

DAFTAR PUSTAKA

- Adini, M. H., Sukmawati, R. A., & Purba, H. S. (2022). Pelatihan Penggunaan Multimedia Pembelajaran Interaktif Berbasis Geogebra. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 4(2), 430. <https://doi.org/10.20527/btjpm.v4i2.4776>
- Akrim. (2020). *Desain Pembelajaran*. Rajawali Pers.
- Alessandroni, N., & Rodríguez, C. (2020). The Development of Categorisation and Conceptual Thinking in Early Childhood: Methods and Limitations. *Psicologia: Reflexao e Critica*, 33(1). <https://doi.org/10.1186/s41155-020-00154-9>
- Amalia, S. R., Purwaningsih, D., Widodo, A. N. A., & Fasha, E. (2020). Model Problem Based Learning Berbantuan GeoGebra dan Model Realistic Mathematics Education terhadap Representasi Matematis Peserta didik ditinjau dari Gaya Kognitif. *Jurnal Elemen*, 6(2), 157–166. <https://doi.org/10.29408/jel.v6i2.1692>
- Amaliah1, D., Khotimah2, & Lestari3, I. (2023). Perancangan Media Pembelajaran Interaktif Berbantuan Geogebra Untuk Mendukung Students Geometric Thinking Skills. *Sentri: Jurnal Riset Ilmiah*, 2(4), 1275--1289.
- Andayani, M., & Amir, Z. (2019). Membangun Self-Confidence Peserta didik melalui Pembelajaran Matematika. *Desimal: Jurnal Matematika*, 2(2), 147–153. <https://doi.org/10.24042/djm.v2i2.4279>
- Andy Rudhito. (2019). *Dasar-Dasar Penelitian Desain untuk Pendidikan*. Sleman : Deepublish.
- Anggraeni, E. D., & Dewi, N. R. (2021). Kajian Teori: Pengembangan Bahan Ajar Matematika Berbantuan GeoGebra untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Melalui Model Pembelajaran Preprospec Berbantuan TIK pada Materi Bangun Ruang Sisi Datar. *PRISMA, Prosiding Seminar Nasional Matematika*, 4, 179–188.
- Anggraini1, S. N., Mujiyanto, G., & Yudiantoro, K. (2023). Peningkatan Hasil Belajar Dan Keaktifan Peserta didik Pada Mata Pelajaran Matematika Dengan Menggunakan Model Pembelajaran Problem Based Learning. *Jurnal Ilmiah Pendidikan Dasar*, 47(1), 100950. <https://doi.org/10.1016/j.tranpol.2019.01.002%0Ahttps://doi.org/10.1016/j.cstp.2023.100950%0Ahttps://doi.org/10.1016/j.geoforum.2021.04.007%0Ahttps://doi.org>

- /10.1016/j.trd.2021.102816%0Ahttps://doi.org/10.1016/j.tra.2020.03.015%0Ahttps://doi.org/10.1016/j
- Apertha, F. K. P., Zulkardi, & Yusup, M. (2018). Pengembangan Lkpd Berbasis Open-Ended Problem Pada. *Jurnal Pendidikan Matematika*, 12(2), 47–62. <https://ejournal.unsri.ac.id/index.php/jpm/article/view/4318>
- Aqib, & Zainal. (2013). *Model-model, Media dan Strategi Pembelajaran Kontekstual*. Bandung: Yrama Widya.
- Arikunto, S. (2016). *Prosedur Penelitian Suatu Pendekatan Praktik*. PT Rineka Cipta.
- Atkinson, & Simon, P. (2022). *Writing Good Learning Outcomes and Objectives: Short guide to creating well-structured intended learning outcomes that ensure effective course designs - Softcover*. Sijen Education.
- Awan, R. un N., Hussain, H., & Anwa, N. (2017). Effects of Problem Based Instruction on Students ' Critical Thinking Skills. *Journal of Educational Research*, 20(2), 0–24.
- Azhari, M. F., Wahyuningrum, E., & Julaeha, S. (2022). Implementasi Kurikulum 2013 oleh Guru Mata Pelajaran Matematika Sekolah Menengah Kejuruan Negeri di Jakarta Utara Tahun 2018. *Jurnal Ilmu Dan Budaya*, 43(2), 167. <https://doi.org/10.47313/jib.v43i2.1684>
- Azizah, A., Junianti, D., & Sofro, A. (2018). Pengembangan Perangkat Pembelajaran Berbasis Masalah Dengan Bantuan GeoGebra Pada Materi Lingkaran Kelas VI SD. *Jurnal Riset Pendidikan Matematika*, 5(2), 147–158. <https://journal.uny.ac.id/index.php/jrpm/article/view/10036/11707>
- Bembenutty, H., Schunk, D., & DiBenedetto, M. K. (2022). Applications of Motivation Research to Practice. *Theory into Practice*, 61(1), 1–4. <https://doi.org/10.1080/00405841.2021.1929000>
- Benning, I., Linsell, C., & Ingram, N. (2023). Examining the changes in mathematics teachers' technology dispositions through GeoGebra-mediated professional development. *Asian Journal for Mathematics Education*, 2(1), 42–63. <https://doi.org/10.1177/27527263231163276>
- Bernard, M., & Sunaryo, A. (2020). Analisis Motivasi Belajar Peserta didik MTs dalam Pembelajaran Matematika Materi Segitiga dengan Berbantuan Media Javascript Geogebra. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 4(1), 134–143.

