

Mathematical Problem Solving on Slow-Learners Based on Their Mathematical Resilience

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Abstract

This study aims to describe mathematical resilience on slow learner students in solving problems. According to the previous research, there is no research focused on the subject of slow learners. The research method is a qualitative descriptive approach. The total population of this study was 71 students with special needs, which consisted of 51 male students and 20 female students. The selection of subjects in this study was reviewed based on three levels of mathematical resilience, namely high, medium, and low. The process of selecting this subject uses the Wright Maps table on Winsteps application version 3.73. Selected subjects were given instruments and interviews to analyze their mathematical problem-solving. The results showed that mathematical resilience on slow learner students was directly proportional to solving mathematical problems for subjects with high mathematical resilience. Meanwhile, subjects with medium and low mathematical resilience were inversely proportional to solving mathematical problems. The stages of solving the problem of the slow learners were incomplete because they have not passed one of the stages formulated by Polya. Therefore, based on the results of this research analysis, teachers can pay more attention to the slow-learners learning strategies in solving problems.

Keywords: mathematical problem solving, mathematical resilience, slow learner

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Introduction

Children with special needs certainly have limitations in the learning process. The limitations of children with special needs in learning mathematics are the lack of ability to absorb lessons and motivation to learn; besides, children with special needs have a reluctance to follow the lesson until it is finished (Harahap & Surya, 2017; Kalambouka et al., 2016). The limitations possessed by children with special needs can affect their mathematical problem-solving. Problem-solving ability is crucial because it is an aspect of higher-order thinking skills consisting of primary intellectual and cognitive ability (Bahar & June Maker, 2015; Simamora et al., 2018; Widodo et al., 2021).

A type of child with special needs is a slow learner. Slow learners are children with normal physiques, but their ability to think and learning achievement are below the average of children in general (Amelia, 2016; Ruhela, 2014; Vasudevan, 2017). Slow learner students are different from children in general regarding their intellectuality. Slow learner's intellectual intelligence is in the range of 70-85, and less than 10% of slow learners can complete school

assignments (Dasaradhi et al., 2016; Tran et al., 2019). It causes slow learner students to solve math problems because it requires students to think at a higher level. Students with low learning achievement prefer to give up and fail to pass mathematical problem-solving; therefore, persistence and beliefs could have a positive impact on students in solving mathematics problems (Soesanto & Dirgantoro, 2021; Wilburne & Dause, 2017). A factor that causes low mathematical problem-solving ability in students is that they easily solve the given problems (Utami & Wutsqa, 2017). Mathematical problem solving can make students afraid and avoid it, then easily give up. To overcome this, students need to have a diligent, persistent, and confident attitude which is commonly called resilience.

Mathematical resilience is the ability or toughness of students to face problems and obstacles in learning mathematics (Lee & Johnston-wilder, 2017). Mathematical resilience includes the toughness to encounter mathematical problems. Mathematical Resilience is essential in the learning process because it makes it possible to overcome obstacles in learning mathematics, as it provides a positive response (Joy, 2019). This positive response enables students to be more persistent in learning mathematics. Negative responses in learning mathematics such as anxiety and fear can turn positive if students develop their mathematical resilience (Johnston-wilder et al., 2015). Mathematical resilience is needed, so students can create supportive situations to solve mathematical problems. Being able to approach the mathematics problem, willingness to develop mathematics ability, and abilities to encounter any obstacles to mathematical growth are the characteristics of mathematical resilience (Lee & Johnston-wilder, 2017). Mathematical resilience is very influential in learning mathematics; as stated by Munthazimah, good mathematical resilience is needed if students are better prepared in the learning process (Muntazhimah & Ulfah, 2020). Mathematical resilience is important for students in carrying out the mathematics learning process to solve mathematical problems.

