

**ANALISIS KEMAMPUAN BERPIKIR ALJABAR SISWA SMP DITINJAU  
DARI *HABITS OF MIND***

**TESIS**

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Magister  
Pendidikan pada Program Studi Pendidikan Matematika



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Sebuah tesis yang diajukan untuk memenuhi salah satu syarat memperoleh gelar  
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## LEMBAR PERNYATAAN

Dengan ini saya menyatakan bahwa tesis dengan judul “**Analisis Kemampuan Berpikir Aljabar Siswa SMP Ditinjau dari *Habits of Mind***” ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung resiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

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Yang membuat pernyataan,

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## ABSTRAK

### **Riane Nurismawati. (1906536). Analisis Kemampuan Berpikir Aljabar Siswa SMP Ditinjau dari *Habits of mind***

Penelitian ini bertujuan untuk mendeskripsikan dan menganalisis secara kuantitatif kemampuan berpikir aljabar siswa SMP, *habits of mind* siswa SMP dan kemampuan berpikir aljabar siswa SMP yang ditinjau dari *habits of mind* serta dilengkapi dengan analisis kemampuan berpikir aljabar siswa secara kualitatif. Untuk memperoleh hasil analisis yang lebih dalam dan kuat serta perspektif yang lebih luas, maka metode yang digunakan adalah *mixed-method* dengan desain *concurrent triangulation strategy*. Pengumpulan data kuantitatif maupun kualitatif dilakukan di waktu yang bersamaan dan terjadi dalam satu tahap penelitian, lalu hasilnya diintegrasikan selama fase interpretasi. Penelitian ini dilakukan di salah satu SMP di kota Cimahi dengan perolehan data berupa hasil tes kemampuan berpikir aljabar, angket *habits of mind* dan wawancara. Hasil penelitian menunjukkan bahwa kemampuan berpikir aljabar dan *habits of mind* siswa SMP berada pada kategori sedang. Secara kuantitatif ditemukan bahwa terdapat perbedaan yang signifikan antara kemampuan berpikir aljabar siswa pada kelompok *habits of mind* tinggi, sedang, maupun rendah. Adapun melalui analisis kualitatif, siswa yang merepresentasikan kelompok *habits of mind* tinggi dominan pada indikator generasional dan meta-level global, sedangkan siswa yang merepresentasikan kelompok *habits of mind* sedang menunjukkan kemampuan dominan pada indikator transformasional dan terakhir siswa dengan kelompok *habits of mind* rendah dominan pada indikator meta-level global. Beberapa teori dan penelitian lain yang berkaitan dengan temuan ini dibahas lebih lanjut.

Kata kunci : aljabar, berpikir aljabar, *habits of mind*, generasional, transformasional, meta-level global

## ABSTRACT

**Riane Nurismawati. (1906536). Analysis of Junior High School Students' Algebraic Thinking Ability Viewed from *Habits of mind***

This study aims to describe and analyze quantitatively of students' algebraic thinking ability, *habits of mind* and algebraic thinking skills viewed from *habits of mind* for junior high school students and also equipped with qualitative analysis. In order to obtain deeper and stronger analysis results as well as a broader perspective, the method used is a mixed-method with a concurrent triangulation strategy design. The collection of both quantitative and qualitative data was carried out at the same time and occur in one research phase, then the results were integrated during the interpretation phase. This research was conducted in one of the junior high schools in the city of Cimahi with data acquisition in the form of algebraic thinking ability test results, *habits of mind* questionnaire and interviews. The findings showed that the algebraic thinking skills and *habits of mind* of junior high school students were in the medium category. Quantitatively, it was found that there was a significant difference between students' algebraic thinking abilities in the high, medium, and low *habits of mind* groups. Meanwhile, through qualitative analysis, students who represent the high *habits of mind* group are dominant on two indicators namely generational and global meta-levels, while students who represent the medium *habits of mind* group show dominant abilities on transformational indicators and finally students with low *habits of mind* groups are dominant on the global meta-level indicators. Several theories and other research related to these findings are discussed further.

