**Jurnal Ilmu Sosial dan Pendidikan (JISIP)**
Vol. 8 No. 4 November 2024
*e-ISSN : 2656-6753, p-ISSN: 2598-9944*
DOI: *10.58258/jisip.v7i1.7652/http://ejournal.mandalanursa.org/index.php/JISIP/index*

# Analysis of Students' Difficulties in Solving Mathematics Problems in Grade 4 Elementary School

**Ahmad Syaf [1], Azra Fauzi[2], Lisda Ramdhani[3]**
STKIP Harapan Bima

**Article Info**
***Article history:***
Received: 3 November 2024
Publish: 15 November 2024

***Keywords:***
*Learning Difficulties;*
*Problem-Solving;*
*Mathematics;*
*Polya;*
*Elementary Education.*

**Abstract**
*The aim of this study is to analyze the difficulties faced by fourth-grade students in solving mathematical problem-solving tasks based on Polya's stages: understanding the problem, planning a strategy, implementing the plan, and evaluating the results. This research adopts a descriptive qualitative approach with four fourth-grade students at SDN Lido, Bima Regency, as subjects. Data were collected through observation, written tests, and interviews with the teacher. The findings indicate that students struggle at each stage of problem-solving, particularly in understanding the problem and selecting appropriate strategies. Factors such as lack of conceptual understanding, accuracy in calculations, and limited habit of evaluating answers contribute to these difficulties. These findings suggest the need for a more structured instructional approach and a supportive learning environment to enhance students' problem-solving skills.*



***Corresponding Author:***
Nama: Ahmad Syaf
STKIP Harapan Bima
Email: syafahmad5@gmail.com

## 1. INTRODUCTION

Understanding the difficulties that elementary school students face in learning mathematics is very important in developing effective learning strategies. Difficulty learning mathematics often stems from complex cognitive challenges as well as external factors, such as teaching methods and learning environments that are less supportive. Addressing these issues is key to improving students' ability to solve problems, a skill that is not only important for academic success but also for application in everyday life.

Cognitively, students often have difficulty understanding mathematical concepts, such as fractions, which involve complex relationships between numerator and denominator (Nugroho et al., 2023). In addition, problem solving skills are hampered by students' inability to understand problem statements, arrange steps sequentially, and identify keywords, which leads to errors in implementation (Swain et al., 2023). External factors also influence difficulties learning mathematics, including language barriers, lack of parental support, low socio-economic status, and lack of practice at home (Gnawali, 2023).

In terms of teaching methods, traditional approaches that tend to focus on basic concepts and algorithms, instead of developing problem solving skills, limit students' ability to apply mathematical knowledge in real situations (Zhou & Cayaban, 2024). More effective teaching methods, such as problem-based learning, have been proven to improve students' mathematics achievement by encouraging active learning and practical application of knowledge (Achadi, 2024; Ahmad et al., 2024). However, teachers often face obstacles in identifying and overcoming student learning challenges, and a lack of support in this regard can slow student progress (Al-Sayed et al., 2024).

To improve the learning outcomes of students who experience difficulties, efforts are needed to create a supportive learning environment, improve teaching methods, and

provide appropriate psychological support to stimulate interest and improve their learning outcomes (Sun, 2024). In addition, cooperation between schools and parents is very important, where parents are encouraged to actively participate in their children's education to encourage holistic development (Sun, 2024).

Based on this background, this research aims to analyze students' difficulties in solving mathematical problem solving questions at the elementary school level, as well as identifying cognitive and external factors that influence these difficulties. It is hoped that this research will provide insight into learning strategies that are more effective and responsive to students' individual needs, so that they can develop better problem-solving skills and apply mathematics in real-life contexts.

## 2. RESEARCH METHOD

This research uses a descriptive qualitative approach to explore and analyze the difficulties faced by students in solving mathematics problems. The research subjects were four grade IV students at SDN Lido, Bima Regency, who were chosen purposely to represent variations in ability in solving mathematical problems. Apart from students, class teachers are also involved as supporting informants to provide additional perspectives regarding student learning difficulties. Data was collected through three main methods: observation, written tests, and interviews. Observations were carried out to directly observe students' processes in following the stages of problem solving, while written tests were designed to evaluate students' abilities in applying addition, subtraction, multiplication and mixture operations. Semi-structured interviews with teachers provided additional information regarding teachers' views of student difficulties and factors that may influence them.

The collected data was analyzed descriptively through several stages. First, data from observations, test results and interviews are reduced and grouped to find patterns or categories of difficulties experienced by students. Next, the data is presented in the form of a descriptive narrative that describes each stage of problem solving based on field findings and teacher interviews as a complement. The final stage is drawing conclusions from the results of the analysis to determine the main factors that cause student learning difficulties, which are then used as a basis for formulating learning strategies that are more effective and responsive to student needs.

