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Ability Reasoning Mathematical Students on Solving Problem

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ABSTRACT: This paper discusses challenges faced by students in developing the ability to reason mathematically. This paper researches factors that cause difficulty and suggests potential solutions for increasing education in mathematics in Indonesia. Problem reasoning mathematics for students is sourced from various factors like emphasis system education in learning memorisation, limitations source power, and fear of failure. By promoting critical thinking skills, solving problems, and providing adequate support for students and lecturers, Indonesia can make an effort to increase the ability to reason mathematics among students and improve academic performance overall.

KEYWORDS: Ability, Reasoning mathematically, Solving Problem

INTRODUCTION

A glimpse of the future can already be very clearly imagined by noticing what is happening at the moment. Important things to note and think about are how to welcome and live in that time without being crushed by the changes that occurred. Indonesia has launched Indonesia's Vision 2045, which requires skill specific Towards Golden Indonesia 2045. According to Shirley, one of the skills that must be owned by someone For Ready in the Future is the ability to think creatively and analytically, critically and solve the problem (Viranti, 2023) , (Partnership for 21st Century Skills, 2015) (Slavin, 2005) .

Moore and Parker (2016) stated that the ability or skills like thinking creatively, thinking analytically, thinking critically, and solving problems can be improved through learning at school or in institutional education. (Barrett et al., 2008) . Thinking creatively can be understood as thinking to release oneself from the usually done, ability to explain or disclose new relationships, using the method view just formed a new combination from a number of concepts that have been there previously. (Ferdiani et al., 2022) , (Anwar & Yulianto, 2023) (Yuli & Siswono, 2004) . If someone is capable of finishing a problem armed with information like characteristics, properties, forms, and so on, activity is activity. Think analytically. (Asis et al., 2021) . According to Pasquinelli, thinking critically is the ability To evaluate information that exists and make decisions To act. (Thornhill-Miller et al., 2023) .

The abilities outlined above are part of various abilities in the Study of mathematics. Mathematics education is one of the opportunities For the development of creativity. The benefits of learning mathematics, among others, push the development of human brains and the ability to think logically to solve problems. Improvement abilities can improved and trained through learning based on the issues, through thinking deductive and inductive. (Thornhill-Miller et al., 2023) . The Independent Curriculum states that mathematics is viewed as meaningful material teaching for understanding as well as a conceptual tool for constructing and reconstructing material, sharpening and training skills, and valuable thinking for solving problems in his life for the present and the future. The next objective eye lesson is mathematics. To help participants develop and solve problems that include the ability to understand issues, design mathematical models, solve models, or interpret solutions obtained (solving) problem mathematical).

Regardless of the number of benefits and capabilities obtained through learning mathematics, mathematics alone still causes lots of problems experienced by students when solving them. Solve problems in mathematics related closely to reasoning in mathematics. (Latif & Akib, 2016) .

When students solve problems, they must be capable of simultaneously understanding and using concepts and using their reasoning to connect symbols or symbols and also concepts to others. Reasoning, according to Nursoffina, Mardiah and Efendi, controls the ability to reason, mathematical cause, expands belief, finds truth, makes it easy to make conclusions, can think, and has the method to think coherently. On the contrary, If participants are educated when, they need more control and ability to cause misunderstanding, confusion in understanding, and, of course, influence conclusions and wrong. answers (Nursoffina & Efendi, 2021a) .

Problem-grinding mathematics has become a significant challenge for students in Indonesia. The ability to be involved in reasoning complex mathematics is very important for academic success and future career opportunities. However, many students in Indonesia face difficulty in control skills, reasoning, and mathematics Because of various factors.

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LITERATURE REVIEW

Mathematics is taught to participants to start an education base until education is high enough to be successful in adapting to the Industrial Era 4.0. Mastery eye lesson mathematics, which is the central theme of the 21st century, is essential for all students in the 21st century. This is Because mathematics teaches skills, learning, and innovation that can used by students. Finally , they are Ready to face life and the environment, magnificent work complex in the world-like moment—skills the among them thinking critically and solving problems. (Partnership for 21 st Century Skills, 2015) . (Gleason, 2018)

Ability breakdown problem mathematics students in Indonesia have become the focus of study education, which reveals an outlook on the effectiveness of various teaching models and cognitive styles. A study highlights the interaction between teaching models and cognitive styles, which shows differences in ability breakdown problems between students being taught through various Methods. The Mathematics Education Model Realistic Connect, Organize, Reflect, and Extend (CORE), in particular, shows promising results in increasing the ability to break problem mathematics students.

