ANALYSIS OF STUDENTS' LEARNING DIFFICULTIES IN UNDERSTANDING MATHEMATICS SENTENCES AND ELEMENTARY SCHOOL CALCULATIONS

Wulandari Ardhi Yaniar[1*], Sri Muryaningsih[2]

[1,2]Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education, Universitas Muhammadiyah Purwokerto
KH. Ahmad Dahlan Road , Hamlet III, Dukuhwaluh, Kembaran District, Banyumas Regency, Central Java, 53182, Indonesia
Email: wulandariardhi123@gmail.com

Abstract: This study aims to discover students' learning difficulties in math sentences and calculations in Class IV SD Negeri 3 Kutasari. This research uses a mixed methods method. The research subjects were five class IV students who were selected from learning outcomes that were below average. The data obtained were in the form of test questions and student interviews, which were analyzed qualitatively. Quantitative analysis to determine student errors in reading and understanding questions (23.47%), errors in transformation (20.40%), errors in calculations (21.43%), errors in process skills (12.24%) and errors in conclusion (22.44%). Some factors cause students' learning difficulties, namely internal factors from within themselves, such as low interest in learning students, students' knowledge abilities, and external factors caused from outside, such as social factors in the form of parental attention and educational aspects (teachers who are less creative in the use of media, learning methods). To overcome students' learning difficulties, efforts are made in the form of repairs or remedial in terms of evaluating learning outcomes, as well as exercises. Teachers should use attractive learning models and learning media to make students understand learning and communicate well with parents to control student learning in the family environment (home).

Keywords: learning difficulties, math sentences, calculations

INTRODUCTION

Education must be done as well as possible to create maximum-quality human resources. Quality human beings can be formed if the education system succeeds in achieving its goals. The goal will be achieved if the education system complies with applicable regulations. Education, according to (Siregar, RS 2022:3), namely activities carried out consciously by students through guidance, teaching, or training to prepare students for the future with changes in themselves. Students from the elementary school level (SD) to tertiary institutions always study one of the fields of study, namely mathematics.

Learning mathematics in elementary schools has two main objectives, namely preparing students to have skills and abilities in using mathematics and being able to teach students mathematical thinking processes (Ananda & Wandini, 2022: 4174). Students still think that mathematics is a complex science to understand, so they have yet to be able to take part in mathematics learning as a whole and have a feeling of laziness in learning mathematics. The causes of students experiencing anxiety in mathematics lessons are a lack of knowledge from previous classes, students are afraid of answering questions, students have difficulty understanding questions, and they are so scared of reading long sentences (Caglar, Mehmet, & Hulya Senol, 2021: 1363). The characteristics of students certainly vary in terms of skill level and thinking ability and have differences in how to acquire knowledge (Prambanan, D., Yathasya, D., & Anwar, PS A, 2023: 32). When studying mathematics, linking mathematical concepts is essential with the aim of being used in problem-solving processes such as word problems. Word problems are a picture of what happens in real life and can introduce students to the importance of mathematics in everyday life. Students must be able to solve word problems, namely regarding skills in reading comprehension questions. Students still think that story problems are challenging to understand.

Several mistakes were experienced by students in learning mathematics, such as failure to understand questions, errors in making decisions or determining how to solve them, and errors in calculating. (Saja'ah, 2018: 99). These mistakes are still often experienced by students because students still need to be able to think critically about learning mathematics. As in the research conducted by Sachdeva & Eggen (2021: 15), critical thinking about learning mathematics seems to receive less attention, and students seem less able to observe critically, be responsible and participate in improving the process of learning mathematics. Therefore, students need critical thinking to understand what math problems mean and how to solve them.

