

## SYSTEMATIC LITERATURE REVIEW: PROBLEM SOLVING ABILITY REVIEWED FROM STUDENTS' LEARNING INDEPENDENCE

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### Abstract

Mathematical problem solving ability is a process carried out by students to solve problems given by using their knowledge and understanding. From several facts obtained, mathematical problem solving ability in Indonesia is included in the low category. One of the factors causing the lack of students' problem solving ability is the lack of student learning independence so that students are not trained when they get non-routine questions given by the teacher. The purpose of this study was to determine the mathematical problem solving ability in terms of student learning independence. The research method used is the *Systematic Literature Review* (SLR) which is carried out by reviewing, evaluating, and interpreting various relevant studies. The results of the study stated that there is a very strong influence of learning independence on students' mathematics KPM. The higher the student's learning independence, the higher the student's mathematical problem solving ability.

**Keywords** : problem solving, independent learning

### Abstrak

Kemampuan pemecahan masalah matematis merupakan proses yang dilakukan oleh siswa untuk menyelesaikan masalah yang diberikan dengan menggunakan pengetahuan dan pemahaman yang dimilikinya. Dari beberapa fakta yang didapatkan, kemampuan pemecahan masalah matematis di Indonesia termasuk dalam kategori yang rendah. Salah satu faktor penyebab kurangnya kemampuan pemecahan masalah siswa yaitu kurangnya kemandirian belajar siswa sehingga siswa tidak terlatih apabila mendapatkan soal yang tidak rutin yang diberikan guru. Tujuan penelitian ini adalah untuk mengetahui kemampuan pemecahan masalah matematis ditinjau dari kemandirian belajar siswa. Metode penelitian yang digunakan adalah *Systematic Literature Review* (SLR) dimana dilakukan dengan cara mengkaji, mengevaluasi, dan menginterpretasi berbagai penelitian yang relevan. Hasil penelitian menyatakan bahwa terdapat pengaruh yang sangat kuat kemandirian belajar terhadap KPM matematis siswa. Semakin tinggi kemandirian belajar siswa maka semakin tinggi juga kemampuan pemecahan masalah matematis siswa.

**Kata kunci** : pemecahan masalah, kemandirian belajar

### INTRODUCTION

Mathematics is eye lesson mandatory that must be mastered in the world of education and one of objective from mathematics is for students own ability breakdown issues at play important in development knowledge knowledge and technology. Learning mathematics must meaningful for students so that the concept can understood so that when combined with field other sciences become effective learning. Research conducted by Wijiyanti & Hartoyo (2021) two students who had follow activity National Science Olympiad (OSN) Mathematics, obtained results that student Not yet in its entirety control material integrated mathematics with eye lesson.

Development ability solve various problem complex mathematics in a way wide is objective main in learning mathematics. *The National Council of Teachers of Mathematics* (NCTM) also states that breakdown problem become standard in the learning process mathematics in schools, as breakdown problem is one of objective learning mathematics (Rambe & Afri, 2020). Even it is said breakdown problem is heart Mathematics. Learning mathematics must arranged such that appearance so that student can have experience in solve problem.

Five reasons *The National Council of Teachers of Mathematics* (NCTM) considers importance learning mathematics in breakdown problem. First, the solution problem considered as part main from mathematics Because in mathematics there is facts and substance in large amount so that for reduce exercise and avoid wrong skills in presenting mathematics so required breakdown problem. Second, mathematics Lots applied for presenting problems important in various field. Third, it is used for build motivation intrinsic in solve problems Mathematics. Fourth, solving problem considered as one of the activity recreation. Fifth, to develop art breakdown problem (Khoerunnisa et al., 2021).

According to Polya, the ability breakdown problem consists of from a number of stages: understanding problem, make planning breakdown problem, implement plan breakdown problem, and see (check) it again. Stages breakdown Polya's problem is considered as simple and easy steps understood in breakdown problems and use in a way worldwide. Ability (Doko et al., 2020) breakdown problem give reject measuring for student for develop and train his thoughts (Lestari et al., 2022). However, in reality, the ability breakdown problem Indonesian students still not optimal.

