

**META-ANALISIS: PENGARUH PENDEKATAN *OPEN-ENDED* TERHADAP
KEMAMPUAN BERPIKIR KREATIF MATEMATIS SISWA**

TESIS

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



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

**META-ANALISIS: PENGARUH PENDEKATAN *OPEN-ENDED*
TERHADAP KEMAMPUAN BERPIKIR KREATIF MATEMATIS SISWA**

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ABSTRAK

Niken Shofiana Dewi, (2023) Meta-Analisis: Pengaruh Pendekatan *Open-Ended* terhadap Kemampuan Berpikir Kreatif Matematis Siswa

Abstrak. Studi yang mengkaji tentang implementasi pendekatan *open-ended* dalam pembelajaran matematika khususnya dalam peningkatan kemampuan berpikir kreatif matematis telah banyak dilakukan sebelumnya. Meskipun studi literatur sistematis telah dilakukan berkaitan dengan studi-studi tersebut tetapi kesimpulan yang dihasilkan belum memberikan jawaban objektif terkait pengaruh penerapan *open-ended* terhadap kemampuan berpikir kreatif matematis siswa. Studi meta-analisis ini dilakukan untuk mengetahui besar ukuran efek yang disebabkan oleh penerapan pendekatan *open-ended* dalam meningkatkan kemampuan berpikir kreatif matematis siswa serta menganalisis karakteristik studi. Sumber database online yang digunakan dalam studi ini antara lain Scopus, Google Scholar, ERIC, Semantic Scholar, dan DOAJ dalam rentang tahun 2012 sampai 2023 dan diperoleh 32 ukuran efek dari 32 studi primer yang melibatkan 1249 siswa pada kelas eksperimen dan 1246 siswa pada kelas kontrol. Perhitungan ukuran efek dan analisis karakteristik studi dilakukan dengan menggunakan bantuan aplikasi *CMA* versi 4.0 berdasarkan persamaan *hedges's g* dengan taraf kepercayaan 95%. Model estimasi yang digunakan adalah *random effect model* berdasarkan asumsi penelitian pendidikan yang didukung dengan uji heterogenitas ukuran efek studi-studi primer. Ukuran efek penerapan *open-ended* terhadap kemampuan berpikir kreatif matematis siswa berada pada kategori sempurna sebesar 1,507 atau memberikan pengaruh sebesar 93,3%. Sementara dari keempat kajian karakteristik studi yang terdiri atas jenjang pendidikan, ukuran sampel kelas eksperimen, kombinasi pembelajaran, dan status keterbantuan teknologi, seluruhnya menunjukkan tidak adanya perbedaan signifikan ukuran efek penerapan *open-ended* ditinjau dari karakteristik studi tersebut. Meskipun demikian, temuan ini memberikan informasi bahwa pendekatan *open-ended* lebih efektif diterapkan pada jenjang SMP, ukuran sampel kecil, dan menggunakan kombinasi pembelajaran dalam meningkatkan kemampuan berpikir kreatif matematis siswa.

Kata Kunci: *Open-Ended*, Kemampuan Berpikir Kreatif Matematis, Meta-analisis

ABSTRACT

Niken Shofiana Dewi, (2023) Meta-Analysis: The Effect of Open-Ended Approach on Students' Mathematical Creative Thinking

Abstract. There have been many studies that examine the implementation of the open-ended approach in mathematics learning, especially in improving mathematical creative thinking abilities. Although systematic literature studies have been conducted in terms of these studies, the resulting conclusions have not provided objective answers regarding the effectiveness of open-ended implementation on students' mathematical creative thinking abilities. This meta-analysis study was conducted to determine the effect size caused by the implementation of the open-ended approach in improving students' mathematical creative thinking ability and to analyze the characteristics of the studies. The online database sources used in this study include Scopus, Google Scholar, ERIC, Semantic Scholar, and DOAJ in the range of 2012 to 2023 and 32 effect sizes from 32 primary studies involved 1249 students of experiment class and 1246 students of control class. Calculation of effect size and analysis of study characteristics were carried out using the help of the CMA version 4.0 application based on the hedges's g equation with a 95% confidence level. The estimation model used was a random effect model based on the assumptions of educational research supported by the heterogeneity test of the effect sizes of the primary studies. The effect size of open-ended application on students' mathematical creative thinking ability was in the perfect category equal to 1.507 or provide an effect of 93.3%. Meanwhile, the four reviews of study characteristics consisting of educational level, experimental class sample size, learning combination, and technology-assisted status, all showed no significant difference in the effect size of open-ended implementation in terms of the study characteristics. Nevertheless, these findings provide information that the open-ended approach is more effective at the junior high school level, small sample size, and using a combination of learning in improving students' mathematical creative thinking ability.

Keywords: *Open-Ended*, Mathematical Creative Thinking, Meta-analysis

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DAFTAR PUSTAKA

- Abramo, G., D'Angelo, C. A., & Rosati, F. (2016). A methodology to measure the effectiveness of academic recruitment and turnover. *Journal of Informetrics*, 10(1), 31–42. <https://doi.org/10.1016/j.joi.2015.10.004>
- Agustianingsih, R., & Mahmudi, A. (2019). How to design open-ended questions? : Literature review. *Journal of Physics: Conference Series*, 1320(1). <https://doi.org/10.1088/1742-6596/1320/1/012003>
- Akbar, S., Kodirun, & Busnawir. (2017). Pengaruh Pembelajaran Berbasis Masalah dengan Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Matematik Ditinjau dari Kemandirian Belajar Siswa SMA. *Jurnal Pendidikan Matematika*, 8(2), 117–128.
- Ali, D., Amir MZ, Z., Kusnadi, K., & Vebrianto, R. (2021). Literature Review: Mathematical Creative Thinking Ability, and Students' Self Regulated Learning to Use an Open Ended Approach. *Malikussaleh Journal of Mathematics Learning (MJML)*, 4(1), 52. <https://doi.org/10.29103/mjml.v4i1.3095>
- Allende-Alonso, S., Bouza-Herrera, C. N., Rizvi, S. E. H., & Sautto-Vallejo, J. M. (2019). Big Data and The Central Limit Theorem: A Statistical Legend. *Revista Investigacion Operacional*, 40(1), 112–123.
- Amin, M., Ibrahim, M., & Alkusaeri. (2022). Meta Analisis: Keefektifan STEM Terhadap Kemampuan Berpikir Kreatif Siswa. *Journal of Authentic Research on Mathematics Education (JARME)*, 4(2), 248–262. <https://doi.org/10.37058/jarme.v4i2.4844>
- Amirullah. (2003). *Alat Evaluasi Keterampilan*. Depdiknas.
- Andiyana, M. A., Maya, R., & Hidayat, W. (2018). Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP Pada Materi Bangun Ruang. *Jurnal Pembelajaran Matematika Inovatif*, 1(3), 239–248. <https://doi.org/10.22460/jpmi.v1i3.239-248>
- Anidar, J. (2017). Teori Belajar Menurut Aliran Kognitif Serta Implikasinya Dalam Pembelajaran. *Jurnal Al-Taujih: Bingkai Bimbingan Dan Konseling Islami*, 3(2), 8–16. <https://doi.org/10.15548/atj.v3i2.528>
- Anthony, G. (1996). *Classroom Instructional Factors Affecting Mathematics Students' Strategic Learning Behaviors*. <https://www.researchgate.net/publication/282613348>
- Ardiyanti, N. P. R., Suarjana, I. M., & Garminah, N. N. (2013). Pengaruh Model Pembelajaran Matematika Berorientasi Open-Ended Problem terhadap Kemampuan Berpikir Kreatif Siswa pada Mata Pelajaran