Several researchers have researched slow learner students, mathematical resilience, and mathematical problem solving, including Attami's first research in 2020 regarding mathematical problem solving based on mathematical resilience. The second research by Muntazhimah in 2020 regarding mathematical resilience with pre-service teachers as the subjects. The third research by Labuem in 2020 regarding the thinking process of slow learner students in solving mathematical problems. Lastly, the fourth research by Vasudevan in 2017 is about slow learner students' education programs.

Based on the relevant researches above, Attami's research result shows that students with high mathematical resilience have better mathematical problem-solving abilities than students with low mathematical resilience, while students with medium mathematical problem-solving skills have the same abilities as students with low mathematical resilience (Attami et al., 2020). Meanwhile, Muntazhimah's research result shows that not all students with good grades have high mathematical resilience because mathematical resilience grows in the individual and requires a process (Muntazhimah & Ulfah, 2020). There are different results from the two studies, namely different levels of mathematical resilience. Attami states that mathematical resilience is directly proportional to problem-solving abilities, while Muntazhimah states that mathematical resilience is not directly proportional to students' scores. The result of research conducted by Labuem, which is based on the problem-solving stages according to Polya, shows that slow learner students can only remember the information at the end of the question and make problem-solving plan based on the word order of the questions. Slow learner students can carry out the plan but are unsure of the answers and do not double-check the answers (Labuem, 2020). Meanwhile, Vasudevan's research shows that slow learner students need more time and attention to absorb the lessons optimally (Vasudevan, 2017). Based on this research, the researcher indicates that slow learner students need more time to learn because the problem-solving stages of slow learner students are not yet complete.

There is a gap in the studies mentioned above in which no one has yet discussed the mathematical resilience of slow learner students in solving mathematical problems. Therefore, the novelty of this research is the subjects that are slow learner students. This study aims to analyze mathematical resilience on slow learner students in solving mathematical problems.

Method

The method used in this research is the descriptive qualitative approach. The qualitative approach is a research procedure that produces data in the words or notes from the researcher or other things being observed (Creswell, 2012). This study aims to describe mathematical resilience in students with special needs in solving mathematical problems. This research was conducted in eight public and private schools in two provinces, namely DKI Jakarta and Banten. The total population in this study was 71 students with special needs in secondary schools. The instruments used were in the form of mathematical resilience questionnaires, mathematical problem-solving questions, and interviews. The mathematical resilience questionnaire is adapted from Kookan with indicators of value, struggle, growth, and

specified based on the type of special needs, namely slow learner and gender. Subjects were then selected based on the mathematical resilience categories, as can be seen in table 1.

Table 1. Subjects were selected based on the mathematical resilience categories

No	Category	Gender	Domicile	Age	Level	Code
1	High	Male	Tangerang	16	Vocational High School	S1
2	Medium	Female	Jakarta	13	Junior High School	S2
3	Low	Male	Tangerang	17	Senior High School	S3

Subjects who had been selected then took the mathematical problem-solving tests and were interviewed. The instrument of the problem-solving test was in the form of algebraic questions consisting of 2 questions that were suitable for use after being validated by the experts. In the validation process, there was a revision to simplify question number 2. The initial question was to find the difference of the circumference between two paintings, and then it was revised so that the question to determine the width of one of the paintings was obtained. Solving the mathematical problems is based on Polya's problem-solving indicators. After taking the mathematical problem-solving test, the students were interviewed by the researcher. The interviews conducted were semi-guided interviews with Newman's error analysis questions, but they could be developed according to the students' answers.

Results

The selected subjects based on the mathematical resilience category then took the mathematical problem-solving test. Problem-solving indicators based on Polya's stages are understanding the problem, devising a plan, carrying out the plan, and looking back (Polya, 2004). In the stage of understanding the problem, the subjects are expected to understand the information, questions, and problems contained in the questions. In the stage of devising a plan, the subjects are expected to obtain other information so that they can develop strategies to work on the questions. In the stage of carrying out the plan, the subjects are expected to carry out the strategies that have been prepared in the previous stage properly. In the stage of looking back, the subjects check and consider the results of the calculations that they have done. Based on the analysis process, the mathematical problem solving of S1, S2, and S3 can be seen in table 2.

