

## SYSTEMATIC LITERATURE REVIEW : SELF-REGULATED LEARNING (SRL) ON MATHEMATICAL PROBLEM- SOLVING ABILITY

Ainia Refi Mafaza<sup>1</sup>, Indah Nur Safira<sup>2</sup>, Maulida Uswatin Khasanah<sup>3</sup>, Dina  
Fakhriyana<sup>4</sup>

Program Studi Tadris Matematika<sup>1,2,3,4</sup>, Fakultas Tarbiyah<sup>1,2,3,4</sup>, Institut Agama  
Islam Negeri Kudus<sup>1,2,3,4</sup>

[ainiarefimafaza@gmail.com](mailto:ainiarefimafaza@gmail.com)<sup>1</sup>, [safirraaaa@gmail.com](mailto:safirraaaa@gmail.com)<sup>2</sup>,  
[maulidauswatink@gmail.com](mailto:maulidauswatink@gmail.com)<sup>3</sup>, [dinafakhriyana@iainkudus.ac.id](mailto:dinafakhriyana@iainkudus.ac.id)<sup>4</sup>

### Abstract

The ability to solve problems is a crucial component that students must possess when learning mathematics. For students to develop these abilities, self-regulated learning is necessary. This study examines the impact of self-regulated learning on mathematical problem-solving abilities as well as abilities as indicators of mathematical problem-solving abilities that are affected by self-regulated learning. The method used in this research is the Systematic Literature Review method, where researchers will review several related previous articles. In the data search, there were 347 articles from the period 2013–2023, which were then selected based on inclusion and exclusion criteria to obtain 25 articles that were suitable for study by researchers. The results of the research conducted include: (1) there is a significant positive influence of self-regulated learning on mathematical problem-solving abilities; (2) students with high level of SRL capable of meeting 4 indicators of mathematical problem-solving ability according to Polya, student with medium level of SRL only able to meet 2 indicators of mathematical problem-solving ability according to Polya, and student with low level of SRL only able to meet 1 indicator of mathematical problem-solving ability according to Polya or not even able to solve existing problems.

*Keyword: Mathematical Problem-Solving Ability, Mathematical Problem-Solving Ability Polya, Self-Regulated Learning*

---

### A. Introduction

Education is an important component of achieving success for a country or nation because the quality of education affects human resources. Education plays an important role in changing the way students think and behave, improving their knowledge, and continuing to be competent in various fields (Juniantari et al., 2019). According to Rahayu & Alyani (2020), mathematics is important to study because it is not much different from everyday human life, whereby continuing to

try to learn and understand mathematics, a person will continue to get used to thinking systematically by using logic creatively and critically. In the 21st century, skills education in learning is starting to be formed to achieve various skills such as being able to work together, being skilled, being creative, and having the ability to think critically (Jumaisyaroh et al., 2015).

The goal of learning mathematics, according to Abidin (2015), is to improve one's capacity for solving complex mathematical problems. Anggraeni & Herdiman (2018) define issue-solving as the process of dissecting or resolving a problem by employing steps that lead to the desired outcome. Problem-solving is a process of acquiring rules at a higher level as well as a way to apply rules that have been mastered through prior learning activities (Hadi & Radiyatul, 2014). Students' ability to solve problems is crucial to their future. Learning experts agree that problem-solving abilities, within certain boundaries, can be acquired through the subject of study and discipline taught (Wena, 2018). In the mathematics learning process, problem-solving abilities need to be highlighted because, by addressing issues, students will be encouraged to think intensively and creatively in solving problems (Sriwahyuni & Maryati, 2022).

Among the specialists who developed strategies for resolving the Polya issue (Sriwahyuni & Maryati, 2022). Learning to solve problems involves four processes, according to Polya: (1) comprehending the problem; (2) formulating a plan for a problem-solving approach; (3) carrying out the problem-solving method; and (4) double-checking the solutions found. After being presented with a problem, students practice comprehending it, coming up with solutions, and putting those solutions into practice until they can conclude. By posing questions that lead to the idea, the teacher assists students at every stage of the problem-solving process.

Self-regulated learning (SRL), also known as independent learning, is necessary for the development of problem-solving skills (Novianti et al., 2023). Learning independence is a way for students to self-regulate to support learning, thereby providing more effective achievements (Follmer & Sperling, 2016). SRL became known when an expert named Zimmerman (1989) developed this concept in the world of education. SRL is defined by Zimmerman (Dinata et al., 2016) as

the degree to which students voluntarily incorporate motivation, metacognition, and behavior into the learning process. SRL is critical to learning because it guides students toward autonomous learning through the creation of study plans, learning objectives, and independent information searches. Rohmah & Herdiman (2017) stated that learning independence is defined as students' willingness to learn subject matter without the help of teachers or peers. So that students can gain knowledge independently and solve the issues they encounter during the course. This supports Dinata's assertion (in Daumiller in Novianti et al., 2023) that accomplishment scores are significantly influenced by SRL, which in turn motivates students to engage in self-regulated autonomous learning activities.