- Matematika Kelas IV SD. *Mimbar PGSD Undiksha*, 1(1).
<https://doi.org/https://doi.org/10.23887/jjgsd.v1i1.860>
- Ariati, C., Juandi, D., & Hasanah, A. (2023). The Effect of Realistic Mathematics Education in Enhancing Indonesian Students' Mathematical Reasoning Ability: A Meta-Analysis. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, 7(2), 324–338. <https://doi.org/10.31764/jtam.v7i2.12493>
- Arik, S., & Yilmaz, M. (2020). The Effect of Constructivist Learning Approach and Active Learning on Environmental Education: A Meta-Analysis Study*. *International Electronic Journal of Environmental Education*, 10(2), 44–84.
- Asterhan, C. S. C., & Schwarz, B. B. (2016). Argumentation for Learning: Well-Trodden Paths and Unexplored Territories. In *Educational Psychologist* (Vol. 51, Issue 2, pp. 164–187). Routledge. <https://doi.org/10.1080/00461520.2016.1155458>
- Aziza, M. (2018). An analysis of a teacher's questioning related to students' responses and mathematical creativity in an elementary school in the UK. *International Electronic Journal of Elementary Education*, 10(4), 475–487. <https://doi.org/10.26822/iejee.2018438138>
- Basadur, M., Runco, M. A., & Vegaxy, L. A. (2000). Understanding How Creative Thinking Skills, Attitudes and Behaviors Work Together: A Causal Process Model. *The Journal of Creative Behavior*, 34(2), 77–100. <https://doi.org/10.1002/j.2162-6057.2000.tb01203.x>
- Belur, J., Tompson, L., Thornton, A., & Simon, M. (2021). Interrater Reliability in Systematic Review Methodology: Exploring Variation in Coder Decision-Making. *Sociological Methods & Research*, 50(2), 837–865. <https://doi.org/10.1177/0049124118799372>
- Bernard, M., & Chotimah, S. (2018). Improve student mathematical reasoning ability with open-ended approach using VBA for powerpoint. *AIP Conference Proceedings*, 2014. <https://doi.org/10.1063/1.5054417>
- Bernard, R. M., Borokhovski, E., Schmid, R. F., Tamim, R. M., & Abrami, P. C. (2014). A meta-analysis of blended learning and technology use in higher education: from the general to the applied. *Journal of Computing in Higher Education*, 26(1), 87–122. <https://doi.org/10.1007/s12528-013-9077-3>
- Besemer, S. P., & O'Quin, K. (1999). Confirming the Three-Factor Creative Product Analysis Matrix Model in an American Sample. *Creativity Research Journal*, 12(4), 287–296. https://doi.org/10.1207/s15326934crj1204_6

- Bland, M. (2015). *An Introduction to Medical Statistics* (Fourth Edition). Oxford University Press.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to Meta-Analysis* (First Edition). John Wiley & Sons, Ltd.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods*, 1(2), 97–111. <https://doi.org/10.1002/jrsm.12>
- Borg, W. (1983). *Educational Research: An Introduction* (Fifth Edition). Longman.
- Brockwell, S. E., & Gordon, I. R. (2007). A Simple Method for Inference on An Overall Effect in Meta-Analysis. *Statistics in Medicine*, 26(25), 4531–4543. <https://doi.org/10.1002/sim.2883>
- Cahyani, D. N., Syaban, M., & Ridha, M. R. (2019). Peningkatan Kemampuan Berpikir Kreatif Matematis Melalui Pembelajaran Open-Ended pada Siswa SMP. *INTERMATHZO: Jurnal Pendidikan Dan Pembelajaran Matematika*, 4(2), 78–86.
- Card, N. A. (2012). *Applied Meta-Analysis for Social Science Research*. The Guilford Press.
- Chang, H.-J., Wu, C.-H., Ho, J.-F., & Chen, P.-Y. (2008). On Sample Size in Using Central Limit Theorem for Gamma Distribution. *Information and Management Sciences*, 19(1), 153–174.
- Choifah, C., Suyitno, A., & Pujiastuti, E. (2022). Systematic Literature Review: Upaya Meningkatkan Kemampuan Berpikir Kreatif pada Pembelajaran Matematika. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 3158–3166. <https://doi.org/10.31004/cendekia.v6i3.1057>
- Christiaans, H. H. C. M. (2002). Creativity as a Design Criterion. *Creativity Research Journal*, 14(1), 41–54. https://doi.org/10.1207/S15326934CRJ1401_4
- Cleophas, T. J., & Zwinderman, A. H. (2017). *Modern Meta-Analysis*. Springer International Publishing Switzerland.
- Coe, R. (2002). It's The Effect Size, Stupid: What Effect Size is and Why It is Important. In *British Educational Research Association* .
- Cohen, J. (1988). *Statistical Power Analysis for The Behavioral Sciences* (Second Edition). Lawrence Erlbaum Associates.

