PENGEMBANGAN *FLIPPED PROBLEM-BASED LEARNING (FPBL)* UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR REFLEKTIF MATEMATIS DAN *SELF EFFICACY* CALON GURU MATEMATIKA

DISERTASI

diajukan untuk memenuhi sebagian syarat untuk memperoleh
gelar Doktor Pendidikan Matematika

Oleh :

RIVA LESTA ARIANY

NIM 1802969

PROGRAM STUDI
PENDIDIKAN MATEMATIKA
FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS PENDIDIKAN INDONESIA

2024

Pengembangan *Flipped Problem – Based Learning* (FPBL) untuk Meningkatkan Kemampuan Berpikir Reflektif Matematis dan *Self Efficacy* Calon Guru Matematika

Oleh

Riva Lesta Ariany

S.Pd. Universitas Islam Negeri Sunan Gunung Djati, 2011

M.Pd. Universitas Pendidikan Indonesia, 2014

Sebuah Disertasi yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Doktor Pendidikan (Dr) pada Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

Universitas Pendidikan Indonesia

Maret 2024

HALAMAN PENGESAHAN

RIVA LESTA ARIANY
NIM. 1802969

PENGEMBANGAN *FLIPPED PROBLEM-BASED LEARNING* UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR REFLEKTIF MATEMATIS DAN *SELF EFFICACY* CALON GURU MATEMATIKA

Disetujui dan Disahkan oleh Panitia Disertasi:

Promotor

5/3/2024

Prof. Dr. Rizky Rosjanuardi, M.Si.
NIP.196901191993031001

Ko-Promotor

Prof. Dr. H. Dadang Juandi, M.Si.
NIP.196401171992021001

Penguji

Prof. Turmudi, M.Ed., M.Sc., Ph.D.
NIP. 196101121987031003

Penguji

Prof. Al Jupri, S.Pd., M.Sc., Ph.D.
NIP. 198205102005011002

Penguji

Prof. Dr. Irawati, MS.
NIP. 195904181983032001

Mengetahui,
Ketua Program Studi Pendidikan Matematika
FPMIPA Universitas Pendidikan Indonesia

Prof. Al Jupri, S.Pd., M.Sc., Ph.D.
NIP.198205102005011002

ABSTRAK

Riva Lesta Ariany (2023). Pengembangan *Flipped Problem – Based Learning* (FPBL) untuk Meningkatkan Kemampuan Berpikir Reflektif Matematis dan *Self Efficacy* Calon Guru Matematika

Berpikir reflektif matematis dan *self efficacy* merupakan aspek penting yang perlu dimiliki calon guru matematika. Pengembangan model pembelajaran *Flipped Problem – Based Learning* (FPBL) merupakan salah satu upaya dosen untuk meningkatkan kemampuan berpikir reflektif matematis dan *self efficacy* calon guru matematika. Penelitian ini bertujuan untuk mengembangkan model pembelajaran yang dapat meningkatkan kemampuan berpikir reflektif matematis dan *self efficacy* mahasiswa, memberikan deskripsi peningkatan kemampuan berpikir reflektif matematis, *self efficacy*, karakteristik berpikir reflektif, kontribusi kemampuan berpikir reflektif matematis terhadap keterampilan mengajar. Metode penelitian ini adalah *research and development*, dengan 10 tahap pengembangan. Mahasiswa yang terlibat dalam uji coba awal sejumlah 12 mahasiswa, 24 mahasiswa pada uji coba produk utama, 10 orang mahasiswa pada uji coba empiris, dan tahap implementasi melibatkan 12 mahasiswa tingkat III semester genap di salah satu Perguruan Tinggi Keagamaan Islam Negeri di Jawa Barat. Hasil penelitian menunjukkan bahwa model pembelajaran FPBL memberikan kontribusi terhadap peningkatan kemampuan berpikir reflektif matematis dan *self efficacy*. Rata-rata peningkatan kemampuan berpikir reflektif mahasiswa secara keseluruhan berada pada kategori sedang. *Self efficacy* mahasiswa menunjukkan peningkatan hanya saja peningkatannya masih pada kategori rendah. Hasil analisis terhadap karakteristik berpikir reflektif menunjukkan bahwa 1 orang mahasiswa berada pada level teknikal, 7 orang pada level kontekstual dan 2 orang pada level dialektik. Kontribusi kemampuan berpikir reflektif matematis terhadap keterampilan mengajar mahasiswa sebesar 67.90%. Kemampuan berpikir reflektif matematis mahasiswa yang memiliki *self efficacy* awal tinggi unggul pada indikator mengidentifikasi soal yang mungkin ambigu dan menentukan berbagai kemungkinan solusi, mengidentifikasi informasi yang hilang, mengidentifikasi penalaran logis, mengevaluasi/memeriksa kebenaran argumen/alasan berdasarkan konsep/sifat matematika yang digunakan.