Sugandi (2013) states that learning independence is characterized by students' capacity for self-diagnosis, their willingness to take initiative in their education, their need to learn, their setting goals, their ability to organize, monitor, and control their learning, their ability to see challenges as opportunities, their use of pertinent learning resources, their application of effective learning strategies, and their evaluation of the learning process and results. Additionally, Hendriana (2017) listed several contexts in which independence can be learned, such as: 1) not relying on others; 2) self-assurance; 3) disciplined behavior; 4) taking initiative; 5) feeling accountable; and 6) self-control.

Based on the preceding description, the researcher is interested in investigating the relation between SRL and mathematical problem-solving abilities in further detail. Furthermore, the relationship between SRL and measures of mathematical problem-solving abilities will be examined. This makes the research unique since it employs the Systematic Literature Review method, which hasn't been used in any other studies. The evaluated literature included data from the past ten years, spanning from 2013 to 2023. This demonstrates how recent the literature data used is.

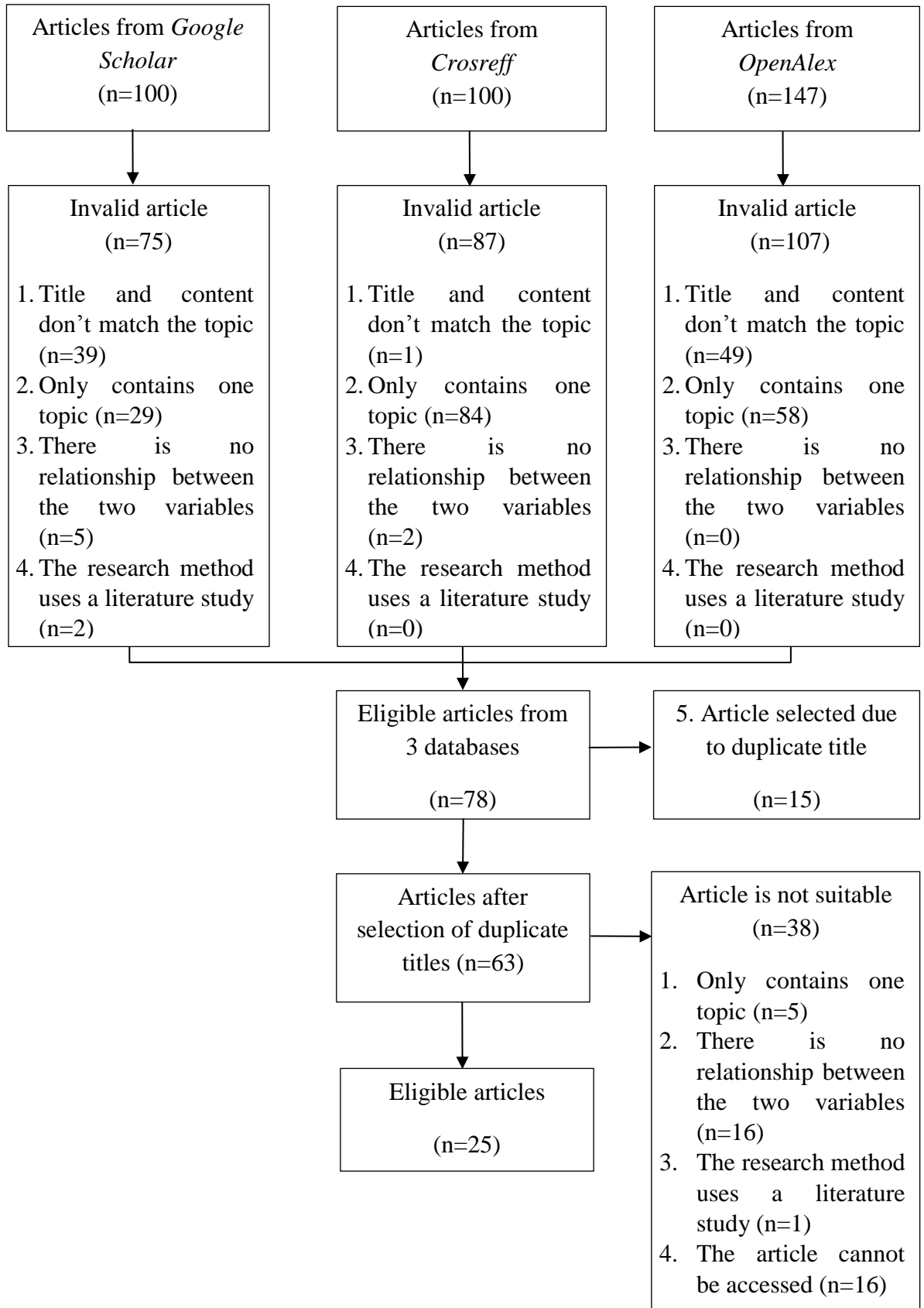
## **B. Method**

The research employed the Systematic Literature Review method, which entails several steps: formulate a research questions, finding pertinent articles, establishing inclusion and exclusion criteria, selecting articles, presenting data,

analyzing data, and coming to conclusions. Systematic Literature Review is a type of research that uses a systematic methodology to identify, select, and review existing articles on a particular topic. The aim is to produce conclusions and recommendations related to the problems studied (Nisdawati & Handican, 2022).