- Cohen, J. (1998). *Statistical Power Analysis for the Behavioral Sciences Second Edition* (Second Edition). Lawrence Erlbaum Associates.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education* (Sixth Edition). Routledge.
- Coladarci, T., & Cobb, C. D. (2014). *Fundamentals of Statistical Reasoning in Education* (Fourth Edition). John Wiley & Sons, Inc.
- Colman, A. M. (2008). *A Dictionary of Psychology*. Oxford University Press. <https://doi.org/10.1093/acref/9780199534067.001.0001>
- Cooper, H. (2003). Psychological Bulletin: Editorial. *Psychological Bulletin*, 129(1), 3–9. <https://doi.org/10.1037/0033-2909.129.1.3>
- Cooper, H. (2017). *Research Synthesis and Meta-Analysis: A Step-by-Step Approach*. Sage Publications, Inc.
- Cooper, H., Hedges, L. V., & Valentine, J. C. (2019). *The Handbook of Research Synthesis and Meta-Analysis*. Russell Sage Foundation. <https://doi.org/10.7758/9781610448864>
- Creswell, J. W. (2012). *Educational Research* (Fourth Edition). Pearson Education, Inc.
- Dewi, N. S., & Juandi, D. (2023). Pengaruh Pendekatan Open-Ended Terhadap Kemampuan Berpikir Kreatif Matematis: Systematic Literature Review. *JPMI: Jurnal Pembelajaran Matematika Inovatif*, 6(3).
- Dillenbourg, P. (1999). What do you mean by “collaborative learning”? In *Collaborative-learning: Cognitive and Computational Approaches* (pp. 1–19). Elsevier.
- Durlak, J. A. (1995). Understanding Meta-Analysis. In *Reading and understanding multivariate statistics*. (pp. 319–352). American Psychological Association.
- Duval, S., & Tweedie, R. (2000). Trim and Fill: A Simple Funnel-Plot–Based Method of Testing and Adjusting for Publication Bias in Meta-Analysis. *Biometrics*, 56(2), 455–463. <https://doi.org/10.1111/j.0006-341X.2000.00455.x>
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, 315(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Ellis, P. D. (2010). *The Essential Guide to Effect Sizes*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511761676>
- Fatah, A., Suryadi, D., Sabandar, J., & Turmudi. (2016). Open-Ended Approach: An Effort in Cultivating Students’ Mathematical Creative

- Thinking Ability and Self-Esteem in Mathematics. *Journal on Mathematics Education*, 7(1), 11–20.
- Filsaime, D. K. (2007). *Menguak Rahasia Berpikir Kritis dan Kreatif*. Prestasi Pustaka.
- Finckh, A., & Tramèr, M. R. (2008). Primer: strengths and weaknesses of meta-analysis. *Nature Clinical Practice Rheumatology*, 4(3), 146–152. <https://doi.org/10.1038/ncprheum0732>
- Fragkos, K. C., Tsagris, M., & Frangos, C. C. (2017). Exploring the distribution for the estimator of Rosenthal's 'fail-safe' number of unpublished studies in meta-analysis. *Communications in Statistics - Theory and Methods*, 46(11), 5672–5684. <https://doi.org/10.1080/03610926.2015.1109664>
- Gafour, O. W. A., & Gafour, W. A. S. (2020). Creative Thinking skills-A Review article. *Journal of Education and E-Learning*, 4, 44–58. <https://www.researchgate.net/publication/349003763>
- Gardner, H. (1993). *Frames of Mind: The Theory of Multiple Intelligences*. Basic Books.
- Gillies, R. M., & Boyle, M. (2008). Teachers' discourse during cooperative learning and their perceptions of this pedagogical practice. *Teaching and Teacher Education*, 24(5), 1333–1348. <https://doi.org/10.1016/j.tate.2007.10.003>
- Ginting, S. S. B. (2019). Peningkatan Kemampuan Berpikir Kreatif Matematis dan Kemandirian Belajar Siswa SMP A-Rahman Medan Melalui Pembelajaran Open-Ended Berbasis Brain-Gym. *Axiom*, 8(1), 26–40.
- Glass, G., McGaw, B., & Smith, M. L. (1981). *Meta-Analysis in Social Research*. Sage Publications.
- Glass, G. V. (1976). Primary, Secondary, and Meta-Analysis of Research. *Educational Researcher*, 5(10), 3–8.
- Gordon, D. (1999). *Kerangka Dasar Sistem Informasi Manajemen*. PT. Pustaka Binaman Presindo.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5(9), 444–454. <https://doi.org/10.1037/h0063487>
- Gultom, S. P. (2017). Analisis Perbedaan Kemampuan Berpikir Kreatif dan Pemecahan Masalah Matematika Antara Siswa yang Diberi Pembelajaran Open-Ended dengan Pembelajaran Konvensional. *Jurnal Suluh Pendidikan FKIP UHN*, 4(2), 100–111. <https://uhn.ac.id/jsp>

- Gumilar, A. C. (2018). Disposisi Matematis dan Peningkatan Kemampuan Berpikir Kreatif Siswa Melalui Pendekatan Open-Ended dengan Setting Kooperatif. *Jumlahku: Jurnal Matematika Ilmiah STKIP Muhammadiyah Kuningan*, 4(2), 31–48.
- Harris, D., & De Bruin, L. (2017). STEAM Education: Fostering Creativity in and Beyond Secondary Schools. *Australian Art Education*, 38(1), 54-75.
- Harwell, M. (2020). Growth in the Amount of Literature Reviewed in a Meta-Analysis and Reviewer Resources. *Mid-Western Educational Researcher*, 32(1), 31–47.
- Hashimoto, Y. (1997). The Methods of Fostering Creativity through Mathematical Problem Solving. *Zentralblatt Für Didaktik Der Mathematik (ZDM)–The International Journal on Mathematics Education*.
- Heritage, M., & Heritage, J. (2013). Teacher Questioning: The Epicenter of Instruction and Assessment. *Applied Measurement in Education*, 26(3), 176–190. <https://doi.org/10.1080/08957347.2013.793190>
- Hogg, R. V., Tanis, E. A., & Zimmerman, D. L. (2015). *Probability and Statistical Inference* (Ninth Edition). Pearson Education, Inc.
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings* (Second Edition). Sage.
- Hunter, M. (1976). Teacher competency: Problem, theory, and practice. *Theory Into Practice*, 15(2), 162–171. <https://doi.org/10.1080/00405847609542627>
- Hurlock, E. (2005). *Psikologi Perkembangan Suatu Pendekatan Sepanjang Rentang Kehidupan*. Erlangga.
- Husna, U., Zubainur, C. M., & Ansari, B. I. (2018). Students' creative thinking ability in learning mathematics through learning model of Logan Avenue Problem Solving (LAPS) – Heuristic. *Journal of Physics: Conference Series*, 1088(1), 12067. <https://doi.org/10.1088/1742-6596/1088/1/012067>
- Ireland, R. (2010). *A Dictionary of Dentistry*. Oxford University Press. <https://doi.org/10.1093/acref/9780199533015.001.0001>
- Islami, F. N., Putri, G. M. D., & Nurdwiandara, P. (2018). Kemampuan Fluency, Flexibility, Originality, dan Self Confidence Matematik Siswa SMP. *JPMI: Jurnal Pembelajaran Matematika Inovatif*, 1(3), 249–258. <https://doi.org/10.22460/jpmi.v1i3.249-258>
- Istianah, E. (2013). Meningkatkan Kemampuan Berpikir Kritis dan Kreatif Matematik dengan Pendekatan Model Eliciting Activities (MEAs) Pada

Siswa SMA. *Infinity: Jurnal Ilmiah Program Studi Matematika STKIP Siliwangi Bandung*, 2(1), 43–54.