Kata Kunci: Berpikir Reflektif, *Flipped Classroom, Problem-Based Learning, Self Efficacy*

ABSTRACT

Riva Lesta Ariany (2023). Development of Flipped Problem - Based Learning (FPBL) to Improve Mathematical Reflective Thinking Ability and Self Efficacy of Prospective Mathematics Teachers

Mathematical reflective thinking and self-efficacy are important aspects that prospective mathematics teachers need to have. The development of the Flipped Problem – Based Learning (FPBL) learning model is one of the lecturers' efforts to improve mathematical reflective thinking skills and the self-efficacy of prospective mathematics teachers. This research aims to develop a learning model that can improve students' mathematical reflective thinking abilities and self-efficacy, providing a description of increasing mathematical reflective thinking abilities, self-efficacy, characteristics of reflective thinking, the contribution of mathematical reflective thinking abilities to teaching skills. This research method is research and development, with 10 development stages. There were 12 students involved in the initial trial, 24 students in the main product trial, 10 students in the empirical trial, and the implementation phase involved 12 even semester III students at one of the State Islamic Religious Universities in West Java. The research results show that the FPBL learning model contributes to increasing mathematical reflective thinking abilities and self-efficacy. The average increase in students' overall reflective thinking abilities is in the medium category. Student self-efficacy shows an increase, but the increase is still in the low category. The results of the analysis of the characteristics of reflective thinking show that 1 student is at the technical level, 7 people are at the contextual level and 2 person is at the dialectical level. The contribution of mathematical reflective thinking skills to students' teaching skills is 67.90%. The mathematical reflective thinking ability of students who have high initial self-efficacy excels in the indicators of identifying questions that may be ambiguous and determining various possible solutions, identifying missing information, identifying logistical reasoning, generating/checking the correctness of arguments/reasons based on the mathematical concepts/properties used.

Keywords: Reflective Thinking, Flipped Classroom, Problem-Based Learning, Self Efficacy

DAFTAR ISI

Hal

ABSTRAK i
KATA PENGANTAR iii
UCAPAN TERIMA KASIH iv
LEMBAR PERSEMBAHAN vi
DAFTAR ISI vii
DAFTAR TABEL ix
DAFTAR GAMBAR xi
DAFTAR LAMPIRAN xiii
BAB I PENDAHULUAN 1
A. Latar Belakang 1
B. Rumusan Masalah 18
C. Tujuan Penelitian 19
D. Manfaat Penelitian 19
E. Definisi Operasional 20
BAB II KAJIAN PUSTAKA 22
A. Kemampuan Berpikir Reflektif Matematis 22
B. Keterampilan Mengajar 43
C. *Self Efficacy* 46
D. *Flipped Clasroom* 49
E. *Problem – Based Learning* 52
F. Pengembangan Model Pembelajaran 55
G. Penelitian Terdahulu 58
H. Kerangka Berpikir 61
BAB III METODE PENELITIAN 65
A. Desain Penelitian 65
B. Partisipan Penelitian 67
C. Perangkat Pembelajaran dan Pengembangannya 68
D. Instrumen Penelitian 69
E. Teknik Analisis Instrumen 71
F. Teknik Pengumpulan Data 81
G. Analisis Data 82
BAB IV HASIL PENELITIAN DAN PEMBAHASAN 91
A. Pengembangan Model Pembelajaran *Flipped Problem Based Learning* 91
1. Analisis Pendahuluan 91
2. Perencanaan Produk Awal 97
3. Pengembangan Model Pembelajaran FPBL 106
4. Uji Coba Produk Awal Model FPBL 112
5. Revisi Model FPBL Setelah Uji Coba Awal 136
6. Uji Coba Produk Utama Model FPBL 145
7. Revisi Model FPBL Setelah Uji Coba Produk Utama 178
8. Uji Coba Empiris Model Pembelajaran FPBL 180
9. Revisi Final Produk 226
10. Diseminasi dan Implementasi Produk 227
B. Peningkatan Kemampuan Berpikir Reflektif Mahasiswa yang Mengikuti Pembelajaran FPBL 235
C. *Self Efficacy* Mahasiswa yang Mengikuti Pembelajaran FPBL 237
D. Karakteristik Berpikir Reflektif Mahasiswa yang Mengikuti

Pembelajaran FPBL 246
E. Kontribusi Kemampuan Berpikir Reflektif Matematis terhadap Keterampilan Mengajar Mahasiswa 252
F. Kemampuan Berpikir Reflektif Matematis Ditinjau *Self Efficacy* Awal Mahasiswa 256
BAB V SIMPULAN, IMPLIKASI DAN REKOMENDASI 267
A. Simpulan 267
B. Implikasi.....269
C. Rekomendasi 271
DAFTAR PUSTAKA.....273

DAFTAR PUSTAKA

Adadan, E. (2018). Examining Preservice Teachers ' Reflective Thinking Skills in the context of Web-Based Portfolios : The Role of Metacognitive Awareness. *Australian Journal of Teacher Education*, *43*(11), 26–50.

Adatepe, S., Kul, M., & Adatepe, E. (2021). Examining Entrepreneurship Characteristics and Reflective Thinking Levels of Pre -Service Teachers at Physical Education and Sports School. *Education Quarterly Reviews*, *4*(3). https://doi.org/10.31014/aior.1993.04.03.343

Akuntono, I. (2014, 14 Januari). "Mendikbud: Kurikulum Berubah Sesuai Perkembangan Zaman". *Kompas.com*, https://nasional.kompas.com/read/2014/01/14/1832135/Mendikbud.Kurikulum.Berubah.Sesuai.Perkembangan.Zaman

Al-Katheri,T. & Al-Shboul, M .(2023). The Effect of Using Flipped Learning Strategy in Developing Reflective Thinking Skills. Dirasat, Human, and Social Science. Vol. 50 (1). 488 – 514.

