

REALISTIC MATHEMATICS EDUCATION BERBASIS *EMERGENT MODELING* UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KRITIS DAN KREATIF MATEMATIS SERTA CURIOSITY MAHASISWA CALON GURU

DISERTASI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
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REALISTIC MATHEMATICS EDUCATION BERBASIS EMERGENT MODELING UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KRITIS DAN KREATIF MATEMATIS SERTA CURIOSITY MAHASISWA CALON GURU

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UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KRITIS DAN KREATIF
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ABSTRAK

Ekasatya Aldila Afriansyah (2021). *Realistic Mathematics Education* Berbasis *Emergent Modeling* untuk Meningkatkan Kemampuan Berpikir Kritis dan Kreatif Matematis serta *Curiosity* Mahasiswa Calon Guru.

Kemampuan Berpikir Kritis Matematis (KBKiM), Kemampuan Berpikir Kreatif Matematis (KBKeM), dan *curiosity* diperlukan mahasiswa calon guru untuk memecahkan suatu permasalahan matematis. Menurut berbagai penelitian relevan, kemampuan tersebut masih tergolong rendah. Perlu pembelajaran yang dapat mendukung peningkatan kemampuan tersebut. Penelitian ini bertujuan untuk menggambarkan pencapaian dan peningkatan KBKiM dan KBKeM serta *curiosity* sebagai dampak penggunaan *Realistic Mathematics Education* berbasis *Emergent Modeling* (RME-EM) ditinjau dari keseluruhan mahasiswa calon guru dan Kemampuan Awal Matematis (KAM). Dengan menggunakan metode kuasi eksperimen dengan desain kelompok kontrol *pretest-posttest*, 51 mahasiswa calon guru di Kota Garut mewakili satu institusi swasta. Dalam penelitian ini digunakan dua kelompok sebagai sampel penelitian, yaitu kelompok eksperimen yang memperoleh pembelajaran RME-EM (Kelompok RME-EM) dan kelompok kontrol yang memperoleh pembelajaran konvensional (Kelompok Konvensional). Analisis data menggunakan Anova satu jalur dan Anova dua jalur. Dari hasil penelitian disimpulkan: 1) Secara keseluruhan, pencapaian dan peningkatan KBKiM serta KBKeM kelompok RME-EM lebih baik daripada kelompok Konvensional. Ditinjau dari KAM, pencapaian dan peningkatan KBKiM dan KBKeM kelompok RME-EM lebih baik daripada kelompok Konvensional; 2) Tidak terdapat pengaruh interaksi antara pembelajaran dan KAM, terhadap pencapaian KBKiM, serta pencapaian dan peningkatan KBKeM, namun terdapat pengaruh interaksi antara pembelajaran dan KAM, terhadap peningkatan KBKiM; Secara keseluruhan, tidak terdapat pencapaian dan peningkatan *curiosity* antara kelompok RME-EM dan Konvensional; 4) Tidak terdapat pengaruh interaksi antara pembelajaran dan KAM, terhadap pencapaian dan peningkatan *curiosity*.

Kata kunci: kemampuan berpikir kritis matematis, kemampuan berpikir kreatif matematis, *curiosity*, *Realistic Mathematics Education* berbasis *Emergent Modeling*.

ABSTRACT

Ekasatya Aldila Afriansyah (2021). Realistic Mathematics Education Based on Emergent Modeling to Improve Mathematical Critical and Creative Thinking Abilities and Curiosity of Prospective Teachers.

Critical Mathematical Thinking Ability (KBKiM), Creative Mathematical Thinking Ability (KBKeM), and Curiosity are needed by prospective teacher students to solve mathematical problems. According to many relevant studies, this ability is still relatively low. Learning is needed to support the improvement of these abilities. This study proposes to describe the achievement and improvement of KBKiM and KBKeM as well as curiosity as the result of using Realistic Mathematics Education based on Emergent Modeling (RME-EM) in terms of overall prospective teachers and Mathematical Early Ability (KAM). Employing a quasi-experimental method with a pretest-posttest control group design, 51 prospective teachers in the City of Garut represent prospective teachers in Institut Pendidikan Indonesia. In this study, two groups were employed as research samples, namely the experimental group who experienced RME-EM learning (RME-EM group) and the control group who experienced conventional learning (Conventional Group). Data analysis employs one-way Anova and two-way Anova. The results of the study concluded: 1) Overall, the achievement and improvement of the KBKiM and KBKeM in the RME-EM group were better than the Conventional group. In terms of KAM, the achievement and improvement of KBKiM and KBKeM in the RME-EM group is better than the Conventional group; 2) There is no effect of interaction between learning and KAM, on the achievement of KBKiM, as well as the achievement and improvement of KBKeM, but there is an influence of interaction between learning and KAM, on increasing KBKiM; Overall, there was no achievement and increased curiosity between the RME-EM and Conventional groups; 4) There is no effect of interaction between learning and KAM, towards achieving and increasing curiosity.

Keywords: mathematical critical thinking ability, mathematical creative thinking ability, curiosity, Realistic Mathematics Education based on Emergent Modeling, quasi-experimental method.

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- Abdulhamid, L., & Venkat, H. (2017). Primary mathematics teachers' responses to students' offers: An 'elaboration' framework. *Journal of Mathematical Behavior*. DOI: 10.1016/j.jmathb.2017.08.007.
- Abdullah, S. S. (2015). Mahasiswa (Calon) Guru Matematika yang Profesional. In *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika UNY*, Hal (pp. 721-726).
- Abdullah, A. S. (2017). Ethnomathematics in Perspective of Sundanese Culture. *Journal on Mathematics Education*, 8(1), 1-16.
- Abramovich, S., Grinshpan, A. Z., & Miligan, D. L. (2019). Teaching Mathematics through Concept Motivation and Action Learning. *Hindawi: Education Research International*, 2019, Article ID 3745406. DOI: 10.1155/2019/3745406.
- Afriansyah, E. A. (2012^a). *Design Research: Konsep Nilai Tempat dalam Operasi Penjumlahan Bilangan Desimal di Kelas V Dekolah Dasar*. Tesis Magister pada SPS UNSRI-UTRECHT: Tidak diterbitkan.
- Afriansyah, E. A. (2012^b). Implementasi PMRI dalam Materi Sifat Komutatif dan Asosiatif pada Bilangan Bulat untuk Level Siswa SD/MI. *Mosharafa: Jurnal Pendidikan Matematika, Edisi 11 Tahun Ke-III*: 19-25.
- Afriansyah, E. A. (2013). Design Research: Place Value in Decimal Numbers Using Metric System. *International Seminar on Mathematics, Science, and Computer Science Education MSCEIS*. Universitas Pendidikan Indonesia (UPI) Bandung.
- Afriansyah, E. A. (2014). What Students' Thinking about Contextual Problem is. *International Seminar on Innovation in Mathematics and Mathematics Education (1st ISIMMED)*. Universitas Negeri Yogyakarta (UNY): Yogyakarta.
- Afriansyah, E. A. (2016). Investigasi Kemampuan *Problem Solving* dan *Problem Posing* Matematis Mahasiswa via Pendekatan *Realistic*. *Mosharafa: Jurnal Pendidikan Matematika*, 5(3), 269-280.
- Afriansyah, E. A. (2017). Desain Lintasan Pembelajaran Pecahan melalui Pendekatan Realistic Mathematics Education. *Mosharafa: Jurnal Pendidikan Matematika*, 6(3), 463-474.
- Afriansyah, E. A., & Dahlan, J. A. (2017). Design Research in Fraction for Prospective Teachers. *the 5th SEA-DR (South East Asia Development Research) International Conference 2017 (SEADRIC 2017), Advances in Social Science, Education*, 100, 91-97.
- Afriansyah, E. A., Puspitasari, N., Luritawaty, I. P., Mardiani, D., & Sundayana, R. (2019). The analysis of mathematics with ATLAS. ti. *Journal of Physics: Conference Series*, 1402(7), 077097.
- Afriansyah, E. A., Herman, T., Turmudi, & Dahlan, J. A. (2020). Mendesain Soal Berbasis Masalah untuk Kemampuan Berpikir Kritis Matematis Calon Guru. *Mosharafa: Jurnal Pendidikan Matematika*, 9(2), 239-250.

- Afrida, A. N., & Handayani, S. (2018, February). Meningkatkan Kemampuan Pemecahan Masalah Matematika dan Rasa Ingin Tahu Siswa Kelas XI Melalui Model ARIAS. In *PRISMA, Prosiding Seminar Nasional Matematika* (Vol. 1, pp. 33-39).
- Ahmadi, N., & Besancon, M. (2017). Creativity as a Stepping Stone towards Developing Other Competencies in Classrooms. *Hindawi: Education Research International, Volume 2017*, Article ID 1357456, 9 pages. DOI: 10.1155/2017/1357456.
- Aisyah, N. (2007). *Pengembangan Pembelajaran Matematika SD*. Jakarta: Dirjen Dikti Depdiknas.
- Aizikovitsh-Udi, E., & Amit, M. (2011). Developing the skills of critical and creative thinking by probability teaching. *Procedia - Social and Behavioral Sciences, 15*, 1087–1091. DOI: 10.1016/j.sbspro.2011.03.243
- Aksan, S. K. P., Busnawir, B., & Baharuddin, B. (2019). Profil Pemecahan Masalah Matematika Siswa SMP Berdasarkan Langkah-Langkah Polya Ditinjau dari Kemampuan Pengajuan Masalah Siswa. *Jurnal Pembelajaran Berpikir Matematika (Journal of Mathematics Thinking Learning)*, 3(2).
- Albarracín, L. (2020). Large Number Estimation as a Vehicle to Promote Mathematical Modeling. *Early Childhood Education Journal*, 1-11.
- Alim, J. A., Hermita, N., Sari, I. K., Alpusari, M., Sulastio, A., Mulyani, E. A., ... & Arnawa, I. M. (2020, October). Development of Learning Flow for KPK Based on Interactive Multimedia Assisted RME Based on Students PGSD UNRI. In *Journal of Physics: Conference Series* (Vol. 1655, No. 1, p. 012045). IOP Publishing.
- Aliusta, G. O., & Özer, B. (2016). Student-centred learning (SCL): roles changed? *Teachers and Teaching*, 1–14. DOI: 10.1080/13540602.2016.1205014
- Allen, K., Higgins, S., & Adams, J. (2019). The relationship between visuospatial working memory and mathematical performance in school-aged children: a systematic review. *Educational Psychology Review*, 1-23.
- Alwi, S. (2017). Problematika guru dalam pengembangan media pembelajaran. *ITQAN: Jurnal Ilmu-Ilmu Kependidikan*, 8(2), 145-167.
- Aminudin, M., Nusantara, T., Parta, I. N., Rahardjo, S., As'ari, A. R., & Subanji. (2019). Engaging problems on trigonometry: why were student hard to think critically? *IOP Conf. Series: Journal of Physics: Conf. Series, 1188*, 012038. DOI: 10.1088/1742-6596/1188/1/012038
- Andresen, M. (2020). To learn about differential equations by modelling. *Mathematics Education in the Digital Age (MEDA)*, 419.
- Andrews-Larson, C., Wawro, M., & Zandieh, M. (2017). A hypothetical learning trajectory for conceptualizing matrices as linear transformations. *International Journal of Mathematical Education in Science and Technology*, 48(6), 809-829.
- Aningsih, & Asih, T. S. N. (2017). Analisis Kemampuan Pemahaman Konsep Matematika Ditinjau dari Rasa Ingin Tahu Siswa pada Model Concept Attainment. *Unnes Journal of Mathematics Education Research*, 6(2). 217-224.
- Anjarwati, Y., Amin, S. M., & Lukito, A. (2016). Peningkatan Keterampilan Berpikir Kritis pada Pembelajaran Geometri dengan Pendekatan Pendidikan Matematika Realistik di Ekasatya Aldila Afriansyah, 2021

