

DESAIN DIDAKTIS KONSEP NILAI TEMPAT KELAS II SD

TESIS

**Diajukan untuk memenuhi sebagian dari
syarat untuk memperoleh gelar Magister Pendidikan Dasar
Program Studi Pendidikan Dasar**



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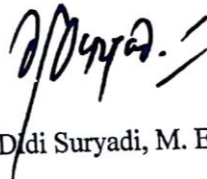
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ABSTRAK

Ulsana Puji Lestari (1706506): Desain Didaktis Konsep Nilai Tempat
Kelas II SD

Penelitian ini merupakan penelitian kualitatif menggunakan desain didaktis yang dilatarbelakangi oleh temuan tiga hambatan belajar pada materi nilai tempat berdasarkan hasil tes, wawancara terhadap guru dan siswa, observasi pembelajaran, analisis buku Kurikulum 2013, dan buku catatan siswa. Ketiga hambatan belajar tersebut yaitu: *ontogenic*, *epistemological*, dan *didactical obstacle* yang ditemukan pada 17 siswa kelas II. *Ontogenic obstacle* teridentifikasi dari ketidakmampuan siswa mengerjakan soal nilai tempat 3 angka yang mengharuskan mereka melakukan situasi aksi untuk menyelesaikannya. *Epistemological obstacle* teridentifikasi dari ketidakmampuan siswa mengerjakan soal nilai tempat 3 angka yang memiliki konteks berbeda. *Didactical obstacle* teridentifikasi dari ketidakmampuan siswa melakukan perkalian dan penjumlahan dengan angka 0. Usaha untuk meminimalkan ketiga hambatan belajar tersebut dilakukan melalui pembuatan desain didaktis yang terdiri dari beberapa *lesson design* dengan didukung oleh kompetensi guru secara didaktis dan konseptual. Desain didaktis awal yang dikembangkan sebanyak 4 *lesson design* dengan memperhatikan konteks materi berupa membilang, lambang dan nama bilangan, nilai tempat 2 angka, penjumlahan, dan perkalian bilangan cacah sehingga ditemukan *learning trajectory* dan faktor yang mempengaruhinya sesuai dengan tahapan berpikir siswa kelas II. Setelah desain didaktis awal diterapkan maka ditemukan pola *learning trajectory* siswa dan faktor yang mempengaruhinya berupa kemampuan prasyarat siswa, perencanaan dan proses pembelajaran, serta penggunaan sumber belajar. Apabila dilihat dari segi kemunculan hambatan belajarnya, maka hasil penelitian menunjukkan bahwa desain didaktis awal yang dikembangkan dapat meminimalkan munculnya ketiga hambatan belajar yang ditemukan.

Kata kunci: desain didaktis, *learning obstacle*, *learning trajectory*, nilai tempat

ABSTRACT

Ulsana Puji Lestari (1706506): Didactical Design Place Value
Concept in Grade II

This research is a qualitative research using a didactic design that is motivated by the findings of three learning barriers on place value material based on test results, interviews with teachers and students, learning observations, 2013 Curriculum book analysis and student notebooks. The three barriers to learning are: ontogenic, epistemological and didactic obstacle found in 17 grade II students. Ontogenous obstacle is identified by the inability of students to work on 3-point site value problems that require them to take action situations to resolve them. The epistemological obstacle was identified from the inability of students to work on 3-point site values that have different contexts. Didactic obstacle is identified by the inability of students to multiply and add by the number 0. Efforts to minimize the three learning barriers are made by creating a didactic design consisting of different lesson designs that are supported by didactic and conceptual teacher competence. The initial didactic design was developed with no less than 4 lesson designs by paying attention to the context of the material in the form of numbers, symbols and number names, position values of 2 digits, addition and multiplication of count numbers so that the learning trajectory and the factors influencing it found in accordance with the thinking stages of class II students. After the initial didactic design is adopted, students' learning path patterns are found and the factors that influence them are the required skills of students, planning and learning processes and the use of learning resources. When viewed in terms of the emergence of learning barriers, the results of the study indicate that the first developed didactic design can minimize the emergence of the three learning barriers found.