- <https://doi.org/10.31004/cendekia.v4i1.173>
- Beswick, K., Watt, H. M. G., Granziera, H., Geiger, V., & Fraser, S. (2023). Boys' Motivation Profiles in Mathematics: Relations With Contextual Factors, Wellbeing and Engagement in A Boys-Only School. *ZDM - Mathematics Education*, 55(2), 315–329. <https://doi.org/10.1007/s11858-022-01464-1>
- Boaler, J., Brown, K., LaMar, T., Leshin, M., & Selbach-Allen, M. (2022). Infusing Mindset through Mathematical Problem Solving and Collaboration: Studying the Impact of a Short College Intervention. *Education Sciences*, 12(10). <https://doi.org/10.3390/educsci12100694>
- Brahim, R., Huda, N., & Anggereini, E. (2023). Pengaruh Model Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematika Ditinjau Dari Self Confidence Peserta didik. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 12(1), 1178. <https://doi.org/10.24127/ajpm.v12i1.6737>
- Branch, R. M., & Theodore J, K. (2013). *Instructional Design Models*. In: Spector, J., Merrill, M., Elen, J., Bishop, M. (eds) *Handbook of Research on Educational Communications and Technology*. Springer, New York, NY. https://doi.org/https://doi.org/10.1007/978-1-4614-3185-5_7
- Brown, A. H., & Green, D. T. (2019). *The Essentials of Instructional Design*. Routledge. <https://doi.org/https://doi.org/10.4324/9780429439698>
- Cai, J., & Stephen, H. (2023). *Making Mathematics Challenging Through Problem Posing in the Classroom*. Springer, Cham. https://doi.org/https://doi.org/10.1007/978-3-031-18868-8_7
- Carpenter, T. P., Moser, J. M., & Romberg, T. A. (2020). *Addition and Subtraction: A Cognitive Perspective*. London: Routledge. <https://doi.org/https://doi.org/10.4324/9781003046585>
- Clements, D. H., & Julie, S. (2021). *Learning and Teaching Early Math: The Learning Trajectories Approach*. Routledge.
- Clements, D. H., & Sarama, J. (2020). *Learning and Teaching Early Math: The Learning Trajectories Approach*. New York: Routledge. <https://doi.org/https://doi.org/10.4324/9781003083528>
- Daro, P., Mosher, F. A., & Corcoran, T. (2011). *Learning Trajectories in Mathematics: A Foundation for Standards, Curriculum, Assessment, and Instruction*. CPRE

Research

Report.

<https://doi.org/https://api.semanticscholar.org/CorpusID:60508665>

Diva, D. F., Andriyani, J., Rangkuti, S. A., Prasiska, M., Lumban Tobing, T. E. W., Irani, A. R., & Saragih, R. M. B. (2023). Pentingnya Pemahaman Konsep Geogebra dalam Pembelajaran Matematika. *Journal on Education*, 5(3), 8441–8446. <https://doi.org/10.31004/joe.v5i3.1629>

Diyah. (2020). *Geogebra Dalam Pembelajaran Matematika*. Deepublish.

Durrotunisa, E. (2023). Penerapan Pembelajaran Realistic Mathematic Education (Rme) Bernantuan Geogebra Terhadap Kemampuan Pemecahan Masalah Matematis Peserta didik. *Edunovatica: Jurnal Inovasi Pembelajaran*, 2(1), 1–6. <https://jurnal.unikal.ac.id/index.php/edunovatica/article/view/2813/1701>

Edelson, D. C. (2022). Design research: What we learn when we engage in design. *Journal of the Learning Sciences*, 11(1), 105–121. https://doi.org/10.1207/S15327809JLS1101_4

Edge, D. (2005). Mathematics Education Research : Designing , Implementing and Concluding. *Mathematics Educator*, 9(1), 1–11.

Erita, S., Utami, E. S. D., & Ningsih, F. (2022). Realistic Mathematic Education-Based Student Worksheet to Improve Students' Mathematical Reasoning on Circle Material. *Indonesian Journal of Science and Mathematics Education*, 5(2), 210–223. <https://doi.org/10.24042/ij sme.v5i2.11249>

Fernandez, A. J. (2020). *Mahir GeoGebra*. Deepublish.

Fitriasari, P. (2017). Pemanfaatan Software Geogebra dalam Pembelajaran Matematika. *Jpmrafa*, 57–69.

Gagne, R. M., Briggs, L. J., & Wager, W. W. (2005). *Principles of Instructional Design*. Wadsworth Publishing.

Geiger, V., Goos, M., & Helen, F. (2015). *A Rich Interpretation of Numeracy for The 21st Century: A Survey of The State of The Field*. ZDM Mathematics Education. <https://doi.org/https://doi.org/10.1007/s11858-015-0708-1>

Goos, M., Bennison, A., Forgasz, H., & Keiko, Y. (2024). *Research in Numeracy Education*. Springer, Singapore. https://doi.org/https://doi.org/10.1007/978-981-97-1964-8_4

Gravemeijer, K. (2004). *Local Instruction Theories as Means of Support for Teachers in*

Reform Mathematics Education. Routledge.