Apart from the ability breakdown problem mathematically, students also need own good personality. One of personality that must be owned by students as form Study to form teak self is independence. During this is the learning process One the direction that occurs inside class make student no independent in study because existence dependence towards teachers (Nurfadilah & Dori, 2019). Independence That need mental and psychological readiness somebody in design and monitor self in a way carefully through cognitive and affective processes in finish problem. For that, independence student since early need developed, because independence support student in study understand behavior along with the risk that must be accounted for by the students, so that later day

student the capable design and monitor his abilities and personality in finish problems faced .

According to (Isnaeni et al., 2018), stated independence Study is condition activity study independent students No depending on others, with independence study student can evaluate ability self Alone will understand, reason, and do a question or problem. Pannen et al (2000) confirm that characteristics main in study independent is not absence of a teacher or friend fellow students, or no existence meeting look at face in class. According to him, that became characteristics main in study independent is existence development ability student for carry out a learning process that is not depends on factors such as teachers, friends, classes and others (Sundayana, 2019). The indicators independence learning proposed by Badjeber, 2020);(Sumarmo et al., 2012)is 1) Initiative and motivation Study intrinsic; 2) Habits to diagnose need learning; 3) Determine learning objectives/targets; 4) Monitor, organize, and control learn; 5) Look difficulty as challenges; 6) Utilizing and seeking relevant sources; 7) Selecting, implementing learning strategies; 8) Evaluating the process and results learning; 9) Concept self/ability self. Independence is character students who need developed in learning at school especially in learning mathematics. Independence study student expected can help in ability breakdown problem, so that student can understand material lessons that have been studied through breakdown problem.

Can concluded from the above description, it was decided do study with title "*Systematic Literature Review (SLR): Ability Solution Problem Mathematical reviewed from Independence Study Students*". The purpose of from study this that is analyze and describe ability breakdown problem student mathematical reviewed from independence study student.

## METHODS

This research method is a descriptive method, namely a research method that attempts to describe or explain variables in the field based on literature review. Literature review is a systematic, explicit and reproducible method for identifying, evaluating and synthesizing research works and ideas that have been produced by researchers and

practitioners (Ulhaq & Rahmayanti, 2019). The data sources obtained in this study are secondary (Hamzah, 2020).

The stages of SLR (Systematic Literature Review) in this study (Newman & Gough, 2020) are developing research questions, selecting studies using selection criteria, assessing the quality of studies, constructing selection criteria, developing search strategies and synthesizing research question results. The researcher limits the search area for relevant research results through Google Scholar with the keywords "mathematical problem-solving skills" and "learning independence" from 2020-2024. Then the researcher reviewed and examined the 8 articles by summarizing and tabulating them in a table containing the researcher's name, year of publication, journal and research results.

## RESULTS AND DISCUSSION

Obtained 7 relevant articles with the keywords used. Next researcher to study relevant articles with problem. Result data research published in article his served as in table 1.

**Tabel 1 Analisis Hasil**

No	Title	Writer	Publisher	Results
1	Analisis Kemampuan Pemecahan Masalah dan Kemandirian Belajar Matematika Siswa MTs Telukdalam	(Sarumaha, 2022)	Jurnal Education and Development	Ability breakdown problem students on the material pattern number is considered very low. It is because of student no understand problems, students stuck with problems that ever studied, not capable develop draft mathematics owned, answer problem without proper strategic plan, lack of practice with various variation question moreover built- in problem of two or more draft mathematics, students more dominant memorize concepts, problems studied is routine so that tend no creative in finish more problems high. Independence student classified as good where student own good independence from all aspects.
2	Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar Siswa pada Materi Lingkaran di Kelurahan Muarasanding	(Arofah & Noordiana, 2021)	PlusMinus	Research result show that students who have independence study good so ability breakdown problem the mathematics will also be good even so on the contrary.
3	Analisis Kemampuan Pemecahan Masalah	(Marwati, 2023)	Tautologi	Ability breakdown problem mathematical student class VIII.2 UPTD

