International Journal of Religion
2024
Volume: 5| Number 11 | pp. 3030 – 3037
ISSN: 2633-352X (Print) | ISSN: 2633-3538 (Online)
ijor.co.uk
DOI: https://doi.org/10.61707/sm1dtc57

Student Problem Solving Ability in Mathematics Learning: Systematic Literature Review

I Gusti Nyoman Yudi Hartawan[1], I Gusti Putu Suharta[2], I Gusti Putu Sudiarta[3] and I Gusti Ngurah Pujawan[4]

Abstract

Problem solving is one of the research topics that are popularly studied by researchers, so it is important to study what kind of research trends are related to problem solving. The purpose of this study was to determine the tendency to study students' mathematical problem-solving abilities. This study uses the systematic literature review (SLR) method, which is carried out through the stages of identifying, assessing, and interpreting all the data collected, with the research object being a study of how to bring out students' problem-solving abilities. The design used is to summarize, review, and analyze 21 articles that are very relevant to the object of research in Sinta-accredited journals, indexed by Scopus and the Web of Science. The results showed that the research methods used in eliciting students' problem-solving abilities were experimental, descriptive qualitative, and developmental research methods. From the results of the analysis, improving students' problem-solving abilities can be done through 1. using the PBL learning model, 2. Using problems that are contextual, realistic, and related to culture, 3. utilizing modules, particularly e-modules; 4. utilizing ICT; and 5. integrating Computational Thinking (CT) into mathematics learning. For this reason, it is recommended for further research to develop an e-module that integrates CT into it.

Keywords: *Problem Solving, Mathematics and Abilities.*

INTRODUCTION

The rapid development of science and technology today has brought very rapid changes in various aspects of life. Jobs and the way we work are changing; many jobs are being lost while new jobs are being created. Economic, social, and cultural changes are also occurring at a high rate. To deal with these various changes, the Indonesian state and other countries are adapting (Runisah, 2021). In order to adapt to these changes, quality resources are needed, especially for the younger generation. The younger generation is required to have several abilities to be able to compete in this industrial 4.0 era, including problem-solving skills, critical thinking skills, and creative thinking skills (Nursyahidah et al., 2018).

Students' problem-solving abilities are among the most important (Istiandaru, 2017; Nursyahidah et al., 2018; zreçberolu, 2018). According to Nursyahidah et al. (2018) problem solving is basic in mathematics education; without this ability, it will limit the benefits and power of mathematical ideas. Problem solving is the ability to analyze the relationship between symbols, information, and patterns (Rizki & Yunita, 2020). According to Polya in (Darmawan & Suparman, 2019) problem-solving ability is a way to find solutions to a difficulty in achieving a goal that is not immediately achieved. NCTM (Barham, 2019) states that in recent years, the attention related to problem solving has been quite large, including about how to help students become problem solvers, or in other words, efforts to bring out problem-solving skills. Problem solving through mathematics learning can improve and develop students' abilities in aspects of application, analysis, synthesis, and evaluation (Rahman, 2016). Alfiani (2021) also conveyed the same thing that learning mathematics in schools focuses on developing students' ability to solve problems and in the end competencies can be achieved that can be used to compete in the 21st century. Thus problem solving must be an important part of learning mathematics and should not be seen as an exercise carried out by students at the end of each material topic (Khalid, 2020).

According to Polya in Barham (2019), there are four indicators of problem solving: 1. understanding the problem; 2. planning a solution; 3. implementing the plan; and 4. testing the results.The process describes the

[1] Ganesha University of Education, Singaraja Bali, Indonesia, Email: yudi.hartawan@undiksha.ac.id

[2] Ganesha University of Education, Singaraja Bali, Indonesia, Email: putu.suharta@undiksha.ac.id

[3] Ganesha University of Education, Singaraja Bali, Indonesia, Email: gussudiarta@undiksha.ac.id

[4] Ganesha University of Education, Singaraja Bali, Indonesia, Email: ngurah.pujawan@undiksha.ac.id

problem-solving strategies demonstrated by the student. Through the process, what is needed by students is attention and patience with the required skills, perseverance with the chosen plan, and sufficient knowledge to choose another plan if the first does not work. At the final stage, participants examine the solutions they have obtained.