Table 2. The result score of Mathematical Problem Solving Research Subjects

Code	Mathematical Problem Solving				Score
	Understanding the problem	Devising a plan	Carrying out the plan	Looking back	
S1	The score for questions number	The score for questions number	The score for question number	The score for questions	Question number 1

Code	Mathematical Problem Solving				Score
	Understanding the problem	Devising a plan	Carrying out the plan	Looking back	
	1 and 2 is 1 because the subject wrote what he knew and was asked in questions number 1 and 2 but did not give a logical reason.	1 and 2 is 1 because the subject was able to make a mathematical model for number 1 and 2 but is still limited to the symbols written in the questions. If the questions were only in the form of sentences, the subject also wrote them in sentences, as well as when writing mathematical formulas.	1 is 2 and for question number 2 is 1 because the subject was able to write down the complete work procedure in question number 1, but there was a wrong mathematical model, so the calculation result was wrong. In question number 2, the subject wrote incomplete procedures and miscalculations.	number 1 and 2 is 0 because the subject did not check the answer again because he was sure of the answer	gets a score of 4, and question number 2 gets a score of 3.
S2	The score for questions number 1 and 2 is 0 because the subject did not write down what she knew and was asked in questions 1 and 2, but the subject rewrote all the questions given.	The score for questions number 1 and 2 is 0 because the subject did not make a mathematical model on question number 1 and 2.	The score for questions number 1 and 2 is 1 because the subject wrote incomplete procedures, the calculation carried out in number 1 was multiplying the numbers in the question, while in number 2 the subject only added the algebraic form and numbers in the questions.	The score for questions number 1 and 2 is 0 because the subject did not check again and felt that the answer was sufficient.	Question number 1 gets a score of 1, and question number 2 gets a score of 1.
S3	The score for questions number 1 and 2 is 1 because the subject wrote down what he knew and was asked in question	The score for questions number 1 and 2 is 0 because the subject wrote the mathematical language on the problem, but no	The score for questions number 1 and 2 is 1 because the subject wrote incomplete procedures on questions	The score for questions number 1 and 2 is 0 because the subject did not check again and was not sure of the	Question number 1 gets a score of 2 and question number 2 gets a

Code	Mathematical Problem Solving				Score
	Understanding the problem	Devising a plan	Carrying out the plan	Looking back	
	number 1 and 2, but it was incomplete because there was no written information and no logical reason.	mathematical model was written for question number 1 and problem number 2.	number 1 and 2, calculation errors were made because the subject was unable to obtain the information in the questions completely.	answer.	score of 2.

Discussion

The three subjects have answered the mathematical problem solving question as shown in Figure 2. The results of problem solving and interviews of all research subjects are presented based on Polya's problem solving stages.

Pak Arya has 2 yards in his house, a yard for playing and gardening. If the gardening yard is 2 meters wide less than the length and the circumference of the yard is 16 meters, while the play yard is 3 times bigger (in length and width) than the gardening yard, then determine the area of the play yard!

Figure 2. Mathematical problem solving question

Understanding the Problem

1. Subject with high mathematical resilience (S1)

In the stage of understanding the problem, S1 can write what he knows and is asked, as can be seen in Figure 3. However, the things written by S1 are just basic information from the questions without being equipped with mathematical modeling and logical reasons why S1 can write this down. It is in line with Tran's research that slow learners have less than 50% logical memory (Tran et al., 2019).

1. Dik :
 keliling halaman berkebun 16 meter
 Panjang : X meter
 lebar : (X-2) meter
 Halaman bermain Panjang 3 kali dari halaman berkebun.
 Halaman bermain lebar 3 kali dari halaman berkebun.
 Ditanya :
 luas Halaman Bermain ?