	Matematis Ditinjau dari Kemandirian Belajar Siswa			SMP Negeri 4 Parepare based on indicator independence Study is in the category currently with percentage 59.66% with indicator first, namely ability understand problem is in the category currently with percentage 52.53%. Indicator second that is ability determine plan settlement is in the category very high with percentage 96.21%. Indicator third that is ability carry out plan settlement is in the category tall with percentage 74.75%. Indicator fourth that is ability inspect return is in the very low category with percentage 15.15%.
4	Analisis Kemampuan Pemecahan Masalah Matematis Siswa Ditinjau dari Kemandirian Belajar Siswa di Desa Bojonggenteng Kabupaten Sukabumi	(Nurmawati et al., 2021)	Juring (Journal of Research in Mathematics Learning)	Ability breakdown problem mathematics in class IX on the material circle from third category independence study, students still not yet fulfil step workmanship question ability breakdown problem student in accordance with step polya and indicators used in study this. So that ability breakdown problem mathematical junior high school students in Bojonggenteng who were reviewed from independence Study Still low.
5	Analisis Kemampuan Pemecahan Masalah Matematis Siswa SMK Terhadap Pembelajaran Trigonometri Secara Online Berbantuan Android Ditinjau dari Kemandirian Belajar Siswa	(Sari et al., 2021)	Jurnal Cendekia: Jurnal Pendidikan Matematika	Independence students and implementation learning by teachers has continuity, where the teacher has prepare all required teaching materials for build independence students. Can seen height percentage obtained by the subject teacher lessons and for make it easier student understand teaching materials. Then, students who are able fulfil indicator ability breakdown problem mathematical is student with the level of independence study high, while students who do not capable fulfil indicator ability breakdown problem mathematical is student with the level of independence study low. This is indicates that teachers must notice category independence students to be able to estimate ability breakdown problems that students have.
6	Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar pada Pembelajaran <i>Blended Problem-Based Learning</i>	(Aminah et al., 2022)	Jurnal Cendekia: Jurnal Pendidikan Matematika	Reason low mathematical KPM is student with independence Study medium and low. Students with independence study currently not enough capable in inspect truth solution obtained whereas student with independence study low only capable identify known data, requested data,

				and the sufficiency of data for solving. Students with independence Study tall capable fulfil all KPM indicators. The research results also show mathematical KPM student class experiment reach completeness minimal learning, mathematical KPM student class experiment more good than class control, and there is influence positive independence study against mathematical KPM students in class experiment by 61.5%.
7.	Hubungan Kemandirian Belajar Siswa Terhadap Kemampuan Pemecahan Masalah Matematis Siswa	(Ambiyar et al., 2020a)	Jurnal Cendekia: Jurnal Pendidikan Matematika	Based on acquisition score questionnaire independence learn and score test ability breakdown problem mathematical student known that score questionnaire independence student of 67.93 and the average result test ability breakdown problem student of 57.70 means the more big independence study student so ability breakdown problem mathematical student more and more good. Based on analysis results research obtained, then can concluded that there is influence independence study to ability breakdown problem mathematical students in class XI MIA 2 SMAN 1 Lubuk Basung.

Based on summary table above, ability breakdown problem mathematical that is ability Where student make an effort look for road exit done in reach goals, also require readiness, creativity, knowledge and ability as well as the application in life daily (Ambiyar et al., 2020b). One of the factors that influences ability breakdown problem student is independence learning. Independence study is a efforts made for do activity study with method independent on base his motivation alone for control a material certain so that can used for solve on going problem faced (Asmar & Delyana, 2020).