keywords: didctical design, learning obstacle, learning trajectory, place value

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DAFTAR PUSTAKA

- Adelina, N., Hendrifiana, Y., & Assagaf, L. (2017). *Tema 5 Pengalamanku Buku Tematik Terpadu Kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Adellina, N., Kusumawati, Y., & Assagaf, L. (2017). *Tema 2 Kegemaranku Buku Tematik Terpadu Kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Arikunto, S. (2013). *Prosedur Penelitian-Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.
- Arias, F. & Araya, A. (2009). Analysis of Didactical Contracts in 10th Grade Math Classes. *Quaderni di Ricerca in Didattica (Matematica)*, 4 (19), 155-163.
- Artigue, M. & Blomhøj, M. (2013). Conceptualizing Inquiry-based Education in Mathematics. *ZDM Mathematics Education Journal*, 45 (6), 797–810. doi: 10.1007/s11858-013-0506-6.
- Ashlock, R. dkk. (1983). *Guiding Each Child's Learning of Mathematics*. Ohio: Charles e.merrill publishing Company.
- Astuti, I. M. J. (2017). *Tema 1 Hidup Rukun Buku Tematik Terpadu Kurikulum 2013: Buku Guru SD/MI Kelas II* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Atweh, B., Bleicher, R. E., & Cooper, T. J. (1998). The Construction of the Social Context of Mathematics Classroom: a Sociolinguistic Analysis. *Journal for Research in Mathematics Education*, 29 (1), 63-82. doi: 10.2307/749718.
- Baroody, A. J. (1990). How and When Should Place-Value Concepts and Skills be Taught?. *Journal for Research in Mathematics Education*. National Council of Teachers of Mathematics, 21 (4), 281-286. doi: 10.2307/749526.
- Bednarz, N. & Janvier, B. (1988). A Constructivist Approach to Numeration in Primary School: Results of a Three Year Intervention with the Same Group of Children. *Journal Educational Studies in Mathematics*, 19 (3), 299-331. doi: <https://doi.org/10.1007/BF00312450>.
- Bingolbali, E. dkk. (2011). Pre-Service and In-Service Teacher's "Views of the Sources of Students" Mathematical Difficulties. *Internasional Electronic Journal for Mathematics Education*. 6 (1), 40-59.

- Blake, B. & Pope, T. (2008). Developmental Psychology: Incorporating Piaget's and Vygotsky's Theories in Classrooms. *Journal of Cross-Disciplinary Perspectives in Education*, 1 (1), 59-67.
- Boulton-Lewis, G. (1992). The Processing Loads of Young Children's and Teacher's Representations of Place Value and Implications for Teaching. *Mathematics Education Research Journal*, 4 (1), 1-23. doi: https://doi.org/10.1007/BF_03217229.
- Brousseau G. (2002). *Theory of Didactical Situations*. Dordrecht: Kluwer Academic Publishers.
- Brown, C. S., Sarama, J., & Clements, D. H. (2007). Thinking About Learning Trajectories in Preschool. *Teaching Children Mathematics*, 14 (3), 178-181.
- Brown, S. A. & College, P. (2008). Exploring Epistemological Obstacle to Development of Mathematics Induction. *Proceedings of the 11th Conference for Research on Undergraduate Mathematics Education*, 1-19.
- Bruner, J. S. (1963). *The Process of Education*. New York: Vantage Books.
- Bussi, M. G. B. (2011). Artefacts and Utilization Schemes in Mathematics Teacher Education: Place Value in Early Childhood Education. *Journal of Mathematics Teacher Education*, 14 (2), 93-112. doi: <https://doi.org/10.1007/s10857-011-9171-2>.
- Carpenter, T. P. dkk. (1982). A Review of Research on Addition and Subtraction (*Working Paper No. 330*). Madison: Wisconsin Center for Education Research.
- Carpenter, T. P. dkk.. (1998). Representation of Addition and Subtraction Word Problems. *Journal for Research in Mathematics Education*, 29 (1), 3-20. doi: 10.2307/749545.
- Chandler, C. & Kamii, C. (2009). Giving Change when Payment is Made with a Dime: The Difficulty of Tens and Ones. *Journal for Research in Mathematics Education*, 40 (2), 97-118.
- Clements, D. H. & Sarama, J. (2004). Learning Trajectories in Mathematics Education. *Mathematical Thinking and Learning*, 6 (2), 81-89. doi: 10.1207/s15327833mtl0602_1.
- Copeland, R. W. (1972). *Mathematics and the Elementary Teacher*. Toronto: W.B. Saunders Company.