Aldahmash, A. H., Alshalhoub, S. A., & Mohammed, M. A. (2021). Mathematics teachers' reflective thinking: Level of understanding and implementation in their professional practices. *PLoS ONE*, *16*(10 October), 1–17. https://doi.org/10.1371/journal.pone.0258149

Aldegether, R. (2020). Predicting reflective thinking among saudi elementary school teachers in riyadh public schools. *International Journal of Education and Practice*, *8*(3), 405–415. https://doi.org/10.18488/journal.61.2020.83.405.415

Ambarini, R., Faridi, A., Sukarno, S., & Yuliasri, I. (2023). Tadaluring Microteaching Learning Model: A practical and applicable key to improve teacher students' qualified teaching achievements. *International Journal of Research in Education and Science* (IJRES), 9(2), 546-570. https://doi.org/10.46328/ijres.3102

Ariany, R. L., Widiastuti, T. T., Jauhari, A. L. R., Fardillah, F. (2021). Classification of Student's Mathematical Reflective Thinking in Calculus Class. *Journal of Physics: Conference Series.* 1764 (1).

Ariany, R.L., Rosjanuardi, R., Juandi, D. (2021). Level of pre-service mathematics teacher's reflective thinking. *Journal of Physics: Conference Series*. 1806.

Arikunto, S. (2006). *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.

Arnata, I. W., Mardana, I. B. P., Suwindra, I. N. P. (2020). Pengaruh Model Pembelajaran Problem Based Flipped Classroom Terhadap Keterampilan Pemecahan Masalah Siswa Kelas XI IPA. *Jurnal Pendidikan Fisika Undiksha*, 10 (1), 36 – 48.

Arslan, C., & Yavuz, G. (2012). A Study on Mathematical Literacy Self-Efficacy Beliefs of Prospective Teachers. *Procedia - Social and Behavioral Sciences*, *46*, 5622–5625. https://doi.org/10.1016/j.sbspro.2012.06.484

Aslan, H. (2014). *The Review Of Academic Perception , Level Of Metacognitive Awareness And Reflective Thinking Skills Of Science And Mathematic University Students*. *141*, 781–790. https://doi.org/10.1016/j.sbspro.2014.05.137

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.

Bandura, A. (1997). *Self Efficacy; The Exercise of Control*. W.H Freeman Company.

Bandura, A. (1998). *Self-Efficacy* (I. V. S. Ramachaundran, Ed.; Reprinted, Vol. 4, Issue 1994). Academic Press.

Barrett, T. (2017). *A New Model of Problem-based learning: Inspiring Concepts, Practice Strategies and Case Studies from Higher Education.* All Ireland Society for Higher Education (AISHE).

Basol, G., & Evin Gencel, I. (2013). Yansıtıcı dusunme duzeyini belirleme olcegi: gecerlilik ve guvenirlik calısması. *Kuram ve Uygulamada Egitim Bilimleri*, 13(2), 929-946.

Berrett, D. (2012) How 'Flipping' the Classroom Can Improve the Traditional Lecture. Chronicle of Higher Education. *Open Journal of Social Sciences*, Vol.7 No.3.

Bishop, J. L., & Verlege, M. A. (2013). *The Flipped Classroom : A Survey of the Research The Flipped Classrom : A Survey of the Research*.

Blanco, Q. A., Carlota, M. L. M., Nasibog, A. J. B., Rodriguez, B. C., Saldana, X. V. R., Vasques, E. C. R., Gagani, F. S. (2020). Efficacy while Engaging in Online Learning amidst COVID-19. *Journal La Edusci.* 1(4): 16 – 25.

Boogren, T. H. (2012). *The Dialectical-Level Reflective Habits of Middle-Grade Teachers : A Phenomenological Study*. Electronic Theses and Dissertations.

Borg, W. R. and M. D. Gall. (1989). *Educational Research: An Introduction*. Fifth Edition. New York and London: Longman.

Buttler, T., Scheurer, J. (2022). Perceptions of Pre-service Teachers on Breakout Room Micro-teaching with Zoom. *Perspectives in Education*. 41(1): 155-179 DOI: https://doi.org/10.38140/ pie.v41i1.6176

Cakiroglu, U., & Ozturk, M. (2017). Flipped Classroom with Problem Based Activities : Exploring Self-regulated Learning in a Programming Language Course Flipped Classroom with Problem Based Activities : Exploring Self-regulated Learning in a Programming Language Course. *ResearchGate, January*, 337–347.