Firstly, two research questions were developed, which are as follows: (Q1) Is there an influence of self-regulated learning on mathematical problem-solving abilities? (Q2) Indicators of mathematical problem-solving abilities that are influenced by self-regulated learning? Secondly, searching for article data using the Publish or Perish programs on the Google Scholar, Open Alex, and Crossref databases. Literature data was searched with the keyword "The Effect of Self-Regulated Learning on Mathematical Problem-solving Ability." The literature data is limited to the period from 2013 to 2023.

Third, the inclusion criteria used in the literature search was that there was an influence of self-regulated learning on mathematical problem-solving abilities. The exclusion criteria set include: (1) Title and content do not match the topic, (2) Only contains one topic, (3) There is no relationship between the two variables, (4) The research method uses a literature study, (5) There are duplicate titles, and (6) The article cannot be accessed. There are 347 articles related to keywords. These articles were selected based on inclusion and exclusion criteria into 25 articles.



**Figure 1.** Diagram of Article Search and Selection Process

### C. Result And Discussion

The results of the research data included in this study are a tabulation of article data documented regarding mathematical problem-solving abilities in 25 articles. For more details, see table 1.

**Table 1.** Research Results Related to Self-Regulated Learning and Mathematical Problem-Solving Ability

No.	Name and Year	Research Result	Q1	Q2
1.	(Supraptinah et al., 2015)	Although students with medium and low level of learning independence also possess good mathematical problem-solving skills, those with high level of learning independence outperform those with medium or low learning independence.	✓	
2.	(Bagus et al., 2022)	Students with high learning independence can solve mathematical problems. Students with medium learning independence can complete the completion stages, but students with low independence cannot find the correct solution.	✓	✓
3.	(Aminah et al., 2022)	Students with low level of SRL are only able to distinguish between known data, questionable data, and a sufficient amount of data for solving tasks, students with medium level of SRL are less able to verify that the answers acquired are accurate. Students with high level of SRL are able to fulfil all indicators of mathematical problem-solving ability	✓	✓
4.	(Lubis et al., 2023)	Students with high levels of self-directed learning are able to fulfil all four indicators of mathematical problem-solving according to Polya. Medium, meeting only indicators 1 and 3. Low, unable to meet all four indicators.	✓	✓
5.	(Lailiyah, 2023)	Students with high self-directed learning can fulfill four indicators of mathematical problem-solving ability, according to Polya. Medium only meets indicators 1, 2, and 3. Low can only meet indicator 3.	✓	✓
6.	(Hasibuan & Nurjanah, 2020)	Students' ability to solve mathematical problems is strongly and favorably impacted by SRL. The direct contribution that SRL makes to the ability to solve mathematical problems is $0.827 = 82.7\%$ . The ability to solve mathematical problems is significantly impacted by SRL. The most important and outstanding component affecting pupils'	✓	