- Corle, C. G. (1964). *Teaching Mathematics in the Elementary School*. New York: The Ronald Press Company.
- Cornu, B. (1991). *Limits*. In Tall D. (eds), *Advanced Mathematical Thinking*. Mathematics Education Library Dordrecht: Kluwer Academic Publishers.
- Dahar, R. W. (2011). *Teori-teori Belajar dan Pembelajaran*. Jakarta: Erlangga.
- Dalyono. (2012). *Psikologi Pendidikan*. Jakarta : Rineka Cipta.
- Daro, P., Mosher, F., & Corcoran, T. (2011). *Learning Trajectory in Mathematics (Research Report No. 68)*. Madison, WI: Consortium for Policy Research in Education.
- D'Amore, B. (2008). Epistemology, Didactics of Mathematics and Teaching Practices. *Mediterranean Journal for Research in Mathematics Education*, 7 (1), 1-22.
- Dewi, N. M. O., Wirya, I. N., & Asril, N. M. (2014). Penerapan Metode Bermain Berbantuan Media Balok Cruissenare untuk Meningkatkan Perkembangan Kognitif. *e-Journal PG PAUD Universitas Pendidikan Ganesha*, 2 (1), 1-10.
- Easley, J. (1983). A Japanese Approach to Arithmetic. *Japanese Journal of Science. Education*, 3 (3), 8-14.
- Fuson, K. C. (1986). Roles of Representation and Verbalization in the Teaching of Multi-digit Addition and Subtraction. *European Journal of Psychology of Education*, 1 (2), 35-56.
- Fuson, K. C. (1988). *Children's Counting and Concepts of Number*. Springer-Verlag New York Inc.
- Fuson, K. C. & Briars, D. J. (1990). Using a Base-ten Blocks Learning/Teaching Approach for First-and Second-Grade Place-Value and Multidigit Addition and Subtraction. *Journal for Research in Mathematics Education*, 21 (3), 180-206. doi: 10.2307/749373.
- Gray, E. M. & Tall, D. O. (1994). Duality, Ambiguity, and Flexibility: A "Proceptual" View of Simple Arithmetic. *Journal for Research in Mathematics Education*, 25 (2), 116-140. doi: 10.2307/749505.
- Haylock, D. (2009). *Mathematics Explained for Primary Teachers*. New Delhi: SAGE Publication, Ltd.

- Haylock, D. & Cockburn, A. (2012). *Understanding Mathematics for Young Children*. New Delhi: SAGE Publication, Ltd.
- Hendrifiana, Y., Ariguntar, P., & Assagaf, L. (2017). *Tema 1: Diriku*. Jakarta: Kemendikbud.
- Hersant, M. & Perrin-Glorian, M. J. (2005). Characterization of an Ordinary Teaching Practice with the Help of the Theory of Didactic Situation Educational Studies in Mathematics. *Journal of Educational Studies in Mathematic*, 59 (1-3), 113-151. doi: <https://doi.org/10.1007/s10649-005-2183-z>.
- Heruman. (2007). *Model Pembelajaran Matematika di SD*. Bandung: Remaja Rosdakarya.
- Hiebert, J. & Wearne, D. (1992). Links Between Teaching and Learning Place Value with Understanding in First Grade. *Journal for Research in Mathematics Education*. 23 (2), 98-122. doi: 10.2307/749496.
- Hiebert, J. & Wearne, D. (1996). Instruction, Understanding, and Skill in Multidigit Addition and Subtraction. *Journal for Research in Mathematics Education*, 14 (3), 251-283.
- Hudoyo, H. (1998). *Mengajar Belajar Matematika*. Jakarta: Depdikbud.
- Iswoyo, S., Oktora, T., & Assagaf, L. (2017). *Tema 4 Keluargaku Buku Tematik Terpadu Kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Jarvis, M. (2011). *Teori-teori Psikologi*. (Edisi Kesepuluh). Bandung: Nusa Media.
- Jones, G. A. dkk. (1996). Multidigit Number Sense: A Framework for Instruction and Assessment. *Journal for Research in Mathematics Education*, 27 (3), 310-336. doi: 10.2307/749367.
- Kamii, C. (1989). *Young Children Continue to Reinvent Arithmetic 2nd Grade: Implications of Piaget's Theory*. New York: Teachers College Press.
- Kansanen, P. (2003). Studying the Realistic Bridge Between Instruction and Learning. An Attempt to a Conceptual Whole of the Teaching-Studying-Learning Process. *Educational Studies Journal*, 29 (2/3), 221-232. doi: <https://doi.org/10.1080/03055690303279>.
- Kennedy, L. M. & Tipps S. (1994). *Guiding Children's Learning of Mathematics*. California: Wadsworth.