Research results related to students' problem-solving abilities show that students' ability to understand problems is still inadequate (Katsaounis & Hadiyanti, 2020; Rizky & Surya, 2017), (Ruliani et al., 2018) stated that students are not able to solve problems well. One of the causes of the low problem-solving ability of students is the learning process only makes students accept the teacher without exploration, causing students to become less critical (Mariani & Susanti, 2019). Using media in learning mathematics is also a special concern because it is rarely integrated into learning. Even though according to (Setiyani et al., 2020), the use of media in learning mathematics can improve students' problem-solving abilities.

Problem solving is a necessary part of learning mathematics. That is, to improve creativity, logic, critical thinking, and systematic thinking, students must master a series of problem-solving skills in mathematics (Setiyani et al., 2020). Improved problem-solving skills can be achieved if the learning process provides opportunities for students to learn actively and meaningfully. For this reason, there must be innovations in mathematics learning, for example, through learning models, learning methods, learning strategies, and learning media. In addition, in order for students' problem-solving abilities to be measured by actual conditions, valid and reliable indicators of problem-solving ability are needed. Thus, the focus of this study is to obtain a comprehensive picture of students' problem-solving abilities in solving mathematical problems through content analysis on how to emerge or improve students' problem-solving abilities. This research is a systematic literature review, which is conducted by identifying, reviewing, evaluating, and interpreting all available research.

METHOD

This research is a systematic literature review (SLR). SLR is a literature review method that identifies, assesses, and interprets findings on a research topic to answer predetermined research questions. Calderon and Ruiz (in Fitriani and Prahmana, 2021) stated that SLR is a way of identifying, evaluating, and interpreting the entire availability of research that is relevant to the formulation of the problem and the topic area under study. Through this method, a systematic review and identification of an article is carried out in each process, following the steps or stages that have been set (Triandini et al., 2019).

The object of this study is to find a way to bring out or improve students' problem-solving abilities in solving mathematical problems.. In this SLR, the data found are evaluated based on questions of quality assessment criteria, namely: (1) whether the journal is Sinta accredited, Scopus indexed, or Web of Science ?; (2) was the journal article published in the period 2016–2022?; and (3) does the journal article mention how to bring up and/or improve students' problem-solving skills in solving math problems? Thus, the inclusion and exclusion criteria used in this SLR study can be seen in Table 1 below.

Table 1. Inclusion and Exclusion Criteria

Criteria	Description
Inclusion	1. The data used are journal articles for the last eight years, from 2015 to 2022. 2. The data comes from the accredited journal Sinta, which is indexed by Scopus and Web of Science. 3. The data explains how to bring up or improve students' problem-solving abilities.
Exclusion	1. The data contains ways to bring out or enhance the problem-solving abilities of students, namely: (a) the application of problem-based learning to experiments; (b) the analysis of problem-solving ability in solving mathematical problems for qualitative research; and (c) digital products in enhancing problem-solving capabilities for development research.

Researchers collected journal articles from Google Scholar, Research Gate, SINTA, DOAJ, Scopus, and Web of Science. The key word in this study is problem-solving ability. From the results of the article search, 21 articles were found with the scope of discussion of problem-solving skills in solving mathematical problems. In general, there are 4 research methods or approaches used in the 21 articles, namely: as many as 10 articles classified as experimental research, 5 articles classified as qualitative research, 5 articles classified as development research, and 1 article classified as class action research. These articles are then analyzed to determine the results of a meta-analysis related to problem-solving ability in solving mathematical problems in order to determine the potential for future research development.

Referring to the objects and criteria for inclusion and exclusion that have been presented in Table 1, in this study, 700 articles have been identified. The identified article will go through several processes according to the PRISMA chart in Figure 1 below.