According to the Head of Korwilcam, Dindik Baturraden explained that students still experience difficulties learning mathematics, including SD Negeri 3 Kutasari. Based on this

information, initial observations and interviews were carried out at SD Negeri 3 Kutasari. The class IV teacher said there were student's difficulties in learning mathematics. Based on the results of initial observations and interviews with class IV teachers in September 2022 at SD Negeri 3 Kutasari, Baturraden District, Banyumas Regency, problems in class IV were encountered, such as in the learning process, the material being taught met the criteria *Higher Order Thinking Skills* (HOTS). In addition, some students lack curiosity or high critical thinking, which causes them not to be able to master the material. Students need to have the necessary thinking skills to understand material concepts systematically. Critical thinking can provide solutions to problems and opinions that are presented reasonably (Zahrotin, Badarudin, & Eka, 2020: 132). Five students still need help understanding mathematical sentences and arithmetic operations. The results of research by Saputri, RA (2020:25) showed that students often experience difficulties solving mathematical sentence problems. Students still need help changing mathematical sentences into symbols of mathematical numbers because they are caused by students' poor understanding of mathematical concepts and inaccurate calculations.

Based on this background, it is necessary to research the implementation of learning the subject matter of Mathematical Sentences and Calculations for class IV SD Negeri 3 Kutasari. This research is needed to describe students' learning difficulties in the Main Material of Mathematical Sentences and Calculations and the obstacles experienced in understanding the material.

RESEARCH METHODS

This research uses *mixed methods research* (quantitative and qualitative). The data collection technique used a description test totaling five questions on mathematical sentences and calculations, observations, and interviews. The research subjects were five grade IV students at SD Negeri 3 Kutasari. There are two data analysis techniques used, namely qualitative data analysis derived from the results of diagnostic tests, interviews, and documentation, namely data reduction, data presentation, concluding, and analysis of quantitative data to determine the percentage level of students' errors in the subject matter of mathematics sentences and calculation.

RESULTS AND DISCUSSION

Results of quantitative data analysis

The results of the research conducted in class IV SD Negeri 3 Kutasari on mathematical sentences and calculations. The results of the student's diagnostic test in solving mathematical sentence questions and calculations were then analyzed to determine learning difficulties in the subject matter of mathematical sentences and measures. The results of student errors in the diagnostic test are calculated using the following formula:

$$P = \frac{n}{N} x100$$

Table 1 . Number of Errors Made by Students in Each Type of Error

Error Type	Question Number					Total	Percentage
	1	2	3	4	5		
Reading & Understanding	4	5	5	5	4	23	23.47%
transformation	2	5	5	5	3	20	20.40%
Calculations	5	4	2	5	5	21	21.43%
Process Skills	2	4	1	4	1	12	12.24%
Conclusion	5	4	5	4	4	22	22.44%
Total	18	22	16	23	17	98	

It can be seen from Table 1 that students make the most mistakes, namely errors in reading and understanding questions, as much as 23.47%. This comes from analyzing the diagnostic test questions for fourth-grade students at SD Negeri 3 Kutasari.

1. Error Reading and Understanding (*Reading & Understanding*)

The difficulties experienced by students occur because they cannot read mathematical terms, do not understand or recognize mathematical symbols, are unable to understand questions, and usually still have difficulty understanding what is being asked and known in the questions. In Table 1 it can be seen that errors in reading and understanding the questions were the most, namely 23.47%. The following is an example of a mistake in reading and understanding the questions presented in Figure 1.

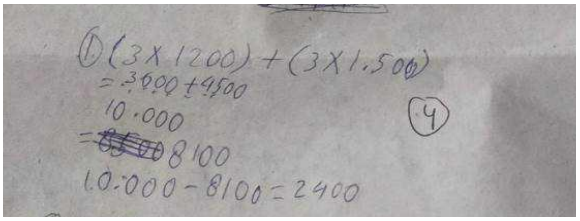

Figure 1. Errors in reading and understanding questions

Based on the results of the analysis of the answers to the students' diagnostic test questions, there needed to be more errors in reading and understanding the questions. Subjects experienced difficulty in solving problems in the completion step. The issue needed to write down what was known and what was asked in the question.

2. Transformation Error (*Transformation)*

The difficulties experienced by students in transforming a problem into a mathematical solution are because students still needed help in determining the formula that is determined to solve the problem. The transformation error is 20.40%. The following is an example of the answers of students who experienced transformation errors presented in Figure 2.