- Kelas IV SDN 1 Pule Kecamatan Pule Kabupaten Trenggalek. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan dan Hasil Penelitian*, 2(1). 98-104.
- Anggareni, P., & Hidayat, A. F. (2019). Identifikasi Tahapan Proses Berpikir Kreatif Siswa SMP dalam Aktivitas Pengajaran Masalah Matematika. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 10(2), 132-140.
- Anggraini, E., & Zulkardi, Z. (2020). Kemampuan Berpikir Kreatif Siswa dalam Mem-posing Masalah menggunakan Pendekatan Pendidikan Matematika Realistik Indonesia. *Jurnal Elemen*, 6(2).
- Anthony, G., Hunter, J., & Hunter, R. (2015). Supporting prospective teachers to notice students' mathematical thinking through rehearsal activities. *Mathematics Teacher Education and Development*, 17(2), 7-24.
- Appelbaum, P. (2004). *Critical Thinking and Learning*. [Online]. Tersedia: <http://www.w3.org/TR/REC-html40>
- Apsari, R. A., Putri, R. I. I., Sariyasa, S., Abels, M., & Prayitno, S. (2020). Geometry representation to develop algebraic thinking: A recommendation for a pattern investigation in pre-algebra class. *Journal on Mathematics Education*, 11(1), 45-58.
- Ardiyaningrum, M., Retnowati, Jailani, & Trisniawati. (2019). Online Measurement to Assess a Problem Solving Skills Based on Multimedia Instrument. *International Conference Computer Science and Engineering, Journal of Physics: Conference Series*, 1339, 012065. DOI: 10.1088/1742-6596/1339/1/012065
- Argina, A. W., Mitra, D., Ijabah, N., & Setiawan, R. (2017). Indonesian PISA Result: What Factors and What Should Be Fixed? *The 1st Education and Language International Conference Proceedings Center for International Language Development of Unissula*. 69-79.
- Arikunto, S. (2012). *Prosedur Penelitian Suatu Pendekatan Praktis*. Edisi Revisi VI. Jakarta: PT. Rineka Cipta.
- Arofah, A. (2015). *Analisis Wacana Pembelajaran Buku Teks IPA Terpadu SMP Kelas VII Berdasarkan Kurikulum 2013 Sub Pokok Bahasan Organisasi Kehidupan* (Doctoral Dissertation, IAIN Syekh Nurjati Cirebon).
- As'ari, A.R., Mahmudi, A., & Nuerlaelah, E. (2017). Our Prospective Mathematics Teachers are Not Critical Thinkers Yet. *Journal on Mathematics Education*, 8(2), 145-156.
- Ashari, N. W., & Salwah, S. (2018). Problem Based Learning Untuk Meningkatkan Self Directed Learning Dalam Pemecahan Masalah Mahasiswa Calon Guru: Suatu Studi Literatur. *Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika*, 1(1).
- Asih, A. K., Irawan, E. B., & Sa'dijah, C. (2017). Penerapan *Realistic Mathematics Education* untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Kelas V. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 2(4), 524-530.
- Atika, N., & MZ, Z. A. (2016). Pengembangan LKS Berbasis Pendekatan RME untuk Menumbuhkembangkan kemampuan berpikir kritis matematis siswa. *Suska Journal of Mathematics Education*, 2(2), 103-110.

- Atweh, B. (2007). *Pedagogy for Socially Response-able Mathematics Education*. Paper presented at the Australian Association of Research in Education, Fremantle, West Australia.
- Avalos, B. (2000). Policies for teacher education in developing countries. *International Journal of Educational Research*, 33(5), 457-474.
- Avalos, B. (2011). Review: Teacher professional development in Teaching and Teacher Education over ten years. *Teaching and Teacher Education*, 27(1), 10-20.
- Avalos, M., Medina, E., & Secada, W. (2018). Reading mathematics problems: Exploring how language counts for middle-school students with varying mathematics levels of proficiency. In A. Bailey, C. Maher, & L. C. Wilkinson (Eds.). *Language, literacy, and learning in the STEM disciplines: Language counts for English learners* (pp. 53–78). New York, NY & Oxford, UK: Routledge Taylor Francis.
- Badengo, T., & Suparman. (2019). Design Module of Learning with RME Approach to Improve Creative Thinking Ability. *International Journal of Scientific & Technology Research*, 8(10), 1178-1182.
- Baker, M., & Rudd, R. (2001). Relationships between Critical and Creative Thinking. *Journal of Southern Agricultural Education Research*, 51(1), 173-188.
- Bakker, A. (2004). *Design Research in Statistics Education. On Symbolizing and Computer Tools*. Amersfoort: Wilco Press.
- Banikowski, A. K., & Mehring, T. A. (1999). Strategies to Enhance Memory Based on Brain-Research. *Focus on Conceptional Children*, 32(2). DOI: 10.17161/fec.v32i2.6772
- Baron, J. B., & Stenberg, R. J. (1987). *Teaching Thinking Skill: Theory and Practice*. New York: W.H. Freeman and Company.
- Barwell, R. (2018). Writing in mathematics classrooms. In A. Bailey, C. Maher, & L. C. Wilkinson (Eds.). *Language, literacy, and learning in the STEM disciplines: Language counts for English learners* (pp. 101–114). New York, NY & Oxford, UK: Routledge Taylor Francis.
- Batlolona, J. R., & Imelda. (2019). The Struggle of Indonesian Students in the Context of TIMSS and PISA has not Ended. *International Journal of Civil Engineering and Technology*, 10(2), 393-406.
- Beddewela, E., Anchor, J., & Warin, C. (2020). Institutionalising intra-organisational change for responsible management education. *Studies in Higher Education*, 1-19.
- Bergman, A. M., & French, T. A. (2019). Developing an Active Approach to Chemistry-Based Group Theory. In *It's Just Math: Research on Students' Understanding of Chemistry and Mathematics* (pp. 213-237). American Chemical Society.
- Berlyne, D. E. (1954). A theory of human curiosity. *British Journal of Psychology*, 45, 180–191.
- Berlyne, D. E. (1960). *Conflict, Arousal and Curiosity*, McGraw-Hill, New York.
- Berlyne, D. E. (1967). Arousal and reinforcement, D. Levine (Ed.), *Nebraska symposium on motivation*, Lincoln: University of Nebraska Press.

- Berlyne, D. E. (1971). *Aesthetics and psychobiology*. New York: Appleton-Century-Crofts.
- Bicer, A., Lee, Y., Perihan, C., Capraro, M. M., & Capraro, R. M. (2020). Considering mathematical creative self-efficacy with problem posing as a measure of mathematical creativity. *Educational Studies in Mathematics*, *105*(3), 457-485.
- Bietenbeck, J., Piopiunik, M., & Wiederhold, S. (2018). Africa's Skill Tragedy Does Teachers' Lack of Knowledge Lead to Low Student Performance. *Journal of human resources*, *53*(3), 553-578.
- Bolitho, R. (2016). The ingredients of quality in teacher education. In G. Pickering, & P. Gunashekar (Eds.), *Ensuring quality in English language teacher education* (pp. 26-32). London: British Council.
- Bos, R., Doorman, M., & Piroi, M. (2020). Emergent models in a reinvention activity for learning the slope of a curve. *The Journal of Mathematical Behavior*, *59*, 100773.
- Brantlinger, A. (2011^a). Rethinking critical mathematics: A comparative analysis of critical, reform, and traditional geometry instructional texts. *Education Studies in Mathematics*, *78*(3), 395-411.
- Brantlinger, A. (2011^b). A view from the other side: Partitioner research on critical mathematics pedagogy in an urban high school. In K. A. Scott & W. J. Blanchett (Eds.), *Urban Education Settings: Lessons Learned and Implications for Future Practice*. Charlotte, NC: Information Age Publishing.
- Brink-Budgen, R. v. d. (2000). *Critical Thinking for Students: Learn the skills of critical assessment and effective argument, 3rd edition*. Begbroke, Oxford: How to Books Ltd.
- Brodin, E. M. (2014). Critical and creative thinking nexus: learning experiences of doctoral students. *Studies in Higher Education*, *41*(6), 971-989. DOI: 10.1080/03075079.2014.943656
- Buchbinder, O., & Zaslavsky, O. (2018). Strengths and inconsistencies in students' understanding of the roles of examples in proving. *Journal of Mathematical Behavior*. DOI: 10.1016/j.jmathb.2018.06.010
- Bullock, E. C. (2018). Intersectional Analysis in Critical Mathematics Education Research: A Response to Figure Hiding. *Sage Journal*, *42*(1), 122-145. DOI: 10.3102/0091732X18759039
- Buscher, C., & Schnell, S. (2017). Students' emergent modelling of statistical measures – a case study. *Statistics Education Research Journal*, *16*(2), 144-162.
- Capuno, R., Necesario, R., Etcuban, J. O., Espina, R., Padillo, G., & Manguilimotan, R. (2019). Attitudes, Study Habits, and Academic Performance of Junior High School Students in Mathematics. *International Electronic Journal of Mathematics Education*, *14*(3), 547-561. DOI: 10.29333/iejme/5768.
- Cárcamo Bahamonde, A. D., Fortuny Aymemí, J. M., & Gómez i Urgellés, J. V. (2017). Mathematical modelling and the learning trajectory: tools to support the teaching of linear algebra. *International journal of mathematical education in science and technology*, *48*(3), 338-352.