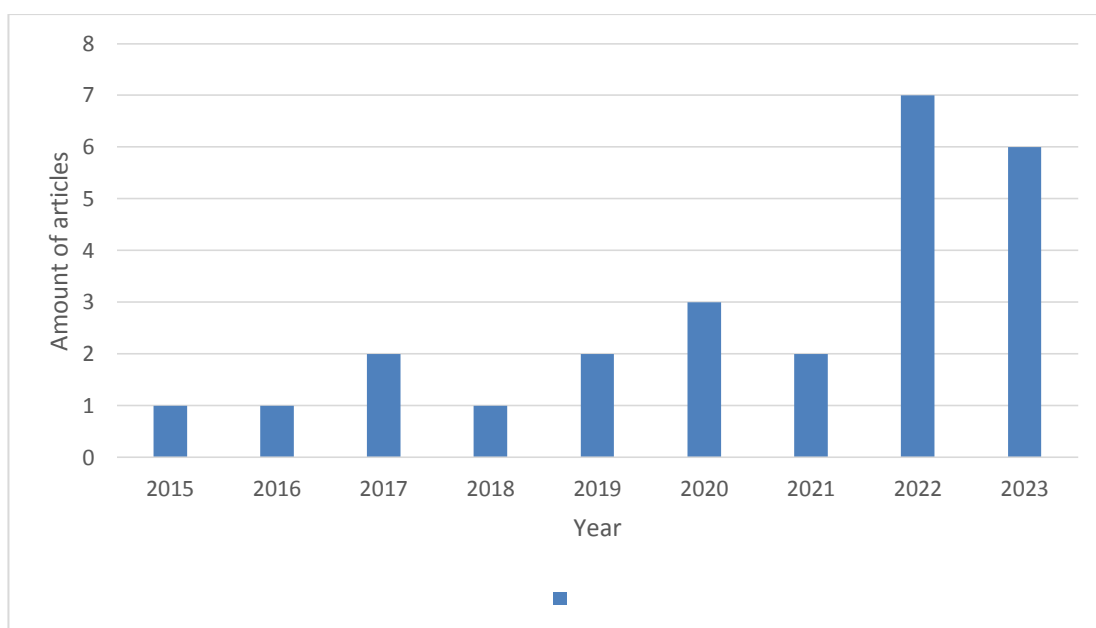
<b>No.</b>	<b>Name and Year</b>	<b>Research Result</b>	<b>Q1</b>	<b>Q2</b>
		ability to solve mathematical problems is SRL. SRL increases one's capacity to solve mathematical problems by 24.26%.		
<b>7.</b>	(Yuliasari, 2017)	Students who use the PBL model have stronger mathematical problem-solving abilities than students who use the GDL model in the group of students with high SRL.	✓	
<b>8.</b>	(A. Amalia et al., 2018)	Self-regulated learning is at a very strong level, meaning it shows a very positive and influential relationship with mathematical problem-solving abilities.	✓	
<b>9.</b>	(Zamnah, 2017)	Students' capacity for SRL and their aptitude for solving mathematical problems are related.	✓	
<b>10.</b>	(Taufik, 2020)	Mathematical problem-solving ability with high category independence is better than low category and medium category independence; medium category independence is better than low category independence.	✓	
<b>11.</b>	(Novianti et al., 2023)	The better SRL a student has, the better their mathematical problem-solving abilities will be.	✓	✓
<b>12.</b>	(Sucipto & Hatip, 2020)	Students' skills to solve mathematical problems vary according to their degree of SRL.	✓	
<b>13.</b>	(Wahyuningsih, 2023)	Students in high level of SRL have good problem-solving abilities, while students in medium level of SRL have fairly good problem-solving abilities, and students in low level of SRL have poor problem-solving abilities.	✓	✓
<b>14.</b>	(Rohani et al., 2022)	Students with high levels of SRL are relatively able to understand the problem, plan, complete the plan, and re-examine well and correctly. Students in medium level of SRL have different abilities; some students only fulfill two steps, specifically identifying the issue and organizing a fix. Some students fulfill three steps, namely being able to understand mathematical problems, being able to write formulas, and being able to carry out calculations from the formulas used. Students with low level of SRL are only able to understand the problem.	✓	✓
<b>15.</b>	(Deo et al., 2023)	Students with high level of SRL can comprehend the problem, make plans, execute strategies, and double-check. Students with	✓	✓

No.	Name and Year	Research Result	Q1	Q2
		medium level of SRL are capable of comprehending issues, coming up with solutions, and carrying them out. Even students with low levels of SRL may comprehend issues, create solutions, and execute strategies.		
16.	(Azizah et al., 2019)	Based on Polya theory, students' problem-solving skills in opportunity material are typically classified as high for very high learning independence students, medium for high and medium learning independence students, and low for low and very low learning independence students within the high problem-solving category.	✓	✓
17.	(Hidayah et al., 2022)	Students with high level of SRL tend to have better problem solving skills. Students with medium levels of SRL have fairly good problem-solving skills. Students with low levels of SRL are not proficient in problem-solving.	✓	✓
18.	(H. Amalia & Jusra, 2022)	Learners with a high level of independence are able to meet 4 indicators of mathematical problem-solving. Learners with medium levels of independence were able to meet 3 indicators and learners with low levels of independence were able to meet 2 indicators.	✓	✓
19.	(Kurniawan, 2016)	SRL, connection skills and mathematical problem-solving are related.	✓	
20.	(Ansori & Herdiman, 2019)	Learning independence has a very strong influence on mathematical problem-solving abilities.	✓	
21.	(Musliha & Revita, 2021)	Students who exhibit high, medium, and low levels of SRL differ in their capacities to solve mathematical problems.	✓	✓
22.	(Noerjuniaty et al., 2022)	The ability of pupils to use both the REACT and the generative learning models to solve mathematical problems was found to have an interaction impact on SRL. Students taught using REACT learning showed a higher level of SRL than students taught with generative learning. These differences have a substantial effect on students' ability to solve mathematical problems.	✓	
23.	(Widodo et al., 2022)	Self-directed learning, self-confidence, and mathematical disposition all have a major impact on one's capacity to solve mathematical problems involving three-	✓	