- Gravemeijer, K., & Michiel, D. (1999). *Context Problems in Realistic Mathematics Education: A Calculus Course as an Example*. Educational Studies in Mathematics. <https://doi.org/https://doi.org/10.1023/A:1003749919816>
- Grotlüschen, A., Desjardins, R., & Liu, H. (2020). Literacy and Numeracy: Global and Comparative Perspectives. *International Review of Education*, 66(2–3), 127–137. <https://doi.org/10.1007/s11159-020-09854-x>
- Hadiztia, H., & Herlina, S. (2023). Implementasi Model Pembelajaran Murder Terhadap Hasil Belajar Matematika Peserta didik Kelas Viii Smp/Mts. *Jurnal Karya Pendidikan Matematika*, 10(1), 27. <https://doi.org/10.26714/jkpm.10.1.2023.27-33>
- Haji, S. (2013). Pendekatan Iceberg Dalam Pembelajaran Pembagian Pecahan Di Sekolah Dasar. *Infinity Journal*, 2(1), 75. <https://doi.org/10.22460/infinity.v2i1.26>
- Han, W., Susanto, D., Dewayani, S., Pandora, P., Hanifah, N., Miftahussururi., Nento, M. N., & Akbari, Q. S. (2017). Materi Pendukung Literasi Numerasi. In *Kemertian Pendidikan dan Kebudayaan, Tim GLN Kemendikbud*. (Vol. 8, Issue 9).
- Harisuddin, M. I. (2020). *Asyiknya Belajar Matematika dengan Geogebra*. Deepublish.
- Herrington, J., Reeves, T. C., & Ron, O. (2013). *Authentic Learning Environments*. Springer, New York, NY. https://doi.org/https://doi.org/10.1007/978-1-4614-3185-5_32
- Heuvel-Panhuizen, M. van den. (2005). The Role Of Contexts In Assessment Problems In Mathematics. *Ethics and Mathematics Education*, 25(2), 2–9. https://doi.org/http://dx.doi.org/10.1007/978-3-031-58683-5_19
- Hohenwarter, M., Hohenwarter, J., Kreis, Y., & Lavicza, Z. (2008). Teaching and calculus with free dynamic mathematics software GeoGebra. *11th International Congress on Mathematical Education*, 1–9.
- Honebein, P. C., & Reigeluth, C. M. (2020). The instructional theory framework appears lost. Isn't it time we find it again? *Revista de Educación a Distancia*, 20(64), 1–24. <https://doi.org/10.6018/RED.405871>
- Huan, C., Meng, C. C., & Suseelan, M. (2022). Mathematics Learning from Concrete to Abstract (1968-2021): A Bibliometric Analysis. *Participatory Educational Research*, 9(4), 445–468. <https://doi.org/10.17275/per.22.99.9.4>
- Irfawandi Samad, & Nur, M. A. (2023). Kemampuan Literasi Numerasi Matematika

- melalui Penerapan Model Pembelajaran Problem Based Learning (PBL). *Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, 7(1), 100–107. <https://doi.org/10.30605/proximal.v7i1.3159>
- Jablonka, E., & Gellert, U. (2018). *International Handbook of Mathematics Education*. Springer. <https://doi.org/10.1007/978-94-009-1465-0>
- Jablonski, S., & Ludwig, M. (2023). Teaching and Learning of Geometry—A Literature Review on Current Developments in Theory and Practice. *Education Sciences*, 13(7). <https://doi.org/10.3390/educsci13070682>
- Jamaluddien, N. W., & Sumargiyani, S. (2022). Analisis Kebutuhan Pengembangan Media Pembelajaran Geogebra Mobile Pada Materi Transformasi Geometri Kelas Xi Smk. *JIPMat*, 7(2), 104–112. <https://doi.org/10.26877/jipmat.v7i2.12611>
- Kelly, C. (2006). Using Manipulatives in Mathematical Problem Solving: A Performance-Based Analysis. *The Mathematics Enthusiast*, 3(2), 184–193.
- Kodariyati, L., & Astuti, B. (2016). Pengaruh Model Pbl Terhadap Kemampuan Komunikasi Dan Pemecahan Masalah Matematika Peserta didik Kelas V Sd. *Jurnal Prima Edukasia*, 4(1), 93. <https://doi.org/10.21831/jpe.v4i1.7713>
- Koskinen, R., & Pitkänemi, H. (2022). Meaningful Learning in Mathematics: A Research Synthesis of Teaching Approaches. *International Electronic Journal of Mathematics Education*, 17(2), em0679. <https://doi.org/10.29333/iejme/11715>
- Kossybayeva, U., Shaldykova, B., Akhmanova, D., & Kulanina, S. (2022). Improving teaching in different disciplines of natural science and mathematics with innovative technologies. *Education and Information Technologies*, 27(6), 7869–7891. <https://doi.org/10.1007/s10639-022-10955-3>
- Kurniawan, D. (2020). *Pendekatan Scientific Berbantuan Geogebra*. Deepublish.
- Kusmayadi, M. A., Makki, M., & Syazali, M. (2023). Pengaruh Model Pembelajaran Kooperatif Tipe STAD Terhadap Keterampilan Berbicara Peserta Didik. *Journal of Classroom Action Research*, 2(1), 255–258.
- Lange, J. De. (1996). *Using and Applying Mathematics in Education*. Dordrecht: Kluwer Academic Publishers.
- Lehrer, R., & Chazan, D. (2006). *Designing Learning Environments for Developing Understanding of Geometry and Space*. New York: Routledge. <https://doi.org/10.4324/9780203053461>