- Kilpatrick, J., Swafford, J., & Findel, B. (2001). *Adding it up: Helping Children Learn Mathematics*. Washington DC: National Academy Press.
- Kunandar. (2008). *Langkah Mudah Penelitian Tindakan Kelas sebagai Pengembangan Profesi Guru*. Jakarta: Rajawali Press.
- Martins-Mourao, A. (2000). Children's Understanding of Number in the Primary School Years: a Unifying View from Early Counting to Knowledge of Place Value Child Development and Learning. *A thesis Institute of Education, submitted for the degree of Doctor of Philosophy*. University of London.
- Matitaputty, C. (2016a). Desain Pembelajaran Matematika dengan Pendekatan Etnomatematika pada Materi Nilai Tempat Kelas 2 Sekolah Dasar. *Jurnal LEMMA Prodi Pendidikan Matematika STKIP PGRI Sumbar*, 3 (1), 1- 12.
- Matitaputty, C. (2016b). Miskonsepsi Siswa dalam Memahami Konsep Nilai Tempat Bilangan Dua Angka. *Jurnal Pendidikan Matematika STKIP Garut "Mosharafa"*, 5, (2), 113-119.
- Mix, K. S. dkk. (2014). Young Children's Interpretation of Multidigit Number Names: From Emerging Competence to Mastery. *National Center for Biotechnology Information Journal*, 85 (3), 1306–1319. doi: 10.1111/cdev.12197.
- Moleong, L. J. (2012). *Metodologi Penelitian Kualitatif*. Bandung: PT Remaja Rosdakarya.
- Negoro, S. T. & Harahap, B. (1983). *Ensiklopedia Matematika*. Jakarta: Ghalia Indonesia.
- Novita, R. & Putra, M. (2017). Peran Desain *Learning Trajectory* Nilai Tempat Bilangan Berbantuan Video Animasi Terhadap Pemahaman Konsep Nilai Tempat Siswa Kelas II SD. *Jurnal Pendidikan Matematika*, 11 (1), 43-56. doi: <http://dx.doi.org/10.22342/jpm.11.1.4683.43-56>.
- Nurhasanah & Assagaf, L. (2017). *Tema 5 Pengalamanku Buku Tematik Terpadu Kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Nurhasanah, Muhibba, I., & Assagaf, L. (2017). *Tema 6 Lingkungan Bersih, Sehat, dan Asri Buku Tematik Terpadu Kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Paige, D. D. dkk. (1988). *Elementary Mathematical Methods*. Macmillan USA.

- Payne, J. N. & Huinker, D. M. (1993). Early Number and Numeration. In R. J. Jensen (Ed) Research ideas for the classroom: *Early childhood mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Power, R. & Del Martello, M. F. (1997). From 834 to Eighty Thirty Four: The Reading of Arabic Numerals by Seven-year-old Children. *Mathematical Cognition Journal*, 3 (1), 63-85. doi: 10.1080/135467997387489.
- Prabawanto, S. & Rahayu, P. (2006). *Bilangan*. Bandung: UPI Press.
- Radford, L. (2008). Theories in Mathematics Education: a Brief Inquiry into Their Conceptual Differences. Working paper. Prepared for the ICMI Survey Team 7. *The notion and role of theory in mathematics education research*.
- Reys, R. dkk. (2012). *Helping Children Learn Mathematics*. USA: John Wiley & Sons, Inc.
- Rohana. (2011). Pengaruh Pembelajaran Berbasis Masalah terhadap Pemahaman Konsep Mahasiswa. *Prosiding PGRI Palembang*.
- Ross, S. (1986). The Development of Children's Place-Value Numeration Concepts in Grades Two through Five. *Paper presented at the annual meeting of the American Educational Research Association*, San Francisco.
- Ruseffendi, E. T. (1979). *Dasar-dasar Matematika Modern untuk Guru*. Bandung: Tarsito.
- Ruseffendi, E. T. (1988). *Pengajaran Matematika Modern dan Masa Kini untuk Guru dan SPG*. Bandung : Tarsito.
- Ruseffendi, E. T. (2006). *Pengantar kepada Membantu Guru Mengembangkan Kompetensinya dalam Pengajaran Matematika untuk Meningkatkan CBSA*. Bandung: Tarsito.
- Ruseffendi, E. T. (2014). *Penelitian Tindakan Kelas*. Jakarta: Kencana Prenada Media Group.
- Sanjaya, W. (2010). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Jakarta: Kencana Prenada Media Group.
- Santrock, J. W. (2002). *Life Span Development*. (Edisi Terjemahan). Jakarta: Erlangga.
- Seefeldt, C. & Wasik, B. A. (2008). Pendidikan Anak Usia Dini: Menyiapkan Anak Usia Tiga, Empat, dan Lima Tahun Masuk Sekolah. Jakarta: Indeks.

