

DAFTAR PUSTAKA

- Abanikannda, M.O., (2016), Influence Of Problem-Based Learning In Chemistry On Academic Achievement Of High School Students In Osun State, Nigeria, *International Journal of Education, Learning and Development*, **4(3)**: 55 – 63.
- Al-tabany, T.I.B., (2014), *Mendesain Model Pembelajaran Inovatif, Progresif, dan Kontekstual*, Prenadademia, Jakarta.
- Andriawan, B., dan Budiarto, M. T., (2014) Identifikasi Kemampuan Berpikir Logis dalam Pemecahan Masalah Matematika Pada Siswa Kelas VIII -1 SMP Negeri 2 Sidoarjo, *Jurnal Ilmiah Pendidikan Matematika*, **3(2)**: 42–48.
- Arifin, Z., (2016), *Evaluasi Pembelajaran*, PT. Remaja Rosdakarya, Bandung.
- Arikunto, S., (2008), *Prosedur Penelitian Suatu Pendekatan Praktek*, Rineka Cipta, Jakarta.
- Ariyanti, B.I, Sahidu, H., Harjono, A., dan Gunawan, Pengaruh Model Direct Instruction Berbantuan Simulasi Virtual Terhadap Penguasaan Konsep Siswa, *Jurnal Pendidikan Fisika dan Teknologi*, **2(4)** : 159 – 163.
- Buchori, A., Setyosari, P., Dasna, I.W., Ulfa, S., Degeng, I.N., Sa'dijah, C., (2017), Effectiveness of Direct Instruction Learning Strategy Assisted by Mobile Augmented Reality and Achievement Motivation on Students Cognitive Learning Results, *Asian Social Science*, **13(9)** : 137 – 144.
- Chiang, W., Chiu, M.H., Chung, S.L., dan Liu, C.K., (2014), Survey of High School Students' Understanding of Oxidation-Reduction Reaction, *Journal of Baltic Science Education*, **13(5)**: 596-607.
- Ekasari, R.R., Gunawan, Sahidu, H., (2016), Pengaruh Model Pembelajaran Langsung Berbantuan Media Laboratorium Terhadap Kreatifitas Fisika Siswa SMA, *Jurnal Pendidikan Fisika dan Teknologi*, **2(3)** : 106 – 110.
- Etiubon, R. U., dan Ugwu, A. N., (2016), Problem-Based Learning and Students' Academic Achievement on Thermodynamics (A case study of University of Uyo, Akwa - Ibom state, Nigeria), *IOSR Journal of Research & Method in Education (IOSR-JRME)*, **6(5)**: 36 -41.
- Eviyanti, C.Y., Surya, E., Syahputra, E., dan Simbolon, M., (2017), Improving the Students' Mathematical Problem Solving Ability by Applying Problem Based Learning Model in VII Grade at SMPN 1 Banda Aceh Indonesia, *International Journal of Novel Research in Education and Learning*, **4(2)** : 138 – 144.