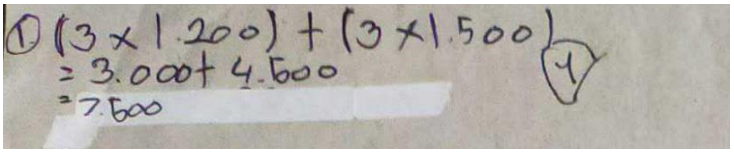

Figure 2. Transformation Error

Based on the results of the analysis of the diagnostic test questions, participants needed help to determine or write down the formula used to solve the problem. Students still look at their friends' answers to determine the correct procedure to solve the problem. Transformation errors occur when students must write down the method used, the incomplete or precise way, or the process because they must write down the required mathematical formula to solve the problem.

3. Error Calculation (*Calculation*)

The difficulties experienced by students in counting occur because they have not mastered correct counting techniques such as addition, subtraction, multiplication, and division. An error in the calculation of 21.43%. The following is an example of the answers of students who experienced calculation errors in Figure 3.

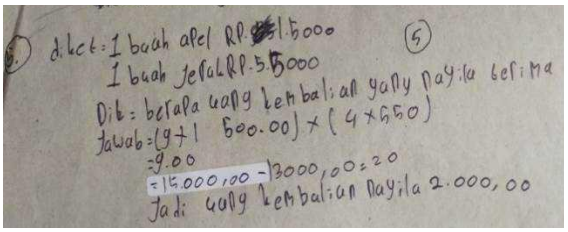

Figure 3. Calculation Errors

Based on the results of the analysis of the answers to the students' diagnostic test questions, it was seen that when calculating the arithmetic operations, the subject could not solve the multiplication and subtraction questions so the answers obtained needed to be corrected. Students still need help calculating the multiplication of tens or subtraction or addition.

4. Process Skill Error (*Process Skill*)

The difficulties experienced by students occurred in explaining the steps in solving the problem. Errors in process skills of 12.24%. The following is an example of the answers of students who experience process skill errors presented in Figure 4.

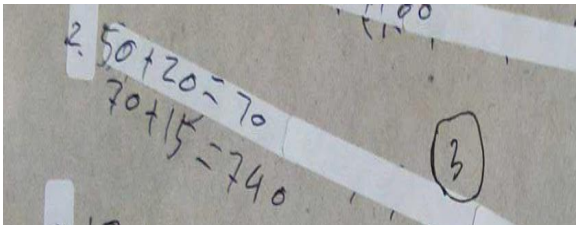

Figure 4. Process Skill Error

Based on the results of the analysis of the diagnostic test, the students were not careful in completing the initial steps of the multiplication calculation, so the next stage of completion needed to be clarified and could not be completed.

5. Error Writing Conclusion (*Conclusion*)

Students need help concluding or writing back the final results in written form answers so that student answers are correct. Errors in writing conclusions by 22.44%. The

following is an example of the answers of students who experienced errors in writing conclusions presented in Figure 5.

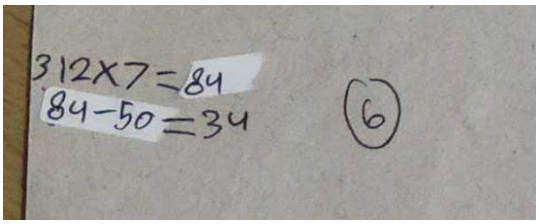

Figure 5. Conclusion Writing Errors

The student's diagnostic test analysis cannot write a conclusion at the end of the answer. Among the mistakes in writing the final answer, many students needed help finding the last question correctly, could not show the definitive answer correctly and could not show the final answer based on the conclusion.

Factors obtained from the results of the analysis of students' learning difficulties and interview results, namely the existence of internal factors, which include psychological factors in the form of students' interest in learning, learning motivation, intellectual elements in the form of lack of power of abstraction, generalization and reasoning abilities and external factors which include social factors in the form of the environment the family and school environment of the students, academic aspects in the form of the teacher's teaching methods, the motivation given by the teacher, the variations used by the teacher in teaching.

Based on the research results of the students described, it is known that fourth-grade students at SD Negeri 3 Kutasari have difficulty learning the subject matter of mathematical sentences and calculations.

