

**PENINGKATAN KEMAMPUAN BERPIKIR KRITIS
MATEMATIS DAN *SELF-CONFIDENCE* SISWA YANG
MEMPEROLEH PEMBELAJARAN DENGAN PENDEKATAN
*METACOGNITIVE SCAFFOLDING***

Tesis

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Magister
Pendidikan Matematika



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**PENINGKATAN KEMAMPUAN BERPIKIR KRITIS MATEMATIS
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Agustus 2019

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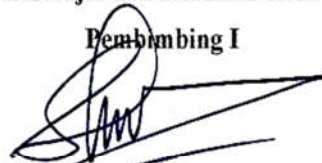
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ABSTRAK

Aulia Putri (2019). Peningkatan Kemampuan Berpikir Kritis Matematis dan *Self-Confidence* Siswa yang Memperoleh Pembelajaran dengan Pendekatan *Metacognitive Scaffolding*.

Tujuan penelitian ini adalah untuk memperoleh gambaran secara komprehensif tentang peningkatan kemampuan berpikir kritis matematis dan *self-confidence* siswa yang memperoleh pembelajaran dengan pendekatan *metacognitive scaffolding*. Penelitian ini merupakan penelitian quasi eksperimen. Desain dalam penelitian ini adalah *non-equivalent pretest and posttest control group design*. Kelas eksperimen diberi pembelajaran dengan pendekatan *metacognitive scaffolding* dan kelas kontrol diberi pembelajaran konvensional. Populasi dalam penelitian ini adalah 150 siswa SMA kelas X tahun ajaran 2018/2019 di salah satu sekolah di kota Bandung. Instrumen yang digunakan terdiri atas soal tes kemampuan berpikir kritis dan skala *self-confidence*. Analisis statistika yang digunakan dalam penelitian ini adalah uji *Mann-whitney* dan Anova dua jalur. Hasil penelitian menunjukkan bahwa: (1) Peningkatan kemampuan berpikir kritis matematis siswa yang mendapatkan pembelajaran dengan pendekatan *metacognitive scaffolding* lebih tinggi secara signifikan daripada siswa yang mendapatkan pembelajaran konvensional; (2) Terdapat perbedaan peningkatan kemampuan berpikir kritis matematis secara signifikan antara siswa yang mendapatkan pembelajaran dengan pendekatan *metacognitive scaffolding* bila ditinjau berdasarkan KAM (tinggi, sedang, rendah); (3) Pencapaian *self-confidence* siswa yang mendapat pembelajaran dengan pendekatan *metacognitive scaffolding* lebih tinggi secara signifikan daripada siswa yang memperoleh pembelajaran konvensional ditinjau secara keseluruhan.

Kata Kunci: kemampuan berpikir kritis matematis, *self-confidence*, pembelajaran dengan pendekatan *metacognitive scaffolding*.

ABSTRACT

Aulia Putri (2019). The Enhancement of Mathematical Critical Thinking Ability and Self-Confidence of Students Who Obtained Learning with the Metacognitive Scaffolding Approach.

The aim of this study was to obtain a comprehensive picture of the enhancement of mathematical critical thinking and self-confidence of students who had learned using the metacognitive scaffolding approach. This study was quasi-experimental study. The design of this study was non-equivalent pretest and posttest control group design. There were two groups of sample used in the study. The experimental group was given learning with metacognitive scaffolding approach and the control group was given conventional learning. The population in this study were 150 senior high school students of grade X in batch 2018/2019 in one school in Bandung. The instruments used consisted of mathematical critical thinking skill test and self-confidence scale. The statistical analysis used in this study was the Mann-Whitney U test and Two-way ANOVA. The results of this study show that: (1) The enhancement of mathematical critical thinking ability of students who obtained learning with the metacognitive scaffolding approach is significantly higher than those of the students who obtained conventional learning; (2) There is difference in the enhancement in mathematical critical thinking ability significantly among students who obtained learning using the metacognitive scaffolding approach when reviewed based on KAM (high, medium, low); (3) The enhancement of *self-confidence* of students who obtained learning with the metacognitive scaffolding approach is significantly higher than those of the students who obtained conventional learning.

Keywords: mathematical critical thinking ability, self-confidence, learning with metacognitive scaffolding approach.