- Janah, I. N., Kusumadewi, R. F., & Ulia, N. (2019). Kemampuan Berfikir Kritis Matematis Siswa dengan Menggunakan Model Collaborative Learning dengan Pendekatan Open-Ended Berbantuan Media Macroflash 8. *Square : Journal of Mathematics and Mathematics Education*, 1(1), 41. <https://doi.org/10.21580/square.2019.1.1.4096>
- Jančařík, A., Jančaříková, K., & Novotná, J. (2013). “Good” Questions in Teaching. *Procedia - Social and Behavioral Sciences*, 93, 964–968. <https://doi.org/10.1016/j.sbspro.2013.09.311>
- Juandi, D., Kusumah, Y. S., & Tamur, M. (2022). A Meta-Analysis of the last two decades of realistic mathematics education approaches. *International Journal of Instruction*, 15(1), 381–400. <https://doi.org/10.29333/iji.2022.15122a>
- Juandi, D., Kusumah, Y. S., Tamur, M., Perbowo, K. S., & Wijaya, T. T. (2021). A meta-analysis of Geogebra software decade of assisted mathematics learning: what to learn and where to go? *Heliyon*, 7(5). <https://doi.org/10.1016/j.heliyon.2021.e06953>
- Juandi, D., & Tamur, M. (2020). *Pengantar Analisis Meta*. UPI Press.
- Kartikasari, I. A., Usodo, B., & Riyadi. (2022). The Effectiveness Open-Ended learning and Creative Problem Solving Models to Teach Creative Thinking Skills. *Pegem Egitim ve Ogretim Dergisi*, 12(4), 29–38. <https://doi.org/10.47750/pegegog.12.04.04>
- Kemendikbud. (2019). *Mengkaji Kembali Hasil PISA sebagai Pendekatan Inovasi Pembelajaran untuk Peningkatan Kompetensi Literasi dan Numerasi*. <https://gurudikdas.kemdikbud.go.id/news/mengkaji-kembali-hasil-pisa-sebagai-pendekatan-inovasi-pembelajaran--untuk-peningkatan-kompetensi-li>
- Kemendikbud. (2022). *Capaian Pembelajaran Kurikulum Merdeka*. <http://s.id/CP-Rev-2022>
- Khairunnisa, A., Gozali, S. M., & Juandi, D. (2022). Systematic Literature Review: Kemampuan Pemahaman Matematis Siswa dalam Menyelesaikan Masalah Matematika. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(2), 1846–1856.
- Komarudin, Monica, Y., Rinaldi, A., Rahmawati, N. D., & Mutia. (2021). Analisis Kemampuan Berpikir Kreatif Matematis: Dampak Model Open Ended dan Adversity Quotient (AQ). *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 10(2), 550–562. <https://doi.org/10.24127/ajpm.v10i2.3241>

- Krippendorff, K. (2004). *Content Analysis: An Introduction to Its Methodology*. SAGE Publications, Inc. <https://doi.org/10.4135/9781071878781>
- Krippendorff, K. (2011). *Computing Krippendorff's Alpha-Reliability*. https://repository.upenn.edu/asc_papers/43
- Kurniati, N., & Sutiarmo, S. (2021). The Effect of Problem Based Learning and Open-Ended Learning on Mathematics Creative Thinking Ability: A Meta Analysis Study. *Jurnal Pendidikan MIPA*, 22(1), 112–120. <https://doi.org/10.23960/jpmipa/v22i1.pp112-120>
- Kurniawan, H., Ilma, R., Putri, I., & Hartono, Y. (2018). Developing Open-Ended Questions for Surface Area and Volume of Beam. *Journal on Mathematics Education*, 9(1), 157–168.
- Kwon, O. N., Park, J. S., & Park, J. H. (2006). Cultivating Divergent Thinking in Mathematics through Open-Ended Approach. *Asia Pacific Education Review*, 7(1), 51–61.
- Lee, K. S., Hwang, D. J., & Seo, J. J. (2003). A Development of the Test for Mathematical Creative Problem Solving Ability (Lee, 2003). *Journal of the Korea Society of Mathematical Education Series D*, 7(3), 163–189.
- Lee, Y. H. (2019). Strengths and Limitations of Meta-Analysis. *The Korean Journal of Medicine*, 94(5), 391–395. <https://doi.org/10.3904/kjm.2019.94.5.391>
- Lestari, K. E., & Yudhanegara, M. R. (2018). *Penelitian Pendidikan Matematika*. Refika Aditama.
- Lestari, N., Hartono, Y., & Purwoko. (2016). Pengaruh Pendekatan Open-Ended Terhadap Penalaran Matematika Siswa Sekolah Menengah Pertama Palembang. *Jurnal Pendidikan Matematika*, 10(1), 81–97.
- Lestari, R., Rahmi, D., & Risnawati. (2019). Pengaruh Penerapan Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Matematis Berdasarkan Kemandirian Belajar Siswa Sekolah Menengah Pertama Negeri 2 Pekanbaru. *Juring: Journal for Research in Mathematics Learning*, 2(3), 239–248.
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ (Clinical Research Ed.)*, 339. <https://doi.org/10.1136/bmj.b2700>