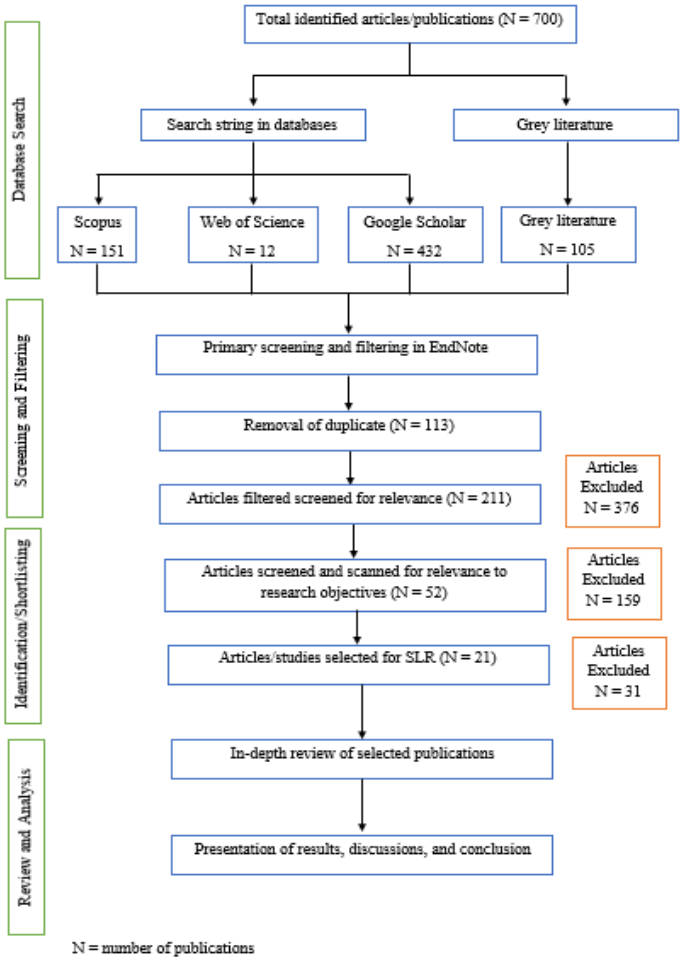

Figure 1. Article Search PRISMA Chart

RESULT

Based on the results of a search for articles using the Publish or Perish (PoP) application with the keyword "problem solving ability," we obtained 700 articles, which were then visualized and described as bibliometric knowledge maps using the VosViewer application, as shown in Figure 2 below.

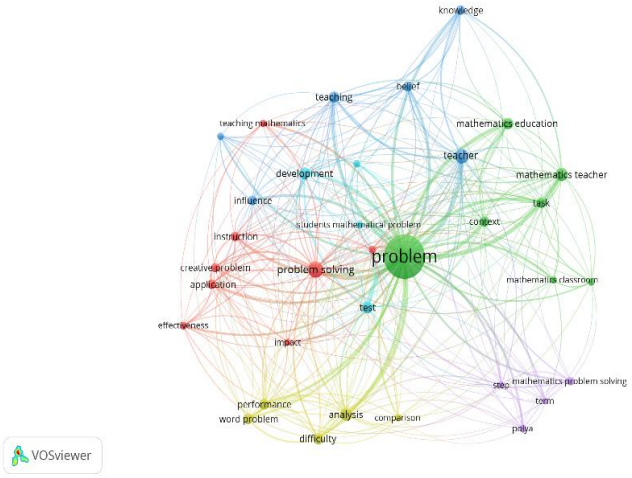

Figure 2. Visualization of research on problem solving.

From figure 2 above, it can be seen that research topics related to problems have become quite popular in the last 8 years. The research topic relates to the problem. From figure 2, it can also be seen that the research topic is related to the problem solving research topic, both related to the student's ability to solve problems, mathematics learning, student difficulties in problem solving, development, comparison, and others. Here are the results of the meta-analysis of the findings of the article presented in Figure 1.