Figure 3. Stages of understanding the problem S1

S1 does not write down the mathematical symbols, and S1's understanding of the question is presented in the interview as follows:

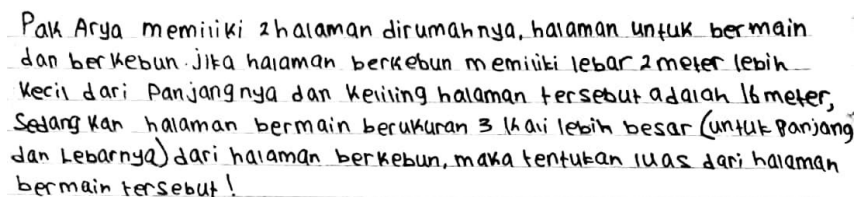
Researcher : Do you know the symbol in question number 1?

- S1 : For number one, I don't really know
 Researcher : Do you understand question number 1?
 S1 : I think I understand

The result of the interview shows that S1 does not know the symbols that can be used to replace sentences in mathematical problems. The symbolic representation is the most prominent error in solving mathematical problems (Sari & Rosjanuardi, 2018), so that S1 continues to write 'times' instead of 'x'. S1 also states "I think" in his answer which indicates that S1 is doubtful about his understanding of the question. This is one of the characteristics of slow learners, namely lack of self-confidence (Ruhela, 2014; Vasudevan, 2017).

2. Subject with medium mathematical resilience (S2)

Based on the answer given by S2, S2 rewrites all the sentences contained in the questions as shown in Figure 4. The excerpt from the interview with S2 is as follows:



Pak Arya memiliki 2 halaman dirumahnya, halaman untuk bermain dan berkebun. Jika halaman berkebun memiliki lebar 2 meter lebih kecil dari panjangnya dan keliling halaman tersebut adalah 16 meter, Sedangkan halaman bermain berukuran 3 kali lebih besar (untuk panjang dan lebarnya) dari halaman berkebun, maka tentukan luas dari halaman bermain tersebut!

Figure 4. Stages of understanding the problem S2

- Researcher : What do you know about question number 1?
 S2 : What I know about it is yard, width, and circumference
 Researcher : What is asked in question number 1?
 S2 : For question number 1, we're asked about the area of the playing yard

Based on the interview, S2 does not understand the question because S2 can only mention some of the information from the question. The inability of students to translate mathematical problems is caused because students do not understand the existing mathematical problems (Sari & Rosjanuardi, 2018). The information in the question that S2 does not mention, such as the difference in width and length of the gardening yard and the size of the playing yard three times longer and wider than the gardening yard. S2 can find out what is asked in the question because the information is at the end of the sentence, as Labuem states that students who are slow to learn can understand the information contained at the end of the question (Labuem, 2020).

3. Subject with low mathematical resilience (S3)

Based on the answer given by S3, S3 has not been able to understand the question. It can be seen in Figure 5 that there is a writing error about what he knows; for example, the

length of the gardening yard in the question is not yet known, while the width is 2 meters smaller than its length. Another information that S3 has misstated is the playing yard in which the length and width of the playing page are three times bigger than the gardening yard, but S3 writes it with a "+" symbol to add the length and width to equal 3. In line with the results of the single-subject observation by Manikmaya and Prahmana that the error in understanding symbols is often made by slow learner students (Manikmaya & Prahmana, 2021). S3 is capable of writing down what is asked correctly.

1. Panjang dan keliling = 16 meter
lebar = 2 m
Hukum bermain $P+L = 3$
maka luas halaman bermain adalah?

Figure 5. Stages of understanding the problem S3

The excerpt from the interview with S3 is as follows:

Researcher : Can you understand question number 1?

S3 : I don't really understand

The result of the interview is related to the error in writing the information contained in the question. Misinformation written in the question occurs because students do not understand the given question (Islamiyah & Prayitno, 2017).