- Light, R. J., & Pillemer, D. B. (1984). *Summing Up: The Science of Reviewing Research*. Harvard University Press.
- Lipsey, M., & Wilson, D. (2001). *Practical Meta-Analysis*. Sage.
- Lombard, M., Snyder-Duch, J., & Bracken, C. C. (2002). Content Analysis in Mass Communication: Assessment and Reporting of Intercoder Reliability. *Human Communication Research*, 28(4), 587–604. <https://doi.org/10.1111/j.1468-2958.2002.tb00826.x>
- Lusa, H., Adnan, A., & Yurniwati, Y. (2021). Effect of Blended Learning on Students' Learning Outcomes: A Meta-Analysis. *Jurnal Pendidikan Progresif*, 11(2), 309–325. <https://doi.org/10.23960/jpp.v11.i2.202113>
- Machin, D., Campbell, M. J., Tan, S. B., & Tan, S. H. (2009). *Sample Size Tables for Clinical Studies* (3rd Edition). A John Wiley & Sons, Ltd., Publication.
- Magelo, C., Hulukati, E., & Djakaria, I. (2019a). Pengaruh Model Pembelajaran Open-Ended terhadap Kemampuan Berpikir Kreatif Matematik Ditinjau dari Motivasi Belajar. *Jambura Journal of Mathematics*, 2(1), 15–21. <https://doi.org/10.34312/jjom.v2i1.2593>
- Magelo, C., Hulukati, E., & Djakaria, I. (2019b). Pengaruh Model Pembelajaran Open-Ended terhadap Kemampuan Berpikir Kreatif Matematik Ditinjau dari Motivasi Belajar. *Jambura Journal of Mathematics*, 2(1), 15–21. <https://doi.org/10.34312/jjom.v2i1.2593>
- Maharani, H. R. (2014). Creative Thinking in Mathematics: Are We Able to Solve Mathematical Problems in A Variety of Way? *International Conference on Mathematics, Science, and Education (ICMSE)*, 120–125.
- Maria Ulfa, F., & Asriana, M. (n.d.). *Keefektifan Model PBL dengan Pendekatan Open-ended pada Pencapaian Kemampuan Berpikir Kreatif Matematis dan Disposisi Matematis Siswa*. <https://journal.unnes.ac.id/sju/index.php/prisma/>
- Martin, E., & McFerran, T. (2008). *A Dictionary of Nursing*. Oxford University Press. <https://doi.org/10.1093/acref/9780199211777.001.0001>
- Martino, A. M., & Maher, C. A. (1999). Teacher Questioning to Promote Justification and Generalization in Mathematics: What Research Practice Has Taught Us. *Journal of Mathematical Behavior*, 18(1), 53–78.
- Masitha, C., & Siregar, N. (2023). Meningkatkan Kemampuan Berpikir Kreatif Matematis Siswa SMP melalui Model Pembelajaran Open Ended. *Jurnal Pendidikan Dan Konseling*, 5(2), 705–716.

- McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia Medica*, 276–282. <https://doi.org/10.11613/BM.2012.031>
- McLeod, S. A. (2018). *Piaget's Theory of Cognitive Development*. <https://www.simplypsychology.org/piaget.html>
- Mowbray, F. I., Manlongat, D., & Shukla, M. (2022). Sensitivity Analysis: A Method to Promote Certainty and Transparency in Nursing and Health Research. *Canadian Journal of Nursing Research*, 54(4), 371–376. <https://doi.org/10.1177/08445621221107108>
- Muazaroh, A. N., & Abadi, I. B. G. S. (2020). Efektifitas Model Pembelajaran Open-Ended Berbantuan Lembar Kerja Siswa Terhadap Kemampuan Berpikir Kreatif. *Mimbar PGSD Undiksha*, 8(3), 372–384.
- Mullen, B., Muellerleile, P., & Bryant, B. (2001). Cumulative Meta-Analysis: A Consideration of Indicators of Sufficiency and Stability. *Personality and Social Psychology Bulletin*, 27(11), 1450–1462. <https://doi.org/10.1177/01461672012711006>
- Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin*, 103(1), 27–43. <https://doi.org/10.1037/0033-2909.103.1.27>
- Mumford, M. D., Medeiros, K. E., & Partlow, P. J. (2012). Creative Thinking: Processes, Strategies, and Knowledge. *The Journal of Creative Behavior*, 46(1), 30–47. <https://doi.org/10.1002/jocb.003>
- Munandar, U. (1999). *Kreativitas & Keberbakatan: Strategi Mewujudkan Potensi Kreatif & Bakat*. Gramedia Pustaka Utama.
- Munarsih, S., Hasibuan, L. R., & Irmayanti. (2019). The Effect of Open Ended Problems Approach on Students' Creative Mathematical Thinking Ability on Opportunities in Class XI of SMA Negeri 1 Rantau Utara. *Jurnal Pembelajaran Dan Matematika Sigma (JPMS)*, 5(1), 21–29.
- Munawwarah, M., Laili, N., & Tohir, M. (2020). Keterampilan Berpikir Kritis Mahasiswa dalam Memecahkan Masalah Matematika Berdasarkan Keterampilan Abad 21. *Alifmatika: Jurnal Pendidikan Dan Pembelajaran Matematika*, 2(1), 37–58. <https://doi.org/10.35316/alifmatika.2020.v2i1.37-58>
- Munroe, L. (2015). The Open-Ended Approach Framework. *European Journal of Educational Research*, 4(3), 97–104. <https://doi.org/10.12973/eu-er.4.3.97>
- Musna, R. R., Juandi, D., & Jupri, A. (2021). A meta-analysis study of the effect of Problem-Based Learning model on students' mathematical

- problem solving skills. *Journal of Physics: Conference Series*, 1882(1). <https://doi.org/10.1088/1742-6596/1882/1/012090>
- Mutiara, S., Haji, S., & Zamzaili. (2022). Pengaruh Pembelajaran Concept-Rich dengan Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Siswa. *Jurnal Didactical Mathematics*, 4(2), 380–387. <https://ejournal.unma.ac.id/index.php/dm>
- Nagendrababu, V., Dilokthornsakul, P., Jinatongthai, P., Veetil, S. K., Pulikkotil, S. J., Duncan, H. F., & Dummer, P. M. H. (2020). Glossary for systematic reviews and meta-analyses. *International Endodontic Journal*, 53(2), 232–249. <https://doi.org/10.1111/iej.13217>
- Nasution, E. Y. P. (2017). Meningkatkan Kemampuan Berpikir Kreatif Siswa Melalui Pendekatan Open-Ended. *Inspiramatika: Jurnal Inovasi Pendidikan Dan Pembelajaran Matematika*, 3(1), 1–15.
- Nazareth, E., Mukhlis, M., & Yuliati, N. (2022). Efektifitas Pembelajaran Berbasis Open-Ended terhadap Kemampuan Berpikir Kreatif Matematis Siswa. *Aritmatika: Jurnal Riset Pendidikan Matematika*, 3(2), 65–74.
- Nehe, M., Surya, E., & Syahputra, E. (2017). Creative Thinking Ability to Solving Equation and Non-Equation of Linear Single Variable in VII Grade Junior High School. *Article in International Journal Of Advance Research And Innovative*, 3(2), 2146–2152. <https://www.researchgate.net/publication/318562469>
- Nindrea, R. D. (2016). *Pengantar langkah-langkah praktis studi meta analisis*. Gosyen Publishing.
- Nohda, N. (2000). Teaching by Open-Approach Method in Japanese Mathematics Classroom. *Proceedings of the Conference of the International Group for the Psychology of Mathematics Education (PME)*.
- Nufus, H., & Duskri, M. (2018). Mathematical Creative Thinking and Student Self-Confidence in the Challenge-Based Learning Approach. *Journal of Research and Advances in Mathematics Education*, 3(2), 57–68. <http://journals.ums.ac.id/index.php/jramathedu>
- Nurrahmah, A., Rismaningsih, F., Hernaeny, U., Pratiwi, L., Wahyudin, Rukyati, A., Yati, F., Lusiani, Riaddin, D., & Setiawan, J. (2021). *Populasi dan Sampel*. Media Sains Indonesia.
- Nursamira, Hermansyah, & Susanti, D. (2022). Studi Literatur: Kemampuan Berpikir Kreatif Matematis Siswa. *Mathematic Education and Application*, 4(2), 44–55.