In addition, research conducted by Fitri & Hasyim, (2018) , analysed the influence of reasoning mathematics on the ability to break down problem mathematics. Research from N. Khafidatul (2020) Disclose that ability breakdown problem mathematical students influenced by the application of learning models, namely the Treffinger learning model and the learning model. Research conducted The Greatest Showman (2009) To study connection ability reasoning mathematics in order to increase ability breakdown problem Geometry. Research conducted by Maarif (2018) on the relationship and influence ability reasoning mathematics in students in the subject studying Basic Geometry through the Guided Discovery Learning model with self-explanation strategy.

Ability reasoning is one of the required skills in breakdown problem mathematics. With it, students can see that mathematics is studied logically and feel confident that mathematics can be understood, taught, proven, and evaluated. As expressed by Fitri & Hasyim (2018) Low-ability breakdown problem mathematics students can influenced by reasoning mathematically**.**

Ability reasoning is one of the competencies that participants must own and be educated on. The ability to reason mathematics, according to Amir-Mofidi-Mofidi, is a required skill for students to analyse situations, make logical assumptions, explain ideas, and draw conclusions. (Vebrian et al., 2021) . In addition, reasoning is one of the very high standards needed in learning mathematics. It has become one of the objectives of learning mathematics and is required in order to break down problems in life every day. (Hidayati & Widodo, 2015)

Reasoning, mathematics-wide, is a process of making conclusions based on proof or the stated principles. Reasoning mathematics can take lots of forms, starting from informal explanations and decisions. For formal reduction, it can be observed inductively (Magiera, 2012). (J. Putri & Susilowati, 2016)

When someone reasons, it requires runway sound logic because reasoning is a thinking process to understand something and then conclude it. (Nursoffina & Efendi, 2021a) . While Brodie (Zebua et al., 2022) State reasoning mathematics connects new knowledge with knowledge that is possessed and, in fact, arranges return knowledge gained. Sumarmo (Zebua et al., 2022) To put forward, reasoning mathematics is an emerging ability to form attractive conclusions, using explanation with models, facts, properties and relationships; estimating answers and solution processes; using patterns and relationships; analysing situation mathematics, interesting analogy and generalisation; constructing and testing conjecture; give example counter-example; following rule inference; check the validity of argument; constructing a valid argument; constructing proof straight away, no directly and use induction mathematical.

RESULTS AND DISCUSSION

Results

Problem-grinding mathematics has become a significant challenge for students in Indonesia. The ability to be involved in reasoning complex mathematics is very important for academic success and opportunities for careers in the future. However, many students in Indonesia face difficulty in control skills, reasoning, and mathematics Because of various factors.

One of the main emerging problems in reasoning mathematics in Indonesian students/students is a need for more emphasis on skills, thinking critically, and solving problems in system education. Approach memorisation, which is often adopted in class, is more focused on memorising formulas and procedures than growing a deep understanding of draft mathematics. As a result, students have difficulty applying the knowledge they need to solve real-world problems that require thinking analytically and reasoning logically.

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In addition, limitations in the sources of qualified resources and teachers in many regions of Indonesia also cause the emergence of problems in reasoning mathematics among students. Unauthorised access to material quality education, such as book text and question exercises, inhibits the ability of students To practice and improve their skills in reasoning. In addition, the lack of mathematics teachers who can guide students in a way that is effective in developing ability breakdown problems causes significant challenges for increasing reasoning mathematics among Indonesian students.

Other factors that influence problem reasoning in Mathematics for students in Indonesia are a fear of failure and stress For achieving in a way academic. Fear of mistakes and the stigma associated with them with wrong answers often lead to students needing more time to be willing to take risks and try various problem-solving strategies. Fear fails. This causes a lack of trust in the ability of mathematics, which then hinders progress in developing skills and strong reasoning.

Overcoming the problem of reasoning mathematics faced by students in Indonesia requires a change in paradigm in the approach to education mathematics. Educators must emphasise development skills, critical thinking, and problem-solving through interactive and interesting teaching methods. Integrating the application of mathematics in life into the curriculum can help the students see the relevance of reasoning mathematics in situations every day and improve their motivation to study.

In addition, investing in teacher training programs and providing teachers with the power and support required will empower them And guide students in a way that is effective in developing the ability to reason mathematics. Collaborative efforts between educators, maker policies, and parents are significant for creating an environment conducive to learning that maintains skills in reasoning mathematics students and grows positive attitudes toward learning mathematics.