- Sierpinska, A. (2000). The 'Theory of Didactic Situations': *Lecture Notes for a Graduate Course with Samples of Students' Work*, Master in the Teaching of Mathematics, Concordia University.
- Simanjuntak, L. dkk. (1993). *Metodologi Mengajar Matematika*. PT. Rineka Cipta, Jakarta.
- Simon, M. A. (1995). Reconstructing Mathematics Pedagogy from a Constructivist Perspective. *Journal for Research in Mathematics Education*, 26 (2), 114-145. doi: 10.2307/749205.
- Simon, M. A. & Tzur, R. (2004). Explicating the Role of Mathematical Tasks in Conceptual Learning: An Elaboration of the Hypothetical Learning Trajectory. *Lawrence Erlbaum Associates, Inc.* 6 (2), 91-104. doi: https://doi.org/10.1207/s15327833mtl0602_2.
- Sinclair, A., Garin, A., & Tièche-Christinat, C. (1992). Constructing and Understanding of Place Value in Numerical Notation. *European Journal of Psychology of Education*, 7 (3), 191-207.
- Sinclair, A. & Scheuer, N. (1993). Understanding the Written Number System: 6 year-olds in Argentina and Switzerland. *Educational Studies in Mathematics*, 24 (2), 199-221.
- Sinyanyuri, S. & Assagaf, L. (2017). *Tema 7: Benda, Hewan, dan Tanaman di Sekitarku buku tematik terpadu kurikulum 2013: Buku Siswa SD /MI Kelas I* Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Soedjadi. (2007). *Masalah Kontekstual sebagai Batu Sendi Matematika Sekolah*. Surabaya: Universitas Negeri Surabaya.
- Sonnabend, T. (2010). *Mathematics for Teachers*. Canada: Nelson Education, Ltd.
- Sudaryanti. (2006). *Pengenalan Matematika Anak Usia Dini*. Yogyakarta: Fakultas Ilmu Pendidikan, Universitas Negeri Yogyakarta.
- Sugiyono. (2011). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R & D)*. Bandung: Alfabeta.
- Sugiyono. (2012). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R & D)*. Bandung: Alfabeta.
- Steinberg, R. M. (1985). Instruction on Derived Facts Strategies in Addition and Subtraction. *Journal for Research in Mathematics Education*, 16 (5), 337-355. doi: 10.2307/749356.