Table 2. The meta-finding results of the problem solving concept

No.	Author's name, year	Research methods	How to Create Troubleshooting
1.	(Abidin et al., 2018)	Quasi-Experiment	Through the application of the Think Pair-Share Learning Model with a contextual approach
2	(Harahap & Hasratuddin, 2017)	Development	Mathematics learning tools based on realistic approaches
3	(Nizaruddin et al., 2017)	Classroom Action Research	through the application of a game-based learning model
4	(Darma et al., 2021)	Development	Schoology-based blended learning model
5	(Salsabila & Pradipta, 2021)	Quasi-Experiment	Through Mathematics Learning Videos on the E-Learning Platform
6	(Rianti et al., 2020)	Development	Mathematics Learning Tools in the Context of Riau Malay Culture
7	(Nursyahidah et al., 2018)	Qualitative Descriptive Research	Realistic mathematics-based learning with ethnomathematics
8	(Rizky & Surya, 2017)	Qualitative Descriptive Research	Use of contextual issues
9	(Darmawan & Suparman, 2019)	Development	Discovery learning-based learning media
10	(Lan et al., 2021)	Quasi-Experiment	Through Mathematics Software : Hawgent
11	(Sihombing & Surya, 2017)	Development	Metacognitive Strategy Based Mathematics Module
12	(Mailisman et al., 2020)	Qualitative Descriptive Research	Use of contextual issues.
13	(Ahmad et al., 2018)	Quasi-Experiment	Mandailing culture-based Realistic Mathematics Learning Model
14	(Amalia et al., 2017)	Quasi-Experiment	Problem Based Learning Model
15	(Suarsana et al., 2019)	Quasi-Experiment	Online problem posing
16	(John et al., 2017)	Quasi-Experiment	Implementation of Computational Thinking in mathematics learning
17	(Maharani et al., 2019)	Qualitative Descriptive Research	Use of mathematical problems
18	(Asadi & Mohammadhasani, 2020)	Quasi-Experiment	CSCL integrated PBL using dynamic mathematical software
19	(Asyhari & Sifa, 2021)	Quasi-Experiment	Problem Based Learning Model
20	(Lu & Wutsqa, 2018)	Quasi-Experiment	E-learning media with Guided Discovery method
21	(Peranginangin et al., 2021)	Qualitative Descriptive Research	Use of mathematical problems

Based on table 2 above, it can be seen that the time span for the article to be published in the last six years, which is in the range of 2017 to 2022. From the table, information is also obtained regarding the research tendency of problem-solving ability to be dominated by experimental research in the form of quasi-experiments (10 articles), development research (5 articles), and qualitative descriptive research (5 articles). In addition, the topics of discussion that often appear in each article and the potential for subsequent research studies can be summarized, as presented in table 3 below.

Table 3. Summary of topics of discussion and potential for further studies

No	More Discussion Appears in the Article	Analysis of Implications and Limitations	Opportunity for Further Study
1	Improve problem-solving abilities by using contextual, realistic problems.	There are 10 (48%) articles which in the process use contextual, realistic problems, some are related to local culture which makes students feel close to their lives so that learning becomes more meaningful. The problems presented are just problems that are not structured at the beginning of the learning process.	It is necessary to combine the type of problems presented at the outset, for example, local cultural problems combined with open-ended problems.
2	Raising problem-solving abilities through the use of innovative models such as PBL, problem posing, realistic mathematics learning, blended learning, and discovery learning.	Through innovative learning that focuses on student activities, especially PBL. PBL will focus on student involvement in the learning process. So that students are required to be independent in solving the problems presented by utilizing the learning resources provided by the teacher.. In this case, learning resources can be in the form of teaching materials or modules. However, in the articles obtained, not much has been studied about learning resources that can facilitate student learning independence.	It is necessary to develop learning resources (modules) that can facilitate student learning independence.
3	Raising problem-solving skills through ICT.	There are 7 (33%) articles that utilize ICT in raising students' problem-solving abilities. Utilization of ICT used is quite varied, this indicates a touch of ICT in learning mathematics makes a positive contribution to students' problem solving abilities. However, the study in this article cannot stand alone to facilitate student learning independently	It is necessary to develop a problem-based mathematics electronic module (E-module) that can facilitate students' problem-solving skills in independent learning.
4	Raising problem- solving skills through learning tools	There were five articles related to developing learning tools (media, modules, syllabus, lesson plans, and worksheets). However, the developed device cannot be used by students where and when they want to use it.	developing problem-based mathematics electronic modules that can facilitate students' problem-solving skills in independent learning.
5	Raising problem- solving skills through Computational Thinking	Two articles discuss the integration of CT in mathematics learning and see its relation to student problem-solving. What was done was only limited to giving questions that referred to CT. this is not enough to facilitate student independence in solving problems.	It is necessary to develop a module that integrates CT in it