Learning independent is a process of controlling self for study no dependent on others, able take decisions and take initiative for overcome problem without expect help from others, and have a sense of trust self in carry out task. Ability student will influenced by his independence in learning. This is in accordance with Novantri et al., (2020) that state that there is difference results study mathematics between students who have independence study high, medium and low. Independence Study students who are still low because of lack of awareness self in matter Study (Apriani & Khasanah, 2017).

Furthermore, (Asworowati, 2020) also think that the more tall independence students, then will the more high results Study mathematics students. Likewise, the more low independence students, then will the more low results study mathematics students. This is in line with study Sulistyani & Roza (2020) that state that independence Study can made into as one of the factors that can influence ability breakdown problem mathematical participant educate. If independence learning that is owned participant educate high, then ability breakdown problem participant educate good, but If independence Study participant educate low, then ability breakdown problem not enough good.

## CONCLUSION

Based on the results of the discussion above, there is a very strong influence of learning independence on students' mathematics KPM. Learning independence is directly proportional to KPM. The higher the students' learning independence, the higher the students' mathematical problem-solving ability. The lower the students' learning independence, the lower the students' mathematical KPM.

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## REFERENCES

- Ambiyar, Aziz, I., & Delyana, H. (2020a). Hubungan Kemandirian Belajar Siswa Terhadap Kemampuan Pemecahan Masalah. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 04(02), 1171–1183.
- Ambiyar, Aziz, I., & Delyana, H. (2020b). *Hubungan Kemandirian Belajar Siswa Terhadap Kemampuan Pemecahan Masalah*. 04(02), 1171–1183.
- 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>
- Apriani, N., & Khasanah, U. (2017). The Relationships Among Learning Independence , Reasoning Ability , And Learning Environment At Home With Students Mathematics