- Çelik, H. C., & Özdemir, F. (2020). Mathematical Thinking as a Predictor of Critical Thinking Dispositions of Pre-service Mathematics Teachers. *International Journal of Progressive Education*, 16(4), 81-98.
- Changwong, K., Sukkamart, A., & Sisan, B. (2018). Critical thinking skill development: Analysis of a new learning management model for Thai high schools. *Journal of International Studies*, 11(2), 37-48. DOI:10.14254/2071- 8330.2018/11-2/3
- Charalambous, C. Y., & Praetorius, A. K. (2020). Creating a forum for researching teaching and its quality more synergistically. *Studies in Educational Evaluation*, 100894.
- Chesky, N. Z., & Mark, R. (2015). Wolfmeyer. *Philosophy of STEM Education: A Critical Investigation*. New York: Palgrave Macmillan. DOI: 10.1057/9781137535467.0006.
- Chew, M. S. F., Shahrill, M., & Li, H. C. (2019). The Integration of a Problem-Solving Framework for Brunei High School Mathematics Curriculum in Increasing Student's Affective Competency. *Journal on Mathematics Education*, 10(2), 215-228.
- Chick, J. K. (1996). Safe-talk: Collusion in apartheid education. In H. Coleman (Ed.). *Society and the language classroom* (pp. 21–39). Cambridge: Cambridge University Press.
- Chin, C., & Osborne, J. (2008). Students' questions: a potential resource for teaching and learning science. *Journal Studies in Science Education*, 44(1), 1-39. DOI: 10.1080/03057260701828101
- Chukwuyenum, A., N. (2013). Impact of Critical thinking on Performance in Mathematics among Senior Secondary School Students in Lagos State. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 3(5), 18-25.
- Costa, A. L. (2001). *Developing Minds, A Resource Book for Teaching Thinking*, (3rd edition). Alexandria-Virginia: Association for Supervision and Curriculum Development.
- Crespo, S. (2003). Learning to pose mathematical problems: Exploring changes in preservice teachers' practices. *Educational Studies in Mathematics*, 52, 243-270. Kluwer Academic Publishers. Netherlands.
- Cropley, D. H., Kaufman, J. C., & Cropley, A. J. (2011). Measuring Creativity for Innovation Management. *Journal of Technology Management & Innovation*, 6(3), 13–30. DOI: 10.4067/s0718-27242011000300002
- Crow & Crow. (1960). *Introduction to Education (New Revised Ed)*. New York: American Book Company.
- Darhim & Hamzah. (2010). Antara *Realistic Mathematics Education* (RME) dengan Matematika Modern (*New Math*).
- Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs*. San Francisco, CA: Jossey-Bass.
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97-140. DOI: 10.1080/10888691.2018.1537791
- Darma, Y., Firdaus, M., & Irvandi, W. (2020). Soft Skills Matematis Mahasiswa Calon Guru Matematika. *Edukasi: Jurnal Pendidikan*, 18(2), 225-239.

- Deffner, D., & McElreath, R. (2020). The importance of life history and population regulation for the evolution of social learning. *Philosophical Transactions of the Royal Society B*, 375(1803), 20190492.
- Dhayanti, D., Johar, R., & Zubainur, C. M. (2018). Improving Students' Critical and Creative Thinking through Realistic Mathematics Education using Geometer's Sketchpad. *Journal of Research and Advances in Mathematics Education*, 3(1), 25-35.
- Dirgantoro, K. P. S. (2018). Kompetensi guru matematika dalam mengembangkan kompetensi matematis siswa. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 8(2), 157-166.
- diSessa, A. A. (2002). Students' criteria for representational adequacy. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 105-130.
- Doorman, M., & Gravemeijer, K. (2008). Emergent modeling: discrete graphs to support the understanding of change and velocity. *ZDM Mathematics Education*, 12.
- Doorman, M., Drijvers, P., Gravemeijer K., Boon P., & Reed H. (2012). Tool use and the development of the function concept: From repeated calculations to functional thinking. *International Journal of Science and Mathematics Education* 10, 1243-1267.
- Dores, O. J., & Setiawan, B. (2019). Meningkatkan Literasi Matematis Mahasiswa Calon Guru Sekolah Dasar dalam Membelajarkan Matematika. *Jurnal Pendidikan Matematika Indonesia*, 4(1), 42-46.
- Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving Students' Learning with Effective Learning Techniques: Promising Directions from Cognitive and Educational Psychology. *Psychological Science in the Public Interest*, 14(1), 4–58. DOI: 10.1177/1529100612453266
- Dwee, C. Y., Anthony, E. M., Salleh, B. M., Kamarulzaman, R., & Kadir, Z. A. (2016). Creating Thinking Classrooms: Perceptions and Teaching Practices of ESP Practitioners. *Procedia - Social and Behavioral Sciences*, 232, 631-639. DOI: 10.1016/j.sbspro.2016.10.087
- Edo, S. I., & Samo, D. D. (2017). Lintasan Pembelajaran Pecahan Menggunakan Matematika Realistik Konteks Permainan Tradisional Siki Doka. *Mosharafa: Jurnal Pendidikan Matematika*, 6(3), 311-322.
- Ennis, R. H. (1985). *Goal for a Critical Thinking Curriculum*. In A. L. Costa (ed). *Developping Minds. A Resource Book for Teacher Thinking* ASCD. Virginia USA.
- Ennis, R. H. (1996). *Critical Thinking*. United States of America: Prentice-Hall Inc.
- Ernest, P. (2010). The scope and limits of critical mathematics education. *Philosophy of Mathematics Education Journal*, 25, 1–21.
- Evans, T., Thomas, M. O., & Klymchuk, S. (2020). Non-routine problem solving through the lens of self-efficacy. *Higher Education Research & Development*, 1-18.
- Facione, P. (2015). *Critical Thinking: What It Is and Why It Counts*. Measured Reasons LLC, Hermosa Beach, CA.

- Fatmawati, A., Zubaidah, S., Mahanal, S., & Sutopo. (2019). Critical Thinking, Creative Thinking, and Learning Achievement: How They Are Related. *Journal of Physics: Conference Series*, 1417, 012070. DOI: 10.1088/1742-6596/1417/1/012070
- Fauzan, A., Plomp, T., & Gravemeijer, K. (2013). The development of an rme-based geometry course for Indonesian primary schools. *Educational design research—Part B: Illustrative cases*, 159-178.
- Fauzan, A., Armiati, A., & Ceria, C. (2018, April). A Learning Trajectory for Teaching Social Arithmetic using RME Approach. In *IOP Conference Series: Materials Science and Engineering* (Vol. 335, No. 1, p. 012121).
- Fauzan, A., & Diana, F. (2020). Learning trajectory for teaching number patterns using RME approach in junior high schools. *JPhCS*, 1470(1), 012019.
- Fauzan, A., Tasman, F., & Fitriza, R. (2020, December). Exploration of Ethnomathematics at Rumah Gadang Minangkabau to Design Mathematics Learning Based on RME in Junior High Schools. In *2nd International Conference Innovation in Education (ICoIE 2020)* (pp. 279-283). Atlantis Press.
- Fauziah, A., & Putri, R. I. I. (2020). Developing PMRI Learning Environment through Lesson Study for Pre-Service Primary School Teacher. *Journal on Mathematics Education*, 11(2), 193-208.
- Febriyana, D., Suyitno, H., & Rochmad, R. (2018). Analysis of Mathematical literacy Ability Viewed From Students' Mathematics Self-concept Based on Gender Differences on IMPROVE Learning with PMRI Approach. *Unnes Journal of Mathematics Education Research*, 7(1), 182-188.
- Febriyanti, Bagaskorowati, R., & Makmuri. (2019). The Effect of the Realistic Mathematics Education (RME) Approach and The Initial Ability of Students on The Ability of Student Mathematical Connection. *International Journal for Educational and Vocational Studies*, 1(3), 153-156.
- Ferreira, S. M., & Bisognin, V. (2020). Construction of Mathematical and Financial Concepts based on Realistic Mathematics Education. *Acta Scientiae*, 22(5), 226-253.
- Firmansyah, M. A. (2017). Peran Kemampuan Awal Matematika dan Belief Matematika terhadap Hasil Belajar. *Prima: Jurnal Pendidikan Matematika*, 1(1), 55-68.
- Firmansyah, R., Handoko, S., & Gunawan, I. (2019). Peningkatan Kemampuan Berpikir Kreatif Matematika Melalui Model RME (Realistic Mathematics Education) di Kelas IV Sekolah Dasar. *EDUCARE*, 17(1), 42-49.
- Flores, M. A. (2016). Teacher education curriculum. In J. Loughran, & M. L. Hamilton (Eds.), *International handbook of teacher education*. Singapore: Springer Science+Business Media.
- Feiman-Nemser, S. (2003). What new teachers need to learn? *Educational leadership*, 60(8), 25-29.
- Freudenthal, H. (1973). *Mathematics as an educational task*. Dordrecht, The Netherlands: D. Reidel Publishing Company.
- Freudenthal, H. (1983). *Didactical phenomenology of mathematical structures*. Dordrecht, The Netherlands: D. Reidel Publishing Company.

- Freudenthal, H. (1991). *Revisiting Mathematics Education: China Lectures*. Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Fuadi, R., Johar, R., & Munzir, S. (2016). Peningkatkan Kemampuan Pemahaman dan Penalaran Matematis melalui Pendekatan Kontekstual. *Jurnal Didaktika Matematika*, 3(1), 47-54.
- Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, Motivation, and Learning: A Research and Practice Model. *Simulation & Gaming*, 33(4), 441-467.
- Gelfuso, A. (2018). “But I Don't Want to Tell Them the Answer”: Preservice Teachers' (mis) understandings about literacy instruction. *Teaching and Teacher Education*, 74, 10-20. DOI: 10.1016/j.tate.2018.04.007
- Glazer, E. (2001). *Using Web Source to Promote Critical Thinking in High School*. Tersedia: <http://math.unipa.it/Aglazer>
- Gravemeijer, K. (1994). *Developing Realistic Mathematics Education*. Utrecht: Technipress, Culemborg.
- Gravemeijer, K. (1999). How emergent models may foster the constitution of formal mathematics. *Mathematical Thinking and Learning*, 1(2), 155–177. DOI: 10.1207/s15327833mtl0102_4
- Gravemeijer, K. (2002^a). From models to modelling. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 7-22.
- Gravemeijer, K. (2002^b). *Emergent modeling as the basis for an instructional sequence on data analysis*. Paper presented at the sixth International Conference on Teaching Statistics, Cape Town, South Africa. Retrieved from http://iaseweb.org/Conference_Proceedings.php?p=ICOTS_6_2002
- Gravemeijer K., & Stephan, M. (2002). Emergent Models as an Instructional Design Heuristic. Dalam: Gravemeijer K., Lehrer R., Van Oers B., Verschaffel L. (eds) *Symbolizing, Modeling and Tool Use in Mathematics Education*. *Mathematics Education Library*, vol 30. Springer, Dordrecht.
- Gravemeijer, K., & Doorman, M. (2004). Context problems in realistic mathematics education: A calculus course as an example. *Educational Studies in Mathematics*, 39, 111-129.
- Gravemeijer, K., & Cobb, P. (2006). Design research from the learning design perspective. *Educational design research* (pp. 17-51). London: Routledge.
- Gravemeijer, K. (2007). Emergent modeling and iterative processes of design and improvement in mathematics education. *Plenary lecture at the APEC-TSUKUBA International Conference III, Innovation of Classroom Teaching and Learning through Lesson Study - Focusing on Mathematical Communication*, Tokyo dan Kanazawa, Jepang.
- Gravemeijer, K. (2008). RME theory and mathematics teacher education. In *International Handbook of Mathematics Teacher Education: Volume 2* (pp. 283-302). Brill Sense.
- Gravemeijer, K., Stephan, M., Julie, C., Lin, F., & Ohtani, M. (2017). What Mathematics Education May Prepare Students for the Society of the Future? *International Journal of Science and Mathematics Education*, 15, 105–123. DOI: 10.1007/s10763-017-9814-6