Can, B. T., & Yildirim, C. (2014). The instrument for determining the levels of reflective thinking among elementary school students. *Educational Research and Review, 9*(1), 9–16. https://doi.org/10.5897/ERR12.093

Chamdani, M., Yusuf, F. A., Salimi, M., & Fajari, L. E. W. (2022). Meta-Analysis Study: The Relationship Between Reflective Thinking and Learning

Achievement. *Journal on Efficiency and Responsibility in Education and Science*, *15*(3), 181–188. https://doi.org/10.7160/eriesj.2022.150305

Chang, Y. H., Yan, Y.C., Lu, Y.T., (2022). Effects of Combining Different Collaboratif Learning Strategies with Problem Based Learning in a flipped classroom on Program Language Learning. Sustainability (Switzerland), 14 (9). https://doi.org/10.3390/su14095282

Chen, M.R.A., Hwang, G.J, Chang, Y.Y. (2019). A Reflective Thinking-Promoting Approach to Enchancing Graduate Student's Flipped Learning Engagement, Participation Behaviors, Reflective Thinking and Project Learning Outcomes. *British Journal of Education Technology*. Vol 05, (5), 2288-2307.

Chee, & Pou. (2012). Reflective Thinking and Teaching Practices : A Percusor For Incorporating Critical Thinking Into The Classroom. *International Journal of Interaction*, *5*(1).

Choy, S. C., Dinham, J., Yim, J. S. C., & Williams, P. (2021). Reflective Thinking Practices Among Pre-Service Teachers: Comparison Between Malaysia and Australia. *Australian Journal of Teacher Education*, *46*(2), 1–15. https://doi.org/10.14221/ajte.2021v46n2.1

Cohen, J. (1988). *Statistical Power Analysis for The Behavioral Sciences* (2nd ed.). Hillsdale N.J.: L. Erlbaum Associates.

Cynthia, R., & Joseph, E. (2014). Millennial Students and The Flipped Classroom. *ASBBS Annual Conference: Las Vegas*, *21*(1), 519–530.

Damayanti, S.A., Santyasa, W.I., Sudiatmika, A. A. I. A. R.(2020). Pengaruh Model *Problem Based-Learning* dengan *Flipped Classroom* terhadap Kemampuan Berpikir Kreatif. *Jurnal Kependidikan Penelitian Inovasi Pembelajaran*, 4 (1), 83-98.

Departemen Pendidikan Nasional. (2005). *Undang-Undang Republik Indonesia, Nomor 14 Tahun 2005 Tentang Guru dan Dosen*. Jakarta: Depdiknas.

Dervent, F. (2015). The effect of reflective thinking on the teaching practices of preservice physical education teachers. *Issues in Educational Research*, *25*(3), 260–275.

Dewey, J. (1933). *How We Think : A Restatement of The Relation of Reflective Thinking to The Educative process*. D.C Heath and Company.

Dunlap, J. C. (2006). The Effect of a Problem-Centered , Enculturating Experience on Doctoral Students ' Self-Efficacy. *Interdisciplinary Journal of Problem-Based Learning*, *1*(2), 11–17.

Elian, S. M., & Hamaidi, D. A. H. (2018). The Effect of Using Flipped Classroom Strategy on the Academic Achievement of Fourth Grade Students in Jordan. *International Journal of Emerging Technologies in Learning (iJET)*, 13(02), pp. 110–125. https://doi.org/10.3991/ijet.v13i02.7816

Erton, İ. (2014). *Quality Control in Education with Reflective Teaching.* Cumhuriyet Newspaper Science and Technology: Ankara.

Fauzi, S. S. M., Hussain, R. M. R. (2016).Designing Instruction for Active and Reflective Learners in The Flipped Classroom. *Malaysian Journal of Learning and Instruction*, Vol. 13, No. 2. 147-173.

Ferdowsi, M. & Afghari, A. (2015). The Effects of Reflective Teaching on Teachers' Performance. *International Journal of Educational Investigations*, Vol.2, No.6: 20-31.

Genc, B. (2004). The Nature of Reflective Thinking and Its Implications for in Service Teacher Education. *Çukurova Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *13*(1), 235–243.

Ghanizadeh, A., & Jahedizadeh, S. (2017). Validating the Persian Version of Reflective Thinking Questionnaire and Probing Iranian University Students ' Reflective Thinking and Academic Achievement. *International Journal of Instruction*, *10*(3), 209–226.

Gilboy, M. B., Heinerichs, S., P. G. (2015). Enhancing Student Engagement Using The Flipped Classroom. *Nutr Edue Behav.*, 109–114.

Gizem Karaoglan-Yilmaz, F., Berk Ustun, A., Zhang, K., & Yilmaz, R. (2023). Metacognitive Awareness, Reflective Thinking, Problem Solving, And Community Of Inquiry As Predictors Of Academic Self-Efficacy In Blended Learning: A Correlational Study. In *Turkish Online Journal of Distance Education*.

Griffin, P., & Care, E. (2015). *Assessment And Teaching of 21st Century Skills: Methods and Approach*. Dodrecht: Springer Business Media.

Guraya, S. (2020). Combating The Covid-19 Outbreak ith A Technology-Driven E-Flipped Classroom Model Of Educational Transformation. *Journal of Taibah University Medical Sciences*, *15*(4), 253–254. https://doi.org/10.1016/j.jtumed.2020.07.006

Guroll, A. (2011). Determining the Reflective Thinking skills of pre-service Teacer in Learning and Teaching Process. *Energy Education Science and Technology Part B : Social and Education Studies*, *3*(3), 387–402.

Hake, R. R. (1999). *Analizing Change Gain Scores.* [*Online*]. Diakses dari: https://web.physics.indiana.edu/sdi/AnalyzingChange-Gain.pdf.