From the table above, it can be seen that improving students' problem-solving abilities can be facilitated in several ways, namely : 1. Through the provision of culturally oriented open-ended problems, 2. Development of teaching modules, 3. Development of problem-based e-modules, 4. Development of learning tools, and 5. Development of modules that integrate CT. Of the five opportunities for further study, it seems that most of the recommendations are focused on providing a module that is able to facilitate students independently in learning to improve problem-solving skills. Thus the recommendation proposed is the provision of an e-module that integrates CT with contextual issues associated with culture.

DISCUSSION

From all the articles analyzed as presented in Table 2, the use of innovative learning models is the choice of researchers in bringing out students' problem-solving abilities, especially PBL, which can facilitate student independence in learning because in PBL students are required to be independent in solving problems, which of course will trigger an increase in problem solving. student problems (Asyhari & Sifa, 2021). The same thing was also conveyed by Hidayati and Wagiran (2020) who stated that PBL is able to improve students' problem-solving skills. However, on the one hand, PBL also has a disadvantage, namely that when the problem presented is not attractive to students, they feel reluctant to solve it (Hidayati & Wagiran, 2020). For this reason, the presentation of the problem is also an important concern in research related to the implementation of PBL.

The results of the article analysis also discovered special attention being paid to the problem presented, of course, this is to condition students to feel close to the problem given so that there is an obligation for them to find a solution immediately (Kosim et al., 2020; Nursyahidah et al., 2018). The problems used in the articles obtained are contextual, realistic, and culturally attributable problems. However, the problem presented is only in the form of unstructured questions; this is, of course, considered insufficient to optimize students' problem-solving abilities. A combination with other types of problems is needed, such as open-ended problems.. This is in accordance with the results of the study (Ramadhani & Yulianto, 2020), namely, that the problem-solving ability of students who are taught through the PBL model with an open-ended approach is better than that of students who are taught with discovery learning.

In addition to facilitating problems that attract students' attention, it also needs to be equipped with supporting devices that are able to facilitate students' learning independently. This is revealed from the results of the analysis in Table 2. The results of the analysis show that students need to be facilitated with learning modules that are able to facilitate independent learning and are used as learning resources in order to solve the problems presented by the teacher. This is consistent with the results of research from Jusmawati et al. (2021) which found that the module tools applied to the creative problem-solving model increased students' problem-solving abilities. Likewise, the results of the study (Sihombing & Surya, 2017) showed that mathematics modules can improve student problem solving. However, the modules developed in the analyzed article (table 2) are still conventional modules, so they need a touch of technology to make the modules more attractive and facilitate students' learning independently. the results of the analysis show that ICT contributes positively in improving students' problem-solving abilities (Asadi & Mohammadhasani, 2020; Darma et al., 2021; Lu & Wutsqa, 2018; Sihombing & Surya, 2017; Suarsana et al., 2019). For this reason, it can be a recommendation for the development of mathematics e-modules as an option in improving students' problem-solving abilities.

The results of other analyses show that the integration of CT in mathematics learning can improve students' problem-solving skills (John et al., 2017). Maharani et al., 2019) state that there is a relationship between CT and problem solving. However, in this article, the integration of CT is limited to giving questions about the nuances of CT (John et al., 2017). This is considered not optimal enough for facilitating student learning independently, which leads to students' problem-solving abilities. For this reason, it would be interesting if CT could be integrated into the mathematics module.