Devising a Plan

1. Subject with high mathematical resilience (S1)

The problem-solving plan prepared by S1 can be seen in Figure 6. S1 can write a mathematical model, namely the formula for the circumference of a rectangle, even though it is not told in the question that the garden is rectangular. It means that S1 can relate the information in the question to what he already knows. In line with Annizar's research results, subjects with higher mathematical skills have an excellent devising plan (Annizar et al., 2020). Based on the interview result, S1 can prepare a problem-solving plan because he has written down what he knows and what is asked in the question. In line with Soesanto's research, prior mathematical knowledge is needed to make problem-solving plans (Soesanto & Dirgantoro, 2021).

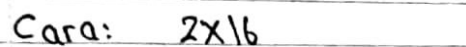
Jawab:
keliling = 2 Panjang + 2 lebar

Figure 6. Stages of devising a plan S1

The preparation of plan carried out by S1 begins with the word “circumference” which shows that slow learner students are able to design plans according to the order of sentences in the question (Labuem, 2020).

2. Subject with medium mathematical resilience (S2)

In the stage of devising a plan, S2 has not been able to plan well. It can be seen from the way S2 immediately writes the numbers in the method section and are not equipped with a formula. The use of concepts and choice of formulas will affect the planning stages (Utami & Wutsqa, 2017).



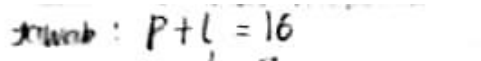
Cara: 2x16

Figure 7. Stages of devising a plan S2

The inability of S2 to use formulas is due to the lack of skills in understanding the sentences in the question. This is in line with the basic principle that students who are slow learners find it difficult to understand abstract ideas (Dasaradhi et al., 2016).

3. Subject with low mathematical resilience (S3)

In the stage of devising of a plan, S3 shows that he is able to write down the symbols that will be used in the next stage as seen in Figure 8. However, what S3 has written is not correct and is not in line with the previous stage.



*link: $P+L = 16$

Figure 8. Stages of devising a plan S3

The result of the interview with S3 at this stage is as follows:

Researcher : Did you make a plan before answering the question? And what plan did you make?

S3 : I read the question and do what I can and answer it right away

S3 has not been able to link the existing information and transform it into mathematical sentences and slow learner students find it difficult to connect new information with information they already have (Islamiyah & Prayitno, 2017; Ruhela, 2014). Devising a plan made by S3 is inappropriate because S3 does not understand mathematical problems well, in line with Annizar's research that subjects who do not understand the problem correctly will tend to be wrong in planning problem solving (Annizar et al., 2020).

Carrying Out the Plan

1. Subject with high mathematical resilience (S1)

The stage of carrying out the plan by S1 can be seen in Figure 9. From the formula for the circumference of the rectangle, S1 finds the length of one of the yards. There is an incomplete information in which S1 does not state which yard that he writes. This is asked by the researcher in the interview which is as follows:

Researcher : So, what steps did you take to solve the question number 1?

S1 : Question number one uses the circumference formula, then I find the length and width of the playing yard.

$$\begin{array}{l}
 \text{keliling} = 2 \text{ Panjang} + 2 \text{ lebar} \\
 16 = 2x + 2(x-2) \\
 16 = 2x + 2x - 4 \\
 16 = 4x - 4 \\
 16 + 4 = 4x \\
 4x = 20 \\
 x = 5
 \end{array}$$

$ \begin{array}{l} \text{Panjang} = 3 \text{ kali} \\ = 3(x) \\ = 3 \times 5 \\ = 15 \end{array} $	$ \begin{array}{l} \text{lebar} = x - 2 \\ = 5 - 2 \\ = 3 \end{array} $	$ \begin{array}{l} \text{luas} = p \times l \\ = 15 \times 3 \\ = 45 \text{ Meter} \end{array} $
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Figure 9. Stages of carrying out the plan S1

It can be understood that the circumference formula used by S1 is to find the length of the gardening yard. Then, that length is used to find the length and width of the playing yard. After that, he finds the area of the playing yard. S1 can find the length of the gardening yard, as can be seen in Figure 9 that S1 finds the “x” correctly, although the information in the answer is incomplete. There is a substitution error in the width of the playing yard. S1 writes that the width of the playing page is $x - 2$ which is not correct because $x - 2$ should be the width of the gardening yard, while the width of the playing page is three times wider than the gardening yard. This error causes an incorrect result for question number 1, in line with previous research that substitution errors often occur, resulting in calculation errors even though the steps being carried out are correct (Calor et al., 2020; Islamiyah & Prayitno, 2017).