**Keywords:** algebra, algebraic thinking ability, *habits of mind*, generational, transformational, global meta-levels

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## DAFTAR PUSTAKA

- Afifaturrohmaniyyah, N., & Malasari, P. N. (2021). Problematika Guru dalam Mengajar Materi Aljabar di Era Pandemi Coronavirus Disease 2019 (Covid-19). *Jurnal Pendidikan Matematika (Kudus)*, 4(1), 43. <https://doi.org/10.21043/jmtk.v4i1.10083>
- Agoestanto, A., Sukestiyarno, Y. L., Isnarto, & Rochmad. (2019). An analysis on generational, transformational, global meta-level algebraic thinking ability in junior high school students. *Journal of Physics: Conference Series*, 1321(3). <https://doi.org/10.1088/1742-6596/1321/3/032082>
- Alhamlan, S., Aljasser, H., Almajed, A., Almansour, H., & Alahmad, N. (2017). A Systematic Review: Using Habits of Mind to Improve Student's thinking in Class. *Higher Education Studies*, 8(1), 25. <https://doi.org/10.5539/hes.v8n1p25>
- Arikunto, S. (2012). *Penelitian tindakan kelas*. PT. Bumi Aksara.
- Bachri, B. S. (2010). Meyakinkan Validitas Data Melalui Triangulasi Pada Penelitian Kualitatif. *Teknologi Pendidikan*, 10, 46–62.
- Badawi, A., Agoestanto, A., Matematika, J., & Semarang, U. N. (2017). Analisis Kemampuan Berpikir Aljabar Dalam Matematika Pada Siswa Smp Kelas Viii. *Unnes Journal of Mathematics Education*, 5(3), 182–189. <https://doi.org/10.15294/ujme.v5i3.13100>
- Blanton, M., Brizuela, B., Stephens, A., Knuth, E., Isler, I., Gardiner, A., Stroud, R., Fonger, N., & Stylianou, D. (2018). (2018). Teaching and learning algebraic thinking with 5-to 12-year-olds: the global evolution of and emerging field of research and practice. *Springer International Publishing*, 27–49. <https://doi.org/10.1080/14794802.2020.1725613>
- Cai, J., Moyer, J. C., Wang, N., & Nie, B. (2011). *Examining Students' Algebraic Thinking in a Curricular Context: A Longitudinal Study*. 161–185. [https://doi.org/10.1007/978-3-642-17735-4\\_11](https://doi.org/10.1007/978-3-642-17735-4_11)
- Campbell, J. (2006). Theorising habits of mind as a framework for learning. *Australian Association for Research in Education Conference*, 1–21.
- Chimoni, M., & Pitta-pantazi, D. (2015). Connections between algebraic thinking and reasoning processes. *CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Charles University in Prague, Faculty of Education; ERME*, 398–404.
- Contini, Dalit; Di Tommaso, Maria Laura; Muratori, Caterina; Piazzalunga, Daniela;