Other research related to the literature review on problem-solving was also carried out by (Septian et al., 2022). However, the focus of the study was only seen from the research methods, the subjects involved, the materials used, and the results of research related to problem-solving. The results of the research presented in the study (Septian et al., 2022) show consistent results, such as the use of mathematics learning tools and PBL in improving student problem-solving. This shows that the SLR results are in line with the results of the meta-analysis. Thus it can be recommended that to improve students' problem-solving abilities it can be done by facilitating students with an e-module that integrates CT with contextual problems associated with culture.

CONCLUSION

Based on the results and discussion above, it can be concluded that: 1. The use of interesting problems in PBL can improve students' problem-solving abilities when the problem is contextual, realistic, and associated with culture, 2. The use of ICT in mathematics learning can improve problem-solving skills, but it still cannot facilitate students' learning independently, 3. CT is used in mathematics learning not only in the form of questions, but also in teaching modules. For this reason, further studies are recommended on efforts to bring out problem-solving skills in students, for example in the form of developing e-modules that integrate CT and contextual problems that are realistic and associated with culture.

REFERENCES

Abidin, C., Amin, S. M., & Sulaiman, R. (2018). The Effect of Think-Pair-Share Learning with Contextual Approach on Junior High School Students' Mathematics Problem Solving Ability. Mathematics, Informatics …. https://www.atlantis-press.com/proceedings/miseic-18/25905001

Ahmad, M., Siregar, Y. P., & Siregar, N. A. (2018). The Effectiveness of Realistic Mathematics Learning Model Based on Mandailing Culture in Teaching of Students' Mathematical Problem Solving Ability. … Conference on Mathematics …. https://www.atlantis-press.com/proceedings/icm2e-18/55909491

Alfiani, N. (2021). THE EFFECT OF OPEN ENDED APPROACH ON PROBLEM SOLVING ABILITY AND LEARNING INDEPENDENCE IN STUDENTS ' MATHEMATICS LESSONS. IJEMS: Indonesian Journal of Education and Mathematical Science, 1(1), 44–50.

Amalia, E., Surya, E., & Syahputra, E. (2017). THE EFFECTIVENESS OF USING PROBLEM BASED LEARNING (PBL) IN MATHEMATICS PROBLEM SOLVING ABILITY FOR JUNIOR HIGH SCHOOL. IJARIIE, 3(2).

Asadi, S., & Mohammadhasani, N. (2020). Technology of Education Journal The investigation of the effect of computer supported collaborative learning (CSCL) environment and dynamic mathematics software on trigonometric problem solving skill. Technology of Education Journal, 14(4), 867–875.

Asyhari, A., & Sifa, M. (2021). PROBLEM-BASED LEARNING TO IMPROVE PROBLEM- SOLVING SKILL : IS IT EFFECTIVE ENOUGH ? Indonesian Journal of Science and Mathematics Education, 04(1), 78–88. https://doi.org/10.24042/ijsme.V4i1.8674

Barham, A. I. (2019). Investigating the Development of Pre-Service Teachers' Problem-Solving Strategies via Problem-Solving Mathematics Classes. European Journal of Educational Research, 9(1), 129–141. https://doi.org/10.12973/eu-jer.9.1.129

Darma, I. K., Karma, I. G. M., & Santiana, I. M. A. (2021). Schoology based applied mathematics blended learning model to improve the students ' problem- solving ability. IConVET. https://doi.org/10.1088/1742-6596/1810/1/012040

Darmawan, E. W., & Suparman. (2019). Design of Mathematics Learning Media based on Discovery Learning to Improve Problem Solving Ability. Indonesian Journal on Learning and Advanced Education, 1(2), 20–28. https://doi.org/10.23917/ijolae.v1i2.7564