2. Subject with medium mathematical resilience (S2)

In this stage, S2 is not able to carry out the plan well. It can be seen in Figure 10 that S2 only multiplies the number in the question then divides it. The process and result of the completion in this stage are incomplete and incorrect. understanding of problem solving procedures will affect students in solving mathematical problems (Attami et al., 2020).

$$\begin{array}{l}
 \text{Cara: } 2 \times 16 \\
 = 32 \times 3 \times 3 \times 3 \\
 = 864 : 2 \\
 = 432 : 2 \\
 = 216
 \end{array}$$

Figure 10. Stages of carrying out the plan S2

The result of the interview is as follows:

Researcher : Why did you multiply the circumference which is 16 meters by 2?

S2 : Because there are two yards

Based on the result of the work and interview, S2 is not able to solve this question until the end properly and correctly. Slow learner students are not able to complete the given task until the end because their cognitive abilities are limited (Harahap & Surya, 2017; Tran et al., 2019).

3. Subject with low mathematical resilience (S3)

The stage of carrying out the plan of S3 can be seen in Figure 11. In the previous stage, S3 is not able to link the information in the question. As the result, S3 is not able to solve the problem correctly in this stage.

$$\begin{array}{l}
 \text{Jawab: } P + L = 16 \\
 L = 2 \quad + \\
 \quad \quad \quad 18 \\
 \text{Harapan bermon: } 3 \\
 P + L = 18 \times 3 = 54 \text{ m}
 \end{array}$$

Figure 11. Stages of carrying out the plan S3

It can be seen in Figure 11 that S3 cannot use the arithmetic symbols correctly so that there is a mismatch between the written formula and the substituted numbers. Based on the result of the interview, S3 multiplies what S3 has added up by 3 because the question states that the length and width of the playing yard are three times larger than the gardening yard, this inconsistency is because the subject does not understand the formula that must be used and relates it to the information contained in the problem which causes errors in problem solving (Utami & Wutsqa, 2017).

Looking Back

The last stage is to check again. S1, S2, and S3 are given the same question as follows:

Researcher : Did you double-check the answer? And are you sure about your answer?

None of S1, S2, and S3 recheck the answers, and they are doubtful about the answers. It is in line with the two other studies that are looking back is the stage with the smallest percentage

compared to other stages, and slow learner students only consider the final answer as the important one, so there is no need to look back (Labuem, 2020; Utami & Wutsqa, 2017). Their doubts in answering questions cause incomplete and inaccurate stages of problem-solving, which is in line with Soesanto's research which states that mathematical problem solving is supported by mathematical beliefs (Soesanto & Dirgantoro, 2021). The uncertainty of S1, S2, and S3 in answering questions is one of the characteristics of slow learners, namely, not having confidence (Ruhela, 2014; Tran et al., 2019; Vasudevan, 2017).

Conclusion

Mathematical resilience on slow learner students is directly proportional to solving mathematical problems for S1 and S2 or S1 and S3. It occurs because S1 has the highest score for mathematical problem-solving. However, mathematical resilience on slow learner students is inversely proportional to S2 and S3 because S3 is superior at understanding the problem. When compared to S1, S2 and S3 tend to lack understanding of the questions, so they cannot make a problem-solving plan properly until the stage of looking back, which results in errors during these stages. This research provides new information about mathematical resilience and mathematical problem solving on slow learner students. Teachers can pay more attention to the slow learner student learning strategies in solving problems.