Discussion

Errors in reading and understanding the questions (*reading & understanding*)

Errors in reading and understanding the questions (*reading & understanding*), namely the difficulty level of students in writing down what is known and asked, is 23.47% of the answers of 5 students. This error is the highest error or the most experienced by students. It can be seen from the observation of the ability of students in

class IV to understand that reading comprehension is still very low, so students experience difficulties in math problems, especially story problems. The results of interviews with IF subjects obtained information that IF was still not fluent in reading a text, so IF could not understand the contents of the reading and could not write down what was asked and what was known. This aligns with research by Reskina, R., & Kartini, K. (2022: 234) that errors in understanding questions occur because students must entirely write down what is asked and what is known in the problem. When working on a diagnostic test, namely, not being able to write down what is known and being asked what is expected in answering the questions, students are wrong in writing down what is known; students are deficient in writing down what is requested, or mistakes in both.

Error in the transformation (*transformation*)

Errors in the transformation (*transformation)*, namely the level of learning difficulty of students in determining the formula used, is 20.40% of the answers of 5 students. Determination of errors in the transformation aspect is seen when carrying out a diagnostic test; students cannot determine or write down the formula used to solve the problem. The interviews with RF subjects revealed that RF, in working on the questions, needed clarification in determining the procedure used to solve the problem, so RF could not write the general formula correctly. This is in line with research by Sudiono, E (2017: 298), which states that transformation errors occur when students do not write down the steps used, write down methods that are incomplete or precise, write down plans because they do not write down the mathematical formulas needed to solve problems.

Error in the calculation (*Calculation)*

Calculation error (*Calculation*), namely the error rate of students in calculating is 21.43% of 5 students in class IV. The determination of errors in the results of the answers seen when calculating the arithmetic operations of addition, subtraction, and multiplication cannot be completed correctly. Students still need help figuring out the expansion of tens, removal, or addition. In addition, when students do calculations, many still need to be more careful and answer the question correctly. The interviews with KY subjects revealed that KY experienced difficulties in calculation operations, such as not being careful in calculations because the numbers were too large, so KY's

final answer needed to be corrected. This is in line with research by Dwi, DF, & Audina, R. (2021: 103) that students experiencing calculation difficulties can occur because students are not careful in working on questions and can occur because students do not understand the questions and concepts. That way, for students who experience conditions like this, it can be said that students experience weaknesses in counting, which can affect students in solving problems.

Error in process skills (*Process Skill*)

Errors in process skills (*Process Skill*) of 12.24 %, the answers cannot explain the steps of solving the problem again. Students can write down formulas and their solutions but need help to define the complete solution steps. In addition, the causes of students experiencing difficulties in process skills *are* not mastering the processes of multiplication, addition, and subtraction, solving questions, students not concentrating, answering questions at random, being confused with the questions being read, and the consequences of the difficulties experienced before. The interviews with BP subjects revealed that BP still had problems in solving questions because they did not understand the questions and dilemmas in calculations, so in processing skills, BP could not continue to answer until the end or got stuck.

Error in conclusion (*Conclusion*)

In conclusion (*Conclusion*), the error rate in writing conclusions is 22.44%. The results of interviews with RS showed that in solving questions, RS still had difficulty writing findings at the end of the answers because they did not understand what conclusions were, as a result of previous problems such as a lack of understanding in understanding the meaning of the questions asked, determining formulas, calculation processes, and process skills.

Internal factors

The results of the interviews and observations found that the students lacked interest in learning mathematics, the lack of motivation to learn was given, and the students were afraid to ask the teacher when they had difficulty understanding the material. They tend to prefer to invite their friends rather than the teacher for reasons of fear. Based on interviews with subjects RS, BP, RF, IF, and KY, information was obtained that they considered mathematics a complex issue, they often needed

clarification and used too many formulas, and students did not like calculations. Lack of interest and motivation of students in mathematics lessons will undoubtedly cause them to find it challenging to concentrate on learning, so the attitude of students when education tends to pay little attention to the teacher when explaining the material. Students experience learning difficulties in mathematics due to low interest in learning and low intellectual intelligence of students. Each student's intelligence level is different; some are cognitively developing fast, and some are slow. Students who have fast intellect, of course, when the teacher explains the material, they will catch on quickly and vice versa.