- Schiavon, L. (2021). The Covid-19 Pandemic and School Closure: Learning Loss in Mathematics in Primary Education. *IZA Discussion Papers Institute of Labor Economics (IZA)*, Bonn, 14785.
- Costa, A. L., & Kallick, B. (2007). *Describing 16 Habits of Mind*.
- Costa, A. L., & Kallick, B. (2008). *Learning and leading with habits of mind : 16 essential characteristics for success*. Alexandria, VA : ASCD, [2008] ©2008. <https://search.library.wisc.edu/catalog/9910152572402121>
- Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. *Proceedings of the Annual Conference of the International Speech Communication Association, INTERSPEECH*.
- Cuoco, A., Paul Goldenberg, E., & Mark, J. (1996). Habits of mind: An organizing principle for mathematics curricula. *Journal of Mathematical Behavior*, 15(4), 375–402. [https://doi.org/10.1016/S0732-3123\(96\)90023-1](https://doi.org/10.1016/S0732-3123(96)90023-1)
- Didi Suhaedi. (2013). Peningkatan Kemampuan Komunikasi Matematis, Berpikir Aljabar, dan Disposisi Matematis Siswa SMP Melalui Pendekatan Pendidikan Matematika Realistik. In *Disertasi Bandung: Universitas Pendidikan Indonesia*.
- Drijvers, P., Goddijn, A., & Kindt, M. (2011). Algebra education: Exploring topics and themes. In *Secondary algebra education* (pp. 5–26). Brill.
- Driscoll, M. (1999). Developing algebraic habits of mind. *Fostering Algebraic Thinking: A Guide for Teachers Grades 6–10*, 1–8.
- Dwi Kusumawati, A., & Sutriyono, S. (2018). Analisis Kesulitan Belajar Siswa Pada Materi Operasi Aljabar Bagi Siswa Kelas Vii Smp Negeri 3 Salatiga. *Paedagogia / FKIP UMMat*, 9(1), 30. <https://doi.org/10.31764/paedagogia.v9i1.265>
- Dwirahayu, G., Kustiawati, D., & Bidari, I. (2018). Pengaruh Habits of Mind Terhadap Kemampuan Generalisasi Matematis. *Jurnal Penelitian Dan Pembelajaran Matematika*, 11(2). <https://doi.org/10.30870/jppm.v11i2.3757>
- Ernest, P. (2002). The Philosophy of Mathematics Education. In *The Philosophy of Mathematics Education*. <https://doi.org/10.4324/9780203497012>
- Fakhrunisa, F., & Hasanah, A. (2020). Students' algebraic thinking: A study of mathematical modelling competencies. *Journal of Physics: Conference Series*, 1521(3). <https://doi.org/10.1088/1742-6596/1521/3/032077>
- Habibi, M., Lasia, D., Oktafia, M., & Ilham, M. (2020). Habits of Mind Strategies for Enhancing Students' Math Problem Solving Skills. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, 4(2), 182. <https://doi.org/10.31764/jtam.v4i2.2590>

- Hadi, S. (1991). Analisis Butir untuk Instrumen Angket, Tes, dan Skala Nilai. *Yogyakarta: FP UGM*.
- Hasibuan, I. (2015). Hasil Belajar Siswa Pada Materi Bentuk Aljabar Di Kelas Vii Smp Negeri 1 Banda Aceh Tahun Pelajaran 2013/2014. *Jurnal Peluang*, 4(1), 5–11.
- Hernandez, I., Levy, R., & Brown, S. (2010). Algebraic reasoning in elementary school classrooms. *USA: Harvey Mudd*.
- Hodiyanto. (2016). Analisis Kesulitan Siswa Kelas IX dalam Mengerjakan Soal Operasi Bentuk Aljabar. *Jurnal Pendidikan Informatika Dan Sains*, 5(1), 51–63.
- Hutajulu, M., & Wahyudin. (2020). Analisis Ketercapaian Indikator Habits of Mind ( HoM ) Siswa SMA. *Jurnal Padagogik*, 3(2), 94–103.
- Jamieson, S. (2004). Likert scales: How to (ab)use them. *Medical Education*, 38(12), 1217–1218. <https://doi.org/10.1111/j.1365-2929.2004.02012.x>
- Kaput, J. (2000). Teaching and Learning a New Algebra. *U.S. Massachusetts: National Center for Improving Student Learning and Achievement*, 1–32. <https://doi.org/10.4324/9781410602619-16>
- Kieran, C. (2004). Algebraic thinking in the early grades: What is it. *The Mathematics Educator*, 8(1), 139–151.
- Kieran, C. (2006). The Core of Algebra: Reflections on its Main Activities. *The Future of the Teaching and Learning of Algebra The 12th ICMI Study*, 21–33. [https://doi.org/10.1007/1-4020-8131-6\\_2](https://doi.org/10.1007/1-4020-8131-6_2)
- Kilpatrick, J., Swafford, J., & Findell, B. (2001). Adding It Up: Helping Children Learn Mathematics. In *Washington, DC: National Academy Press*.
- Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research* (M. L. Miller (ed.)). Sage Publications.
- Kızıltoprak, A., & Köse, N. Y. (2017). Relational thinking: The bridge between arithmetic and algebra. *International Electronic Journal of Elementary Education*, 10(1), 131–145. <https://doi.org/10.26822/iejee.2017131893>
- Kriegler, S. (2007). Just What is Algebraic Thinking? *Introduction to Algebra :TeacherHandbook*, 1–11.
- Lew, H.-C. (2004). Developing Algebraic Thinking in the Earlier Grades : A Case Study of the Chinese Elementary School Curriculum 1. *The Mathematics Educator*, 8(1), 107–130. [https://link.springer.com/chapter/10.1007/978-3-642-17735-4\\_3](https://link.springer.com/chapter/10.1007/978-3-642-17735-4_3)