- Lestari, W. M., Ngazizah, N., & Purworejo, U. M. (2021). Model Pembelajaran Problem Based Learning untuk Peningkatan Motivasi Belajar dan Kemampuan Problem Based Learning Models For Improving Learning. *Jurnal Pendidikan Dasar*, 2(2), 93–105.
- Lestaringih, E. D. (2017). Pengembangan Model Problem Based Learning Dan Blended Learning Dalam Pembelajaran Pemantapan Kemampuan Profesional Mahapeserta didik. *LITE : Jurnal Bahasa, Sastra Dan Budaya*, 13(2), 105–112.
- Lidinillah, D. A. M. (2018). Educational Design Research : a Theoretical Framework for Action. *Pedadidaktika*, 1(1), 1–13.
- Lisanti, S., & Effendy, U. (2017). Model Problem Based Learning Pada Materi Keliling Dan Luas Lingkaran Terhadap Hasil Belajar Peserta didik Kelas V. *Jurnal Inovasi Sekolah Dasar*, 4(1), 74–83.
- Lisnani. (2019). Pengaruh Penggunaan Konteks Daun terhadap Hasil Belajar Peserta didik. *Mosharafa: Jurnal Pendidikan Matematika*, 8(3), 423–434. <https://doi.org/10.31980/mosharafa.v8i3.578>
- M, C., Reigeluth, & Carr-Chellman. (2009). *Instructional-Design Theories and Models, Volume III: Building a Common Knowledge Base*. Routledge.
- Mangelep, N. O. (2018). Pengembangan Perangkat Pembelajaran Matematika Pada Pokok Bahasan Lingkaran Menggunakan Pendekatan Pmri Dan Aplikasi Geogebra. *Mosharafa: Jurnal Pendidikan Matematika*, 6(2), 193–200. <https://doi.org/10.31980/mosharafa.v6i2.306>
- Marande, G. M. S., & Adha Diana, H. (2022). Design Research : Pengembangan Lintasan Belajar Dalam Pembelajaran Matematika Realistik Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis. *Fibonacci: Jurnal Pendidikan Matematika Dan Matematika*, 8(1), 31. <https://doi.org/10.24853/fbc.8.1.31-46>
- Maulidina, A. P., & Hartatik, S. (2019). Profil Kemampuan Numerasi Peserta didik Sekolah Dasar Berkemampuan Tinggi Dalam Memecahkan Masalah Matematika. *Jurnal Bidang Pendidikan Dasar*, 3(2), 61–66. <https://doi.org/10.21067/jbpd.v3i2.3408>
- McKenney, S., & Reeves, T. C. (2021). Educational Design Research: Portraying, Conducting, And Enhancing Productive Scholarship. *Medical Education*, 55(1), 82–92. <https://doi.org/10.1111/medu.14280>

- Meirida, U., Johar, R., & Ahmad, A. (2021). Pengembangan lintasan belajar limas untuk mengembangkan kemampuan spasial peserta didik melalui pendidikan matematika realistik berbantuan GeoGebra. *Pythagoras: Jurnal Pendidikan Matematika*, 16(1), 1–18. <https://doi.org/10.21831/pg.v16i1.36157>
- Meng, N., Dong, Y., Roehrs, D., & Luan, L. (2023). Tackle Implementation Challenges In Problem-based Learning: A Survey Study of PBL E-learning Platforms. *Educational Technology Research and Development*, 71(3), 1179–1207. <https://doi.org/10.1007/s11423-023-10202-7>
- Mensah, P. A. A., Ansu, B., Besing Karadaar, I., & Gurah junior, J. (2023). GeoGebra as a Tool for Improving Mathematics Instruction and Learning by Ghanaian Teachers. *American Journal of Education and Technology*, 2(2), 69–75. <https://doi.org/10.54536/ajet.v2i2.1586>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Moanoang, C., Arsyad, N., & Nasrullah, N. (2021). Desain Pembelajaran Matematika Berbasis Hypothetical Learning Trajectory (HLT) Pada Materi Operasi Bilangan Bulat Peserta didik Kelas VII SMP Bunda Kasih Sudiang. *Issues in Mathematics Education (IMED)*, 5(2), 100. <https://doi.org/10.35580/imed23842>
- Mohd Yusof, M. A., & Maat, S. M. (2022). Kesiediaan Murid Tahun Satu dalam Mengikuti Pembelajaran Matematik Secara Kelas Berbalik. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 7(7), e001635. <https://doi.org/10.47405/mjssh.v7i7.1635>
- Munahefi, D. N., Mulyono, Dwijanto, Fariz, R., Khoirunnisa, K., & Noverinto, B. (2021). *Model Open Ended Project Based Learning Berbantuan GeoGebra pada Materi Vektor di Sekolah Menengah Atas*. Lakeisha.
- Mutia, M. (2017). Analisis kesulitan peserta didik SMP dalam memahami konsep kubus balok dan alternatif pemecahannya. *Beta: Jurnal Tadris Matematika*, 10(1), 83–102. <https://doi.org/10.20414/betajtm.v10i1.107>
- Nasution, A. U., Syahputra, E., & Ahyaningsih, F. (2022). Pengembangan Model Pembelajaran Berbasis Matematika Realistik Berbantuan Geogebra Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Peserta didik SMP AI