Fitriani, R., & Prahmana, R. C. I. (2021). Penelitian Implementasi Pembelajaran Matematika Bagi Anak Berkebutuhan Khusus Di Indonesia. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 10(3), 1293. https://doi.org/10.24127/ajpm.v10i3.3968

Harahap, S. S., & Hasratuddin, S. E. (2017). The Development of Learning Devices Based Realistic Approach for Increasing Problem Solving Mathematics Ability of Student in SMPS Gema Buwana. In IJISM Journal. ijism.org. https://www.ijism.org/administrator/components/com_jresearch/files/publications/IJISM_679_FINAL.pdf

Hidayati, R. M., & Wagiran. (2020). IMPLEMENTATION OF PROBLEM-BASED LEARNING TO IMPROVE PROBLEM-SOLVING SKILLS IN VOCATIONAL HIGH SCHOOL. Jurnal Pendidikan Vokasi, 10(2), 177–187.

Istiandaru, A. (2017). Krulik and Rudnik Model Heuristic Strategy in Mathematics Problem Solving. International Journal on Emerging Mathematics Education, 1(2), 205–210.

John, E., Costa, F., Maria, L., Sampaio, R., Dario, D., & Guerrero, S. (2017). Computational Thinking in Mathematics Education : A Joint Approach to Encourage Problem-Solving Ability. IEEE. https://doi.org/10.1109/FIE.2017.8190655

Jusmawati, J., Satriawati, S., Irman, R., Rahman, A., & ... (2021). Development of mathematics module based on creative problem solving in elementary students. Linguistics and Culture …, 5(1), 367–375. http://lingcure.org/index.php/journal/article/view/1691

Katsaounis, T. D., & Hadiyanti, R. (2020). Mathematical problem-solving skills of junior high school students. AICMSTE 2019. https://doi.org/10.1088/1742-6596/1460/1/012010

Khalid, M. (2020). Enhancing creativity and problem solving skills through creative problem solving in teaching mathematics. Creativity Studies, 13(2), 270–291. https://doi.org/10.3846/cs.2020.11027

Kosim, A., Sunardi, & Tirta, I. M. (2020). Analysis of realistic mathematics learning approach on the students ' problem solving skill and self-confidence on sequence and series materials. ICOPAMBS. https://doi.org/10.1088/1742-6596/1465/1/012031

Lan, X., Zhou, Y., Wu, X., & Purnama, A. (2021). The effect of dynamic mathematics software on mathematical problem solving ability. SEA-STEM 2020, 1–7. https://doi.org/10.1088/1742-6596/1882/1/012059

Lu, U., & Wutsqa, D. U. (2018). The Effectiveness of E-learning Media with Guided Discovery Method from The Perspective of Student ' s Mathematics Problem Solving Skill. 5th ICRIEMS Proceedings, 1, 169–176.

Maharani, S., Kholid, M. N., Pradana, L. N., Nusantara, T., Info, A., Thinking, C., Solving, P., & Education, M. (2019). PROBLEM SOLVING IN THE CONTEXT OF COMPUTATIONAL THINKING. Infinity: Journal of Mathematics Education, 8(2), 109–116.

Mailisman, N., Ikhsan, M., & Hajidin. (2020). Mathematics problem-solving skills of vocational high school students related to the 21 st -century education. AICMSTE, 1–8. https://doi.org/10.1088/1742-6596/1460/1/012014

Mariani, Y., & Susanti, E. (2019). KEMAMPUAN PEMECAHAN MASALAH SISWA MENGGUNAKAN MODEL PEMBELAJARAN MEA (MEANS ENDS ANALYSIS). Lentera Sriwijaya: Jurnal Ilmiah Pendidikan Matematika, 1(1), 13–25.

Nizaruddin, N., Muhtarom, M., & Sugiyanti, S. (2017). Improving students ' problem-solving ability in mathematics through game- based learning activities. World Transactions on Engineering and Technology Education, 15(2).