- Lewis, K., Kuhfeld, M., Ruzek, E., & Mceachin, A. (2021). Learning during COVID-19-Reading and math achievement in the 2020-2021 school year. *Nwea Research, July*, 1–12.
- Lins, R. C., & Bell, A. (1992). A framework for understanding what algebraic thinking is. *Shell Centre for Mathematical Education/Nottingham University, UK*, 324.
- Locke, V. N., Patarapichayatham, C., & Lewis, S. (2021). Learning Loss in Reading and Math in U.S. Schools Due to the COVID-19 Pandemic. *Istation, March*, 1–40.
- Loveless, T., Fennel, F., Williams, V., Ball, D., & Banfield, M. (2008). The Final Report of the National Mathematics Advisory Panel. *In Foundations for Success: Report of the National Mathematics Advisory Panel*, 37(9), 645–648. <http://edr.sagepub.com/content/37/9/645.full>
- Malasari, P. N., Herman, T., & Jupri, A. (2019). Kontribusi Habits of Mind Terhadap Kemampuan Literasi Matematis Siswa pada Materi Geometri. *Jurnal Pendidikan Matematika*, 2(2).
- Malihatuddarojah, D., & Prahmana, R. C. I. (2019). Analisis Kesalahan Siswa Dalam Menyelesaikan Permasalahan Operasi Bentuk Aljabar. *Jurnal Pendidikan Matematika*, 13(1), 1–8. <https://doi.org/10.22342/jpm.13.1.6668.1-8>
- Marshall, Rossman, Gretchen B., C. (2016). *Designing qualitative research*.
- Marzano, R. J. (1992). *A Different Kind of Classroom: Teaching with Dimensions of Learning*. Association for Supervision and Curriculum Development. <https://files.eric.ed.gov/fulltext/ED350086.pdf>
- Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., & Barbara. (1988). *Dimension of Thinking: A Framework for Curriculum and Instruction*. The Association for Supervision and Curriculum Development, 125 N. West St., Alexandria, VA 22314.2798.
- Mata, L., Monteiro, V., Peixoto, F., Santos, N. N., Sanches, C., & Gomes, M. (2021). Emotional profiles regarding maths among primary school children – A two-year longitudinal study. *European Journal of Psychology of Education*, 37(2), 391–415. <https://doi.org/10.1007/s10212-020-00527-9>
- Maudy, S. Y., Suryadi, D., & Mulyana, E. (2019). Level of student' algebraic thinking. *Journal of Physics: Conference Series*, 1157(4). <https://doi.org/10.1088/1742-6596/1157/4/042057>
- Maudy, Septiani Yugni. (2018). *Studi Level Berpikir Aljabar Siswa Sekolah Menengah*. Universitas Pendidikan Indonesia.