References

- Amelia, W. (2016). Karakteristik dan jenis kesulitan belajar anak slow learner. *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, 1(2), 53–58. <https://doi.org/10.30604/jika.v1i2.21>.
- Annizar, A. M., Maulyda, M. A., Khairunnisa, G. F., & Hijriani, L. (2020). Kemampuan pemecahan masalah matematis siswa dalam menyelesaikan soal PISA pada topik geometri. *Jurnal Elemen*, 6(1), 39–55. <https://doi.org/10.29408/jel.v6i1.1688>.
- Attami, D., Budiyono, B., & Indriati, D. (2020). The mathematical problem-solving ability of junior high school students based on their mathematical resilience. *Journal of Physics: Conference Series*, 1469(1), 012152. <https://doi.org/10.1088/1742-6596/1469/1/012152>.
- Bahar, A., & June Maker, C. (2015). Cognitive backgrounds of problem solving: A comparison of open-ended vs. closed mathematics problems. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(6), 1531–1546. <https://doi.org/10.12973/eurasia.2015.1410a>.
- Boone, W. ., Yale, M. ., & Staver, J. . (2014). Rasch analysis in the human sciences. *Springer*, 111–136. <https://doi.org/10.1007/978-94-007-6857-4>.
- Calor, S. M., Dekker, R., Drie, J. P. Van, & Zijlstra, B. J. H. (2020). “Let us discuss math”: Effects of shift - problem lessons on mathematical discussions and level raising in early algebra. *Mathematics Education Research Journal*, 32, 743–763. <https://doi.org/10.1007/s13394-019-00278-x>.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, evaluating quantitative, and qualitative research* (4th ed.). Boston: Pearson.

- Dasaradhi, K., Mandal, M., Dt, K., Mentor, H., & Wing, G. (2016). 30 Methods to improve learning capability in slow learners Sriharipuram. *International Journal of English Language, Literature, and Humanities*, 4(2), 556–570.
- Faradillah, A., & Febriani, L. (2021). Mathematical trauma students' junior high school based on grade and gender. *Infinity Journal*, 10(1), 53. <https://doi.org/10.22460/infinity.v10i1.p53-68>.
- Harahap, W. L., & Surya, E. (2017). Development of learning media in mathematics for students with special needs. *International Journal of Sciences: Basic and Applied Research*, 33(July), 1–12.
- Islamiyah, A. C., & Prayitno, S. (2017). Analisis kesalahan siswa SMP pada penyelesaian masalah sistem persamaan linear dua variabel. *Jurnal Didaktik Matematika*, 4185, 66–76. <https://doi.org/10.24815/jdm.v5i1.10035>.
- Johnston-wilder, S., Lee, C., & Brindley, J. (2015). *Developing mathematical resilience in school-students who developing mathematical resilience in school-students who have experienced repeated failure*. United Kingdom: Warwick University.
- Joy, U. C. (2019). Achievement motivation and emotional intelligence as predictors of mathematical resilience among secondary school students. *Advances in Social Sciences Research Journal*, 6(5), 191–200. <https://doi.org/10.14738/assrj.65.6385>.
- Kalambouka, A., Pampaka, M., Omuvwie, M., & Wo, L. (2016). Mathematics dispositions of secondary school students with special educational needs. *Journal of Research in Special Educational Needs*, 16(1), 701–707. <https://doi.org/10.1111/1471-3802.12204>.
- Kooken, J., Welsh, M. E., Mccoach, D. B., Johnston-wilder, S., & Lee, C. (2015). Development and validation of the mathematical resilience scale. *Measurement and Evaluation in Counseling and Development*, 49(3), 217–242. <https://doi.org/10.1177/0748175615596782>.
- Labuem, S. (2020). The thinking process of children with special needs (slow learner) in inclusion classes in solving mathematical problem. *JUPITEK: Jurnal Pendidikan Matematika*, 2(2), 43–50. <https://doi.org/10.30598/jupitekvol2iss2pp43-50>.
- Lee, C., & Johnston-wilder, S. (2017). The construct of mathematical resilience. In *Understanding Emotions in Mathematical Thinking and Learning*. Elsevier Inc. <https://doi.org/10.1016/B978-0-12-802218-4.00010-8>.
- Manikmaya, P., & Prahmana, R. C. I. (2021). Single subject research: Pembelajaran perbandingan senilai dan berbalik nilai berpendekatan contextual teaching and learning untuk siswa slow learner. *Journal of Honai Math*, 4(1), 35–48. <https://doi.org/10.30862/jhm.v4i1.172>.
- Muntazhimah, M., & Ulfah, S. (2020). Mathematics resilience of pre - service mathematics teacher. *International Journal of Scientific & Technology Research*, 9(1), 7–11.
- Polya, G. (2004). *How to solve it mathematical method* (4th ed.). Princeton University Press.
- Ruhela, R. (2014). The pain of the slow learners. *Online International Interdisciplinary Research*, 4(4), 193–200.
- Sari, D. P., & Rosjanuardi, R. (2018). Errors of students learning with react strategy in solving the problems of mathematical representation ability. *Journal on Mathematics Education*, 9(1), 121–128. <https://doi.org/10.22342/jme.9.1.4378.121-128>.
- Simamora, R. E., Saragih, S., & Hasratuddin, H. (2018). Improving students' mathematical problem solving ability and self-efficacy through guided discovery learning in local culture context. *International Electronic Journal of Mathematics Education*, 14(1), 61–72. <https://doi.org/10.12973/iejme/3966>.
- Soesanto, R. H., & Dirgantoro, K. P. S. (2021). Kemampuan pemecahan masalah mahasiswa pada kalkulus integral dilihat dari keyakinan dan pengetahuan awal matematis. *Jurnal Elemen*, 7(1), 117–129. <https://doi.org/10.29408/jel.v7i1.2899>.