- Gravemeijer, K. (2020). A Socio-Constructivist Elaboration of Realistic Mathematics Education. In *National Reflections on the Netherlands Didactics of Mathematics* (pp. 217-233). Springer, Cham.
- Greer, B., & Skovsmose, O. (2012). Seeing the cage? The emergence of critical mathematics education. In O. Skovsmose & B. Greer (Eds.), *Opening the cage: Critique and politics of mathematics education* (pp. 1–20). Rotterdam, Netherlands: Sense.
- Grigorescu, D. (2020). Curiosity, intrinsic motivation and the pleasure of knowledge. *Journal of Educational Sciences & Psychology*, 10(1).
- Gruber, M. J., Valji, A., & Ranganath, C. (2019). Curiosity and Learning. *The Cambridge Handbook of Motivation and Learning*, 397–417. DOI: 10.1017/9781316823279.018
- Gruver, J. (2018). A trajectory for developing conceptual understanding of logarithmic relationships. *The Journal of Mathematical Behavior*, 50, 1-22.
- Hadi, S. (2002). *Effective Teacher Professional Development for The Implementation of Realistic Mathematics Education in Indonesia*. Thesis University of Twente, Enschede.
- Hadi, S., & Novaliyosi. (2019). TIMSS Indonesia (Trends in International Mathematics and Science Study). *Prosiding Seminar Nasional Program Studi Magister Pendidikan Matematika Universitas Siliwangi*, 562-569.
- Hailikari, T., Katajauvori, N., & Lindblom-Ylänne, S. (2008). The Relevance of Prior Knowledge in Learning and Instructional Design. *American Journal of Pharmaceutical Education*, 72(5), Article 113.
- Haji, D. Y. S. S., & Widada, W. (2020). Meningkatkan Kemampuan Berpikir Kritis Calon Guru Matematika Melalui Aplikasi E-Learning Zoom pada Mata Kuliah Microteaching di Universitas Bengkulu. *Jurnal Pendidikan Matematika Raflesia*, 5(3), 74-83.
- Hake, R. R. (2002). Relationship of Individual Student Normalized Learning Gains in Mechanics with Gender, High-School Physics, and Pretest Scores on Mathematics and Spatial Visualization. *Physics Education Research Conference*, Boise, Idaho.
- Harahap, M. S. (2018). Meningkatkan Kemampuan Pemecahan Masalah Matematis dengan Penggunaan Bahan Ajar RME (Realistic Mathematic Education). *Jurnal Education And Development*, 3(2), 56-56.
- Hardy, J. H., Ness, A. M., & Mecca, J. (2017). Outside the box: Epistemic curiosity as a predictor of creative problem solving and creative performance. *Personality and Individual Differences*, 104, 230–237.
- Harkness, S. S., & Noblitt, B. (2017). Playing the believing game: Enhancing productive discourse and mathematical understanding. *Journal of Mathematical Behavior* 45, 63–77. DOI: 10.1016/j.jmathb.2016.12.004
- Harries, T., & Barnby, P. (2004). Representing Multiplication. *Proceeding of the British Society for Research into Learning Mathematics*. British: Research Learning of Mathematics.
- Hartuti, P. M., & Widyasari, H. (2016). Peran Kemampuan Awal Matematika dan Persepsi Mahasiswa pada Statistika terhadap Prestasi Belajar Statistika. *Jurnal SAP*, 1(2), 135-144.

- Hasan, R., Lukitasari, M., Utami, S., & Anizar. (2019). The activeness, critical, and creative thinking skills of students in the lesson study-based inquiry and cooperative learning. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 5(1), 77-84.
- Hedegaard, M. (2020). Children's exploration as a key in children's play and learning activity in social and cultural formation. In *Children's Exploration and Cultural Formation* (pp. 11-27). Springer, Cham.
- Hendriana, H., & Sumarmo, U. (2014). *Penilaian Pembelajaran Matematika*. Bandung: PT Refika Aditama.
- Henry, G. T., Campbell, S. L., Thompson, C. L., Patriarca, L. A., Luterbach, K. J., Lys, D. B., & Covington, V. M. (2013). The predictive validity of measures of teacher candidate programs and performance: Toward an evidence-based approach to teacher preparation. *Journal of Teacher Education*, 64(5), 439-453.
- Herbel-Eisenmann, B., Johnson, K. R., Otten, S., Cirillo, M., & Steele, M. D. (2015). Mapping talk about the mathematics register in a secondary mathematics teacher study group. *Journal of Mathematical Behavior*, 40, 29-42.
- Herman, T. (2018, January). Improving students' mathematical representational ability through RME-based progressive mathematization. In *Journal of Physics: Conference Series* (Vol. 948, No. 1, p. 012038). IOP Publishing.
- Hernández-Rodríguez, O., López-Fernández, J., Quintero-Rivera, A. H., & Velázquez-Estrella, A. (2020). The Influence of Realistic Mathematics Education Outside the Netherlands—The Case of Puerto Rico. In *International Reflections on the Netherlands Didactics of Mathematics* (pp. 297-315). Springer, Cham.
- Heru, H., Yuliani, R. E., & Nery, R. S. (2020). Kecemasan mengajar matematika mahasiswa calon guru dalam melakukan praktik mengajar. *Jurnal Math Educator Nusantara: Wahana Publikasi Karya Tulis Ilmiah di Bidang Pendidikan Matematika*, 6(1), 1-12.
- Hevriansyah, P., & Megawanti, P. (2016). Pengaruh Kemampuan Awal terhadap Hasil Belajar Matematika. *JKPM*, 2(1), 37-44.
- Hidayat, R., & Nurrohmah. (2016). Analisis Peningkatan Kemampuan Pemahaman Konsep Matematis Siswa Mts Lewat Penerapan Model Pembelajaran *Problem Based Learning* Berbantuan *Software Geogebra* Berdasarkan Kemampuan Awal Matematika. *JPPM*, 9(1), 12-19.
- Hidayat, W., Jayanti, K., Nurismadanti, I. F., Akbar, M. Z. I., Pertiwi, K. A., & Rengganis, P. (2018). Pembelajaran RME (*Realistic Mathematics Education*) terhadap Kemampuan Berpikir Kreatif Matematik pada Siswa SMP). *JPMI - Jurnal Pembelajaran Matematika Inovatif*, 2(1), 42-50.
- Hidayat, W., & Sariningsih, R. (2020). Profil Kemampuan Penalaran Kreatif Matematis Mahasiswa Calon Guru. *Jurnal Elemen*, 6(1), 108-127.
- Hikayat, C., Suparman, Hairun, Y., & Suharna, H. (2020). Design of Realistic Mathematics Education Approach to Improve Critical Thinking Skills. *Universal Journal of Educational Research*, 8(6), 2232-2244. DOI: 10.13189/ujer.2020.080606

- Hong, E., Hartzell, S. A., & Greene, M. T. (2009). Fostering Creativity in the Classroom: Effects of Teachers' Epistemological beliefs, Motivation, and Goal Orientation. *Journal of Creative Behavior*, 1-19. DOI: 10.1002/j.2162-6057.2009.tb01314.x
- Hora, M. T., & Oleson, A. K. (2017). Examining study habits in undergraduate STEM courses from a situative perspective. *Hora and Oleson International Journal of STEM Education*, 4(1). DOI 10.1186/s40594-017-0055-6
- Hudson, B., Henderson, S., & Hudson, A. (2015). Developing mathematical thinking in the primary classroom: liberating students and teachers as learners of mathematics. *Journal of Curriculum Studies*, 47(3), 374-398. DOI: 10.1080/00220272.2014.979233
- Ibad, Z., Sukestiyarno, Y. L., & Hidayah, I. (2020). The Creative Thinking Skills based on the Learning Autonomy Assisted by Contextual Module and Mentoring. *Unnes Journal of Mathematics Education Research*.
- Irdawati, A., Marlina, R., & Murni, I. (2019, November). Realistic Mathematics Education (RME) Approach to Enhance Mathematical Cognition of Elementary School Students. In *Journal of Physics: Conference Series* (Vol. 1387, No. 1, p. 012140). IOP Publishing.
- Ismaimuza, D. (2010). *Kemampuan Berpikir Kritis dan Kreatis Matematik Siswa SMP Melalui Pembelajaran Berbasis Masalah Dengan Strategi Konflik Kognitif*. Disertasi Doktor pada SPs. UPI: Tidak Diterbitkan.
- Jackson, L., Alston, K., Bialystok, L., Blum, L., Burbules, N. C., Chinnery, A., ... & Stitzlein, S. M. (2020). Philosophy of education in a New Key: Snapshot 2020 from the United States and Canada. *Educational Philosophy and Theory*, 1-17.
- Jaworski, B. (1994). *Investigating mathematics teaching: A constructivist enquiry*. London: Routledge Falmer.
- Jirout, J., & Klahr, D. (2012). Children's scientific curiosity: in search of an operational definition of an elusive concept. *Dev. Rev.* 32, 125-160.
- Julie, H., Suwarsono, S., & Juniati, D. (2014). Understanding Profile from the Philosophy, Principles, and Characteristics of RME. *Journal on Mathematics Education*, 5(2), 148-159. DOI: 10.22342/jme.5.2.1499.148-159
- Jupri, A., Usdiyana, D., & Sispiyati, R. (2020). Realistic Mathematics Education Principles for Designing a Learning Sequence on Number Patterns. *Jurnal Kiprah*, 8(2), 105-112.
- Kaiser, G. (2020). Mathematical modelling and applications in education. *Encyclopedia of mathematics education*, 553-561.
- Kamarullah. (2017). Pendidikan Matematika di Sekolah Kita. *Al Khawarizmi: Jurnal Pendidikan dan Pembelajaran Matematika*, 1(1), 21-32.
- Kant, D., & Sarikaya, D. (2020). Mathematizing as a virtuous practice: different narratives and their consequences for mathematics education and society. *Synthese*, 1-25.
- Karwowski, M., Jankowska, D. M., & Szwajkowski, W. (2017). Creativity, Imagination, and Early Mathematics Education. In R. Leikin & B. Sriraman (Eds.), *Introduction to Interdisciplinary Perspectives to Creativity and Giftedness* (pp. 7-22). Switzerland: Springer.

- Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and Exploration: Facilitating Positive Subjective Experiences and Personal Growth Opportunities. *Journal of Personality Assessment*, 82(3), 291–305. DOI: 10.1207/s15327752jpa8203_05
- Kaunang, D. F. (2018). Penerapan Pendekatan Realistic Mathematics Education dalam Pembelajaran Matematika Materi Persamaan Garis Lurus di SMP Kristen Tomohon. *Mosharafa: Jurnal Pendidikan Matematika*, 7(2), 307-314.
- Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *IJ STEM Ed*, 5(34). DOI: 10.1186/s40594-018-0131-6
- Kharkhurin, A. V. (2014). Creativity.4in1: Four-Criterion Construct of Creativity. *Creativity Research Journal*, 26(3), 338–352. DOI: 10.1080/10400419.2014.929424
- Kidd, C., & Hayden, B. Y. (2015). The Psychology and Neuroscience of Curiosity. *Neuron*, 88(3), 449–460. DOI: 10.1016/j.neuron.2015.09.010
- Kilpatrick, J. (2020). History of research in mathematics education. *Encyclopedia of mathematics education*, 349-354.
- Knuth, E. J. (2002). Fostering Mathematical Curiosity. *The Mathematics Teacher*, 95(2), 126-130.
- Kokka, K., & Chao, T. (2020). 'How I show up for Brown and Black students': Asian American male mathematics teachers seeking solidarity. *Race Ethnicity and Education*, 23(3), 432-453.
- Kusumaningrum, H., & Suparman. (2020). Design of Social Arithmetic Students Worksheets with RME Approaches to Improve Critical Thinking Ability. *International Journal of Scientific & Technology Research*, 9(03), 4978-4982.
- Kusumaningsih, W., Darhim, D., Herman, T., & Turmudi, T. (2018). Improvement Algebraic Thinking Ability Using Multiple Representation Strategy on Realistic Mathematics Education. *Journal on Mathematics Education*, 9(2), 281-290.
- Larsen, S., & Lockwood, E. (2013). A local instructional theory for the guided reinvention of the quotient group concept. *The Journal of Mathematical Behavior*, 32(4), 726-742.
- Larsen, S., Johnson, E., & Bartlo, J. (2013). Designing and scaling up an innovation in abstract algebra. *The Journal of Mathematical Behavior*, 32(4), 693-711.
- Larsson, K. (2017). Understanding and teaching critical thinking—A new approach. *International Journal of Educational Research*, 84, 32–42. DOI: 10.1016/j.ijer.2017.05.004
- Latipah, R. A. (2013). *Analisis Ketepatan Konsep dan Representasi Visual Buku Teks Biologi SMA Kelas XI Semester II pada Konsep Sistem Reproduksi Manusia* (Doctoral dissertation, IAIN Syekh Nurjati Cirebon).
- Laurens, T., Batlolona, F. A., Batlolona, J. R., & Leasa, M. (2017). How Does Realistic Mathematics Education (RME) Improve Students' Mathematics Cognitive Achievement? *EURASIA Journal of Mathematics, Science and Technology Education*, 14(2), 569-578. DOI: 10.12973/ejmste/76959.
- Lee, J. C.-K. (2019). Teachers' work, change and learning: roles, contexts and engagement. *Teachers and Teaching*, 25(4), 399–403. DOI: 10.1080/13540602.2019.1625616

- Lehrer, R., & Pritchard, C. (2002). Symbolizing space into being. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 59-86.
- Leicester, M., & Taylor, D. (2010). *Critical Thinking Across the Curriculum: Developing critical thinking skills, literacy and philosophy in the primary classroom*. New York: Mc Graw Hill, Open University Press.
- Leng, K. S., Razali, F., & Ayub, A. F. M. (2020). The effectiveness of realistic mathematics education approach toward students learning: A systematic literature review of empirical evidence. *Journal of Critical Reviews*, 7(13), 548-552.
- Lestari, W. (2017). Pengaruh Kemampuan Awal Matematika dan Motivasi Belajar terhadap Hasil Belajar Matematika. *Jurnal Analisa*, 3(1), 76-84.
- Lev-Zamir, H., & Leikin, R. (2013). Saying versus doing: Teachers' conceptions of creativity in elementary mathematics teaching. *ZDM*, 45(2), 295–308.
- Li, Y., & Schoenfeld, A. H. (2019). Problematizing teaching and learning mathematics as “given” in STEM education. *International Journal of STEM Education*, 6(44). DOI: 10.1186/s40594-019-0197-9
- Liljedahl, P., Santos-Trigo, M., Malaspina, U., & Bruder, R. (2016). *Problem Solving in Mathematics Education*. Switzerland: Springer Open.
- Lince, R. (2016). Creative Thinking Ability to Increase Student Mathematical of Junior High School by Applying Models Numbered Heads Together. *Journal of Education and Practice*, 7(6), 206-212.
- Lindholm, M. (2018). Promoting Curiosity? *Sci & Educ*, 27, 987–1002. DOI: 10.1007/s11191-018-0015-7
- Litman, J. A. (2005). Curiosity and the pleasures of learning: Wanting and liking new information. *Cognition and Emotion*, 19, 793–814.
- Litman J. A. (2012). Epistemic Curiosity. Dalam: Seel N.M. (eds) *Encyclopedia of the Sciences of Learning*. Springer, Boston, MA.
- Lloyd, H. (2020). A Study of Active Orientation, Part 1: A Perspective-Based Theory of Cognitive Development. *Draft paper*.
- Lobos, C., Muñoz, C., & Valenzuela, J. (2020). Exploring the Causes of the Drop in Intellectual Curiosity during Teacher Education in Chile. *REMIE-Multidisciplinary Journal of Educational Research*, 10(1).
- Loewenstein, G. (1994). The psychology of curiosity: a review and reinterpretation. *Psychol. Bull.* 116, 75-98.
- Lu, X., Leung, F. K. S., & Li, N. (2020). Teacher agency for integrating history into teaching mathematics in a performance-driven context: a case study of a beginning teacher in China. *Educational Studies in Mathematics*, 1-20.
- Maher, C. A., & Martino, A. M. (2000). From patterns to theories: Conditions for conceptual change. *Journal of Mathematical Behavior*, 19(2), 247–271.

- Mahmoodzadeh, M., & Khajavy, G.H. (2019). Towards Conceptualizing Language Learning Curiosity in SLA: An Empirical Study. *J Psycholinguist Res*, 48, 333–351. DOI: 10.1007/s10936-018-9606-3
- Mahmudi, A. (2010). *Pengaruh Pembelajaran Dengan Strategi MHM Berbasis Masalah Terhadap Kemampuan Berpikir Kreatif, Kemampuan Pemecahan Masalah, dan Disposisi Matematis, serta Persepsi Terhadap Kreativitas*. Disertasi pada S.Ps UPI. Tidak diterbitkan.
- Mahmuzah, R. (2015). Peningkatan Kemampuan Berpikir Kritis Matematis Siswa SMP Melalui Pendekatan Problem Posing. *Jurnal Peluang*, 4(1).
- Mamolo, A., & Zazkis, R. (2012). Stuck on convention: A story of derivative-relationship. *Educational Studies in Mathematics*, 81(2), 161–167.
- Mann, S., & Edge, J. (2013). Overview - innovation as action new-in-context: An introduction to the PRESETT collection. In J. Edge, & S. Mann (Eds.), *Innovations in pre-service education and training for English language teachers* (pp. 5-14). London: British Council.
- Martin, D. B. (2000). *Mathematics success and failure among African-American youth: The roles of sociohistorical context, community forces, school influence, and individual agency*. Mahwah, NJ: Erlbaum.
- Martínez, S., Guíñez, F., Zamora, R., Bustos, S., & Rodríguez, B. (2020). On the instructional model of a blended learning program for developing mathematical knowledge for teaching. *ZDM*, 1-15.
- Maulina, P. H., Puspita, L., & Usman, N. (2018). 5M (Mengamati, Menanya, Mencoba, Menalar dan Mengkomunikasikan) Tema Cita-Citaku Kelas IV SD Negeri 157 Palembang. *Jurnal Inovasi Sekolah Dasar*, (5)2, 132-139.
- Maya, F. A., Sari, I. K., & Zanthly, L. S. (2018). Analisis Kemampuan Berpikir Kreatif, Berpikir Kritis Matematik Siswa SMK pada Materi SPLDV. *JPMI - Jurnal Pembelajaran Matematika Inovatif*, 2(4), 167-176.
- McGregor, D. (2007). *Developing Thinking; Developing Learning*. Mainhead: Open University Press.
- Mead, G. H. (1934). *Mind, self and society: From the standpoint of a social behaviorist*. Edited by C. W. Morris. Chicago, IL: University of Chicago Press.
- Mead, G. H. (1938). *Philosophy of the act*. Edited by C. W. Morris. Chicago, IL: University of Chicago Press.
- Meika, I., Suryadi, D., & Darhim, D. (2019). Developing A Local Instruction Theory for Learning Combinations. *Infinity Journal*, 8(2), 157-166.
- Meira, L. (2002). Mathematical representations as systems of notations-in-use. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 87-104.
- Miatun, A., & Nurafni, N. (2019). Profil kemampuan berpikir kreatif matematis ditinjau dari gaya kognitif reflective dan impulsive. *Jurnal Riset Pendidikan Matematika*, 6(2), 150-164.