- Azhar Medan. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 6(2), 1623–1635.
<https://doi.org/10.31004/cendekia.v6i2.1379>
- Ní Shé, C., Ní Fhloinn, E., & Mac an Bhaird, C. (2023). Student Engagement with Technology-Enhanced Resources in Mathematics in Higher Education: A Review. *Mathematics*, 11(3), 1–34. <https://doi.org/10.3390/math11030787>
- Nida Winarti, Maula, L. H., Amalia, A. R., Pratiwi, N. L. A., & Nandang. (2022). Penerapan Model Pembelajaran Project Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Peserta didik Kelas Iii Sekolah Dasar. *Jurnal Cakrawala Pendas*, 8(3), 552–563. <https://doi.org/10.31949/jcp.v8i3.2419>
- Niss, M., & Eva, J. (2020). *Mathematical Literacy. In: Lerman, S. (eds) Encyclopedia of Mathematics Education.* Springer, Cham.
https://doi.org/https://doi.org/10.1007/978-3-030-15789-0_100
- Nisya, K. (2019). *PTK Jadikan Guru Profesional.* Jakarta: Guerpedia.
- Nopriana, T., Rosita, C. D., & Halbi, D. (2022). Implementation of Didactical Design on Circle Material at Junior High School. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 13(1), 100–112. <https://doi.org/10.15294/kreano.v13i1.32620>
- Novianda, D. (2022). Analisis Hambatan Belajar (Learning Obstacles) Dalam Pembelajaran Geometri: Literatur Review. *Jurnal Gantang*, 6(2), 133–139. <https://doi.org/10.31629/jg.v6i2.2866>
- Novilanti, F. R. E., & Suripah. (2021). Alternatif Pembelajaran Geometri Berbantuan Software GeoGebra di. *Cendekia: Jurnal Pendidikan Matematika*, 05(01), 357–367.
- Nur, I. R. D., Herman, T., & Dahlan, T. H. (2022). Numeracy Literacy in Early Childhood: An Investigation in Arithmetic, Geometry and Patterns in Early Stage. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, 6(2), 308. <https://doi.org/10.31764/jtam.v6i2.7007>
- Nurjanah, N., & Juliana, A. (2020). Hambatan Didaktis Peserta didik SMP dalam Penyelesaian Masalah Geometri Berdasarkan Kemampuan Persepsi Ruang. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 11(2), 236–244. <https://doi.org/10.15294/kreano.v11i2.26752>
- Nuryati, S., Reflina, R., Islam, U., Sumatra, N., Utara, S., Islam, U., Sumatra, N., & Utara, S. (2023). Effect of Geogebra Towards Students '. *Kalamatika*, 8(1), 93–106.

- Ochkov, V., Vasileva, I., Orlov, K., Chudova, J., & Tikhonov, A. (2022). Visualization in Mathematical Packages When Teaching with Information Technologies. *Mathematics*, *10*(19). <https://doi.org/10.3390/math10193413>
- OECD. (2018). *Students' Numeracy Skills and Practices*. www.oecd.org/skills/piaac/publicdataandanalysis.
- OECD. (2023). *OECD Skills Outlook 2023: Skills for A Resilient Green and Digital Transition*. https://www.oecd-ilibrary.org/education/oecd-skills-outlook-2023_27452f29-en
- Permana, F. A. (2022). Pembelajaran Kontekstual Meningkatkan Hasil Belajar Materi Lingkaran Peserta didik Kelas VIII SMP Negeri 1 Idi Rayeuk. *Jurnal Serambi Akademika*, *10*(1), 1–14. <http://www.ojs.serambimekkah.ac.id/serambi-akademika/article/view/3991%0Ahttp://www.ojs.serambimekkah.ac.id/serambi-akademika/article/download/3991/2951>
- Popovic, C. (2013). Teaching for quality learning at university. (2nd Edn.). In *Innovations in Education and Teaching International* (Vol. 50, Issue 4). <https://doi.org/10.1080/14703297.2013.839332>
- Prahmana. (2017). *Design Research (Teori Dan Implementasinya: Suatu Pengantar)*. Depok : Rajawali Pers.
- Praveen, S., & Leong, K. E. (2013). Effectiveness of Using Geogebra on Students ' Understanding in Learning Circles. *The Malaysian Online Journal of Educational Technology*, *1*(4), 1–11.
- Purbaningrum, M., & Mahmudi, A. (2024). The Effect of GeoGebra-Assisted Problem-Based Learning on Students' Mathematical Literacy Skills and Learning Motivation. *AL-ISHLAH: Jurnal Pendidikan*, *16*(2), 1337–1350. <https://doi.org/10.35445/alishlah.v16i2.4620>
- Purwanti, R. D., Pratiwi, D. D., & Rinaldi, A. (2016). Pengaruh Pembelajaran Berbatuan Geogebra terhadap Pemahaman Konsep Matematis ditinjau dari Gaya Kognitif. *Al-Jabar : Jurnal Pendidikan Matematika*, *7*(1), 115–122. <https://doi.org/10.24042/ajpm.v7i1.131>
- Putrawangsa, S. (2019). *Design research: Sebagai Framework Desain Pembelajaran*. Sanabil.
- Putri, H., Susiani, D., Wandani, N. S., & Putri, F. A. (2022). Instrumen Penilaian Hasil