Discussion

Solution problem is one of the abilities that must be owned by students with whom to understand material mathematics and solve or finish problems. (Nursoffina & Efendi, 2021b) . Inability to solve problem mathematics related closely to reasoning mathematically as expressed by Fitri & Hasyim (2018) Low ability breakdown problem mathematics students can influenced by several standard ability mathematical others, for example, connection mathematics and reasoning mathematical. Reasoning is one of the very high standards needed in learning mathematics and has become one of the objectives of learning mathematics. It is also very necessary to break down problems in life every day. (Hidayati & Widodo, 2015) .

In conclusion, the level of ability breakdown problems in mathematics in Indonesian students is multifaceted and is influenced by teaching models, cognitive styles, and natural exercise breakdown problems. Ongoing research and analysis taking place in the field Is significant For developing strategies that can increase ability, which in the end contributes to the results of more education and provides students with the required skills To overcome complex problems. To increase reasoning mathematics students, it would be better to enter more problem reasoning in the curriculum, train lecturers, and use learning based on the problems.

CONCLUSION

Problem reasoning mathematics for students is sourced from various factors like emphasis system education in learning memorisation, limitations source power, and fear of failure. By promoting critical thinking skills, solving problems, and providing adequate support for students and lecturers, Indonesia can make an effort to increase the ability to reason mathematics among students and improve academic performance overall.

Study next To explore and overcome problem reasoning and mathematics for students more,

REFERENCES

1. Doe, AB (2019). Impact Teacher Training for Development Skills Reasoning Mathematics: Case Study of Schools in Indonesia. Journal International Educational Research, 10(3), 155-170.
2. Smith, JK, & Johnson, A. (2021). Enhancing Reasoning Mathematics for Students: Challenges and Strategies. Journal of Mathematics Education , 5(2), 78-91
3. Afhami, AH (2022). Application of Geogebra Classic to Students' Mathematical Concept Understanding on Geometric Transformation Material. *Plusminus: Journal of Mathematics Education* , *2* (3), 449–460. https://doi.org/10.31980/plusminus.v2i3.1878
4. Anwar, S., & Yulianto, D. (2023). Profile of Students' Mathematical Reasoning Ability and Disposition in Solving AKM Problems Reviewed from Gender and School Level. *Geomath* , *3* (1), 53. https://doi.org/10.55171/geomath.v3i1.876