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- Afiatin, T., & Martaniah, S. M. (1998). Peningkatan kepercayaan diri remaja melalui konseling kelompok. *Psikologika: Jurnal Pemikiran dan Penelitian Psikologi*, 3(6), 66-79.
- Anghileri, J. (2006). Scaffolding practices that enhance mathematics learning. *Journal of Mathematics Teacher Education*, 9(1), 33-52.
- Ariestyan, dkk. (2016). *Proses Berpikir Reflektif Siswa Dalam Menyelesaikan Soal Matematika Materi Sistem Persamaan Linear Dua Variabel*. Vol 7 No 1.
- Arvyaty, A., Salim, S., & Maryanti, E. (2018). Teaching Material Mathematics with a Metacognitive Approach Guidance. *Journal of Education and Learning*, 12(2), 306-310.
- Azevedo, R., & Hadwin, A. F. (2005). Scaffolding self-regulated learning and metacognition—Implications for the design of computer-based scaffolds. *Instructional Science*, 33(5), 367-379.
- Bandura, A., & Wessels, S. (1997). *Self-efficacy*. W.H. Freeman & Company.
- Bannert, M., Hildebrand, M., & Mengelkamp, C. (2009). Effects of a metacognitive support device in learning environments. *Computers in Human Behavior*, 25(4), 829-835.
- Blakey, E., & Spence, S. (1990). *Developing metacognition*. ERIC Clearinghouse on Information and Technology.
- Brown, A. L. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanism. In F. E Weinert and R. H Kluwe (Eds.), *Metacognition, Motivation and Understanding*. Hilldale: Lawrence Erlbaum Associates.
- 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*, 3(5), 18-25.
- Chinnappan, M. & Chandler, P. A. (2010). Managing cognitive load in the mathematics classroom. *Australian Mathematics Teacher*, 66 (1), 5-11.
- Departemen Pendidikan Nasional. (2006). *Kurikulum Tingkat Satuan Pendidikan*. Jakarta: Depdiknas.
- Desoete, A., Roeyers, H., & Buysse, A. (2001). Metacognition and mathematical problem solving in grade 3. *Journal of learning Disabilities*, 34(5), 435-447.

- Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron & R. J. Sternberg (Eds.), *Series of books in psychology. Teaching thinking skills: Theory and practice* (pp. 9-26). New York, NY, US: W H Freeman/Times Books/ Henry Holt & Co.
- Ennis, R. (1996). *Critical Thinking*. USA: Prentice Hall, Inc.
- Firdaus, F., Kailani, I., Bakar, M. N. B., & Bakry, B. (2015). Developing critical thinking skills of students in mathematics learning. *Journal of Education and Learning (EduLearn)*, 9(3), 226-236.
- Fisher, Robert. (1998). Thinking about Thinking: Developing Metacognition in Children. *Early Child Development and Care, Vol 141*, 1-15.
- Flavell, J. H. (1976). *Metacognitive and Cognitive Monitoring*. A New Area of Cognitive Development Inquiry, American psychologist.
- Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity* (Vol. 99). New York, NY: Free press.
- Ghanizadeh A. (2016). The interplay between reflective thinking, critical thinking, self-monitoring, and academic achievement in higher education. *High educational journal-springer*. DOI 10.1007/s10734-016-0031-y
- Hacker, D. J., & Dunlosky, J. (2003). Not All Metacognition Is Created Equal. *New Directions for Teaching and Learning*, 95, 73-79.
- Haeruman, L. D., Rahayu, W., & Ambarwati, L. (2017). Pengaruh Model Discovery Learning Terhadap Peningkatan Kemampuan Berpikir Kritis Matematis dan Self-Confidence ditinjau dari Kemampuan Awal Matematis Siswa SMA di Bogor Timur. *Jurnal Penelitian dan Pembelajaran Matematika*, 10(2).
- Hannula, M. S., Majjala, M., & Pehkonen, E. (2004). Development of understanding self-confidence in mathematics. Grade 5-8. *Group for the Psychology of Mathematics Education*, 66 (1), 64-74
- Haridza & Irving, K.E. (2017). Developing critical thinking of middle school students using problem based learning 4 core areas (pbl4c) model. *J Phys.: Conf. Ser* 812 012081
- Hartono. (2011). *Metodologi Penelitian*. Pekanbaru: Zanafafa Publishing.
- Hendriana, H., Rohaeti, E.E., & Sumarmo, U. (2017). *Hard Skills dan Soft Skills Matematik Siswa*. Bandung: Refika Aditama.