- Sumantri, M. & Syaodih, N. (2009). *Perkembangan Peserta Didik*. Jakarta: Universitas Terbuka.
- Surajiyo. (2007). *Ilmu Filsafah Suatu Pengantar*. Jakarta: Bumi Aksara.
- Suryadi, D. (2008). *Metapedadidaktik dalam pembelajaran matematika: Suatu strategi pengembangan diri menuju guru matematika profesional (pidato pengukuhan guru besar dalam bidang ilmu pendidikan matematika pada FPMIPA UPI, 22 Oktober 2008)*. Bandung: UPI.
- Suryadi, D. (2010). *Menciptakan Proses Belajar Aktif: Kajian dari Sudut Pandang Teori Belajar dan Teori Didaktik*. Makalah pada Seminar Nasional Pendidikan Matematika di UNP. Tidak diterbitkan.
- Suryadi, D. (2013). Didactical Design Research (DDR) to Improve the Teaching of Mathematics. *Far East Journal of Mathematics Education*, 10 (1), 145–59.
- Suryadi, D. dkk. (2009). *Metapedidaktik dalam Pembelajaran Matematika: Suatu Strategi Pengembangan Diri Menuju Guru Matematika Profesional*. Bandung: Pidato pengukuhan Guru Besar Universitas Pendidikan Indonesia.
- Tall, D. (2002). *The Psychology of Advanced Mathematical Thinking*. New York: Kluwer Academic Publishers.
- Tall, D. (2008). *The Transition to Formal Thinking in Mathematics*. *Mathematics Education Research Journal*, 20 (2), hlm. 5-24.
- Tall, D. & Vinner, S. (1981). Concept Image and Concept Definition in Mathematics, with Special Reference to Limits and Continuity. *Educational Studies in Mathematics Journal*, 12 (2), 151-169. doi: <https://doi.org/10.1007/BF00305619>.
- Taylor, L. (1993). Vygotskian Influences in Mathematics Education with Particular References to Attitude Development. *Journal Focus of Learning Mathematics*, 15 (2), 3-17.
- Thomson, I. (2000). Teaching Place Value in UK: Time for Reappraisal?. *Educational Review Journal*, 52 (3), 291-298. doi: <https://doi.org/10.1080/713664046>.
- Thuneberg, H. dkk. (2014). Conceptual change in adopting the nationwide special education strategy in Finland. *Journal of Educational Change*, 15 (1), 37-56.

- Torbeyns, J., Verschaffel, L., & Ghesquiere, P. (2004). Strategic Aspects of Simple Addition and Subtraction: the Influence of Mathematical ability. *Elsevier*, 14 (2), 177–195. doi: <https://doi.org/10.1016/j.learninstruc.2004.01.003>.
- Trianto. (2011). *Mendesain Model Pembelajaran Inovatif-Progresif*. Jakarta: Prestasi Pustaka.
- Troutman, A. P. & Lichtenberg, B. K. (1991). *Mathematics a good beginning: strategies for teaching children*. California: Wadsworth.
- 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 Journal*, 54 (1), 9-35.
- Van de Walle, J. A. (2007). *Matematika Sekolah Dasar dan Menengah*. (Edisi terjemahan). Jakarta: Erlangga.
- Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2010). *Elementary and Middle School Mathematic*. Boston: Pearson Allyn & Bacon.
- Varelas, M. & Becker, J. (1997). Children's Developing Understanding of Place Value: Semiotic Aspects. *Taylor & Francis, Ltd*, 15 (2), 265-286. doi: https://doi.org/10.1207/s1532690xci1502_4.
- Wahyuni, A. (2017). Analisis Hambatan Belajar Mahasiswa Pada Mata Kuliah Kalkulus Dasar. *Jurnal Nasional Pendidikan Matematika*, 1 (1), 10-23. doi: <http://dx.doi.org/10.33603/jnpm.v1i1.253>.
- Wahyuningrum, A. S., Suryadi, D., & Turmudi. (2017). Epistemological Obstacles on the Topic of Ratio and Proportion among Junior High School Students. *Journal of Physics*, 1-10. doi: 10.1088/1742-6596/895/1/012066.
- Warfield, V. W. (2006). *Invitation to Didactique*. Washington: University of Washington.
- Wright, R. J., Ellemor-Collins, D., & Tabor, P. D. (2012) *Developing Number Knowledge: Assessment, Teaching & Intervention with 7-11 Year Olds*. London: Sage Publications, Ltd.
- Yang, M. T. & Cobb, P. (1995). A Cross-Cultural Investigation into the Development of Place-Value Concepts of Children in Taiwan and the United States. *Journal of Educational Studies in Mathematics Journal*, 28 (1), 1-33.

Yusuf, Y. dkk. (2017). Analisis Hambatan Belajar (*Learning Obstacle*) Siswa SMP Pada Materi Statistika. *Jurnal Aksioma*, 8 (1), 76-86. doi: <http://dx.doi.org/10.26877/aks.v8i1.1509>.

Zulkardi. (2003). *Pendidikan Matematika di Indonesia: Beberapa Permasalahan dan Upaya Penyelesaiannya*. Palembang: Universitas Sriwijaya.