- Pembelajaran Kognitif pada Tes Uraian dan Tes Objektif. *Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar*, 4(2), 139–148. <https://doi.org/10.36232/jurnalpendidikandasar.v4i2.2649>
- Putri, W. K. H. W., Suryadi, D., & Mulyana, E. (2020). Developing A Didactical Design: The Distance Between A Point And A Line In Three Dimensional Shape. *Journal of Physics: Conference Series*, 1521(3). <https://doi.org/10.1088/1742-6596/1521/3/032027>
- Putu Ade Andre Payadnya, I., Prahmana, R. C. I., Lo, J. J., Noviyanti, P. L., & Made Dharma Atmaja, I. (2023). Designing area of circle learning trajectory based on “what-if” questions to support students’ higher-order thinking skills. *Journal on Mathematics Education*, 14(4), 757–780. <https://doi.org/10.22342/jme.v14i4.pp757-780>
- Rahadyan, A., Kurniawan, I., & Halimatussa’diah, H. (2023). Implementation of Geogebra in Mathematics To Improve the Skills of Teachers. *JMM (Jurnal Masyarakat Mandiri)*, 7(1), 530. <https://doi.org/10.31764/jmm.v7i1.12352>
- Ralmugiz, U., & Kusumawati, M. (2020). Efektivitas Pendekatan Realistic Mathematics Education Dalam Meningkatkan Kemampuan Literasi Matematis Peserta didik. *Math Educa Journal*, 4(2), 169–178. <https://doi.org/10.15548/mej.v4i2.1819>
- Rangkuti, A. N., & Siregar, A. I. (2020). Lintasan Belajar Teorema Pythagoras dengan Pendekatan Pendidikan Matematika Realistik. *Logaritma: Jurnal Ilmu-Ilmu Pendidikan Dan Sains*, 7(02), 149–162. <https://doi.org/10.24952/logaritma.v7i02.2112>
- Reigeluth, C. M. (2013). *Instructional Design Theories and Models: An Overview of Their Current Status*. Routledge. <https://doi.org/https://doi.org/10.4324/9780203824283>
- Reinhold, F., Strohmaier, A., Finger-Collazos, Z., & Reiss, K. (2021). Considering Teachers’ Beliefs, Motivation, and Emotions Regarding Teaching Mathematics With Digital Tools: The Effect of an In-Service Teacher Training. *Frontiers in Education*, 6(October), 1–12. <https://doi.org/10.3389/feduc.2021.723869>
- Reinke, L. T., & Casto, A. R. (2022). Motivators or Conceptual Foundation? Investigating The Development of Teachers’ Conceptions of Contextual Problems. *Mathematics Education Research Journal*, 34(1), 113–137.

<https://doi.org/10.1007/s13394-020-00329-8>

- Reis, S. M., & Renzulli, J. S. (2018). The five dimensions of differentiation. *International Journal for Talent Development and Creativity*, 6(1), 87–94.
- Reyaz Ahmad Bhat. (2023). The Impact of Technology Integration on Student Learning Outcomes: A Comparative Study. *International Journal of Social Science, Educational, Economics, Agriculture Research and Technology (IJSET)*, 2(9), 592–596. <https://doi.org/10.54443/ijset.v2i9.218>
- Ridha, M. R., Pramiasih, E. E., & Widjajani. (2020). The Use of Geogebra Software in Learning Geometry Transformation to Improve Students' Mathematical Understanding Ability. *Journal of Physics: Conference Series*, 1477(4). <https://doi.org/10.1088/1742-6596/1477/4/042048>
- Risalah, D., Nusantara, T., Sutawidjaja, A., & Susiswo. (2019). Spatial reasoning based on the tendency of gestalt law to solve geometry problems. *Universal Journal of Educational Research*, 7(12), 2742–2746. <https://doi.org/10.13189/ujer.2019.071223>
- Ruiz-Cecilia, R., Medina-Sánchez, L., & Rodríguez-García, A. M. (2023). Teaching and Learning of Mathematics through CLIL, CBI, or EMI—A Systematic Literature Review. *Mathematics*, 11(6), 1–29. <https://doi.org/10.3390/math11061347>
- Saifanah, S. N., & Zanthi, L. S. (2020). Analisis Kesalahan Peserta didik SMP dalam Menyelesaikan Soal pada Materi Lingkaran. *JMPM: Jurnal Matematika Dan Pendidikan Matematika*, 5(1), 65–75. <https://doi.org/10.26594/jmpm.v5i1.1808>
- Salvia, N. Z., Sabrina, F. P., & Maula, I. (2022). Analisis Kemampuan Literasi Numerasi Peserta Didik Ditinjau Dari Kecemasan Matematika. *Prosandika Unikal (Prosiding Seminar Nasional Pendidikan Matematika Universitas Pekalongan)*, 3(2019), 352–360. <https://www.proceeding.unikal.ac.id/index.php/sandika/article/view/890>
- Saputra, H., Maulina, S., Mirunnisa, M., & Razi, Z. (2022). Pengaruh Pembelajaran Kontekstual Terhadap Pemahaman Konsep Geometri Peserta didik. *JSR: Jurnal Sains Riset*, 12(3), 719–724. <http://journal.unigha.ac.id/index.php/JSR>
- Sarama, J., & Douglas H, C. (2016). *Physical and Virtual Manipulatives: What Is "Concrete"?* Springer, Cham. [https://doi.org/https://doi.org/10.1007/978-3-319-32718-1_4](https://doi.org/10.1007/978-3-319-32718-1_4)
- Schukajlow, S., Rakoczy, K., & Pekrun, R. (2017). Emotions and motivation in