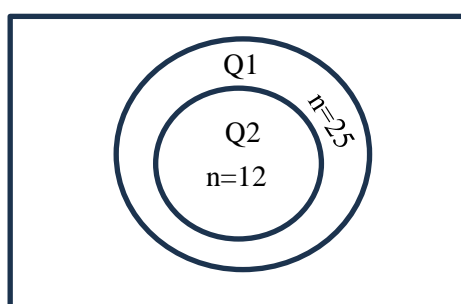
No.	Name and Year	Research Result	Q1	Q2
		variable linear equations.		
24.	(Pramesti et al., 2023)	There is a significant influence between self-efficacy and SRL on algebra problem-solving abilities.	✓	
25.	(Alyani & Ramadhina, 2022)	There is a connection between mathematical problem and SRL during COVID-19, with a Pearson correlation of 0.634.	✓	

Based on the search results, 25 articles were obtained that met the inclusion and exclusion criteria after reading the title, abstract, and contents of the entire article. The details of the number of articles based on the year of publication can be seen in Figure 2.



**Figure 2.** Diagram of Amount of Articles Every Year

Based on the questions asked in this research, the articles are categorized according to the discussion that can answer the first question and the second question. The results for these categories are presented in the following figure.



**Figure 3.** Article Category Diagram Based on Research Questions

Figure 3 above presents the number of articles that answered (Q1) Is there an influence of self-regulated learning on mathematical problem-solving abilities? (Q2) Indicators of mathematical problem-solving abilities that are influenced by self-regulated learning? 25 articles answered (Q1), while 12 articles answered both questions at once.

**The Effect of Self-Regulated Learning (SRL) on Mathematical Problem-Solving Ability**

Table 1 demonstrates that students' skills to solve mathematical problems are significantly improved by SRL. This has been demonstrated to be true in 25 articles. A student with high levels of SRL may answer questions on problem-solving thoroughly and effectively, indicating that the student also possesses high levels of mathematical problem-solving skills. While they can solve issues, children with medium levels of SRL are less thorough in their problem-solving because of their modest proficiency with mathematical concepts. Additionally, because they struggle with solving mathematical problems, students with low SRL only understand the questions posed in the problem.

This is consistent with a study by Widodo et al. (2022) (Bagus et al., 2022), where students with a high levels of SRL were able to fully comprehend the questions, develop a solution, accurately answer the questions, and double-check their answers. Learners with a medium level of SRL can fully comprehend the problem, formulate an imperfect solution plan, and appropriately execute the solution. Conversely, students with low levels of SRL can comprehend the problem in its entirety, plan a solution but fail to see any results, or execute a solution but make a calculation error that causes the results to be incorrect. In each case, this indicates that the student lacks the problem-solving skills necessary to solve the problem SRL are more prepared and adept at solving mathematical problems because they take an active role in their education and go above and beyond to study on their own (A. Amalia et al., 2018)

According to Hasibuan & Nurjanah (2020), students' problem-solving skills are influenced by SRL by 24.26%. The most effective strategy for enhancing mathematical problem-solving skills is SRL. Accordingly, students' skills in

solving mathematical problems will improve with more SRL (Novianti et al., 2023). If learning independence is also good, Ansori & Herdiman (2019) research demonstrates an average proportion of 70.86% of good problem-solving abilities. Thus, pupils' ability to solve mathematical problems is significantly influenced by SRL.

Research by Kurniawan (2016), Zamnah (2017), (Alyani & Ramadhina, 2022) reveal a relationship or correlation between mathematical problem-solving ability and SRL. There is a one-way correlation between SRL and the mathematical problems-solving abilities. This implies that an increase SRL will be accompanied by an increase in the mathematical problems-solving ability. However, SRL is not the only factor that influences mathematical problem-solving abilities; there are other factors, namely mathematical disposition, mathematical connection abilities, self-confidence, and self-efficacy (Hasibuan & Nurjanah, 2020); (Kurniawan, 2016); (Widodo et al., 2022); (Pramesti et al., 2023).

#### **Indicators of Problem-Solving Ability Influenced by Self-Regulated Learning (SRL)**

Twelve publications address the subject of how SRL influences problem-solving ability. This information is based on Table 1. Pupils with high SRL also frequently possess strong mathematics problem-solving skills. Students with medium SRL, on the other hand, will be able to finish issues in a reasonable length of time. Furthermore, children with low SRL also struggle with problem-solving skills. Polya lists the following as indicators of problem-solving ability: (1) understanding the problem; (2) creating a plan for a problem-solving approach; (3) implementing the problem-solving strategy; and (4) double-checking the results.

The findings of the research by Widiyanto et al. (2022), Aminah et al. (2022), Azizah et al. (2019), H. Amalia et al. (2022), Musliha & Revita (2021), and Deo et al. (2023) indicate that students with high levels of SRL can meet four indicator of problem-solving ability, which include comprehending problems, formulating plans, solving problems, and double-checking the answers. There are just three markers that students with medium SRL may meet: issue comprehension, problem

solution, and planning. Conversely, pupils with low levels of SRL are only able to meet one need, which is comprehending the issue.