Heong, Y. M., Othman, W. B., Yunos, J. Bin, Kiong, T. T., Hassan, R. Bin, Mohaffyza, M., & Mohamad, B. (2011). The Level of Marzano Higher Order Thinking Skills among Technical Education Students. *International Journal of Social Science and Humanity*, *1*(2), 121–125.

Hwang, G. J., Lai, C., & Wang, S. Y. (2015). Seamless Flipped Learning : A Mobile Technology- Enhanced Flipped Classroom With Effective Learning Strategies. *Journal of Computers in Education*, *2*(4), 449–473. https://doi.org/10.1007/s40692-015-0043-0

Ilhan, A., Pocan, S., Aslaner, R. (2023) Microteaching and Peer Assessment in Mathematics Teaching Practise. *Brock Education Journal*. Vol. 32 (2) 29−57 https://journals.library.brocku.ca/broc

Joyce, B & Weil, M. (1996). *Models of Teaching*. Boston: Allyn & Bacon.

Kandaga, T. (2012). *Penerapan Model Pembelajaran Time Token untuk Meningkatkan Kemampuan Pemahaman dan Disposisi Matematis Siswa SMA*. (Tesis). Sekolah Pascasarjana, Universitas Pendidikan Indonesia, Bandung.

Kaya, G., & Öz, S. (2021). Investigation of the Effect of Teacher Training Programs on Reflective Thinking: ALACT Model. *International Journal of Progressive Education*, *17*, 2021. https://doi.org/10.29329/ijpe.2020.332.17

Kember, D., Leung, D., Jones, D., & Loke, A. (2000). Development of A Questionnaire to Measure The Level Of Reflective Thinking. *Assessment & Evaluation in Higher Education*, *25*(4), 381–395.

Kenna, D.C. (2014). *The Study of The effect The Flipped Classroom model on Student Self Efficacy*. (Tesis). Nort Dakota State University of Agriculture and Applied Science.

Kenney, R., Shoffner, M., & Norris, D. (2013). Reflecting to learn mathematics : supporting pre-service teachers ' pedagogical content knowledge with reflection on writing prompts in mathematics education. *Reflective Practice : International and Multidisciplinary Perspectives*, *14*(6), 787–800. https://doi.org/10.1080/14623943.2013.836082

Khalid, F., Ahmad, M., Karim, A. A., Daud, Y., & Din, R. (2015). Reflective Thinking : An Analysis of Students ' Reflections in Their Learning about Computers in Education. *Creative Education*, *6*, 2160–2168. https://doi.org/10.4236/ce.2015.620220

Koçak, C., & Onen, aysem S. (2014). Analysis on Reflective Thinking Tendencies Of Student Teachers According To Their Individual Innovativeness And Sociotropic- Autonomic Personality Characteristics. *CY-ICER*, *143*, 788–793. https://doi.org/10.1016/j.sbspro.2014.07.477

Korthagen, F. A. J., Kessels, J., Koster, B., Lagerwerf, B., & Wubbels, T. (2001). *Linking practice and theory: The pedagogy of realistic teacher education*. Lawrence Erlbaum Associates.

Koszalka, T., & Grabowski, B. L. (1996). KaAMS: A PBL Environment Facilitating Reflective Thinking Primary. *Learning and Instruction*.

Lipman. (2013). *Thinking in Education*. Cambridge University Press.

Limiansi, K., Hadi, S. (2022). *Students Self-Efficacy Profile in Online Learning*. Proceedings of the 5th International Conference on Current Issues in Education, 85-90, Atlantis Press. https://doi.org/10.2991/assehr.k.220129.016

Marlina, R., Suwono, H., Yuenyong, C., Ibrohim, Hamdani. (2023). Reflection Practice in Microteaching: Evidence from Prospective Science Teacher. *Tadris: Jurnal*

Keguruan dan Ilmu Tarbiyah. 8 (1): 95-111 (2023). DOI: 10.24042/tadris.v8i1.15846

Mathew, P., Mathew, P., & Peechattu, J. (2017). Reflective practices: a means to teacher development. *Asia Pacific Journal of Contemporary Education Technology (APJCECT)*, *3*(1), 1–6.

Meika, I., Mauladaniyati, R.,Sujana, A., Berliana, R.(2023). Self Efficacy Matematika dan Mengajar Matematika Mahasiswa Calon Guru Matematika. Mendidik: *Jurnal Kajian Pendidikan dan Pengajaran*. Vol. 9 No.2, 262-267

Meltzer, D. E. (2002). *Journal: The Relationship Between Mathematics Preparation and Conceptual Learning Gain in Physics : A Possible "Hidden Variable" in Diagnostic Pretest Score.* Am.J.Phy 70 (12) Desember. American Association of Physics Teachers. Departement of Physics and Astronomy, Iowa State University.

Mezirow, J. (1977). Perspective transformation. *Studies in Adult Education*, 9(2), 153–164.

Miao, Y., Holst, S. J., Haake, J. M., & Steinmetz, R. (2000). PBL-Protocols : Guiding and Controlling Problem Based Learning Processes in Virtual Learning Environments. *Fourth International Conference of the Learning Sciences*, 232–237.