.

## 3. RESEARCH RESULTS AND DISCUSSION

The results of this research show that students experience various difficulties in solving mathematics problems based on Polya's problem solving stages, namely: understanding the problem, planning strategies, implementing plans, and evaluating results. The following is a description of the results based on each stage.

1. **Problem Understanding**

   In the problem understanding stage, only a small percentage of students are able to understand the information given in the problem correctly. On a simple addition problem, for example, two out of four students were able to understand the context of the problem and recognize the key information needed to solve it. However, two other students experienced confusion in understanding the meaning of the questions, especially in questions that involved context or stories. This shows that some students have difficulty identifying the main elements in the problem and understanding what is asked, which causes them to make the wrong start in solving the problem.

2. **Strategy Planning**

   At the planning stage, students' difficulties are seen in choosing appropriate operations or steps to solve the problem. In multiplication and mixture problems, only one student

succeeded in designing the correct solution strategy, while the other three students were unable to determine the relevant mathematical operations for the problem. For example, in multiplication problems, some students choose the operation of addition instead of multiplication, indicating a lack of understanding of the concept of the corresponding operation. Failure to plan the right strategy often causes students to proceed to the implementation stage with the wrong steps.

3. **Implementation of the Plan**
   The implementation of the plan shows that students still face great challenges in performing arithmetic operations correctly, even after choosing the right method. In mixed questions, all students made errors in calculations, such as adding or subtracting incorrectly. In addition, some students do not double-check the calculation operations that have been carried out, so that the results obtained are inaccurate. Errors in implementation can be caused by a lack of accuracy and a weak understanding of basic mathematical operations, such as addition and multiplication.
4. **Evaluation of Results**
   The results evaluation stage is one of the biggest challenges for students. Most students do not double-check the answers they obtain, so that errors that occur in the previous steps are not detected. In subtraction questions, for example, even though most students answered correctly, they did not verify their answers so they did not realize that there were small errors in the calculations. This evaluation stage seems to be often ignored by students, even though it is very important in ensuring the correctness of the answers given.

The results of interviews with teachers provide deeper insight into the difficulties students face in solving mathematical problem-solving questions. Teachers identify that several internal and external factors influence students' ability to understand and solve problems.

1. **Basic Concept Understanding Factor**
   The teacher explains that one of the main causes of students' difficulties is their insufficient understanding of basic mathematical concepts. In questions that require the use of addition, subtraction or multiplication operations, some students experience confusion, especially when the questions are presented in story form. Teachers note that students who are more active in asking questions and following explanations during learning tend to have better understanding. On the other hand, students who rarely participate actively show greater difficulties in understanding basic concepts, which ultimately hinders them in planning and implementing problem-solving strategies.
2. **Limitations in Developing and Following Systematic Steps**
   Teachers also revealed that many students had difficulty following the systematic steps according to the Polya approach. Students are often unfamiliar with structured planning and evaluation processes. This causes students to be less able to determine the right initial steps or recheck their answers. Teachers see that students' habits in evaluating their own work are still low, so that mistakes that can actually be corrected are often overlooked. The teacher suggests the need for additional practice to familiarize students through each stage of problem solving systematically.
3. **The Influence of Teaching Methods and Environmental Support**
   Teachers highlight the importance of more interactive and problem-based teaching methods to increase students' interest and skills in mathematics. However, teachers admit that limited time and support in the classroom are challenges in implementing this method consistently. Apart from that, teachers also mentioned that the lack of practice at home or support from parents also affected students' ability to understand

and solve math problems. Teachers assess that students who receive more support from home, such as assistance in studying, show better abilities in solving problems.

4. **Student Motivation and Self-Confidence**
   According to teachers, students' motivation and self-confidence play an important role in solving mathematical problems. Students who have high motivation and feel confident when working on questions tend to be more thorough and better at following problem-solving steps. On the other hand, students who find mathematics difficult and scary tend to give up quickly and are reluctant to check their answers again. Teachers believe that a supportive classroom atmosphere and motivating teaching methods can help increase students' self-confidence.

This research shows that students experience difficulties at each stage of problem solving according to Polya, which includes understanding problems, strategic planning, implementing plans, and evaluating results. This finding is consistent with previous research, which also revealed that students often have difficulty understanding problem statements, choosing the right strategy, carrying out calculations accurately, and verifying their solutions (Azhari & Wandini, 2023; Muhassanah & Setiani, 2024). These difficulties highlight the need for a more structured and in-depth learning approach to hone students' problem-solving skills.