- Hendriana, H. & Soemarmo, U. (2017). *Penilaian Pembelajaran Matematika*. Bandung: Refika Aditama.
- Hidayanti, D., As'ari, A. R., & Daniel, C. (2016). *Analisis kemampuan berpikir kritis siswa SMP kelas IX pada materi kesebangunan*.
- Hmelo-Silver, C. E., & Azevedo, R. (2006). Understanding complex systems: Some core challenges. *The Journal of the learning sciences*, 15(1), 53-61.
- Huitt, W. (1997). *Metacognition*. Educational Psychology Interactive. Valdosta, GA: Valdosta State University.
- Ilyas, M. & Fitriani, A. (2014). Pengembangan Bahan Ajar Matematika Berbasis Problem Posing dengan Scaffolding Metakognitif pada SMPN Kota Palopo. *Prosiding*, 1 (1), 34-46.
- James, I., & Okpala, C. O. (2010). The use of metacognitive scaffolding to improve college students' academic success. *Journal of College Teaching & Learning*, 7(11), 47-50.
- Jbeili, I. (2012). The Effect of Cooperative Learning with Metacognitive Scaffolding on Mathematics Conceptual Understanding in Procedural Fluency. *International for Research in Education*.
- Kementerian Pendidikan dan Kebudayaan (Kemendikbud). (2014). *Buku guru ilmu pengetahuan sosial kelas VII*. Jakarta: Pusat Kurikulum dan Perbukuan, Kemendikbud.
- Kharbach, M. (2012). *The 21st Century skills Teachers and Student Need to Have*. Halifax: Creative Commons Attribution Mount Saint Vincent University.
- Kramarski, B., & Mizrachi, N. (2004). Enhancing Mathematical Literacy with the Use of Metacognitive Guidance in Forum Discussion. *International Group for the Psychology of Mathematics Education*.
- Kristianti. (2017). *Meningkatkan Kemampuan Berpikir Kritis dalam Motivasi Belajar Siswa SMP melalui Pembelajaran Matematika dengan Model Assure Berbantuan Software Autograph*. Tesis Magister pada SPs UPI (Bandung : Tidak diterbitkan).
- Lauster, P. (2002). *Tes Kepribadian*. Alih Bahasa: D.H Gulo. Edisi Bahasa Indonesia. Cetakan Ketiga belas. Jakarta: Bumi Aksara
- Listiani, W. (2016). The enhancement of mathematical critical thinking skills and self-efficacy at senior high school students through learning-based problems contextual model. *Journal of Mathematics Education*. 1(2), 55-61.

- Machin, A. (2014). Implementasi pendekatan saintifik, penanaman karakter dan konservasi pada pembelajaran materi pertumbuhan. *Jurnal Pendidikan IPA Indonesia*, 3(1).
- Molenaar, I., van Boxtel, C. A., & Sleegers, P. J. (2011). Metacognitive scaffolding in an innovative learning arrangement. *Instructional Science*, 39(6), 785-803.
- Multahadah, C. (2015). Penerapan teknik Metacognitive Scaffolding dengan Pendekatan Saintifik untuk meningkatkan kemampuan pemecahan masalah matematis dan motivasi berprestasi siswa SMA. Tesis Magister Sps UPI. Bandung: Tidak Diterbitkan.
- Mulyana, A., Sumarmo, U., Kurniawan, R. (2018). The Role of Problem Solving Approach on Student's Mathematical Critical Thinking Ability and Disposition. *Journal of Innovative Mathematics Learning*. Vol. 1, No. 3
- Musthafa, R. A., Sunardi, & Fatahillah, A. (2014). Analisis Tingkat Kemampuan Penalaran Siswa Dalam Menyelesaikan Soal Cerita Materi FPB dan KPK Kelas VII B SMP Negeri 10 Jember. *Jurnal Edukasi Universitas Jember*.
- Mutakinati, L. et. al. (2018). Analysis of students, critical thinking skill of middle school through STEM education Poject-Based Learning. *Jurnal Pendidikan IPA Indonesia*.
- Nindiasari, H. (2013). *Meningkatkan kemampuan dan disposisi berpikir reflektif matematis serta kemandirian belajar siswa sma melalui pembelajaran dengan pendekatan metakognitif*. Tesis Magister pada SPs UPI (Bandung : Tidak diterbitkan).
- Noer, S H. (2008). *Problem-Based Learning dan Kemampuan Berpikir Reflektif dalam Pembelajaran Matematika*.
- Ozsoy, G., & Ataman, A. (2017). The effect of metacognitive strategy training on mathematical problem solving achievement. *International Electronic Journal of Elementary Education*, 1(2), 67-82.
- Palinussa, A. L. (2014). Students' critical mathematical thinking skills and character: Experiments for junior high school students through realistic mathematics education culture-based. *Journal on Mathematics Education*, 4(1), 75-94.
- Piaget, J. (1976). Piaget's theory. In *Piaget and his school* (pp. 11-23). Springer, Berlin, Heidelberg.