Miladinović, I. Ć., Dimitrijevic, M., Ilic, B. (2021) "Reflection on Action: Peer Micro-teaching Process of Prospective EFL Teachers and Class Teachers Focusing on Mother Tongue Teaching." *Technium Social Sciences Journal*, vol. 25, pp. 9-19, doi:10.47577/tssj.v25i1.4992.

Mirzaei, F., Aliah, F., & Kashefi, H. (2014). Assessing and Improving Reflective Thinking of Experienced and Inexperienced Teachers. *Procedia - Social and Behavioral Sciences*, *141*, 633–639. https://doi.org/10.1016/j.sbspro.2014.05.111

Mirzaei, F., Phang, F. A., & Kashefi, H. (2014). Measuring Teachers Reflective Thinking Skills. *Procedia - Social and Behavioral Sciences*, *141*, 640–647. https://doi.org/10.1016/j.sbspro.2014.05.112

Muin, A. (2016). *Meningkatkan Kemampuan dan Disposisi Berpikir Reflektif Matematis Mahasiswa Dengan Pendekatan Meta Kognitif*. (Disertasi). FPMIPA, Universitas Pendidikan Indonesia, Bandung.

Mursid, R. (2013). Pengembangan Model Pembelajaran Praktik Berbasis Kompetensi Berorientasi Produksi. *Jurnal Cakrawala Pendidikan*, 5(1). doi:https://doi.org/10.21831/cp.v5i1.1257

Muyassaroh, I., Yulistia, A., Pratikno, A.S. (2022). Analisis Pembelajaran Sains Melalui *Flipped-Problem Based Learning* Berbantuan Zoom *Meeting* dan E-campus Pelita Bangsa. *Dwija Cendekia: Jurnal Riset Pedagogik*. 6(2), 433-446

Nerantzi, C. (2020). The Use of Peer Instruction and Flipped Learning to Support Flexible Blended Learning During and After the COVID-19 Pandemic. *International Journal of management and Applied Research*. 7(2), 184 - 195

Nieveen, N. (2007). Formative Evaluation in Educational Design Research. In T. Plomp & N. Nieveen (Eds.), *An Introduction to Educational Design Research* (pp. 89–102). SLO.

Nindiasari, H. (2013). *Meningkatkan Kemampuan dan Disposisi Berpikir Reflektif Matematis Serta Kemandirian Belajar Siswa SMA Melalui Pembelajaran Dengan Pendekatan Metakognitif*. (Disertasi). FPMIPA, Universitan Pendidikan Indonesia, Bandung

Noer, S. H. (2008). *Problem-Based Learning dan Kemampuan Berpikir Reflektif dalam Pembelajaran Matematika. Prosiding Seminar Nasional Matematika dan Pendidikan Matematika. 267-280.*

Nuraeni., Rahmawati, M.R. (2018). Promoting Reflective Practice in Flipped Classroom. ITELL *(Indonesian Technology Enchanced Language Learning*). 148-152.

Nuriadin, I., Kusumah, Y. S., Sabandar, J. (2015). Enhancing Of Students' Mathematical Reflective Thinking Ability Through Knowledge Sharing Learning Strategy In Senior High School. *International Journal of Education and Research*, 3 (9), 255–268. www.ijern.cpm/september-2015.php

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.

Ocak, G., Yildirim, H., Olur, Burak. (2020). Development of Reflective Thinking Scale for Senior Primary Education Students. *Europeaan Journal of Alternative Education Studies*, 5 (1), 1 – 15.

Orakci, S. (2021). Teachers ' Reflection and Level of Reflective Thinking on the Different Dimensions of their teaching practice. *International Journal of Modern Education Studies*, *5*(1), 117–145. https://doi.org/10.51383/ijonmes.2021.88

Orakci, S., & Rüzgar, M. E. (2021). Analyzing of The Relationships Between Attitudes Towards Teaching Profession, Reflective Thinking and Individual Innovativeness. *Education Reform Journal*, *6*(1), 19–30. https://doi.org/10.22596/erj2021.06.01.19.30

Ouweneel, E., Schaufeli, W. B., & Le Blanc, P. M. (2013). Believe, and you will achieve: changes over time in self-efficacy, engagement, and performance. *Applied psychology. Health and well-being*, *5*(2), 225–247. https://doi.org/10.1111/aphw.12008

Pagarra, H., Irfan, M., & Syawaluddin, A. (2020). Effectiveess of Micro Teaching Learning on Teaching Basic Skills: Do The Facilities Matter?. *International Journal od Scientific & Technology Research.* 9(3), 4715-4719.

Pedro, J. Y. (2005). Reflection in Teacher Education : Exploring Pre-Service Teachers ' Meanings of Reflective Practice. *Reflective Practice*. https://doi.org/10.1080/1462394042000326860

Porter, L. K. (1998). *Critical Reflective Thinking in Euclidean Geometry: For Grade Nine Mathematics Student*. National Library of Canada.

Putra, H. D. (2019). *Meningkatkan Kemampuan Mathematical Problem Posing, Berpikir Reflektif Matematis, dan Kemandirian Belajar Siswa SMA Melalui Pendekatan Saintifik Dengan Strategi WHAT-IF-NOT*. (Disertasi). FPMIPA, Universitas Pendidikan Indonesia, Bandung.