- Nursilawati, I., Nurhikmayati, I., & Santoso, E. (2019). Model Pembelajaran Treffinger Untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis Siswa. *Journal UIN*, 1(2), 127–133.
- OECD. (2018). *PISA 2018 Results*. www.oecd.org/about/publishing/corrigenda.htm.
- Pajares, F., & Miller, M. D. (1997). Mathematics self-efficacy and mathematical problem solving: Implications of using different forms of assessment. *Journal of Experimental Education*, 65(3), 213–228. <https://doi.org/10.1080/00220973.1997.9943455>
- Palah, S., Maulana, M., & Aeni, A. N. (2017). Pengaruh Pendekatan Open-Ended Berstrategi M-RTE terhadap Kemampuan Berpikir Kreatif Matematis Siswa pada Materi Persegi Panjang. *Jurnal Pena Ilmiah*, 2(1), 1161–1170.
- Panjaitan, S. M. (2020). Upaya Meningkatkan Kemampuan Berpikir Kreatif Peserta Didik dengan Pembelajaran Kontekstual Humanistik. *SEPREN: Journal of Mathematics Education and Applied*, 1(2), 68–77.
- Pasaribu, L. H., Suriyani, & Masitah. (2018). Peningkatan Kemampuan Berpikir Kreatif dan Self-Efficacy Siswa Melalui Pendekatan Pembelajaran Open-Ended. *Sigma*, 4(1), 36–43.
- Pearson, K. (1904). Report on Certain Enteric Fever Inoculation Statistics. *BMJ*, 2(2288), 1243–1246. <https://doi.org/10.1136/bmj.2.2288.1243>
- Pehkonen, E. (1997). The State-of-Art in Mathematical Creativity. *Zentralblatt Für Didaktik Der Mathematik*, 29(3), 63–67. <https://doi.org/10.1007/s11858-997-0001-z>
- Permendikbud. (2017). *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 17 Tahun 2017 tentang Peserta Didik Baru*. www.peraturan.go.id
- Pigott, T. D., & Polanin, J. R. (2020). Methodological Guidance Paper: High-Quality Meta-Analysis in a Systematic Review. *Review of Educational Research*, 90(1), 24–46. <https://doi.org/10.3102/0034654319877153>
- Pramuditya, S. A., Noto, M. S., & Azzumar, F. (2022). Characteristics of Students' Mathematical Problem Solving Abilities in Open-Ended-Based Virtual Reality Game Learning. *Infinity Journal*, 11(2), 255–272. <https://doi.org/10.22460/infinity.v11i2.p255-272>
- Puspita Sari, N. M. D., Ardana, I. M., & Astawa, I. W. P. (2019). Pengaruh Pendekatan Open-Ended dengan Scaffolding terhadap Kemampuan Berpikir Kreatif dan Motivasi Belajar Matematika. *Wahana Matematika*

- Dan Sains: Jurnal Matematika, Sains, Dan Pembelajarannya*, 13(2), 101–115.
- Putri, A. A., & Simanjuntak, E. (2022). Pengaruh Pendekatan Open-Ended Berbantuan Video Animasi terhadap Kemampuan Berpikir Kreatif Matematis Siswa di Kelas VIII SMP Negeri 2 Kualuh Selatan. *Jurnal Inspiratif*, 8(2), 85–96.
- Rachmantika, A. R., & Wardono. (2019). Peran Kemampuan Berpikir Kritis Siswa Pada Pembelajaran Matematika dengan Pemecahan Masalah. *Prosiding Seminar Nasional Matematika*, 2, 439–443. <https://journal.unnes.ac.id/sju/index.php/prisma/>
- Rahayuningsih, S., Sirajuddin, S., & Ikram, M. (2021). Using open-ended problem-solving tests to identify students' mathematical creative thinking ability. *Participatory Educational Research*, 8(3), 285–299. <https://doi.org/10.17275/per.21.66.8.3>
- Ramos, R. (2014). Meta-analysis. In *Encyclopedia of Quality of Life and Well-Being Research* (pp. 3999–4002). Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_1794
- Retnawati, H., Apino, E., Hasan, K., Rizqa, D., & Anazifa, D. (2018). *Pengantar Analisis Meta*. Parama Publishing.
- Riansyah, F., & Suhar. (2014). Peningkatan Kemampuan Berpikir Kreatif Matematik Siswa Kelas XI IPA SMA Negeri 5 Kendari dengan Menggunakan Pendekatan Pembelajaran Open-Ended. *Jurnal Penelitian Pendidikan Matematika*, 2(1), 43–55. www.jpmm.hol.es
- Rifa'i, R., Sujana, A., & Romdonah, I. (2020). Penerapan Model Pembelajaran Treffinger untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis Siswa. *Jurnal Analisa*, 6(1), 1–9. <http://journal.uinsgd.ac.id/index.php/analisa/index>
- Robbins, S. P., & Judge, T. A. (2018). *Essentials of Organizational Behavior* (14th Edition). Pearson Education, Inc.
- Rogers, C. (2021). *Student Perceptions of Open-Ended Learning Experiences in Writing Instruction*. California State University San Marcos.
- Rosenthal, R. (1978). Combining results of independent studies. *Psychological Bulletin*, 85(1), 185–193. <https://doi.org/10.1037/0033-2909.85.1.185>
- Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin*, 86(3), 638–641. <https://doi.org/10.1037/0033-2909.86.3.638>