- mathematics education: theoretical considerations and empirical contributions. *ZDM - Mathematics Education*, 49(3), 307–322. <https://doi.org/10.1007/s11858-017-0864-6>
- Setiawan, S., Julrissani, J., & Savira, L. (2023). Analisis Kemampuan Pemahaman Konsep Matematis Peserta didik Pada Materi Bangun Ruang Sisi Datar. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 12(1), 80. <https://doi.org/10.24127/ajpm.v12i1.5106>
- Shoimin, A. (2014). *68 model pembelajaran inovatif dalam kurikulum 2013*. Yogyakarta Ar-Ruzz Media.
- Simanjuntak, & Damera, S. (2019). *GeoGebra Dalam Pembelajaran Matematika*. CV Jakad Publishing.
- Simon, M. (2014). *Hypothetical Learning Trajectories in Mathematics Education*. Springer, Dordrecht. [https://doi.org/https://doi.org/10.1007/978-94-007-4978-8_72](https://doi.org/10.1007/978-94-007-4978-8_72)
- Siswanto, R. D., & Kusumah, Y. S. (2017). Peningkatan Kemampuan Geometri Spasial Peserta didik Smp Melalui Pembelajaran Inkuiri Terbimbing Berbantuan Geogebra. *Jurnal Penelitian Dan Pembelajaran Matematika*, 10(1). <https://doi.org/10.30870/jppm.v10i1.1196>
- Sofyan, H., Wagiran, Komariah, K., & Triwiyono, E. (2017). *Problem Based Learning Dalam Kurikulum 2013*. Yogyakarta: UNY Press.
- Sokha, K. (2024). Examine the Impact of Contextual, Personal, and Behavioral Factors on High School Teachers' Engagement in Teaching Science Using an Integrated STEM Approach. *International Journal of Science and Mathematics Education*, 0123456789. <https://doi.org/10.1007/s10763-024-10447-5>
- Sugiyono. (2021). *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Alfabeta.
- Sukirwan, Nuraini, P. R., & Warsito. (2019). Desain Pembelajaran Himpunan Melalui Perancangan Hypothetical Learning Trajectory Menggunakan Pendekatan Matematika Realistik. *Journal of Authentic Research on Mathematics Education (JARME)*, 4(1). [https://doi.org/https://doi.org/https://doi.org/10.37058/jarme.v4i1.3675](https://doi.org/10.37058/jarme.v4i1.3675)
- Sulianto, J. (2008). Pendekatan Kontekstual dalam Pembelajaran Matematika untuk Meningkatkan Berpikir Kritis pada Peserta didik Sekolah Dasar. *PYTHAGORAS Jurnal Pendidikan Matematika*, 4(2), 14–25. <https://doi.org/10.21831/pg.v4i2.555>

- Sumartini, T. S. (2018). Peningkatan Kemampuan Pemecahan Masalah Matematis Peserta didik melalui Pembelajaran Berbasis Masalah. *Mosharafa: Jurnal Pendidikan Matematika*, 5(2), 148–158. <https://doi.org/10.31980/mosharafa.v5i2.270>
- Suparatulaton, R., Jun-On, N., Hong, Y. Y., Intaros, P., & Suwannaut, S. (2023). Exploring problem-solving through the intervention of technology and Realistic Mathematics Education in the Calculus content course. *Journal on Mathematics Education*, 14(1), 103–128. <https://doi.org/10.22342/JME.V14I1.PP103-128>
- Suryati, A. Y., & L, E. N. (2020). Desain Didaktis Konsep Keliling Lingkaran Berbasis Model Pembelajaran SPADE. *PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 7(2), 66–76. <https://doi.org/10.17509/pedadidaktika.v7i2.25795>
- Suwendra, I. W. (2018). *Metodologi Penelitian Kualitatif dalam Ilmu Sosial, Pendidikan, Kebudayaan*. Nilacakra Publishing House.
- Syahbana, A. (2016). *Belajar Menguasai GeoGebra (Program Aplikasi Pembelajaran Matematika)*. NoerFikri.
- Theresia Ingga Sari, Nyimas Aisyah, & Cecil Hiltrimartin. (2022). Lintasan Belajar SPLDV Melalui Pendekatan Model Eliciting Activities (MEAs). *Inomatika*, 4(1), 45–55. <https://doi.org/10.35438/inomatika.v4i1.304>
- Thoring, K., Mueller, R. M., & Badke-Schaub, P. (2015). Technology-Supported Design Research. *Proceedings of the International Conference on Engineering Design, ICED, 11(DS 80-11)*, 1–10.
- Trimurtini, Waluya, S. B., Sukestiyarno, Y. L., & Iqbal, K. (2021). A Systematic Review on Geometric Thinking: A Review Research Between 2017-2021. *European Journal of Educational Research*, 10(3), 1199–1213. https://www.researchgate.net/profile/Ebrun-Eren/publication/348382981_Education_Policies_in_the_Context_of_Political_Communication_in_Turkey/links/5ffc2aeba6fdccdc846cc03/Education-Policies-in-the-Context-of-Political-Communication-in-Turkey.pdf
- Tung, K. Y. (2018). *Pembelajaran Geometri, Demonstrasi Geometri, Animasi Geometri yang Menarik*. Andi.
- U. L. T. P. Gunasekare. (2016). Self Determination Theory (SDT): a review on SDT as a Complementary Theory of Motivation. *Kelaniya Journal of Human Resource*