- Miles, M. B., & Huberman, A. M. (1984). Drawing Valid Meaning from Qualitative Data: Toward a Shared Craft. *Educational Researcher*, 13(5), 20–30. <https://doi.org/10.3102/0013189X013005020>
- Misbahuddin, M., Mustamin, S. H., & Nur, F. (2019). Analisis Keterampilan Berpikir Aljabar Siswa Kelas VIII MTs. *Al Asma : Journal of Islamic Education*, 1(2), 76. <https://doi.org/10.24252/asma.v1i2.11162>
- Mohsen, N. S. (2022). *Algebraic thinking and its relation to metacognitive skills among middle school students*. 14(03), 4823–4831.
- Moses, R. P., & Cobb, C. E. (2001). *Radical equations : math literacy and civil rights*. Beacon Press.
- Muthmainnah, M., Priatna, N., & Priatna, B. A. (2017). Analysis of Students' Error in Algebraic Thinking Test. *Journal of Physics: Conference Series*, 895(1), 6–11. <https://doi.org/10.1088/1742-6596/895/1/012089>
- Nada, Y. H. (2019). *Karakteristik Berpikir Aljabar Siswa Berdasarkan Komponen Berpikir Aljabar Kriegler Ditinjau dari Jenjang Sekolah dan Kemampuan Matematika*. Universitas Pendidikan Indonesia.
- NCTM. (2000). *Principles and standards for school mathematics*. <http://catalog.hathitrust.org/api/volumes/oclc/43919702.html>
- Nobre, S., Amado, N., & Carreira, S. (2012). Solving a contextual problem with the spreadsheet as an environment for algebraic thinking development. *Teaching Mathematics and Its Applications*, 31(1), 11–19. <https://doi.org/10.1093/teamat/hrr026>
- Nugraha, N., Kadarisma, G., & Setiawan, W. (2019). Analisis Kesulitan Belajar Matematika Materi Bentuk Aljabar pada Siswa SMP Kelas VII. *Journal On Education*, 01(02), 323–334.
- Nugrahani, F. (2014). Metode Penelitian Kualitatif dalam Penelitian Pendidikan Bahasa. In *Solo: Cakra Books. Pusat bahasa departemen pendidikan nasional*. <http://e-journal.usd.ac.id/index.php/LLT%0Ahttp://jurnal.untan.ac.id/index.php/jpdpb/article/viewFile/11345/10753%0Ahttp://dx.doi.org/10.1016/j.sbspro.2015.04.758%0Awww.iosrjournals.org>
- Nurhayati, Hartoyo, A., & Hamdani. (2017). Kemampuan Metakognisi Siswa dalam Pemecahan Masalah pada Materi Bangun Datar Di Kelas VII SMP. *Jurnal Pendidikan Dan Pembelajaran Untan*, Vol. 6, No, 1–13.
- Nurmala, N., Rohaeti, E. E., & Sariningsih, R. (2018). Pengaruh Habits of Mind (Kebiasaan Berpikir) Terhadap Pemecahan Masalah Matematik Siswa Smp.

*Journal on Education*, 1(2), 163–168.

- Permatasari, D. (2021). Analisis Kesulitan Siswa dalam Kegiatan Transformasional Berpikir Aljabar. *Jurnal Gantang*, 6(1), 19–27.  
<https://doi.org/10.31629/jg.v6i1.2523>
- Permatasari, D., Azka, R., & Fikriya, H. (2021). Exploring students' algebraic thinking in generational activities and their difficulties. *Beta: Jurnal Tadris Matematika*, 14(1), 53–68. <https://doi.org/10.20414/betajtm.v14i1.418>
- Permatasari, D., & Harta, I. (2018). Kemampuan Berpikir Aljabar Siswa Sekolah Pendidikan Dasar Kelas V Dan Kelas Vii: Cross-Sectional Study. *Jurnal Pendidikan Dan Kebudayaan*, 3(1), 99. <https://doi.org/10.24832/jpnk.v3i1.726>
- Pitta-Pantazi, D., Chimoni, M., & Christou, C. (2020). Different Types of Algebraic Thinking: an Empirical Study Focusing on Middle School Students. *International Journal of Science and Mathematics Education*, 18(5), 965–984.  
<https://doi.org/10.1007/s10763-019-10003-6>
- Prafitriyani, S., Magfirah, I., Amir, N., Irmawati, A., & Umanailo, M. C. B. (2019). Influence Of Emotional Intelligence On Mathematics Learning Outcomes Of Class VII Middle School 9 Buru Students. *International Journal of Scientific & Technology Research*, 8.
- Pratiwi, V., Farokhah, L., & Abidin, Z. (2019). a Lesson Design of Algebraic Thinking in Elementary School As an Efforts To Develop Mathematical Literation in Industrial Era 4.0. *PrimaryEdu - Journal of Primary Education*, 3(2), 61. <https://doi.org/10.22460/pej.v3i2.1376>
- Putro, S. T. (2020). Problematika Pembelajaran di Era Pandemi COVID-19 Stud Kasus: Indonesia, Filipina, Nigeria, Ethiopia, Finlandia, dan Jerman. *Geomedia: Majalah Ilmiah Dan Informasi Kegeografian*, 18(2), 50–64.  
<https://journal.uny.ac.id/index.php/geomedia/article/view/36058>
- Radford, L. (2002). Algebra as tekhnē: Artefacts, Symbols and Equations in the Classroom. *Mediterranean Journal for Research in Mathematics Education*, 1(1), 31--56.
- Radford, L., & Peirce, C. S. (2006). Algebraic Thinking and The Generalization of Patterns: A Semiotic Perspective. In *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education, North American*, 1, 2–21. <https://doi.org/10.5840/jphil20019858>
- Rivera, F. D., & Becker, J. R. (2008). Middle school children's cognitive perceptions of constructive and deconstructive generalizations involving linear figural patterns. *ZDM - International Journal on Mathematics Education*, 40(1), 65–82.  
<https://doi.org/10.1007/s11858-007-0062-z>