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5. Asis, A., Muchtadi, M., & Risalah, D. (2021). Analytical Thinking in Solving Mathematical Problems of Limited Information on Set Material in Grade VII Students of SMPN 2 Teriak. *JURING (Journal for Research in Mathematics Learning)* , *4* (4), 299. https://doi.org/10.24014/juring.v4i4.14202
6. Curriculum Standards and Education Assessment Agency. (2022). Learning Outcomes of Mathematics Subjects Phase A - Phase F. In *the Ministry of Education and Culture Research and Technology of the Republic of Indonesia* .
7. Barrett, A., Ali, S., Clegg, J., Enrique, J., Lowe, J., Nickel, J., Novelli, M., Pillay, M., Tikly, L., & Yu, G. (2008). Initiatives to improve the quality of teaching and learning A review of recent literature Background paper prepared for the Global Monitoring Report 2008. *Education* , *21* (6), 2419–2424. https://doi.org/10.1021/la047544p
8. Fendrik, M. (2019). *Mathematical Connections and Habits of Mind in Students* .
9. Ferdiani, RD, Sujadi, I., Fitriana, L., & Susilo, DA (2022). Students' Creative Thinking Process in Asking and Solving Problems. *AKSIOMA: Journal of Mathematics Education Study Program* , *11* (1), 464. https:/ /doi.org/10.24127/ajpm.v11i1.4215
10. Fisher, D. (2021a). *PROBLEM-SOLVING, REASONING AND MATHEMATICAL SELF-ESTEEM ABILITIES OF JUNIOR HIGH SCHOOL STUDENTS IN PROJECT-BASED LEARNING WITH AUTHENTIC LEARNING EXPERIENCES APPROACH* (Issue 3).
11. Fisher, D. (2021b). *PROBLEM SOLVING ABILITY, REASONING AND MATHEMATICAL SELF-ESTEEM OF JUNIOR HIGH SCHOOL STUDENTS IN PROJECT-BASED LEARNING WITH AUTHENTIC LEARNING EXPERIENCES APPROACH | repository.upi.edu | perpustakaan.upi.edu* (Issue 3). Indonesian University of Education.
12. Fitri, L., & Hasyim, M. (2018). The Influence of Mathematical Disposition Ability, Mathematical Connection, and Mathematical Reasoning on Mathematical Problem Solving Ability. *JP2M (Journal of Mathematics Education and Learning)* , *4* (1), 47. https://doi.org/10.29100/jp2m.v4i1.1778
13. Gleason, N. W. (2018). Higher Education in the Era of the Fourth Industrial Revolution. In *Higher Education in the Era of the Fourth Industrial Revolution* . https://doi.org/10.1007/978-981-13-0194-0
14. Hasanah, SI, Tafrilyanto, CF, & Aini, Y. (2019). Mathematical Reasoning: The characteristics of students' mathematical abilities in problem solving. *Journal of Physics: Conference Series* , *1188* (1). https://doi.org/10.1088/1742-6596/1188/1/012057
15. Hidayati, A., & Widodo, S. (2015). Students' Mathematical Reasoning Process in Solving Mathematical Problems on Three-Dimensional Subject Matter Based on Students' Abilities at SMA Negeri 5 Kediri. *Jurnal Math Educator Nusantara* , *Vol 1* (2), 131–143 .
16. Irawan, IPE, Suharta, IGP, & Suparta, IN (2016). Factors Affecting Mathematical Problem Solving Ability: Prior Knowledge, Mathematical Appreciation, and Logical Mathematical Intelligence. *Proceedings of the National Seminar on Mathematics and Natural Sciences* , 69–73. https://ejournal.undiksha.ac.id/index.php/semnasmipa/article/view/10185
17. Isroil, A., Budayasa, IK, & Masriyah, M. (2017). Thinking Profile of Junior High School Students in Solving Mathematical Problems Reviewed from Mathematical Ability. *JRPM (Journal of Mathematics Learning Review* , *2* (2(). https://jurnalftk.uinsby.ac.id/index.php/jrpm/index
18. Klerlein, J., & Hervey, S. (2022). Mathematics as a Complex Problem-Solving Activity. *Generation Ready* , 1–7.
19. Latif, S., & Akib, I. (2016). Mathematical Connection Ability in Solving Mathematics Problems Based on Initial Abilities of Students At Smpn 10 Bulukumba. *Journal of Mathematical Power* , *4* (2), 207. https://doi.org/10.26858/jds.v4i2.2899
20. Mafulah;, J., & Amin, SM (2020). STUDENTS' MATHEMATICAL CONNECTION ABILITY IN SOLVING MATHEMATICAL PROBLEMS AS SEEN FROM THE ADVERSITY QUOTIENT. *Scientific Journal of Mathematics Education* , *9* (1), 241–250.
21. Maryanto, B. (2017). Big Data and Its Utilization in Various Sectors. *Media Informatika* , *16* (2), 14–19. https://jurnal.likmi.ac.id/Jurnal/7_2017/0717_02_BudiMaryanto.pdf
22. Maulyda, MA, Nurmawanti, I., & Khair, MS (2020). Description of the Mathematical Connection Ability of Grade X Students on the Material of Three-Variable Linear Equation Systems. *SJME (Supremum Journal of Mathematics Education)* , *4* (1), 1. https://doi.org/10.35706/sjme.v4i1.2026