- Management*, 11(01), 58–68.
<https://doi.org/https://doi.org/10.4038/kjhrm.v11i1.28>
- Uno, H. B., & Mohamad, N. (2014). *Belajar dengan Pendekatan PAILKEM*. Jakarta: PT Bumi Aksara.
- Valenzuela, H. (2018). A multiple case study of college-contextualized mathematics curriculum. *MathAMATYC Educator*, 9(2), 49–55.
<http://www.amatyc.org/?page=MathAMATYCEducator>
- Vardanyan, V., Harutyunyan, I., Galstyan, G., & Adamyan, S. (2023). Development of a Methodology for Teaching Mathematics in Colleges Using the Dynamic Program «Geogebra». *Bulletin of High Technology*, 2(26), 85–92.
<https://doi.org/10.56243/18294898-2023.2-85>
- Wahyuni, Y., Fauzan, A., Yerizon, Y., & Musdi, E. (2022). Analisis Literasi Digital Mahapeserta didik dalam Pembelajaran Matematika Berbasis Geogebra. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 3358–3371.
<https://doi.org/10.31004/cendekia.v6i3.1737>
- Wang, C. C. (2021). The process of implementing problem-based learning in a teacher education programme: an exploratory case study. *Cogent Education*, 8(1).
<https://doi.org/10.1080/2331186X.2021.1996870>
- Westwood, P. S. (2021). *Numeracy: Defined, Described and in Context*. Springer, Singapore. https://doi.org/https://doi.org/10.1007/978-981-16-3761-2_1
- Widiastuti, S. M., Ariyanto, L., & Wardani, B. (2023). Penerapan Model PBL dengan Pendekatan TaRL Berbantuan GeoGebra untuk Meningkatkan Kemampuan Pemecahan Masalah Peserta didik SMK. *Seminar Nasional Pendidikan Profesi Guru Universitas PGRI Semarang, November 2023*, 1577–1588.
- Winarno, S., Muthu, K. S., & Ling, L. S. (2017). Direct Problem-Based Learning (DPBL): A Framework for Integrating Direct Instruction and Problem-Based Learning Approach. *International Education Studies*, 11(1), 119.
<https://doi.org/10.5539/ies.v11n1p119>
- Yaumi, M. (2018). *Media dan Teknologi Pembelajaran*. Prenada Media Group.
- Yayuk, E., Ekowati, D. W., Suwandayani, B. I., & Ulum, B. (2018). *Pembelajaran Matematika yang Menyenangkan*.
- Yew, E. H. J., & Goh, K. (2016). Problem-Based Learning: An Overview of its Process

- and Impact on Learning. *Health Professions Education*, 2(2), 75–79. <https://doi.org/10.1016/j.hpe.2016.01.004>
- Zainudin, M. M., & Zainudin, A. F. (2023). The Use of Representations in Supporting Early Mathematics Learning and Problem Solving. *International Journal of Academic Research in Progressive Education and Development*, 12(2), 1706–1717. <https://doi.org/10.6007/ijarped/v12-i2/17352>
- Ziatdinov, R., & Valles, J. R. (2022). Synthesis of Modeling, Visualization, and Programming in GeoGebra as an Effective Approach for Teaching and Learning STEM Topics. *Mathematics*, 10(3). <https://doi.org/10.3390/math10030398>
- Zulnaldi, H., & Zamri, S. N. A. S. (2017). The effectiveness of the geogebra software: The intermediary role of procedural knowledge on students' conceptual knowledge and their achievement in mathematics. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(6), 2155–2180. <https://doi.org/10.12973/eurasia.2017.01219a>
- Hinton, V., & Flores, M. (2022). Concrete-Representational-Abstract–Integrated as a Tier 2 Instruction to Teach Addition. *Rural Special Education Quarterly*, 41(3), 169-178. doi: 10.1177/87568705221075756
- Susanti, R., & Susanti, V. D. (2023). Pengaruh Model Pembelajaran Contextual Teaching and Learning ditinjau dari Gaya Belajar terhadap Kemampuan Pemahaman Konsep Matematis. *Jurnal Ilmiah Pendidikan Matematika Al Qalasaki*, 7(1), 85-93. doi: 10.32505/qalasaki.v7i1.6094
- Sun, Y., Nambiar, R., & Vidyasagaran, V. (2023). Gamifying math education using object detection. *arXiv preprint arXiv:2304.06270*. doi: 10.48550/arxiv.2304.06270
- Balseca, C. L. I., Balseca, E. G. I., Orellana, J. C. M., Caiza, A. F. M., Maji, F. M. C., & Godoy, L. F. S. (2023). Project-Based Learning (Abp) In The Teaching Of Mathematics In The Context Of Computer Programming. *Journal of Namibian Studies: History Politics Culture*, 33, 2051-2069. doi: 10.59670/jns.v33i.830
- Borghini, A. M., Shaki, S., & Fischer, M. H. (2022). Concrete constraints on abstract concepts. *Psychological Research*, 86(8), 2366-2369. doi: 10.1007/s00426-022-01685-9