- Rosenthal, R. (1991). *Meta-Analytic Procedures for Social Research*. SAGE Publications, Inc. <https://doi.org/10.4135/9781412984997>
- Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2005). *Publication Bias in Meta-Analysis* (H. R. Rothstein, A. J. Sutton, & M. Borenstein, Eds.). Wiley. <https://doi.org/10.1002/0470870168>
- Ruseffendi, E. T. (1991). *Pengantar Kepada Membantu Guru Mengembangkan Kompetensinya dalam Pendidikan Matematika untuk Meningkatkan CBSA*. Tarsito.
- Rusnawa, A. (2005). *Meta Analisis*. FK UNPAD.
- Sadat, A., Harisuddin, M. I., & Oktavian, I. (2020). Pembelajaran Matematika dengan Menggunakan Pendekatan Open-Ended untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa. *Symmetry | Pasundan Journal of Research in Mathematics Learning and Education*, 5(2), 159–168.
- Sagala, S. (2014). *Konsep dan Makna Pembelajaran*. Alfabeta.
- Sapta, A., Pakpahan, S. P., & Sirait, S. (2019). Using The Problem Posing Learning Model Based On Open Ended To Improve Mathematical Critical Thinking Ability. *Journal of Research in Mathematics Trends and Technology*, 1(1), 13–17. <https://doi.org/10.32734/jormtt.v1i1.752>
- Saputri, L., & Sari, D. P. (2018). Pengaruh Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif dan Kepercayaan Diri pada Materi SPLDV di Kelas X SMK Putra Anda Binjai. *Jurnal Serunai Matematika*, 10(2), 31–41.
- Sariningsih, R., & Herdiman, I. (2017). Mengembangkan kemampuan penalaran statistik dan berpikir kreatif matematis mahasiswa di Kota Cimahi melalui pendekatan open-ended. *Jurnal Riset Pendidikan Matematika*, 4(2), 239. <https://doi.org/10.21831/jrpm.v4i2.16685>
- Schildkamp, K., van der Kleij, F. M., Heitink, M. C., Kippers, W. B., & Veldkamp, B. P. (2020). Formative assessment: A systematic review of critical teacher prerequisites for classroom practice. *International Journal of Educational Research*, 103. <https://doi.org/10.1016/j.ijer.2020.101602>
- Setiawan, M. F., Lambertus, & Makkulau. (2019). Penerapan Pendekatan Open-Ended untuk Mengembangkan Kemampuan Berpikir Kreatif Matematik Siswa SMP Ditinjau dari Pengetahuan Awal Matematika. *Jurnal Pendidikan Matematika*, 10(1), 13–24.
- Shahrill, M. (2013). Review of teacher questioning in mathematics classrooms
Review of Effective Teacher Questioning in Mathematics Classrooms. In

Article in International Journal of Humanities and Social Science (Vol. 66, Issue 17). <https://www.researchgate.net/publication/283410274>

- Shimada, S., & Becker, J. P. (1997). *The Open-Ended Approach: A New Proposal for Teaching Mathematics*. National Council of Teachers of Mathematics.
- Shriki, A. (2010). Working like real mathematicians: Developing prospective teachers' awareness of mathematical creativity through generating new concepts. *Educational Studies in Mathematics*, 73(2), 159–179. <https://doi.org/10.1007/s10649-009-9212-2>
- Siagian, Q. A., Darhim, D., & Juandi, D. (2023a). The Effect of Cooperative Learning Models on The Students' Mathematical Critical and Creative Thinking Ability: Meta-Analysis Study. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 7(1), 969–990. <https://doi.org/10.31004/cendekia.v7i1.2281>
- Siagian, Q. A., Darhim, D., & Juandi, D. (2023b). The Effect of Cooperative Learning Models on The Students' Mathematical Critical and Creative Thinking Ability: Meta-Analysis Study. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 7(1), 969–990. <https://doi.org/10.31004/cendekia.v7i1.2281>
- Silver, E. A. (1997). Fostering Creativity through Instruction Rich in Mathematical Problem Solving and Problem Posing. *ZDM International Reviews on Mathematical Education*, 29(3).
- Sinaga, R. S., & Zulfita, E. (2021). Pengaruh Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Siswa Kelas VIII MTs Al-Jam'iyatul Wasliyah Stabat. *Jurnal Serunai Matematika*, 13(1), 81–88.
- Siswono, T. Y. E. (2008). *Model Pembelajaran Matematika Berbasis Pengajaran dan Pemecahan Masalah untuk Meningkatkan Kemampuan Berpikir Kreatif*. Unesa Press.
- Siswono, T. Y. E. (2011). Level of Student's Creative Thinking in Classroom Mathematics. *Educational Research and Review*, 6(7), 548–553. <http://www.academicjournals.org/ERR>
- Situmorang, A. S. (2022). Pengaruh Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Matematis Peserta Didik. *Sepren: Journal of Mathematics Educatio and Applied*, 4(1), 74–80.
- Sofiatun, S., Sampoerna, P. D., & Hakim, L. E. (2018). Unnes Journal of Mathematics Education The effect of scaffolding techniques on the ability of student's reasoning ability and mathematics anxiety reviewed from gender. *Unnes Journal of Mathematics Education*, 7(1), 63–71. <https://doi.org/10.15294/ujme.v7i1.22574>

- Sternberg, R. J., & Funke, Joachim. (2019). *Psychology of Human Thought*. Heidelberg University Publishing.
- Sterne, J. A. C., Becker, B. J., & Egger, M. (2005). The Funnel Plot. In *Publication Bias in Meta-Analysis* (pp. 73–98). Wiley. <https://doi.org/10.1002/0470870168.ch5>
- Sterne, J. A. C., & Egger, M. (2001). Funnel plots for detecting bias in meta-analysis. *Journal of Clinical Epidemiology*, *54*(10), 1046–1055. [https://doi.org/10.1016/S0895-4356\(01\)00377-8](https://doi.org/10.1016/S0895-4356(01)00377-8)
- Sugilar, H. (2013). Meningkatkan Kemampuan Berpikir Kreatif dan Disposisi Matematik Siswa Madrasah Tsanawiyah Melalui Pembelajaran Generatif. *Infinity: Jurnal Ilmiah Program Studi Matematika STKIP Siliwangi Bandung*, *2*(2), 156–168.
- Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. PT Alfabet.
- Suherman, S., & Vidákovich, T. (2022). Assessment of mathematical creative thinking: A systematic review. *Thinking Skills and Creativity*, *44*. <https://doi.org/10.1016/j.tsc.2022.101019>
- Sullivan, P., Mousley, J., & Zevenbergen, R. (2005). Increasing access to mathematical thinking. *MSOR Connections*, *5*(4). <https://doi.org/10.11120/msor.2005.05040011>
- Suparman, Juandi, D., & Tamur, M. (2021). Review of problem-based learning trends in 2010-2020: A meta-analysis study of the effect of problem-based learning in enhancing mathematical problem-solving skills of Indonesian students. *Journal of Physics: Conference Series*, *1722*(1). <https://doi.org/10.1088/1742-6596/1722/1/012103>
- Suparman, T., & Zanthi, L. S. (2019). Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP. *Journal On Education*, *1*(2), 503–508.
- Suparman, Yohannes, & Arifin, N. (2021). Enhancing Mathematical Problem-Solving Skills of Indonesian Junior High School Students through Problem-Based Learning: A Systematic Review and Meta-Analysis. *Jurnal Pendidikan Matematika*, *12*(1), 1–16. <http://ejournal.radenintan.ac.id/index.php/al-jabar/index>
- Tamur, M., & Juandi, D. (2021). The Impact of Problem-Based Learning toward Enhancing Mathematical Thinking: A Meta-Analysis Study. *Journal of Engineering Science and Technology*, *16*(4), 3548–3561. <https://www.researchgate.net/publication/353759290>
- Tamur, M., Juandi, D., & Adem, A. M. G. (2020). Realistic Mathematics Education in Indonesia and Recommendations for Future