- Mitchell, R. N., & Marin, K. A. (2015). Examining the use of a structured analysis framework to support prospective teacher noticing. *Journal of Mathematics Teacher Education*, 18(6), 551-575.
- Mongkondaw, O., & Supanyoot, W. (2016). Guidelines for enhancing learning curiosity of non-formal student using daily life context. *SHS Web of Conferences*, 26, 01009. DOI: 10.1051/shsconf/20162601009
- Monjan, S. V., & Gassner, S. M. (1979). *Critical Issues in Competency Based Education*. New York: Pergamon Press.
- Monsen, J. J., Ewing, D. L., & Kwoka, M. (2014). Teachers' attitudes towards inclusion, perceived adequacy of support and classroom learning environment. *Learning Environments Research*, 17(1), 113-126.
- Moore, K. C., Silverman, J., Paoletti, T., Liss, D., & Musgrave, S. (2018). Conventions, habits, and U.S. teachers' meanings for graphs. *Journal of Mathematical Behavior*. DOI: 10.1016/j.jmathb.2018.08.002
- Mudaly, V., & Sukhdeo, S. (2015). Mathematics Learning in the Midst of School Transition from Primary to Secondary School. *International Journal Education Science*, 11(3), 244-252. DOI: 10.1080/09751122.2015.11890395
- Muhtadi, D., & Sukirwan, S. (2017). Implementasi Pendidikan Matematika Realistik (PMR) untuk Meningkatkan Kemampuan Berpikir Kreatif Matematik dan Kemandirian Belajar Peserta Didik. *Mosharafa: Jurnal Pendidikan Matematika*, 6(1), 1-12.
- Muhtadi, D., & Saleh, H. (2020, August). The Role of Progressive Mathematics in Geometry Learning. In *Journal of Physics: Conference Series* (Vol. 1613, No. 1, p. 012042). IOP Publishing.
- Mulligan, J., Oslington, G., & English, L. (2020). Supporting early mathematical development through a 'pattern and structure' intervention program. *ZDM*, 1-14.
- Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2016). *TIMSS 2015 International Results in Mathematics*. Retrieved from Boston College, TIMSS & PIRLS International Study Center.
- Mulyana, T. (2005). *Upaya Meningkatkan Kemampuan Berpikir Kreatif Matematika Siswa SMA Jurusan IPA Melalui Pembelajaran dengan Pendekatan Induktif – Deduktif*. Tesis pada S.Ps UPI. Tidak diterbitkan.
- Munandar, U. (2002). *Kreativitas dan Keberbakatan: Strategi Mewujudkan Potensi Kreatif dan Bakat*. Jakarta: Grafindo Pustaka Utama.
- Murni, S., Bernard, M., Ruqoyyah, S., & Chotimah, S. (2020). PGSD student's mathematical creative thinking skills judging from creativity quotations by making vba-based teaching. In *Journal of Physics: Conference Series* (Vol. 1521, p. 032040).
- Murtiyasa, B. (2015). Tantangan pembelajaran matematika era global. *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika UMS 2015*.
- Muryaningsih, S. (2020). Peningkatan Sikap Rasa Ingin Tahu dan Prestasi Belajar Matematika Melalui Model Pembelajaran Matematika Realistik. *Jurnal Profesional Akademisi Program Studi Pendidikan Guru Sekolah Dasar*, 2(1), 1-12. DOI 10.35438/cendekiawan.v2i1.166

- Musdi, E., Permana, D., Wiska, S., & Rusyda, N. A. (2020). Increasing Student Mathematical Critical Thinking Ability Through the Development of Geometry Instructional Device Based on Van Hiele's Theory. In *Journal of Physics: Conference Series* (Vol. 1554, p. 012073).
- Muslimin, M., Putri, R. I. I., Zulkardi, Z., & Aisyah, N. (2020). Learning Integers with Realistic Mathematics Education Approach based on Islamic Values. *Journal on Mathematics Education*, 11(3), 363-384.
- Muthma'innah, M., Dahlan, J. A., & Suhendra. (2019). Ability of mathematical critical thinking – what about Learning Cycle 7E model? *IOP Conf. Series: Journal of Physics: Conf. Series*, 1157, 032129. DOI:10.1088/1742-6596/1157/3/032129
- Mutia, I., & Leonard, L. (2015). Kajian Penerapan E-Learning Dalam Proses Pembelajaran Di Perguruan Tinggi. *Faktor Exacta*, 6(4), 278-289.
- Nakano, T. C., & Wechsler, S. M. (2018). Creativity and innovation: Skills for the 21st Century. *Estudos de Psicologia (Campinas)*, 35(3), 237-246. DOI: 10.1590/1982-02752018000300002
- National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: Author.
- Ndiung, S., Dantes, N., Ardana, I. M., & Marhaeni, A. A. I. N. (2019). Treffinger Creative Learning Model with RME Principles on Creative Thinking Skill by Considering Numerical Ability. *International Journal of Instruction*, 12(3), 731-744. DOI: 10.29333/iji.2019.12344a
- Neale, D. C. (1969). The role of attitudes in learning mathematics. *The Arithmetic Teacher*, 16(8), 631-640.
- Neumann, I., Jeschke, C., & Heinze, A. (2020). First Year Students' Resilience to Cope with Mathematics Exercises in the University Mathematics Studies. *Journal für Mathematik-Didaktik*, 1-27.
- Neto, J. C., Filipe, J. A., & Caleiro, A. B. (2019). Creativity and innovation: A contribution of behavioral economics. *International Journal of Innovation Studies*, 3(1), 12-21. DOI: 10.1016/j.ijis.2019.06.003
- Nopriana, T., & Noto, M. S. (2017). Komunikasi Matematis dan Disposisi Berpikir Kritis Mahasiswa Pendidikan Matematika pada Mata Kuliah Matematika Diskrit. *Teorema: Teori dan Riset Matematika*, 1(2), 45-54.
- Nuraida, I., Kusumah, Y. S., & Kartasmita, B. G. (2018, March). Local Instruction Theory (LIT) on spherical geometry for enhancement students' strategic competence. In *Journal of Physics: Conference Series* (Vol. 983, No. 1, p. 012105).
- Nuri, B., & Marsigit. (2019). The Reluctance of Students to Ask in Mathematics Learning: How Does the Teacher Solve It? *Journal of Physics: Conference Series*, 1320, 012069. DOI:10.1088/1742-6596/1320/1/012069
- Nurwahidah, I. (2020). Kemampuan Keterampilan Dasar Mengajar Mahasiswa Calon Guru Ipa Program Studi Pendidikan Ipa. *EduTeach: Jurnal Edukasi dan Teknologi Pembelajaran*, 1(2), 22-33.

- O'Brien, M. (2012). Fostering a Creativity Mindset for Teaching (and Learning). *LEARNing Landscapes*, 6(1), 315-333.
- Oers, B. van. (2002^a). Informal representations and their improvements. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 25-28.
- Oers, B. van. (2002^b). The mathematization of young children's language. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 29-57.
- Oktaviyanthi, R., & Agus, R. N. (2018). Peningkatan kemampuan pemecahan masalah mahasiswa calon guru melalui keterampilan fungsional matematis. *Beta: Jurnal Tadris Matematika*, 11(1), 1-19.
- Oliveira, Z. V., & Kikuchi, L. M. (2019). The Mathematics Laboratory as Space for Teacher Education. *Cadernos De Pesquisa*, 48(169), 802-829. DOI: 10.1590/198053145239
- Osman, M. (2008). Observation Can Be as Effective as Action in Problem Solving. *Cognitive Science*, 32, 162–183. DOI: 10.1080/03640210701703683.
- Oudeyer, P. Y., Gottlieb, J., & Lopes, M. (2016^a). Intrinsic motivation, curiosity, and learning. *Progress in Brain Research*, 257–284. DOI: 10.1016/bs.pbr.2016.05.005
- Oudeyer, P. Y., & Smith, L. B. (2016^b). How Evolution May Work Through Curiosity-Driven Developmental Process. *Topics in Cognitive Science*, 8(2), 492–502. DOI: 10.1111/tops.12196
- Palinussa, A. L. (2013). Students' Critical Mathematical Thinking Skills and Character: Experiments for Junior High School Students through Realistic Mathematics Education Culture-Based. *IndoMS, J.M.E.* 4(1), 75-94.
- Palis, A. G., & Quiros, P. A. (2014). Adult learning principles and presentation pearls. *Middle East African journal of ophthalmology*, 21(2), 114.
- Palsdottir, G., & Sriraman, B. (2017). Teacher's Views on Modeling as a Creative Mathematical Activity. In R. Leikin & B. Sriraman (Eds.), *Introduction to Interdisciplinary Perspectives to Creativity and Giftedness* (pp. 47-56). Switzerland: Springer.
- Pasandaran, R. F. (2019). Representasi Matematika dalam Penyelesaian Masalah Non Rutin. *Guru Tua: Jurnal Pendidikan dan Pembelajaran*, 2(1), 45-52.
- Payan-Carreira, R., Dominguez, C., Monteiro, M. J., & Rainho, M. C. (2016). Application of the ADAPTED FRISCO framework in case-based learning activities. *Revista Lusófona de Educação*, 32, 175-191.
- Perdana, R., Budiyo, Sajidan, & Sukarmin. (2019). Analysis of Student Critical and Creative Thinking (CCT) Skills on Chemistry: A Study of Gender Differences. *Journal of Educational and Social Research*, 9(4), 43-52, DOI: 10.2478/jesr-2019-0053
- Peter-Szarka, S. (2012). Creative climate as a means to promote creativity in the classroom. *Electronic Journal of Research in Educational Psychology*, 10(3), 1011-1034. DOI: 10.25115/ejrep.v10i28.1547

- Picón, R. O., Sevian, H., & Mortimer, E. F. (2020). Conceptual Profile of Substance. *Science & Education*, 29(5), 1317-1360.
- Praet, M., & Desoete, A. (2014). Enhancing young children's arithmetic skills through non-intensive, computerised kindergarten interventions: A randomized controlled study. *Teaching and Teacher Education*, 39, 56-65.
- Prahmana, R. C. I., Sagita, L., Hidayat, W., & Utami, N. W. (2020). Two Decades of Realistic Mathematics Education Research in Indonesia: A Survey. *Infinity Journal*, 9(2), 223-246.
- Pratiwi, W. D., Susanti, E., & Araiku, J. (2020, March). Supporting mathematics learning in situational-referential phase with emergent modeling. In *Journal of Physics: Conference Series* (Vol. 1480, No. 1, p. 012002). IOP Publishing.
- Prihantoro, N. A., Warsono, W., & Sunarto, S. (2017). Analisis Isi Buku Teks Pelajaran Ilmu Pengetahuan Sosial Kurikulum 2013 Kelas VII SMP/MTS. *The Indonesian Journal of Social Studies*, 1(1), 1-10.
- Presmeg, N. (2002). Transitions in emergent Modelling. Dalam: Gravemeijer, K., Lehrer, R., Oers, B. van, & Verschaffel, L. (Eds). *Symbolizing, Modelling, and Tool Use in Mathematics Education*. Netherlands: Kluwer Academic Publishers, 131-137.
- Putri, R. I. I., & Zulkardi. (2020). Designing Pisa-Like Mathematics Task Using Asian Games Context. *Journal on Mathematics Education*, 11(1), 135-144. DOI: 10.22342/jme.11.1.9786.135-144.
- Qadri, L., Ikhsan, M., & Yusrizal. (2019). Mathematical Creative Thinking Ability for Students Through REACT Strategies. *International Journal for Educational and Vocational Studies*, 1(1). 58-61. DOI: 10.29103/ijevs.v1i1.1483
- Rahmawati, F. (2013). Pengaruh Pendekatan Pendidikan Realistik Matematika dalam Meningkatkan Kemampuan Komunikasi Matematis Siswa Sekolah Dasar. *Kumpulan Makalah Seminar Semirata 2013*, 225-238.
- Rasmussen, C., & Blumenfeld, H. (2007). Reinventing solutions to systems of linear differential equations: A case of emergent models involving analytic expressions. *The Journal of Mathematical Behavior*, 26(3), 195-210.
- Ratumanan, T. G., & Tetelepta, Y. (2019). Analisis Pembelajaran Matematika Berdasarkan Kurikulum 2013 Pada SMA Negeri 1 Masohi. *JUMADIKA: Jurnal Magister Pendidikan Matematika*, 1(1), 25 – 34.
- Rauterberg, M. (1995) About a framework for information and information processing of learning systems. Dalam: Falkenberg E.D., Hesse W., Olivé A. (eds) *Information System Concepts. IFIP Advances in Information and Communication Technology*. Springer, Boston, MA
- Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan*, 42(7), 305-310.
- Rhosalia, L. A. (2017). Pendekatan Saintifik (*Scientific Approach*) dalam Pembelajaran Tematik Terpadu Kurikulum 2013 Versi 2016. *JTIEE*, 1(1), 59-77.
- Riska, R., & MZ, Z. A. (2018). Kemampuan Pemecahan Masalah Matematis dengan Model Pembelajaran Cooperative Integrated Reading and Composition (CIRC) ditinjau dari