Rachmawati, A & Turmudi, T. (2022). Pedagogical Content Knowledge dalam Pembelajaran Matematika: Studi Literature Review. *DWIJA CENDEKIA: Jurnal Riset Pedagogik.* 6. 762. 10.20961/jdc.v6i3.66857.)

Ramadhani, R., Umam, R., Abdurrahman, A., & Syazali, M. (2019). The Effect of Flipped-Problem Based Learning Model Integrated with LMS-Google Classroom for Senior High School Students. *Journal for the Education of Gifted Young*, *7*(2), 137–158. https://doi.org/10.17478/jegys.548350

Remesh A. (2013). Microteaching, An Efficient Technique for Learning Effective Teaching. *J Res Med Sci* 18:158-63.

Rodgers, C. (2002). Defining Reflection: Another Look at John Dewey and ReflectiveThinking. *Teacher College Record*, *104*(4), 842–866.

Rogers, J., Peecksen, S., Douglas, M., & Simmons, M. (2019). International and Multidisciplinary Perspectives Validation of a reflection rubric for higher education. *Reflective Practice*, *20*(6), 761–776. https://doi.org/10.1080/14623943.2019.1676712

Sagir, U., Safak, Aslan, Oktay, B., Harun, & Oner Armagan, F. (2016). Investigation of The Relationship Between Pre-Service Science Teachers ' Perceived Self-Efficacy in Science Teaching And Disposition Toward Reflective Thinking. *European Journal of Science and Mathematics Education*, *4*(3), 331–345.

Sahidin, L., Budiarto, M. T., & Fuad, Y. (2019). Developing Vignettes to Assess Mathematical Knowledge for Teaching Based Conceptual. *International Journal of Instruction*, *12*(3), 551–564. https://doi.org/10.29333/iji.2019.12339a

Sahin, G. G., & Ovez, F. T. D. (2012). An Investigation of Prospective Teachers Reflective Thinking Tendency. *International Conference on New Horizons in Education INTE*, *55*, 568–574. https://doi.org/10.1016/j.sbspro.2012.09.538

Santoso, A. (2010). Studi Deskriptif Effect Size Penelitian-penelitian di Fakultas Psikologi Universitas Sanata Dharma. *Jurnal Penelitian*. 14 (1). 1 – 17.

Saracoglu, M. (2022). Reflective Thinking And Inquiry Skills as Predictors of Self-Efficacy In Teaching Mathematics. *Problems of Education in the 21st Century*, *80*(1), 213–231. https://doi.org/10.33225/pec/22.80.213

Schon, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books

Schon, D. A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.

Semerci, C. (2007). Developing a reflective thinking tendency scale for teachers and student teachers. *Educational Sciences: Theory & Practice*, *7*(3).

Sinmas, W. F., Sundaygara, C., Pranata, K.B. (2019). Pengaruh PBL Berbasis Flipped Class Terhadap Prestasi Ditinjau Dari Motivasi Belajar Siswa. *Rainstek Jurnal Terapan Sains & Teknologi*. 1 (3), 14-20

Slade, M. L., Catalana, S. M., & Waters, T. (2019). The Impact of Reflective Practice on Teacher Candidates ' Learning. *Reflective Practice and Student Learning*, *13*(2), 1–8.

Spalding, E. & Wilson, A. (2002). Demystifying Reflection: A Study of pedagogical Strategies That Encourage Reflective Journal Writing, *Teachers College Record*, 104:7, pp. 139–421.

Sudjana. (2002). *Metoda Statistika*. Bandung: Tarsito.

Sudijono, A. (1996). *Pengantar Evaluasi Pendidikan*. Jakarta: PT. Raja Grafindo Persada.

Sudijono, A. (2001). *Pengantar Evaluasi Pendidikan*. Jakarta: Rajawali Pers.

Suharna, H. (2012). Berpikir Reflektif (Reflective Thinking) Siswa SD Berkemampuan Matematika Tinggi Dalam Masalah Pecahan. *Seminar Nasional Matematika Dan Pendidikan Matematika, November*, 978–979.

Suherman, E. (2003). *Evaluasi Pembelajaran Matematika*. JICA FPMIPA UPI.

Suherman, E., & Kusumah, Y. S. (1990). *Petunjuk Praktis untuk Melaksanakan Evaluasi Pendidikan Matematika*. Wijaya Kusumah.

Sumardi, K. (2011). *Pengembangan Model-Model Pembelajaran*. http://kaminsumardi.staf.upi.edu/files/2011/10/Makalah-Model-Pembelajaran.pdf. Diakses pada 24 Februari 2018.

Sumartini, T. (2020). Self efficacy Calon Guru Matematika. *Mosharofa*. Vol 9, 3, 419 – 428.