- Prabawanto, S. (2012). *Peningkatan Kemampuan Pemecahan Masalah, Komunikasi, dan Self-Efficacy Matematis Mahasiswa melalui Pembelajaran dengan Pendekatan Metacognitive Scaffolding*. Disertasi: Universitas Pendidikan Indonesia. Tidak Diterbitkan.
- Purwasih, R. (2015). Peningkatan Kemampuan Pemahaman Matematis dan Self Confidence Siswa MTS di Kota Cimahi Melalui Model Pembelajaran Inkuiri Terbimbing. *Didaktik*, 9(1), 16-25.
- Reeve, E. M. (2016). 21st century skills needed by students in technical and vocational education and training (TVET). *Asian International Journal of Social Sciences*, 16(4), 65–82.
- Reynolds, D., & Muijs, D. (1999). The effective teaching of mathematics: A review of research. *School Leadership & Management*, 19(3), 273-288.
- Robertson, S. I. (2001). *Problem Solving*. East Sussex, England: Psychology Press.
- Rohayati, I. (2011). Program Bimbingan Sebaya untuk Meningkatkan percaya diri siswa. *Jurnal UPI*, Edisi khusus. [Online]. Tersedia: <http://jurnal.upi.edu>.
- Roll, I., Holmes, N. G., Day, J., & Bonn, D. (2012). Evaluating metacognitive scaffolding in guided invention activities. *Instructional science*, 40(4), 691-710.
- Sabandar, J. *Berpikir Reflektif dalam Pembelajaran Matematika*.
- Santrok, John W. (2007). *Psikologi Pendidikan*. Jakarta: Kencana Prenada Media Group.
- Schraw, G., & Mosham, D. (1995). Metacognitive Theories. *Educational Psychology Review*, 7, 351-371.
- Schunk, D. H. (2012). *Learning Theories: An educational perspective*, sixth edition. Pearson Education.
- Slavin, R. (2009). *Cooperative Learning*. Teori Riset dan Praktik. Bandung: Nusa Media.
- Snedecor, G. W., & Cochran, W. G. (1989). *Statistical methods*, 8thEdn. Ames: Iowa State Univ. Press Iowa.
- Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif dan R&D*. Jakarta: Alfabeta.
- Sumarmo, U. (2015). *Berpikir dan Disposisi matematik serta pembelajarannya*.

- Sumarmo, U., Mulyani, E., & Hidayat, W. (2018). Mathematical Communication Ability and Self Confidence Experiment with Eleventh Grade Students Using Scientific Approach. *JIML-Journal of Innovative Mathematics Learning*, 1(1), 19-30.
- Syah, M. (2008). *Psikologi Belajar*. Jakarta: PT. Raja GrafindoPersada.
- TIMSS. (2012). TIMSS 2011 International result in mathematics. Chestnut Hill: TIMSS & PIRLS International Study Center.
- Veenman, M. V., Kok, R., & Blöte, A. W. (2005). The relation between intellectual and metacognitive skills in early adolescence. *Instructional Science*, 33(3), 193-211.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological process*. Cambridge, MA. Cambridge UP.
- Walqui, A. (2006). Scaffolding instruction for English language learners: A conceptual framework. *International Journal of Bilingual Education and Bilingualism*, 9(2), 159-180.
- Willingham, D. T. (2007). Critical thinking: Why it is so hard to teach?. *American federation of teachers summer 2007*, p. 8-19.
- Wieman, C. (2007). Why not try a scientific approach to science education?. *Change: The Magazine of Higher Learning*, 39(5), 9-15.
- Yates, S. M. (2002). The Influence of Optimism and Pessimism on Student Achievement in Mathematics. *Mathematics Education Research journal*, Vol. 14, N0.1.
- Zain, A R and Jumadi. (2018). Effectiveness of guided inquiry based on blended learning in physics instruction to improve critical thinking skills of the senior high school student. *J. Phys.: Conf. Ser.* 1097 012015
- Zein, Mas'ud dan Darto. (2012). *Evaluasi Pembelajaran Matematika*. Pekanbaru: Daulat Riau.