- Kemampuan Awal Matematis Siswa. *Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang*, 2(2), 225-233.
- Risnawati. (2013). Pengaruh Pendekatan *Realisitic Mathematics Education* dengan Mind Mapping terhadap Kemampuan Berpikir Kritis dengan *Self-Efficacy* Mahasiswa. *Beta*, 6(1), 37-45.
- Rizkiani, A., & Septian, A. (2019). Kemampuan Metakognitif Siswa SMP Dalam Pembelajaran Matematika dengan Menggunakan Pendekatan Realistic Mathematics Education (RME). *UNION: Jurnal Ilmiah Pendidikan Matematika*, 7(2), 275-284.
- Rosneli, M. R., Fadhilaturrahmi, F., & Hidayat, A. (2019). Penerapan Pembelajaran Realistic Mathematics Education (RME) untuk Meningkatkan Kemampuan Pemecahan Masalah Siswa di Sekolah Dasar. *Journal on Teacher Education*, 1(1), 70-78.
- Rubiyanti, D., & Suparman. (2020). Mathematics Module Based on RME to Improve Students Creative Thinking. *International Journal of Scientific & Technology Research*, 9(1), 188-192.
- Runisah, Herman, T., & Dahlan, J. A. (2016). The Enhancement of Students' Critical Thinking Skills in Mathematics through The 5E Learning Cycle with Metacognitive Technique. *Advances in Social Science, Education and Humanities Research (ASSEHR)*, volume 57. 1st International Conference of Mathematics and Science Education (ICMSEd 2016), 101-106.
- Ruseffendi, E. T. (1991). *Penelitian Pendidikan dan Hasil Belajar Siswa Khususnya Dalam Pengajaran Matematika*. Bandung: Draft (Diktat).
- Ruseffendi, E. T. (2006). *Pengantar Kepada Membantu Guru Mengembangkan Kompetensinya dalam Pengajaran Matematika untuk Meningkatkan CBSA*. Bandung: Tarsito.
- Ruseffendi, E. T. (2010). *Dasar-Dasar Penelitian Pendidikan dan Bidang Non-Eksakta Lainnya*. Bandung: Tarsito.
- Sabandar, J. (2007). Berpikir Reflektif. Makalah disampaikan pada *Seminar Nasional Sehari: Permasalahan Matematika dan Pendidikan Matematika Terkini*. UPI Bandung: Tidak Diterbitkan.
- Samani, M., Sunwinarti, Putra, B. A. W., Rahmadian, R., & Rohman, J. N. (2019). Learning Strategy to Develop Critical Thinking, Creativity, and Problem-Solving Skills for Vocational School Students. *Jurnal Pendidikan Teknologi dan Kejuruan*, 25(1), 36-42. DOI: 10.21831/jptk.v25i1.22574
- Samson, P. L. (2015). Creative students will find the challenge in learning something interesting so that it can foster motivation in learning. *Collected Essays on Learning and Teaching*, 8, 153-164.
- Sanchez, H. S. (2013). A cognitive perspective on pre-service and in-service language teaching. *Babylonia*, 21(1), 51-56.
- Sanchez, H. S., Kuchah, K., Rodrigues, L. & de Pietri, E. (2017). Pre-service language teachers' development of appropriate pedagogies: A transition from insightful critiques to educational insights. *Teaching and Teacher Education*, 70, 236-245. DOI: 10.1016/j.tate.2017.11.024.

- Santoso, E., Sugandi, M. K., & Warmi, A. (2020). Mempersiapkan Calon Guru Matematika dan IPA dalam Menghadapi Era Industri 4.0. *BIO EDUCATIO:(The Journal of Science and Biology Education)*, 5(2).
- Saputri, F., Jazim, J., & Vahlia, I. (2020). Pengembangan Bahan Ajar Matematika Menggunakan Pendekatan *Realistic Mathematic Education* (RME). *EMTEKA: Jurnal Pendidikan Matematika*, 1(1), 24-35.
- Saragih, A. H. (2008). Kompetensi minimal seorang guru dalam mengajar. *Jurnal Tabularasa*, 5(1), 23-34.
- Sardiman. (2008). *Interaksi dan Motivasi Belajar Mengajar*. Jakarta: Raja Grafindo Persada.
- Sariningsih, R., & Purwasih, R. (2017). Pembelajaran Problem Based Learning Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Dan Self Efficacy Mahasiswa Calon Guru. *JNPM (Jurnal Nasional Pendidikan Matematika)*, 1(1), 163-177.
- Sarumaha, Y. A., Putri, R. I. I., & Hartono, Y. (2018). Percentage Bar: A Model for Helping Fifth Grade Students Understand Percentages. *Mosharafa: Jurnal Pendidikan Matematika*, 7(2), 155-166.
- Savic, M., Karakok, G., Tang, G., Turkey, H. E., & Naccarato, E. (2017). Formative Assessment of Creativity in Undergraduate Mathematics: Using a Creativity-in-Progress Rubric (CPR) on Proving. In R. Leikin & B. Sriraman (Eds.), *Introduction to Interdisciplinary Perspectives to Creativity and Giftedness* (pp. 23-46). Switzerland: Springer.
- Saxena, R., Shrivastava, K., & Bhardwaj, R. (2016). Teaching Mathematical Modeling in Mathematics Education. *Journal of Education and Practice*, 7(11), 34-44.
- Schleider, A. (2018). *PISA 2018: Insight and Interpretations*. OECD.
- Sembiring, R. K., Hadi, S., & Dolk, M. (2008). Reforming mathematics learning in Indonesian classrooms through RME. *ZDM*, 40(6), 927-939.
- Sembiring, R. K., Koogland, K., & Dolk, M. (2010). *A Decade of PMRI in Indonesia*. Utrecht: APS International.
- Shaheen, N. (2016). International students' critical thinking-related problem areas: UK university teachers' perspectives. *Journal of Research in International Education*, 15(1), 18–31. DOI: 10.1177/1475240916635895
- Sherin, M. G., Jacobs, V. R., & Philipp, R. A. (2011). Situating the study of teacher noticing. In M. G. Sherin, V. R. Jacobs, & R. A. Philipp (Eds.), *Mathematics teacher noticing: Seeing through teachers' eyes* (pp. 3-13). New York: Routledge.
- Siswono, T. Y. E. (2016). Proses Berpikir Kreatif Siswa dalam Memecahkan dan Mengajukan Masalah Matematika. *Jurnal Ilmu Pendidikan*, 15(1).
- Siswono, T. Y. E. (2017). Pembelajaran Matematika yang Realistik-Humanistik. *EDU-MAT: Jurnal Pendidikan Matematika*, 5(1).
- Sitorus, J., & Masrayati. (2016). Students' creative thinking process stages: Implementation of realistic mathematics education. *Thinking Skills and Creativity*, 22, 111-120. DOI: 10.1016/j.tsc.2016.09.007

- Skovsmose, O. (1985). Mathematical education versus critical education. *Educational Studies in Mathematics*, 16, 337–354.
- Skovsmose, O. (2006). Research, practice, uncertainty and responsibility. *Journal of Mathematical Behavior*. 35(4), 267–284.
- Somakim. (2010). Peningkatan Kemampuan Berpikir Kritis dan Self-Efficacy Matematika Siswa Sekolah Menengah Pertama dengan Penggunaan Pendekatan Matematika Realistik. Disertasi Doktor pada SPs Universitas Pendidikan Indonesia. Bandung: Tidak Diterbitkan.
- Son, A. L., & Ditasona, C. (2020, October). CORE RME learning model on improving students' mathematical problem-solving ability. In *Journal of Physics: Conference Series* (Vol. 1657, No. 1, p. 012060). IOP Publishing.
- Soraya, F., Yurniwati, & Cahyana, U. (2018). Penerapan Pendekatan *Realistic Mathematics Education* (RME) untuk Meningkatkan Kemampuan Berpikir Kreatif Pokok Bahasan Pecahan pada Siswa Kelas IV SDN Rawajati 06 Pagi. *Jurnal JPSD*, 4(2), 87-94. DOI: 10.26555/jpsd
- Spektor-Levy, O., Baruch, Y. K., & Mevarech, Z. (2011). Science and Scientific Curiosity in Pre-school-The teacher's point of view. *International Journal of Science Education*, 35(13), 2226-2253. DOI:10.1080/09500693.2011.631608
- Sriraman, B. (2004). The characteristics of mathematical creativity. *The Mathematics Educator*, 14, 19–34.
- Sriraman, B. (2005). Are giftedness and creativity synonyms in mathematics? *Journal of Secondary Gifted Education*, 17, 20–36.
- Stacey, K. (2011). The PISA View of Mathematical Literacy in Indonesia. *IndoMS. J.M.E*, 2(2), 95-126.
- Sternberg, R. J. (2006). The Nature of Creativity. *Creativity Research Journal*, 18(1), 87-98.
- Stockero, S. L., Rupnow, R. L., & Pascoe, A. E. (2017). Learning to notice important student mathematical thinking in complex classroom interactions. *Teaching and Teacher Education*, 63, 384-395. DOI: 10.1016/j.tate.2017.01.006.
- Suci, D. W., Firman, & Neviyarni. (2019). Peningkatan Keterampilan Berpikir Kritis Siswa Melalui Pendekatan Realistik Di Sekolah Dasar. *Jurnal Basicedu*, 3(4), 2042-2049.
- Sukendra, I. K. (2020, October). Developing teaching materials for Trigonometry in mathematics with realistic orientation using HOTS questions. In *Journal of Physics: Conference Series* (Vol. 1663, No. 1, p. 012020). IOP Publishing.
- Sukmadinata, N. S. (2004). *Kurikulum dan Pembelajaran Kompetensi*. Bandung: Yayasan Kusuma Karya.
- Sumarmo, U. (2010). *Berpikir dan Disposisi Matematik: Apa, Mengapa, dan Bagaimana Di Kembangkan Pada Peserta Didik*. Bandung: FPMIPA UPI.
- Sundayana, R. (2018). *Statistika Penelitian Pendidikan*. Bandung: Alfabeta.
- Supriadi, D. (1994). *Kreativitas, Kebudayaan dan Perkembangan IPTEK*. Bandung: Alfabeta.