At the problem understanding stage, many students have difficulty identifying the main elements in the problem and understanding the meaning of the question given. This obstacle causes errors from the first step in solving the problem, which has an impact on the entire resolution process (Azhari & Wandini, 2023; Muhassanah & Setiani, 2024). Students are often confused, especially when questions contain context or stories that require deeper interpretation (Pebrianti et al., 2023). This shows that there is still a need to provide more intensive training in reading and understanding context-based questions to improve students' analytical skills at the initial stage of problem solving.

The strategy planning stage is also a significant challenge for students. Students are often unable to choose appropriate mathematical operations to solve problems, such as confusing addition with multiplication (Malo, 2024; Pebrianti et al., 2023). Mistakes in designing strategies have the potential to lead to wrong answers, because the chosen strategy functions as a foundation for subsequent steps (Pebriyanti & Amelia, 2023). These findings indicate that students' ability to identify relevant operations is still weak, and more focused instruction on selecting appropriate strategies may be needed to strengthen this skill.

At the implementation stage, students often make errors in calculations, such as adding or subtracting incorrectly. Even though some students choose the right method, they often make calculation errors due to lack of accuracy or weak understanding of basic operations (Agustina & Nurdiyanto, 2023; Muhassanah, 2023). This lack of accuracy indicates that students need to receive more in-depth training in basic operations and understanding of mathematical concepts to be able to carry out calculation steps more accurately.

The results evaluation stage is often ignored by students, so that errors in the previous stages are not detected. Most students do not double-check their answers, which results in missed errors that could be corrected (Kusumaningrum et al., 2023; Muhassanah, 2023). According to Hayati et al. (2023), evaluation is an important stage that ensures the accuracy of the solution, but students often feel satisfied with the first answer they get. These results suggest the need for greater emphasis on evaluating or rechecking answers, which can help students improve accuracy in problem solving.

Apart from internal factors, this research also shows that external factors, such as teaching methods, student motivation, and learning environment support, influence

students' ability to solve mathematical problems (Lestari et al., 2023). Teachers need to adopt teaching methods that better support problem-based learning and create a conducive learning environment to increase student motivation. Thus, a structured approach and adequate support from the learning environment is expected to help students overcome difficulties in problem solving and improve their overall mathematical skills.

## 5. CONCLUSION

This research shows that fourth grade students face various difficulties in solving mathematics problems based on Polya's problem solving stages. The main difficulties are identified at the stage of understanding problems, planning strategies, implementing plans, and evaluating results. Students are often unable to fully understand the problem statement, choose an appropriate strategy, or perform calculations correctly, and most ignore the important evaluation stage to ensure the accuracy of the answer.

These findings emphasize the need for a more structured and adaptive learning approach, with an emphasis on exercises that hone understanding, planning and evaluation skills in problem solving. In addition, support from more interactive teaching methods, a supportive learning environment, and parental involvement can increase motivation and problem-solving skills. student problems. With appropriate learning strategies, it is hoped that students can overcome these difficulties and develop stronger mathematical skills to apply in academic contexts and everyday life.

.

## 6. BIBLIOGRAPHY

Achadi, B. S. (2024). Application of Problem-Solving Learning to Improve Mathematics Learning Outcomes in Elementary Schools. *PEDAGOGIKA*, *14*(2), 209–220. https://doi.org/10.37411/pedagogika.v14i2.2725

Agustina, R., & Nurdiyanto, A. (2023). Analisis Kemampuan Pemecahan Masalah Matematis Siswa SMK Berdasarkan Tahapan Polya. *Jurnal Pendidikan Matematika Universitas Lampung*, *11*(3), 160–169. https://doi.org/10.23960/mtk/v11i3.pp160-169

Ahmad, B., Zulfiqar, A., & Bajwa, R. S. (2024). Studying the Effect of Problem-Based Learning on Mathematics Achievement of Elementary Students. *Journal of Excellence in Social Sciences*, *3*(2), 125–136. https://doi.org/10.69565/jess.v2024i3.246

Al-Sayed, D. K. M., Maree, H. A. B., Abdel Latif, ager S. M., Muhammad, I. M. M., Mahmoud, I. M. M., Mobarak, M. M. S., Seif, T. M. A., & Ouaf, M. E. M. (2024). Difficulties in Learning Mathematics Among Primary School Pupils. □□□□□□ 244–221), 1(*1*, □□□□□□□□□□□□ □□□□□□ □□ □□□□□□□□□□. https://doi.org/10.21608/aash.2024.368787