- Safitri, P. T. (2017). Analisis Habits of Mind Matematis Siswa SMP di Kota Tangerang. *Aksioma*, 6(2), 205–217.
- Safitri, P. T., Yasintasari, E., Putri, S. A., & Hasanah, U. (2020). Analisis Kemampuan Metakognisi Siswa dalam Memecahkan Masalah Matematika Model PISA. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, 4(1), 11. <https://doi.org/10.31331/medivesveteran.v4i1.941>
- Seeley, C. L. (2004). A Journey in Algebraic Thinking. *NCTM News Bulletin*, September, 2004.
- Shidiq, U., & Choiri, M. (2019). Metode Penelitian Kualitatif di Bidang Pendidikan. In *Journal of Chemical Information and Modeling* (Vol. 53, Issue 9). [http://repository.iainponorogo.ac.id/484/1/METODE PENELITIAN KUALITATIF DI BIDANG PENDIDIKAN.pdf](http://repository.iainponorogo.ac.id/484/1/METODE%20PENELITIAN%20KUALITATIF%20DI%20BIDANG%20PENDIDIKAN.pdf)
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- Sugiyono, P. D. (2010). *Statistika untuk penelitian*. Bandung: Alfabeta.
- Taylor-Cox, J. (2003). Algebra in the early years? Yes! *Young Children*, 58.
- Ugwuanyi, C. S., Okeke, C. I. O., & Asomugha, C. G. (2020). Prediction of learners' mathematics performance by their emotional intelligence, self-esteem and self-efficacy. *Cypriot Journal of Educational Sciences*, 15(3), 492–501. <https://doi.org/10.18844/cjes.v15i3.4916>
- Weinert, F. E. (1987). Introduction and overview: Metacognition and motivation as determinants of effective learning and understanding. In *Metacognition, motivation, and understanding* (pp. 1–16). Erlbaum.
- Widyawati, Astuti, D., & Ijudin, R. (2018). Proses Berpikir Siswa Dalam Menyelesaikan Soal Cerita Ditinjau Berdasarkan Kemampuan Matematika. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, 7(9), 1–8.
- Wiryanto, W. (2020). Proses Pembelajaran Matematika Di Sekolah Dasar Di Tengah Pandemi Covid-19. *Jurnal Review Pendidikan Dasar : Jurnal Kajian Pendidikan Dan Hasil Penelitian*, 6(2), 125–132. <https://doi.org/10.26740/jrpd.v6n2.p125-132>
- Yandari, I. A. V., Supartini, S., Pamungkas, A. S., & Khaerunnisa, E. (2019). The Role of Habits of Mind (HOM) on Student's Mathematical Problem Solving

Skills of Primary School. *Al-Jabar : Jurnal Pendidikan Matematika*, 10(1), 47–57. <https://doi.org/10.24042/ajpm.v10i1.4018>

Zull, J. E. (2004). The art of changing the brain. *Educational Leadership*, 62(1), 68–72.