As for the four indicators of problem-solving ability, research by Lailiyyah et al. (2023), Wahyuningsih (2023), and Rohani et al. (2022) indicates that students with high levels of SRL may meet them. In contrast, pupils with SRL can only complete one indicator, while those with medium SRL can only complete two or three indicator. According to studies by Lubis et al. (2023), Novianti et al. (2023), and Hidayah et al. (2022), however, pupils with low SRL do not fulfill any criteria for proficiency in solving mathematical problem. Thus, the students is unable to tackle challenges involving problem-solving.

#### **D. Conclusion**

It is clear from the literature review conducted for this study that SRL significantly improves one's capacity for solving mathematical problems. The capacity to answer mathematical problems increases with the degree of SRL. In addition, according to Polya, students with high SRL can meet four indicators of mathematical problem-solving ability; students with medium capable can meet only two indicators; and students with low capable can only meet one indicator of mathematical problem-solving ability or cannot yet complete existing problems. It is hoped that this research can be used to reject measuring someone, especially a participant, and educate them to always increase SRL. This matters because it influences SRL, which is significant for the ability problem in mathematics. Study studies literature This is also expected to be developed in the study; furthermore, related indicators of SRL influence ability-solution problems in mathematics.

#### **Reference**

- Abidin, Z. (2015). *Intuisi Dalam Pembelajaran Matematika*. Lentera Ilmu Cendekia.
- Alyani, F., & Ramadhina, A. L. (2022). The Relation between Self-Regulated Learning and Mathematical Problem-Solving During Covid-19. *Journal of Education Research and Evaluation*, 6(4), 645–652. <https://doi.org/10.23887/jere.v6i4.47593>
- Amalia, A., Syafitri, L. F., Sari, V. T. A., & Rohaeti, E. E. (2018). Hubungan Antara Kemampuan Pemecahan Masalah Matematik dengan Self Efficacy

dan Kemandirian Belajar Siswa SMP. *Jurnal Pembelajaran Matematika Inovatif*, 1(5), 887–894. <https://doi.org/10.22460/jpmi.v1i5.p887-894>

Amalia, H., & Jusra, H. (2022). Mathematical problem-solving ability: The impact of self regulated learning on the system of linear inequalities in two variables. *DESIMAL: JURNAL MATEMATIKA*, 5(2), 187–196. <https://doi.org/10.24042/djm.v5i2.12893>

Aminah, S., Sembiring, M. G., & Prastiti, T. D. (2022). Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar pada Pembelajaran Blended Problem-Based Learning. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 2773–2787. <https://doi.org/10.31004/cendekia.v6i3.1728>

Anggraeni, R., & Herdiman, I. (2018). Kemampuan Pemecahan Masalah Matematik Siswa Smp Pada Materi Lingkaran Berbentuk Soal Kontekstual Ditinjau Dari Gender. *Jurnal Numeracy*, 5(1), 19–28. <https://numeracy.stkipgetsempena.ac.id>

Ansori, Y., & Herdiman, I. (2019). Pengaruh Kemandirian Belajar terhadap Kemampuan Pemecahan Masalah Matematis Siswa SMP. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, 3(1), 11. <https://doi.org/10.31331/medivesveteran.v3i1.646>

Azizah, A., Maimunah, M., & Roza, Y. (2019). Kemampuan Pemecahan Masalah Matematis Siswa pada Materi Peluang Berdasarkan Self-Regulated Learning (S-RL). *Jurnal Review Pembelajaran Matematika*, 4(1), 23–31. <https://doi.org/10.15642/jrpm.2019.4.1.23-31>

Bagus, E. W., Isnarto, I., Nur Cahyono, A., Kartini Bawen No, J., & Tengah, J. (2022). Mathematical Problem Solving Ability of Vocational School Students Reviewed from Self Regulated Learning in Selective Problem Solving (SPS) Assisted Learning Management System (LMS) Learning. *Unnes Journal of Mathematics Education Research*, 11(2), 2022–2171. <http://journal.unnes.ac.id/sju/index.php/ujmer>

Deo, Z., Pattisina, C., & Sopiany, H. N. (2023). KEMAMPUAN PEMECAHAN MASALAH MATEMATIS BERDASARKAN KATEGORI SELF-REGULATED LEARNING SISWA SMP. *Jurnal Math-UMB*, 10(3), 181–191. <https://doi.org/10.36085/mathumbedu.v10i3.4921>

Dinata, P. A. C., Rahzianta, & Zainuddin, M. (2016). SELF REGULATED LEARNING SEBAGAI STRATEGI MEMBANGUN KEMANDIRIAN PESERTA DIDIK DALAM MENJAWAB TANTANGAN ABAD 21. *Prosiding Seminar Nasional Pendidikan Sains (SNPS)*, 139–146.