- Suriyani. (2017). Peningkatan Kemampuan Berpikir Kreatif Melalui Pendekatan Open-Ended. *SIGMA*, 3(2), 54-60.
- Suryadi, D. (2005). *Penggunaan Pendekatan Pembelajaran Tidak Langsung serta Pendekatan Gabungan Langsung dan Tidak Langsung dalam Rangka Meningkatkan Kemampuan Berpikir Matematika Tingkat Tinggi Siswa STTP*. Disertasi SPS UPI: Tidak diterbitkan.
- Tambychik, T., & Meerah, T. S. M. (2010). Students' Difficulties in Mathematics Problem-Solving: What do they Say? *Procedia Social and Behavioral Sciences*, 8, 142–151.
- Taubah, R., Isnarto, & Rochmad. (2018). Student Critical Thinking Viewed from Mathematical Self-efficacy in Means Ends Analysis Learning with the Realistic Mathematics Education Approach. *Unnes Journal of Mathematics Education Research*, 7(1), 189-195.
- Thompson, G. G., Gardner, E. F., & Di Vesta, F. J. (1957). *Educational Psychology*. New York: Appleton-Century-Crofts Inc.
- Tieben, R., Bekker, T., & Schouten, B. (2011). Curiosity and Interaction: making people curious through interactive systems. 361-370.
- Tong, D. H., Loc, N. P., Uyen, B. P., & Son, T. H. (2020). Enhancing Creative and Critical Thinking Skills of Students in Mathematics Classrooms: An Experimental Study of Teaching the Inequality in High Schools. *Universal Journal of Educational Research*, 8(2), 477-489.
- Turmudi, & Jupri, A. (2009). Guided Reinvention in Mathematical Modelling. *Presented in the 2th International Conference on Lesson Study, August, 1st 2009*. 1-5.
- Treffers, A. (1987). *Three dimensions. A model of goal and theory descriptions in mathematics instruction - the Wiskobas Project*. Dordrecht: Reidel Publishing Company.
- Ulucinar, U., & Aypay, A. (2016). A Model of Decision-Making Based on Critical Thinking. *Education and Science*, 41(185), 251-268. DOI: 10.15390/EB.2016.4639
- Vale, I., & Barbosa, A. (2015). Mathematics Creativity in Elementary Teacher Training. *Journal of the European Teacher Education Network*, 10, 101-109.
- Van den Beemt, A., MacLeod, M., Van der Veen, J., Van de Ven, A., van Baalen, S., Klaassen, R., & Boon, M. (2020). Interdisciplinary engineering education: A review of vision, teaching, and support. *Journal of engineering education*, 109(3), 508-555.
- van den Brom-Snijders, P. A. (2005). Progressive Mathematization of Long Division Strategies. *Journal for Research in Mathematics Education*, 36(1), 44-73.
- Van den Heuvel-Panhuizen, M. (2003). The didactical use of models in realistic mathematics education: An example from a longitudinal trajectory on percentage. *Educational Studies in Mathematics*, 54, 9-35.
- Van den Heuvel-Panhuizen, M., & Drijvers, P. (2014). Realistic Mathematics Education. In: Lerman S. (eds) *Encyclopedia of Mathematics Education*. Springer Science + Business Media Dordrecht. DOI: 10.1007/978-94-007-4978-8
- Van den Heuvel-Panhuizen, M., & Drijvers, P. (2020). Realistic mathematics education. *Encyclopedia of mathematics education*, 713-717.

- Van den Heuvel-Panhuizen, M. (2020). *International Reflections on the Netherlands Didactics of Mathematics: Visions on and Experiences with Realistic Mathematics Education* (p. 366). Springer Nature.
- Vasileva, O., & Balyasnikova, N. (2019). (Re) Introducing Vygotsky's thought: From historical overview to contemporary psychology. *Frontiers in Psychology, 10*, 1515.
- Vidal, R. V. V. (2010). Creative problem solving: an applied university course. *Pesquisa Operacional, 30*(2), 405–426. DOI:10.1590/s0101-74382010000200009
- Voigt, M., Fredriksen, H., & Rasmussen, C. (2020). Leveraging the design heuristics of realistic mathematics education and culturally responsive pedagogy to create a richer flipped classroom calculus curriculum. *ZDM, 1-12*.
- Wahyudi, Waluya, S. B., Rochmad, & Suyitno, H. (2018). Mathematical Creative Thinking Ability and Scaffolding Process According with Learning Styles for Pre-Service Teachers. *Anatolian Journal of Education, 3*(1), 39-50.
- Wahyuni, A., & Kurniawan, P. (2018). Hubungan kemampuan berpikir kreatif terhadap hasil belajar mahasiswa. *Matematika, 17*(2).
- Wardak, D. (2020). The Multimodal Meaning-Making Process in Educational Design Team Meetings. *Designs for Learning, 12*(1), 56-70.
- Warren, C. A. (2018). Empathy, teacher dispositions, and preparation for culturally responsive pedagogy. *Journal of Teacher Education, 69*(2), 169-183.
- Webb, D. C., Van der Kooij, H., & Geist, M. R. (2011). Design research in the Netherlands: Introducing logarithms using realistic mathematics education. *Journal of Mathematics Education at Teachers College, 2*(1).
- Webster, S. (2019). Understanding lack of development in early career teachers' practical knowledge of teaching speaking skills. *System, 80*, 154-164.
- Wertsch, J. V. (1985). *Vygotsky and the social formation of mind*. Cambridge: Harvard University Press.
- Whitehouse, S., Vickers-Hulse, K., & Carter, J. (2018). Curious teachers, create curious learners and great historians. *International Journal of Primary, Elementary and Early Years Education, 46*, 648-660.
- Widada, W., Nugroho, K. U. Z., Sari, W. P., & Pambudi, G. A. (2019, October). The ability of mathematical representation through realistic mathematics learning based on ethnomathematics. In *Journal of Physics: Conference Series* (Vol. 1318, No. 1, p. 012073). IOP Publishing.
- Widjaja, W. (2008). *Local instruction theory on decimals: The case of Indonesian pre-service teachers* (Doctoral dissertation).
- Wijaya, A. (2012). *Pendidikan Matematika Realistik: Suatu Alternatif Pendekatan Pembelajaran Matematika*. Yogyakarta: Graha Ilmu.
- Wilkinson, L. C. (2018). Teaching the language of mathematics: What the research tells us teachers need to know and do. *Journal of Mathematical Behavior, 51*, 167-174. DOI: 10.1016/j.jmathb.2018.05.001

- Wu, Y., & Koutstaal, W. (2020). Charting the contributions of cognitive flexibility to creativity: Self-guided transitions as a process-based index of creativity-related adaptivity. *Plos one*, 15(6), e0234473.
- Wulandari, N. F., & Jailani. (2018). Mathematics Skill of Fifteen Years Old Students in Yogyakarta in Solving Problems Like PISA. *Journal on Mathematics Education*, 9(1), 129-144.
- Xi, J., & Lantolf, J. P. (2020). Scaffolding and the zone of proximal development: A problematic relationship. *Journal for the Theory of Social Behaviour*.
- Yilmaz, R. (2020). Prospective Mathematics Teachers' Cognitive Competencies on Realistic Mathematics Education. *Journal on Mathematics Education*, 11(1), 17-44.
- Yudistira, I., & Rabbani, S. (2020). Penggunaan Metode Pembelajaran Realistics Mathematic Education (RME) pada Operasi Hitung Penjumlahan dan Pengurangan Bilangan Siswa Kelas I SD. *COLLASE (Creative of Learning Students Elementary Education)*, 3(5), 193-200.
- Yulia, Y., Musdi, E., Afriadi, J., & Wahyuni, I. (2020). Developing a hypothetical learning trajectory of fraction based on RME for junior high school. *JPhCS*, 1470(1), 012015.
- Zakiah, N. E., Fatimah, A. T., & Sunaryo, Y. (2020). Implementasi Project-Based Learning Untuk Mengeksplorasi Kreativitas dan Kemampuan Berpikir Kreatif Matematis Mahasiswa. *Teorema: Teori dan Riset Matematika*, 5(2), 285-293.
- Zaslavsky, O. (2017). There is more to examples than meets the eye: Thinking with and through mathematical examples in different settings. *Journal of Mathematical Behavior*. <http://dx.doi.org/10.1016/j.jmathb.2017.10.001>
- Zazkis, R. (2008). Examples as tools in mathematics teacher education. In D. Tirosh, & T. Wood (Eds.). *International handbook in mathematics teacher education, vol. 2: Tools in mathematics teacher education* (pp. 135–156). Rotterdam, Netherlands: Sense.
- Zetriuslita, Z., Ariawan, R., & Nufus, H. (2016). Analisis kemampuan berpikir kritis matematis mahasiswa dalam menyelesaikan soal uraian kalkulus integral berdasarkan level kemampuan mahasiswa. *Infinity Journal*, 5(1), 56-66.
- Zetriuslita, Wahyudin, & Jarnawi. (2017). Mathematical Critical Thinking and Curiosity Attitude in Problem Based Learning and Cognitive Conflict Strategy: A Study in Number Theory course. *International Education Studies*, 10(7), 65-78. DOI: 10.5539/ies.v10n7p65
- Zetriuslita, Wahyudin, & Jarnawi. (2018). Mathematical Communication Ability and Curiosity Attitude through Problem Based Learning and Cognitive Conflict Strategy Based on Academic Level: A Study in Number Theory. *PEOPLE: International Journal of Social Sciences*, 4(2), 726-742. DOI: 10.20319/pijss.2018.42.726742
- Zetriuslita, Z., & Ariawan, R. (2021). Students' mathematical Thinking Skill Viewed from Curiosity Through Problem-Based Learning Model on Integral Calculus. *Infinity Journal*, 10(1).
- Zubainur, C. M., Johar, R., Hayati, R., & Ikhsan, M. (2020). Teachers' Understanding about the Characteristics of Realistic Mathematics Education. *Journal of Education and Learning (EduLearn)*, 14(3), 456-462.

Zulkardi Z., Putri R. I. I., & Wijaya, A. (2020). Two Decades of Realistic Mathematics Education in Indonesia. Dalam: van den Heuvel-Panhuizen M. (eds) *International Reflections on the Netherlands Didactics of Mathematics*. ICME-13 Monographs. Springer, Cham.