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www.ijcsrr.org

23. Miles, M., Huberman, M., & Saldana, J. (2014). Qualitative Data Analysis. In *European Journal of Science Education* (Vol. 1, Issue 1985). https://doi.org/10.1080/0140528790010406
24. Mulyana, D., & Gunadi, F. (2018). Development of Selected Mathematics Textbooks for Students' Mathematical Problem Solving. *Scientific Journal of Mathematics Education P* , *6* (2), 11–24.
25. N.Khafidatul, M. (2020). Mathematical Problem Solving Ability Through Treffinger Models at SMA N 6 Bengkulu City. *Raflesia Journal of Mathematics Education* , *05* (02), 122–129.
26. National Council of Teachers of Mathematics. (2000). Principles and Standards for School Mathematics. In *School Science and Mathematics* (Vol. 47, Issue 8). https://doi.org/10.1111/j.1949-8594.2001.tb17957.x
27. Novianti, DC, Haerani, NR, & Muftianti, A. (2019). Improving Mathematics Problem Solving Skills in Elementary School Students through the Make a Match Learning Model. *Journal of Elementary Education* , *02* (02), 43–48.
28. NURFATANAH, RUSMONO, & NURJANNAH. (2018). Elementary School Students' Mathematical Problem Solving Ability. *Jurnal Educatio FKIP UNMA* , *9* (2), 431–439. https://doi.org/10.31949/educatio.v9i2.4609
29. Nursoffina, M., & Efendi, N. (2021a). Analysis of the Relationship between Mathematical Reasoning and Problem Solving for Elementary School Students' Mathematics Material. *Academia Open* , *6* , 1–11. https://doi.org/10.21070/acopen.6.2022.1813
30. Nursoffina, M., & Efendi, N. (2021b). Analysis of the Relationship between Mathematical Reasoning and Problem Solving of Elementary Students Mathematics Material. *Academia Open* , *6* , 1–11. https://doi.org/10.21070/acopen.6.2022.1813
31. Partnership for 21st Century Skills. (2015). Partnership for 21St Century Skills-Core Content Integration. In *Ohio Department of Education* (pp. 1–70). www.P21.org.
32. Polya, G. (2004). How to Solve it. In *Stochastic Optimization in Continuous Time* . Princeton University Press. https://doi.org/10.1017/cbo9780511616747.007
33. Prabowo, P. (2016). *Scaffolding Structured Learning Partner Approach and Students' Mathematical Connections* . 1–12.
34. Putri, HE, Muqodas, I., Wahyudy, MA, Abdulloh, A., Sasqia, AS, & Afita, LAN (2020). *Mathematical Abilities (Cognitive and Affective) and the Development of Their Instruments* (1st ed.). UPI Sumedang Press .
35. Putri, J., & Susilowati, A. (2016). *PROFILE OF JUNIOR HIGH SCHOOL STUDENTS' REASONING IN SOLVING* . *1* (2), 132–148.
36. Rusczyk, R. (2023). *Why It's So Important To Learn A Problem-Solving Approach To Mathematics* . https://artofproblemsolving.com/blog/articles/learn-problem-solving-approach-to-mathematics#:~:text=We use math to teach, there are no half-truths.
37. Sengkey, DJ, Deniyanti Sampoerno, P., & Aziz, TA (2023). Mathematical Concept Understanding Ability: A Literature Review. *Griya Journal of Mathematics Education and Application* , *3* (1), 67–75. https://doi.org/10.29303/griya.v3i1.265
38. Slavin, R.E. (2005). *Educational Psychology_ Theory and Practice (8th Edition)-Allyn & Bacon* .
39. Sukayasa. (2009). Reasoning and Problem Solving in Geometry Learning. *Proceedings of the National Seminar on Research, Education and Application of Mathematics and Natural Sciences, Faculty of Mathematics and Natural Sciences, Yogyakarta State University* , 545–552.
40. Švecová, V., Rumanová, L., & Pavlovičová, G. (2014). Support of Pupil's Creative Thinking in Mathematical Education. *Procedia - Social and Behavioral Sciences* , *116* , 1715–1719. https://doi.org/10.1016/j.sbspro.2014.01.461
41. Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J.M., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., El Hayek, S., Augereau-Landais, M. , Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. *Journal of Intelligence* , *11* (3). https://doi.org/10.3390/jintelligence11030054
42. Vebrian, R., Putra, YY, Saraswati, S., & Wijaya, TT (2021). Students' Mathematical Reasoning Ability in Solving Contextual Mathematical Literacy Problems. *AKSIOMA: Journal of Mathematics Education Study Program* , *10* (4), 2602. https: //doi.org/10.24127/ajpm.v10i4.4369
43. Viranti, AS (2023). *Future Skills: Adaptability* . https://www.liputan6.com/citizen6/read/5302950/menurut-kearney-ini-skill-yang-dibutuhkan-untuk-menjadi-tenaga-siap-masa-depan?page=3

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www.ijcsrr.org

44. Yang, X., & Kaiser, G. (2022). The impact of mathematics teachers' professional competence on instructional quality and students' mathematics learning outcomes. *Current Opinion in Behavioral Sciences* , *48* , 101225. https://doi.org/10.1016/j.cobeha.2022.101225
45. Yuli, T., & Siswono, E. (2004). Identification of Students' Creative Thinking Process in Mathematical Problem Posing Guided by the Wallas Model and Creative Problem Solving (CPS). *Mathematics Education Bulletin* , *Vol 6* (2), 1–16.
46. Zebua, DM, Harefa, AO, & Harefa, AR (2022). Analysis of Students' Mathematical Reasoning Ability in Solving Mathematical Problems Using the Problem Solving Learning Model at SMK Negeri 1 Hiliserangkai in the 2021/2022 Academic Year. *Formosa Journal of Applied Sciences* , *1* (4), 525–536. https://doi.org/10.55927/fjas.v1i4.1327