- Sumintono, B. (2018). Rasch model measurements as tools in assesment for learning. *Atlantis Press*, 173, 38–42. <https://doi.org/10.2991/icei-17.2018.11>.
- Tran, T., Thi, T., Nguyen, T., Thi, T., Le, T., & Phan, T. A. (2019). Slow learners in mathematics classes: the experience of Vietnamese primary education. *Education 3-13 International Journal of Primary, Elementary and Early Years Education*, 48(5), 580–596. <https://doi.org/10.1080/03004279.2019.1633375>.
- Utami, R. W., & Wutsqa, D. U. (2017). An analysis of mathematics problem-solving ability and self-efficacy students of junior high school in Ciamis Regency. *Jurnal Riset Pendidikan Matematika*, 4(2), 166–175. <https://doi.org/10.21831/jrpm.v4i2.14897>.
- Vasudevan, A. (2017). Slow learners – Causes, problems and educational programmes. *International Journal of Applied Research*, 3(12), 308–313.
- Wei, S., Chee, C., Looi, K., & Sumintono, B. (2020). Assessing computational thinking abilities among Singapore secondary students: a Rasch model measurement analysis. *Journal of Computers in Education*, 8, 213–236. <https://doi.org/10.1007/s40692-020-00177-2>.
- Widodo, S. A., Ibrahim, I., Hidayat, W., Maarif, S., & Sulistyowati, F. (2021). Development of mathematical problem solving tests on geometry for junior high school students. *Jurnal Elemen*, 7(1), 221–231. <https://doi.org/10.29408/jel.v7i1.2973>.
- Wilburne, J. M., & Dause, E. (2017). Teaching self-regulated learning strategies to low-achieving fourth-grade students to enhance their perseverance in mathematical problem solving. *Investigations in Mathematics Learning*, 9(1), 38–52. <https://doi.org/10.1080/19477503.2016.1245036>.