External Factors

The attention factor of parents causes students to have difficulty in learning; this is because students solve math problems on their own, which are considered difficult without the help of parents. Of course, related to the lack of attention from parents, which is the cause of students' learning difficulties, shows that the role of parents is significant in student achievement. This is in line with research by Asriyanti, FD, & Purwati, IS (2020: 87), that the role of parents is a supporting factor in children's learning. Therefore, parents' attention and support are needed in students' learning process.

The results of interviews with the hospital obtained information that the hospital was not accompanied by his parents when studying, which caused the hospital to have no interest in learning, and the parents' motivation needed to be improved. This aligns with research conducted by Amaliyah, A., Rini, CP, Hartantri, SD, & Yuliani, S. (2021: 17) that students with learning difficulties tend to have low interest and motivation in learning mathematics.

Lack of motivation in learning affects students' enthusiasm, so some students need help learning mathematics. This also impacts students' intellectual factors related to understanding, solving math problems, and being able to reason and solve problems. Parents are also the cause of students' low motivation because parents do not provide a basis, indifferent to students' activities at school. Many parents still think their children can do it because they study at school and leave it to the teacher.

Based on the research results, the variety of teachers teaching still needs to improve in learning, and learning media have not been used in learning. Class teachers

certainly have an essential role in the success of the learning process. At the time of knowledge, the learning methods used by the teacher were less varied; the teacher only used conventional methods. The interviews with BP subjects revealed that grade IV teachers in learning the subject matter of math sentences did not use learning media and learning methods that did not vary; this would undoubtedly make students feel bored in learning, especially mathematics. This aligns with research by Utari, DR, Wardana, MYS, & Damayani, AT (2019: 538) that less varied and conventional teacher methods tend to result in students feeling bored with learning mathematics. In addition, there is no learning media used by teachers in learning. Teachers must make learning mathematics fun, and teachers can explain that mathematics is essential for everyday life and career (Hussein, YF, & Csíkos, C. (2023: 12).

Based on the results of the interviews, it was found that the five students admitted that their teacher only used markers to write on the blackboard and did not use media or visual aids in the subject matter of math sentences and calculations. Using learning media is very helpful in explaining a material; concrete learning media is critical in learning mathematics. This is by Utari, DR, Wardana, MYS, & Damayani, AT (2019: 538) research that teachers who do not use concrete learning media will cause students to find it challenging to understand the concepts being taught, which results in students' difficulties in understanding concepts.

CONCLUSION

Students learning difficulties in the subject matter of math sentences and calculations for class IV SD Negeri 3 Kutasari have difficulty reading and understanding (*reading & understanding*) as much as 23.47% because students have not been able to understand questions in the form of stories, as for students who have not been able to read, this is also the cause of students' understanding difficulties in mathematical sentence problems and calculations. Students also experience challenges in transformation *or* test in determining the formula as much as 20.40% because there is an error in determining the procedure used because they need help understanding the problem correctly. Learning difficulties were also experienced in calculations (*calculation*) of 21.43%, especially in tens multiplication operations. Students also

shared learning difficulties in process skills at 12.24%. They could not explain the process again. They needed to gain an understanding of the questions they answered and had trouble concluding (22.44 *%)* because they needed to understand what was being asked from the questions.

Factors that cause students' learning difficulties in the subject matter of math sentences and calculations are internal and external. Internal factors are factors generated from within, such as psychological factors in students' attitudes when learning, interests, and intellectual factors in the form of students' knowledge abilities. At the same time, external factors are factors caused from outside, such as social factors in the form of the family environment in the form of parental attention and educational factors in the form of the use of learning media and teacher creativity in teaching.

ACKNOWLEDGEMENTS

Praise be to Allah SWT, who has bestowed His grace and guidance on the writer so that he can complete the article "Analysis of Students' Learning Difficulties in Mathematical Sentences and Calculations in Elementary Schools." The author expresses his gratitude to the supervisor lecturer Sri Muryaningsih, M.Pd, who has guided and provided motivation in preparing this article. All teachers of SD Negeri 3 Kutasari who have helped in the research process and my parents who have supported and encouraged the writer.

REFERENCES

Amaliyah, A., Rini, C. P., Hartantri, S. D., & Yuliani, S. (2021). Analisis Kesulitan Belajar Matematika Siswa Kelas V SD Negeri Taman Cibodas Kecamatan Periuk Kota Tangerang. *Indonesian Journal of Elementary Education (IJOEE)*, *2*(2), 11-20.