Azhari, Y., & Wandini, R. R. (2023). Miskonsepsi Pemahaman Materi Bangun Datar dengan Penerapan Teori Polya di PGMI 3 UIN Sumatera Utara. *Jurnal Arjuna : Publikasi Ilmu Pendidikan, Bahasa Dan Matematika*, *2*(1), 267–274. https://doi.org/10.61132/arjuna.v2i1.521

Gnawali, Y. P. (2023). Learning Difficulties of Mathematics at Primary Level. *Pragyaratna प्रज्ञारत्न*, *5*(1), 206–215. https://doi.org/10.3126/pragyaratna.v5i1.59289

Hayati, R., Surya, E., Kartika, Y., Karim, A., & Fachrurazi, F. (2023). PENGGUNAAN LANGKAH POLYA UNTUK MENGANALISIS KEMAMPUAN PEMECAHAN MASALAH DI SEKOLAH DASAR. *Kadikma*, *14*(1), 39. https://doi.org/10.19184/kdma.v14i1.39033

Kusumaningrum, S. R., Furqon, M. N., Ulya, W. J., & Amaliyah, F. (2023). Analisis

Kemampuan Pemecahan Masalah Matematika Dalam Menyelesaikan Soal Cerita Berdasarkan Prosedur Polya. *JURNAL RISET RUMPUN MATEMATIKA DAN ILMU PENGETAHUAN ALAM*, *2*(2), 162–169. https://doi.org/10.55606/jurrimipa.v2i2.1539

Lestari, D. P., Soegeng Ysh, A. Y., & Sulianto, J. (2023). ANALISIS KESULITAN BELAJAR SISWA DALAM MEMECAHKAN MASALAH MATEMATIKA DENGAN METODE POLYA PADA MATERI PECAHAN KELAS V SD NEGERI 1 DOPLANG. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(1), 656–669. https://doi.org/10.36989/didaktik.v9i1.726

Malo, M. W. (2024). Analisis Kemampuan Pemecahan Masalah Mahasiswa Dalam Matakuliah Matematika Diskrit Pada Materi Fungsi. *Jurnal Arjuna : Publikasi Ilmu Pendidikan, Bahasa Dan Matematika*, *2*(2), 335–344. https://doi.org/10.61132/arjuna.v2i2.702

Muhassanah, N. (2023). Analysis of Problem Solving Ability Polya Stages of Open University Students in Mathematics Courses. *International Journal of Research in Mathematics Education*, *1*(1), 76–89. https://doi.org/10.24090/ijrme.v1i1.8618

Muhassanah, N., & Setiani, A. (2024). Analysis of student errors based on Polya's steps in three-dimensional geometry. *Union: Jurnal Ilmiah Pendidikan Matematika*, *12*(2), 340–349. https://doi.org/10.30738/union.v12i2.17575

Nugroho, I. A., Purbasari, I., & Bakhruddin, A. (2023). ANALISIS POLA KESULITAN BELAJAR MATEMATIKA DALAM MENYELESAIKAN SOAL OPERASI HITUNG PECAHAN PADA SISWA SEKOLAH DASAR. *Prismatika: Jurnal Pendidikan Dan Riset Matematika*, *6*(1), 182–197. https://doi.org/10.33503/prismatika.v6i1.3431

Pebrianti, A., Usdiyana, D., Dedy, E., & Sudihartinih, E. (2023). KESULITAN SISWA DALAM MENYELESAIKAN SOAL PEMECAHAN MASALAH DITINJAU DARI KEMAMPUAN AWAL MATEMATIKA SISWA. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *12*(3), 3530. https://doi.org/10.24127/ajpm.v12i3.7400

Pebriyanti, Y., & Amelia, R. (2023). Analysis of Students' Problem Solving Ability on Set Material According to Polya Model. *(JIML) JOURNAL OF INNOVATIVE MATHEMATICS LEARNING*, *6*(4), 272–279. https://doi.org/10.22460/jiml.v6i4.18504

Sun, J. (2024). The Causes and Strategies of Helping the Mathematics Students in Primary School. *Journal of Education and Educational Research*, *7*(3), 155–158. https://doi.org/10.54097/b8e6bv25

Swain, B. K., Das, B. S., & Rout, N. (2023). *Learning Difficulties of Elementary School Students in Mathematics*. https://doi.org/10.21203/rs.3.rs-3039573/v1

Zhou, Y., & Cayaban, N. (2024). Problem Solving Strategies in Mathematics of Students in the of Primary Level: Basis for Strategic Study Guide. *Journal of Education and Educational Research*, *8*(2), 32–37. https://doi.org/10.54097/wr425v38