Nursyahidah, F., Saputro, B. A., & Rubowo, M. R. (2018). Students Problem Solving Ability Based on Realistic Mathematics with Ethnomathematics. Journal of Research and Advances in Mathematics Education, 3(1), 13–24. https://eric.ed.gov/?id=EJ1283906

Özreçberoğlu, N. (2018). Making it count: Strategies for improving problem-solving skills in mathematics for students and teachers' classroom management. Eurasia Journal of Mathematics, Science and Technology Education, 14(4), 1253–1261. https://doi.org/10.29333/ejmste/82536

Peranginangin, R. B., Tambunan, H., & Sitepu, S. (2021). Analysis of Mathematics Problem Solving Ability of Junior High School Students in Solving Problems in Online Learning. Phenomenon, 11(2), 127–144.

Rahman, A. (2016). Exploration of mathematics problem solving process based on the thinking level of students in junior high school. International Journal of Environmental and Science Education, 11(14), 7278–7285. https://api.elsevier.com/content/abstract/scopus_id/84988640873

Ramadhani, A. N., & Yulianto, A. (2020). The Mathematical Problem-solving Ability of Elementary Students Using Problem-based Learning Model with Open-Ended Approach. Journal of Primary Education, 9(3), 276–281.

Rianti, R., Saragih, S., & Zulkarnain. (2020). Development of Mathematics Learning Tools in the Context of Riau Malay Culture to Improve Students Mathematical Problem Solving Ability. Journal of Educational Science, 4(1), 73–82.

Rizki, L. M., & Yunita, W. (2020). The effect of dynamic mathematics software on mathematical problem solving ability. SEA-STEM 2020, Journal of Physics: Conference Series. https://doi.org/10.1088/1742-6596/1882/1/012059

Rizky, M., & Surya, E. (2017). Analysis of Student Difficulties in Mathematics Problem Solving Ability at MTs SWASTA IRA Medan. International Journal of Sciences: Basic and Applied Research (IJSBAR), 33(3), 63–75. https://core.ac.uk/download/pdf/249335829.pdf

Ruliani, I. D., Murtianto, Y. H., & Matematika, P. (2018). Profile Analysis of Mathematical Problem Solving Abilities with Krulik & Rudnick Stages Judging from Medium Visual Representation. 7(1), 22–29.

Runisah. (2021). PEMBELAJARAN MATEMATIKA UNTUK MENGHADAPI ERA SOCIETY 5.0. Euclid, 8(2), 159–173. https://jurnal.ugj.ac.id/index.php/Euclid/article/view/4498/2648

Salsabila, A., & Pradipta, T. R. (2021). Mathematical Problem Solving Ability: The Impact of Mathematics Learning Videos on an E-Learning Platform. Al-Jabar: Jurnal Pendidikan Matematika. http://103.88.229.8/index.php/al-jabar/article/view/8708

Septian, A., Widodo, S. A., Afifah, I. N., & Nisa, D. Z. (2022). Mathematical Problem Solving Ability in Indonesia. Journal of Instructional Mathematics, 3(1), 16–25. https://doi.org/10.37640/jim.v3i1.1223

Setiyani, S., Fitriyani, N., & Sagita, L. (2020). Improving s tudent ' s mathematical problem solving skills through Quizizz. Journal of Research and Advances in Mathematics Education, 5(3), 276–288. https://doi.org/10.23917/jramathedu.v5i3.10696

Sihombing, H., & Surya, E. (2017). Development of Mathematics Module Based on Metacognitive Strategy in Improving Students ' Mathematical Problem Solving Ability at High School. Journal of Education and Practice, 8(19).

Suarsana, I. M., Lestari, I. A. P. D., & Mertasari, N. M. S. (2019). The effect of online problem posing on students' problem-solving abilitiy in mathematics. International Journal of Instruction, 12(1), 809–820. https://doi.org/10.29333/iji.2019.12152a

Triandini, E., Jayanatha, S., Indrawan, A., Werla Putra, G., & Iswara, B. (2019). Systematic Literature Review Method for Identifying Platforms and Methods for Information System Development in Indonesia. Indonesian Journal of Information Systems, 1(2), 63.