Sunbul, A. M., & Kurnaz, A. (2016). CHAPTER 12 : Reflective Thinking and Teaching Reflective Thinking. In *Learning and Teaching: Theories, Approaches and Models* (pp. 167–173). Cozum Egitim Yayincilik. http://www.ijonte.org/FileUpload/ks63207/File/chapter_12.pdf

Sunzuma, G., & Maharaj, A. (2019). In-service Teachers' Geometry Content Knowledge: Implications for how Geometry is Taught in Teacher Training

Institutions. *International Electronic Journal of Mathematics Education*, *15*(1), 633–646. https://doi.org/10.29333/iejme/5776

Sutopo. (2010). Penentuan Jumlah Sampel pada Penelitian. *Jurnal Ekonomi Manajemen Akuntansi*.17(29)

Taggart, G. L., & Wilson, A. P. (2005). *Promoting Reflective Thinking in Teachers 50 Action Strategies.* Thousand Oaks, California: Corwin Press.

Thompson, N., & Pascal, J. (2012). Developing critically reflective practice. *Reflective Practice : International and Multidisciplinary Perspectives*, *13*(2), 311–325.

Türnüklü, E., Gündoğdu Alayli, F., & Akkaş, E. N. (2013). Investigation of prospective primary mathematics teachers' perceptions and images for quadrilaterals. *Educational Sciences: Theory & Practice*, *13*(2), 1225–1232.

Ulger, K. (2018). The Effect of Problem-Based Learning on the Creative Thinking and Critical Thinking Disposition of Students in Visual Arts Education The Effect of Problem-Based Learning on the Creative Thinking and Critical. *Interdisciplinary Journal of Problem-Based Learning*, *12*(1), 3–6.

Umam, I. U., Nurlaelah, E., Suhendra. (2023). Mathematical Critical Thingking Ability Based om Student's Sel Efficacy Using Phenomenological Study Aproach. *Jurnal Program Studi Pendidikan Matematika*. 12(2). 2676-2687

Uzun, M. S., Yuksel, N. S., & Dost, S. (2013). Investigation of Preservice Teachers Mathematics Teaching Efficacy Beliefs In Terms of Their Reflective Thinking Tendencies. *4th International Conference on New Horizons in Education*, *106*, 1595–1602. https://doi.org/10.1016/j.sbspro.2013.12.180

Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry*, 6, 205-228.

Wahyuni, P. dan Yolanda, F. (2019). Profil self efficacy mahasiswa calon guru pada mata kulian teori dan praktek pengajaran micro pendidikan matematika. *JPPM*, 12, 2

Wahyuni, I., H. & Saraswati, S. (2023). *Problem Based Learning* Berbasis *Flipped Classroom*: Efektifitas dan Penerapannya Pada Materi Lingkaran Kelas VIII. *Jurnal Penelitian, Pendidikan dan Pengajaran (JPPP)*, 4 (2), 108-116

Weast, D. O. N. (1996). Alternative Teaching Strategies: The Case for Critical Thinking. *Teaching Sociology*, *24*(2), 189–194.

Widarti, F. O., Fajri, Nursafiah (2021). Mengukur Keterampilan Dasar Mengajar Mahasiswa Pada Masa Pandemi Covid-19. (JPB) *Jurnal Pembelajaran Biologi: Kajian Biologi dan Pembelajarannya*. Vol. 8, No. 1

Widodo,. A.N.A, Ardani,A., Aristyo,D.N. (2021). Pengaruh self efficacy dan prestasi microteaching berbantuan zoom meeting terhadap kemampuan mengajar matematika. *Aksioma*. 10, 2, 1088-1098

Wijaya, H. P. S. (2018). Student reflection ini Micro-teaching class. https://repository.petra.ac.id/18857/3/III.A.2.c.1.2_Students'_Reflection.pdf

Yaacob, A., Mohd Asraf, R., Hussain, R. M. R., & Ismail, S. N. (2020). Empowering Learners' Reflective Thinking through Collaborative Reflective Learning. *International Journal of Instruction*, *14*(1), 709–726. https://doi.org/10.29333/IJI.2021.14143A

Yadav, P. (2022). Development of Scale on Reflective Thinking. *Journal of Applied Research in Humanities, Language, and Social Sciences*, Vol 2, Issue No:1, Oct 2022

Yanuar, M., (2017). *Kemampuan Berpikir Reflektif Matematis dan Habits of Striving for accuracy and precision dalam pembelajaran dengan Pendekatan Rigorous Mathemarical Thinking*. Universitas Pendidikan Indonesia. Diakses melalui repository.upi.edu. Perpustakaan .upi.edu.

Zahid, M. (2019). Effect of Reflective Teaching Practices on the Performance of Prospective Teachers. *The Turkish Online Journal of Educational Technology*, *18*(1), 32–43.

Žilková, K. (2011). Parallelogram Conceptions and Misconceptions of Students Who Study to Become Teachers in Pre-Primary and Primary Education. *Indian Journal of Applied Research*, *4*(7), 128–130. https://doi.org/10.15373/2249555x/july2014/38

Zimmerman, B. J. (2000). Self Efficacy: An Essential Motive to Learn. *Contemporary Educational Psychology*, *25*, 82–91.

Zubaidah, S. (2018). "Mengenal 4C: Learning and Innovation Skills untuk Menghadapi Era Revolusi Industri 4.0". *Prosiding Seminar "2nd Science Education National Conference" di Universitas Trunojoyo Madura.* (hlm 1-18).

Zwaal, W., & Otting, H. (2012). The Impact of Concept Mapping on the Process of Problem-based Learning. *Interdisciplinary Journal of Problem-Based Learning*, *6*(1), 3–27.