- Learning Outcomes In Class Xi Tkj Of Even Semester In Smk Negeri 1 Pleret Bantul. *AdMathEduSt*, 111–114.
- Arofah, M. N., & Noordiyana, M. A. (2021). Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar Siswa pada Materi Lingkaran di Kelurahan Muarasanding. *PLUSMINUS Jurnal Pendidikan Matematika*, 1(3), 421–434.
- Asmar, A., & Delyana, H. (2020). Hubungan Kemandirian Belajar Terhadap Kemampuan Berpikir Kritis Melalui Penggunaan Software Geogebra. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 9(2), 221. <https://doi.org/10.24127/ajpm.v9i2.2758>
- Asworowati, M. T. (2020). Hubungan Kemandirian Belajar dengan Hasil Belajar Matematika Siswa Kelas V SDN Se-Kecamatan Grabag Tahun Ajaran 2019/2020. *Kalam Cendekia*, 8(1), 77–82.
- Badjeber, R. (2020). Kemandirian belajar mahasiswa tadris matematika FTIK IAIN Palu selama masa pembelajaran daring. *Koordinat Jurnal Pembelajaran Matematika Dan Sains*, 1(1), 1–9.
- Gaudensia Doa Doko, M., Farida, N., Studi Pendidikan Matematika, P., & Kanjuruhan Malang, U. (2020). *Jurnal Terapan Sains & Teknologi ANALISIS KEMAMPUAN PEMECAHAN MASALAH MATEMATIKA SISWA BERDASARKAN TAHAPAN POLYA MATERI SEGIEMPAT*. 2(3).
- Hamzah, A. (2020). *Metode Penelitian Kepustakaan Library Research*. Literasi Nusantara.
- Isnaeni, S., Fajriyah, L., Risky, E. S., Purwasih, R., & Hidayat, W. (2018). Analisis Kemampuan Penalaran Matematis dan Kemandirian Belajar Siswa pada Materi Persamaan Garis Lurus. *Journal of Medives*, 2(1), 107–115.
- Khoerunnisa, D., Inka Amiroh, A., Dzakhirah Nurshalihah, N., & Marta Putri, F. (2021). Analisis Implementasi Pembelajaran Berbasis STEM Untuk Memfasilitasi Kemampuan Pemecahan Masalah Matematis dalm Era New Normal. *ALGORITMA Journal of Mathematics Education (AJME)*, 3, 169–181. <https://doi.org/10.15408/ajme.v3i2.23248>
- Lestari, D. E., Amrullah, A., Kurniati, N., & Azmi, S. (2022). Pengaruh Motivasi Belajar Siswa terhadap Kemampuan Pemecahan Masalah Matematika Pada Materi Barisan dan Deret. *Jurnal Ilmiah Profesi Pendidikan*, 7(3), 1078–1085. <https://doi.org/10.29303/jipp.v7i3.719>
- Marwati. (2023). Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemandirian Belajar Siswa. *Tautologi: Journal of Mathematics Education*, 1(2), 40–46.
- Novantri, W., Maison, M., Muslim, M., & Afriyati, L. W. (2020). Are Discovery Learning and Independent Learning Effective in Improving Students' Cognitive Skills? *Indonesian Journal of Science and Mathematics Education*, 3(2), 144–152. <https://doi.org/10.24042/ijsme.v3i2.6615>
- Nurfadilah, S., & Dori, L. H. (2019). Kemandirian Belajar Siswa dalam Pembelajaran Matematika. *Prosiding Sesiomadika*.
- Nurmawati, R. D., Nurcahyono, N. A., & Imswatama, A. (2021). Analisis Kemampuan Pemecahan Masalah Matematis Siswa Ditinjau dari Kemandirian Belajar Siswa di Desa Bojonggenteng Kabupaten Sukabumi. *Juring (Journal for Research in Mathematics Learning)*, 4(2), 135–146.
- Rambe, A. Y. F., & Afri, L. D. (2020). ANALISIS KEMAMPUAN PEMECAHAN MASALAH MATEMATIS SISWA DALAM MENYELESAIKAN SOAL MATERI BARISAN DAN DERET. *AXIOM : Jurnal Pendidikan Dan Matematika*, 9(2), 175. <https://doi.org/10.30821/axiom.v9i2.8069>



- Sari, Y. P., Kamid, & Rusdi, M. (2021). Analisis Kemampuan Pemecahan Masalah Matematis Siswa SMK Terhadap Pembelajaran Trigonometri secara Online Berbantuan Android Ditinjau dari Kemandirian Belajar Siswa. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(1), 58–68.
- Sarumaha, R. (2022). Analisis Kemampuan Pemecahan Masalah dan Kemandirian Belajar Matematika Siswa MTs Telukdalam. *Jurnal Education and Development*, 10(3), 414–419.
- Sulistiyani, D., & Roza, Y. (2020). Hubungan Kemandirian Belajar dengan Kemampuan Pemecahan Masalah Matematis. *Jurnal Pendidikan Matematika*, 11(1), 1–12.
- Sumarmo, U., Hidayat, W., Zukarnaen, R., Hamidah, M., & Sariningsih, R. (2012). Kemampuan dan Disposisi Berpikir Logis, Kritis, dan Kreatif Matematik (Eksperimen terhadap Siswa SMA Menggunakan Pembelajaran Berbasis Masalah dan Strategi Think-Talk-Write). *Jurnal Pengajaran Matematika Dan Ilmu Pengetahuan Alam*, 17(1).
- Sundayana, R. (2019). Perbandingan Desain Pembelajaran ASSURE dan PPSI untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis dan Kemandirian Belajar. *Moshrafa: Jurnal Pendidikan Matematika*, 8(1), 143–154.
- Wijiyanti, N., Hartoyo, A., & Zubaidah. (2020). *Pengembangan Lembar Kerja Peserta Didik Berbasis STEM Untuk Meningkatkan Keterampilan Berpikir Kreatif di Sekolah Menengah Pertama*.