Ananda, E. R., & Wandini, R. R. (2022). Analisis Perspektif Guru dalam Mengatasi Kesulitan Belajar Siswa pada Pembelajaran Matematika Sekolah Dasar. *Jurnal Basicedu*, *6*(3), 4173-4181.

Ardiyanti, S.A, & Farihah.U. (2019). Analisis Kesulitan Siswa dalam Menyelesaikan Soal Cerita pada Materi Teorema Phythagoras Ditinjau dari Pemecahan Masalah Polya. Prosiding Seminar Nasional Pendidikan Matematika, 389-398.

Asriyanti, F. D., & Purwati, I. S. (2020). Analisis Faktor Kesulitan Belajar Ditinjau dari Hasil Belajar Matematika Siswa Kelas V Sekolah Dasar. *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan*, *29*(1), 79-87

Caglar, Mehmet, and Hulya Senol. 2021. "Factors That Cause Students to Develop Math Anxiety and Strategies to Diminish." Cypriot Journal of Educational Sciences. 16 (4): 1356–67.

Dwi, D. F., & Audina, R. (2021). Analisis Faktor Penyebab Kesulitan Belajar Matematika Kelas IV Sekolah Dasar Negeri. *Cybernetics: Journal Educational Research and Social Studies*, 94-106.

Hussein, Y. F., & Csíkos, C. (2023). The effect of teaching conceptual knowledge on students' achievement, anxiety about, and attitude toward mathematics. *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(2).

Prambanan, D., Yathasya, D., & Anwar, P. S. A. (2023). Analysis of Cognitive Learning Outcomes of Compliance Personality Students in Solving Mathematical Problems. *Journal Evaluation in Education (JEE)*, *4*(1), 31-35

Reskina, R., & Kartini, K. (2022). Analisis Kesalahan Siswa Dalam Menyelesaikan Soal Aritmetika Sosial Berdasarkan Teori Newman. *Edumatica: Jurnal Pendidikan Matematika*, *12*(03), 238-248.

Sachdeva, S., & Eggen, P. O. (2021). Learners' Critical Thinking About Learning Mathematics. *No. Electronic Journal of Mathematics Education*, *16*(3), 1-18.

Saputri, R. A. (2020). Analisis Interpretasi Bahasa Matematika Siswa Kelas V SDN Malinau (Loksado, Kal-Sel). *THETA: Jurnal Pendidikan Matematika*, *2*(1), 20-26.

Saraswati, P. M. S., & Agustika, G. N. S. (2020). Kemampuan berpikir tingkat tinggi dalam menyelesaikan soal HOTS mata pelajaran matematika. *Jurnal Ilmiah Sekolah Dasar*, *4*(2), 257-269.

Saja'ah, U. F. (2018). Analisis kesulitan siswa kelas IV Sekolah Dasar dalam menyelesaikan soal pemecahan masalah. *Eduhumaniora: Jurnal Pendidikan Dasar*, *10*(2), 98-104.

Siregar, R. S., Saputro, A. N. C., Saftari, M., Panggabean, N. H., Simarmata, J., Kholifah, N., & Harianja, J. K. (2022). *Konsep Dasar Ilmu Pendidikan*. Yayasan Kita Menulis.

Sudiono, E. (2017). Analisis kesalahan dalam menyelesaikan soal matematika materi persamaan garis lurus berasarkan analisis newman. *UNION: Jurnal Pendidikan Matematik*, *5*(3), 295-301.

Utari, D. R., Wardana, M. Y. S., & Damayani, A. T. (2019). Analisis kesulitan belajar matematika dalam menyelesaikan soal cerita. Jurnal Ilmiah Sekolah Dasar, 3(4), 534-540.

Zahrotin, S., Badarudin, B., & Eka, K. I. (2020). Peningkatkan Kemampuan Berpikir Kritis Dan Komunikasi Matematis Menggunakan Model Pembelajaran Problem Based Learning (PBL) Berbasis Literasi Matematis. *Journal for Lesson and Learning Studies*, *3*(1), 131-140.