- Implementation: A Meta-Analysis Study. *JTAM | Jurnal Teori Dan Aplikasi Matematika*, 4(1), 17. <https://doi.org/10.31764/jtam.v4i1.1786>
- Tang, J.-L., & Liu, J. L. (2000). Misleading funnel plot for detection of bias in meta-analysis. *Journal of Clinical Epidemiology*, 53(5), 477–484. [https://doi.org/10.1016/S0895-4356\(99\)00204-8](https://doi.org/10.1016/S0895-4356(99)00204-8)
- Thalheimer, W., & Cook, S. (2002). How to calculate effect sizes from published research: A simplified methodology. *Work-Learning Research*. www.work-learning.com
- Thomas, G., & Pring, Richard. (2004). *Evidence-Based Practice in Education*. Open University Press.
- TIMSS. (2011). *Average Percent Correct in the Mathematics Content and Cognitive Domains*.
- Torrance, E. P. (1974). *The Torrance Tests of Creative Thinking: Norms-Technical Manual*. Princeton. Personal Press.
- Treffinger, D. J., Young, G. C., Selby, E. C., & Shepardson, C. (2002). *Assessing Creativity: A Guide for Educators*. Center for Creative Learning.
- Ulinuha, R., Budi Waluya, S., Rochmad, R., NoKm, P., & Kedu, K. (2021). Creative Thinking Ability With Open-Ended Problems Based on Self-Efficacy in Gnomio Blended Learning. *Unnes Journal of Mathematics Education Research*, 10(1), 20–25. <http://journal.unnes.ac.id/sju/index.php/ujmer>
- Valentine, J. C., Pigott, T. D., & Rothstein, H. R. (2010). How Many Studies Do You Need? *Journal of Educational and Behavioral Statistics*, 35(2), 215–247. <https://doi.org/10.3102/1076998609346961>
- van Leeuwen, A., & Janssen, J. (2019). A systematic review of teacher guidance during collaborative learning in primary and secondary education. In *Educational Research Review* (Vol. 27, pp. 71–89). Elsevier Ltd. <https://doi.org/10.1016/j.edurev.2019.02.001>
- Wahyudi, I., & Marsyidin, S. (2019). The Effect of Open Ended Approaches and Learning Motivation on Mathematical Learning Outcomes in Class V. *International Journal of Educational Dynamics*, 1(2), 211–217. <http://ijeds.ppj.unp.ac.id/index.php/IJEDS>
- Wahyuningsih, S. S., Darmayanti, T., & Bintarti, A. (2019). Meta Analisis Tutorial Online Universitas Terbuka. *Jurnal Pendidikan Terbuka Dan Jarak Jauh*, 20(1), 32–38. <https://doi.org/10.33830/ptjj.v20i1.674.2019>

- White, J. V., & Barthel, G. (2009). Evidence-Based Medicine. In *Comprehensive Vascular and Endovascular Surgery* (pp. 53–63). Elsevier. <https://doi.org/10.1016/B978-0-323-05726-4.00005-6>
- Widiawati, W., Fuadiyah, S., Syamsurizal, S., & Ardi, A. (2019). The Analysis of Creative Thinking Ability of VII Class Student in Biology Learning at SMPN 25 (Junior High School 25) Padang. *Jurnal Atrium Pendidikan Biologi*, 4(4), 75. <https://doi.org/10.24036/apb.v4i4.7196>
- Widodo, S., Katminingsih, Y., & Nirwono, B. (2021). Meta Analisis: Pengaruh Model Pembelajaran Berdasarkan Masalah terhadap Kemampuan Berpikir Kreatif. *Indonesian Journal of Educational Development*, 1(4), 567–577. <https://doi.org/10.5281/zenodo.4559716>
- Wolf, F. M. (1986). *Meta-Analysis Quantitative Methods for Research Synthesis* (First Edition). Sage Publication, Inc.
- Wulandari, N., & Mashuri. (2014). Keefektifan Pembelajaran Circ dengan Pendekatan Open-Ended terhadap Kemampuan Berpikir Kreatif Siswa Kelas VIII Materi Kubus-Balok. *UJME: Unnes Journal of Mathematics Education*, 3(3), 231–240. <http://journal.unnes.ac.id/sju/index.php/ujme>
- Yohannes, Y., Juandi, D., & Diana, N. (2020). The evaluation of problem-based learning model towards high school students' critical thinking skills: A meta-Analysis study in indonesia. *ACM International Conference Proceeding Series*, 199–204. <https://doi.org/10.1145/3436756.3437045>
- Yunita, Y., Juandi, D., Tamur, M., Adem, A. M. G., & Pereira, J. (2020). A meta-analysis of the effects of problem-based learning on students' creative thinking in mathematics. *Beta: Jurnal Tadris Matematika*, 13(2), 104–116. <https://doi.org/10.20414/betajtm.v13i2.380>
- Zhang, C., & Kuncel, N. R. (2020). Moving Beyond the Brag Sheet: A Meta-Analysis of Biodata Measures Predicting Student Outcomes. *Educational Measurement*, 00(0), 1–16.
- Zhang, Y., Paquette, L., Bosch, N., Ocumpaugh, J., Biswas, G., Hutt, S., & Baker, R. S. (2022). The evolution of metacognitive strategy use in an open-ended learning environment: Do prior domain knowledge and motivation play a role? *Contemporary Educational Psychology*, 69, 102064. <https://doi.org/10.1016/j.cedpsych.2022.102064>
- Zubaidah, A. (2017). Strategi Metakognitif Dalam Pembelajaran Matematika. *Jurnal Penelitian Dan Pembelajaran Matematika*, 10(1). <https://doi.org/10.30870/jppm.v10i1.1198>