. Students only focus at the beginning and get bored at the end of the material explanation. Students still do not fully understand the problems or questions to be solved. Students are still lacking in discussions with group members to identify appropriate strategies or problem-solving paths.	regarding the material being taught. However, some groups are still lacking in discussing with their group mates to identify appropriate problem-solving strategies to solve the questions.	
Strategies and Student Activities	In the next meeting, the teacher must divide the material to be taught into smaller pieces. In the next meeting, the teacher must be more skilled in explaining and guiding students in formulating problems.	Teachers must be more skilled in guiding and directing students to discuss with their group members.	
Action	The teacher focuses on varies the realia media to explain		

3. Concepts Understanding

Understanding concepts is a student's ability to master various subject matter. Apart from that, students can also convey the information back in a way that is easier to understand, provide interpretation of the data, and apply concepts according to their cognitive structure. (Misrina 2022).

The results of students' conceptual understanding tests from cycles I, II and III can be seen in the picture below:
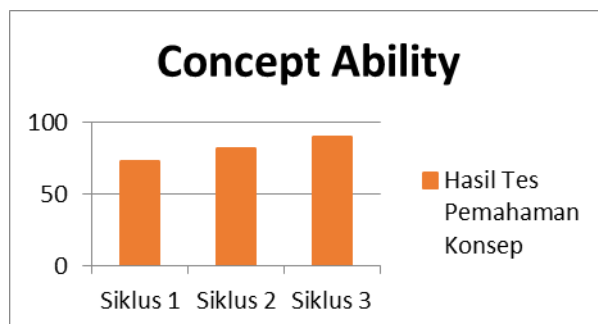

Concept Ability

Diagram Concept Ability Student I, II and III Cycle

It can be concluded that the results of students' conceptual understanding tests have increased in each cycle. In cycle I, the results of the students' concept ability test showed that 18 out of 28 students had achieved the criteria for completion, with an average score of 72.91% (good). However, this value has not yet reached the predetermined indicator value for understanding classical concepts, namely 85%.

In the implementation of cycle II, 22 students completed with a percentage score of 81.99% (good) and the remaining 7 students did not complete. The results of students' concept understanding tests in the third cycle increased with a percentage score of 89.72% (very good). In this cycle, 23 students completed, and 5 students who did not complete. However, this value meets the established indicators of research success, namely 85%.

Misrina's opinion and research results which state that there is an influence between its learning model and students' understanding of mathematical concepts in elementary schools (Misrina 2022).

The Elaboration in Detail Result of Concept Understanding Cycle I, II and III

Concept Understanding	Cycle I	Cycle II	Cycle III
Discovering	Based on the test results, there were 10 students who had not experienced any improvement in their understanding of the concept of fractions and the material on multiplying fractions that had been explained by the teacher.	Based on the test results, there were 7 students (1 student was absent due to illness) who had not experienced any improvement in their understanding of the concept of fractions and the material on dividing fractions (dividing ordinary fractions by ordinary fractions and dividing ordinary fractions by natural numbers) which had been explained by the teacher.	Many students have experienced an increase in conceptual understanding in each indicator and have achieved a learning completion score. This happens because students already understand the material taught through the problem-solving model learning steps and with the help of realia media. Although there are 5 students who have not achieved the learning completion score, the classical completion score has been met
Strategies and Action	In the next meeting, the teacher must be able to improve students' understanding of concepts and learning outcomes to be even better by using the application of the Problem-Solving learning model and realia media. privately, teachers guide students who have not completed their learning	The next meeting the teacher must be more enthusiastic and straightforward in giving moral messages and motivation to students to be active and focused on learning. Giving moral messages can be linked to the values of everyday life.	It was finished in cycle three

4. CONCLUTION

Based on data analysis from the results of research carried out in cycles I, II, and III in class V of SDN 6 Blangpsidie with the participation of 28 students, the conclusions that can be drawn are as follows:

1. Teacher activity using the Problem Solving model and realia media experienced a significant increase from 78.57% (good) in cycle I, increased to 89.28% (very

good) in cycle II, and continued to increase to 95.23% (very good) in cycle III and has exceeded the success indicator ≥80%

2. Student activity also increased from 76.19% (good) in cycle I to 84.52% (very good) in cycle II. Furthermore, it continued to increase to 94.04% (very good) in cycle III and has exceeded the success indicator ≥80%

3. Students' understanding of mathematical concepts shows an increase from 72.91% (good) in cycle I to 81.99% (good) in cycle II, and continues to increase to 89.72% (very good) in cycle III and has exceeded the indicator success is ≥85%.

SUGGESTION

Based on the research that has been carried out, the suggestions that can be put forward are as follows:

1. Researchers: Evaluation of the application of its model and realia media to other materials and exploration of a wider variety of media. It recommended to add more practical implementation suggestions for teachers, such as training to apply realia media effectively or giving concrete media for enhance mathematics concepts.

2. Educators: Adopt its model and realia media, to applying and modifying in teaching mathematics, particularly in multiplication and division of fractions, to optimize students' critical, high-level, and creative thinking abilities, as well as increase understanding and meaning of learning.

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