Follmer, D. J., & Sperling, R. A. (2016). The Mediating Role of Metacognition in the Relationship between Executive Function and Self- Regulated Learning. *British Journal of Educational Psychology*, 86(4), 559–575.

<https://doi.org/10.1111/bjep.12123>

- Hadi, S., & Radiyatul, R. (2014). Metode Pemecahan Masalah Menurut Polya untuk Mengembangkan Kemampuan Siswa dalam Pemecahan Masalah Matematis di Sekolah Menengah Pertama. *EDU-MAT: Jurnal Pendidikan Matematika*, 2(1), 53–61. <https://doi.org/10.20527/edumat.v2i1.603>
- Hasibuan, N. A., & Nurjanah. (2020). Contributions of Self-Regulated Learning, Disposition Mathematically and Habits of Mind Against Mathematical Problem Solving Ability Students. *Proceedings of the 7th Mathematics, Science, and Computer Science Education International Seminar, MSCEIS 2019*, 1–6. <https://doi.org/10.4108/eai.12-10-2019.2296363>
- Hendriana, H., Rohaeti, E. E., & Sumarmo, U. (2017). *Hard Skills dan Soft Skills Matematik Siswa* (cetakan 1). PT Refika Aditama.
- Hidayah, N., Safitri, W. D., Zaenuri, Z., & Junaedi, I. (2022). Mathematical Problem-Solving Ability from Self\_Regulated Learning for Class 10th Senior High School Students. *ISET: Konferensi Internasional Sains, Pendidikan Dan Teknologi*, 456–473.
- Jumaisyaroh, T., Napitupulu, E. E., & Hasratuddin, H. (2015). Peningkatan Kemampuan Berpikir Kritis Matematis Dan Kemandirian Belajar Siswa Smp Melalui Pembelajaran Berbasis Masalah. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 5(2), 157. <https://doi.org/10.15294/kreano.v5i2.3325>
- Juniantari, M., Pujawan, I. G. N., & Widhiasih, I. D. A. G. (2019). Pengaruh Pendekatan Flipped Classroom Terhadap Pemahaman Konsep Matematika Siswa Sma. *Journal of Education Technology*, 2(4), 197. <https://doi.org/10.23887/jet.v2i4.17855>
- Kurniawan, F. (2016). *PENERAPAN MODEL PEMBELAJARAN CONTEXTUAL TEACHING AND LEARNING (CTL) UNTUK MENINGKATKAN KEMAMPUAN KONEKSI DAN PEMECAHAN MASALAH MATEMATIS SERTA SELF REGULATED LEARNING SISWA* [Universitas Pasundan]. <http://repository.unpas.ac.id/12511/>
- Lailiyah, S. (2023). Analisis Perbedaan Kemampuan Pemecahan Masalah Matematis Ditinjau dari Self-Directed Learning. *Postulat: Jurnal Inovasi Pendidikan Matematika*, 4(1), 1–20. <https://doi.org/10.30587/postulat.v4i1.6023>
- Lubis, F. A., Azizah, N., Ardiani, V., & Zahari, C. L. (2023). Analisis Kemampuan Pemecahan Masalah Matematis pada Materi Sistem Persamaan Linier Dua Variabel (SPLDV) Ditinjau dari Self Directed Learning. *Jurnal Dirosah Islamiyah*, 5(2), 411–419. <https://doi.org/10.47467/jdi.v5i2.2974>
- Musliha, M., & Revita, R. (2021). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematis Ditinjau

dari Self Regulated Learning Siswa. *JRPM (Jurnal Review Pembelajaran Matematika)*, 6(1), 68–82. <https://doi.org/10.15642/jrpm.2021.6.1.68-82>

Nisdawati, N., & Handican, R. (2022). Systematic Literature Review: Apakah model Problem Based Learning mampu meningkatkan kemampuan pemecahan masalah matematis? *Education And Application*, 4(2), 88–97.

Noerjuniaty, N., Busnawir, B., & Misu, L. (2022). Pengaruh Model Pembelajaran React Terhadap Kemampuan Pemecahan Masalah Matematis Ditinjau dari Self Regulated Learning Siswa. *Jurnal Pembelajaran Berpikir Matematika (Journal of Mathematics Thinking Learning)*, 7(1), 99–119. <https://doi.org/10.33772/jpbm.v7i1.26961>

Novianti, N., Karim, A., & Jasmaniah, J. (2023). Kemampuan Pemecahan Masalah Calon Guru SD Ditinjau Dari Self Regulated Learning. *Journal on Education*, 5(4), 16581–16590. <https://doi.org/10.31004/joe.v5i4.2816>

Pramesti, S. L. D., Andini, N. M., & Fitriani, O. Y. (2023). PENGARUH SELF EFFICACY DAN SELF REGULATED LEARNING TERHADAP KEMAMPUAN PEMECAHAN MASALAH ALJABAR MAHASISWA. *Afeksi: Jurnal Penelitian Dan Evaluasi Pendidikan*, 4(1), 76–90. <https://doi.org/10.35672/afeksi.v4i1.67>

Rahayu, N., & Alyani, F. (2020). Kemampuan Berpikir Kritis Matematis Ditinjau Dari Adversity Quotient. *Prima: Jurnal Pendidikan Matematika*, 4(2), 121. <https://doi.org/10.31000/prima.v4i2.2668>

Rohani, D., R, Z., & Bistari, B. (2022). Kemampuan Pemecahan Masalah Matematika Ditinjau Dari Self-Regulated Learning Siswa Dalam Materi Lingkaran Di Smp. *Jurnal AlphaEuclidEdu*, 3(2), 168. <https://doi.org/10.26418/ja.v3i2.52772>

Rohmah, M. S., & Herdiman, I. (2017). PENERAPAN PENDEKATANBRAINSTORMING ROUND ROBIN UNTUK MENINGKATKAN KEMAMPUAN PENALARAN DAN KONEKSI MATEMATIK SERTA KEMANDIRIAN BELAJAR SISWA MTs TERPADU. *Prisma*, 6(2), 91–100. <https://doi.org/10.35194/jp.v6i2.121>

Sriwahyuni, K., & Maryati, I. (2022). Kemampuan Pemecahan Masalah Matematis Peserta didik Pada Materi Statistika. *PLUSMINUS: Jurnal Pendidikan Matematika*, 2(2), 335–344. <https://doi.org/10.35438/inomatika.v4i1.279>

Sucipto, S., & Hatip, A. (2020). KEMAMPUAN PEMECAHAN MASALAH MATEMATIKA BERDASARKAN GAYA KOGNITIF, KEMANDIRIAN BELAJAR, DAN GENDER ( Studi Kasus Mahasiswa Prodi Pendidikan Matematika FKIP Universitas Dr. Soetomo). *JPMI (Jurnal Pendidikan Matematika Indonesia)*, 5(1), 1. <https://doi.org/10.26737/jpmi.v5i1.1092>

- Sugandi, A. I. (2013). Pengaruh Pembelajaran Berbasis Masalah Dengan Setting Kooperatif Jigsaw Terhadap Kemandirian Belajar Siswa Sma. *Infinity Journal*, 2(2), 144. <https://doi.org/10.22460/infinity.v2i2.31>
- Supraptinah, U., Budiyo, B., & Subanti, S. (2015). Eksperimentasi Pembelajaran Discovery Learning, Problem Based Learning, Dan Think-Talk-Write dengan Pendekatan Saintifik Terhadap Kemampuan Pemecahan Masalah Matematika ditinjau dari Kemandirian Belajar Siswa. *Jurnal Elektronik Pembelajaran Matematika*, 3(10), 1138–1149. <https://jurnal.fkip.uns.ac.id/index.php/s2math/article/view/6686>
- Taufik, A. (2020). Implementasi Model Pembelajaran Ttw Dan Pbl Terhadap Pemecahan Masalah Siswa Ditinjau Dari Kemandirian Belajar. *Jurnal Ilmiah Global Education*, 1(2), 121–133. <https://doi.org/10.55681/jige.v1i2.45>
- Wahyuningsih, B. Y. (2023). Kemampuan Pemecahan Masalah Matematika Ditinjau dari Self Regulated Learning (Kemandirian Belajar) Siswa. *Jurnal Pendidikan Dan Konseling*, 5(1), 2762–2771. <http://journal.universitaspahlawan.ac.id/index.php/jpdk/article/view/11401>
- Wena, M. (2018). *Strategi Pembelajaran Inovatif Kontemporer : Suatu Tinjauan Konseptual Operasional* (Cetakan 11). Bumi Aksara.
- Widodo, A. N. A., Amalia, S. R., Khasanah, A., & Raharjo, M. (2022). Pengaruh self directed learning, self confidence dan disposisi matematis terhadap kemampuan pemecahan masalah. *Jurnal Pendidikan Surya Edukasi (JPSE)*, 8(2), 151–161. <https://doi.org/10.37729/jpse.v8i2.2596>
- Yuliasari, E. (2017). Eksperimentasi Model PBL dan Model GDL Terhadap Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, 6(1), 1. <https://doi.org/10.25273/jipm.v6i1.1336>
- Zamnah, L. N. (2017). Hubungan Antara Self-Regulated Learning Dengan Kemampuan Pemecahan Masalah Matematis Pada Mata Pelajaran Matematika Kelas Viii Smp Negeri 3 Cipaku Tahun Pelajaran 2011/2012. *Teorema*, 1(2), 31. <https://doi.org/10.25157/.v1i2.549>