- Fathurrohman, M., (2015), *Model – Model Pembelajaran Inovatif*, Ar – Ruzz Media, Yogyakarta.
- Giac, C.C., Lian N. T.P., dan Tuan, P.N., (2017), Training Skills to Solve Some Inorganic Chemistry Exercises by Using the Graphic Method of Calculation for Teaching Chemistry in High School, *World Journal of Chemical Education*, **5(1)**: 12 – 19.
- Guñter, T. C., dan Kılınc, S., (2017), The effects of Problem-Based Learning (PBL) on the Academic Achievement of Students Studying 'Electrochemistry', *Chemistry Education Research and Practice*, **18**: 78 – 98.
- Gurses, A., Dogar, C., dan Geyik, E., (2015), Teaching Of The Concept Of Enthalpy Using Problem Based Learning Approach, *Social and Behavioral Sciences*, **197**, 2390 – 2394.
- Haider, A., (2017), Students' Performance in Chemistry in relation to their Logical Thinking Ability, *International Journal of Research*, **3(9)**: 753 – 761.
- Helling, J., LaughlinMc, T.F., Weber, K. P., Dolliver, M.P., (2016), The Effects of Direct Instruction Procedures with a Place Value Chart and Model-Lead-Test Error Correction Procedure to Teach Regrouping with Three-Digit Subtraction Accuracy: A Case Study Disabilities, *International Journal of English and Education*, **5(1)**: 391 – 402.
- Horak, A.K., dan Galluzzo, G.R., (2017), Gifted Middle School Students' Achievement and Perceptions of Science Classroom Quality During Problem Based Learning, *Journal of Advanced Academics*, **28(1)** : 28 - 50
- Irons, A., dan Thomas P., (2015), Problem Based Learning in Digital Forensics, *ITAL*, **0(0)** : 1 – 11.
- Karo – karo, A., (2012), Penerapan Model Pembelajaran Langsung Untuk Meningkatkan Aktivitas Belajar Siswa Pada Mata Pelajaran Penjaskes di Kelas X – 1 SMA Negeri 12 Medan T.A 2012/2013, *Jurnal Saintech*, **6(2)**, ISSN 2086 – 9681.
- Kemendikbud,(2013),<https://www.kemdikbud.go.id/main/blog/2016/12/peringkat-dan-capaian-pisa-indonesia-mengalami-peningkatan>, diakses 26 Januari 2016 pukul 07.56 wib.
- Kurniasih, I., dan Sani, B., (2017), *Konsep dan Pembelajaran*, Kata Pena, Yogyakarta, ISBN : 978 – 602 – 1296- 31 – 8.
- Lubis,M.A., Harahap M.B., dan Maanurung, S.R., (2017), Analisis Model Pembelajaran Scientific Inquiry Dan Kemampuan Berpikir Logis Terhadap Keterampilan Proses Sains Siswa SMA, *Jurnal Pendidikan Fisika* **6(2)** : 70 – 75.

- Maandig, R. B., Lomibao, L. S., Luna C. A., (2017), Structured Content Reading Instruction vs. Direct Instruction: Their Implication on Students' Achievement, Reading Comprehension and Critical Thinking in Mathematics, *American Journal of Educational Research*, **5(5)**: 574 – 578.
- Maharani, A., dan Laelasari, (2017), Experimentation of Spices Learning Strategies With The Method Of Problem Based Learning (PBL) to Build Motivation and The Ability to Think Logically for Vocational School Students, *Journal of Mathematics Education*, **6(2)**, ISSN 2460 – 9285.
- Major, T., (2017), Problem Based Learning Pedagogies in Teacher Education: The Case of Botswana, *Interdisciplinary Journal of Problem-Based Learning*, **12(1)** : 1 – 11.
- Mansyur, J., dan Darsikin, (2015), Enhancing Direct Instruction on Introductory Physics for Supporting Students' Mental-Modeling Ability, *International Education Studies*, **9(6)** : 32 – 44.
- Masykurni, Gani, A., dan Khaldun, I., (2016), PENERAPAN MODEL Problem Based Learning (PBL) Berbasis Komputer Untuk Meningkatkan Sikap Ilmiah dan Hasil Belajar pada Konsep Larutan Penyangga di SMA Negeri 1 Padang Tiji, **4(2)** : 83 – 95.
- Maysara, (2016), The Effectiveness Of Problem Based Learning (Pbl) Model On Students' Learning Outcomes At Class XI IPA 2 of Senior High School 5 South Konawe on The Subject of Colloid System, *International Journal of Education and Research*, **4(7)**: 493 – 504.
- Merrit, J., (2017), Problem-Based Learning in K–8 Mathematics and Science Education: A Literature Review, *Interdisciplinary Journal of Problem-Based Learning*, **11(2)** : 1 – 13.
- Mustaffa, N., Ismail, Z., Tasir, Z., Nihra, M., Said, M. H., (2016), The Impacts of Implementing Problem-Based Learning (PBL) in Mathematics: A Review of Literature, *International Journal of Academic Research in Business and Social Sciences*, **6(12)**: 490 – 503.
- NH., M. I. S., dan Winata, H., (2016), Meningkatkan Hasil Belajar Siswa Melalui Penerapan Model Pembelajaran Direct Instruction, *Jurnal Pendidikan Manajemen Perkantoran*, **1(1)**: 52 – 63.
- Ningsih, S. R., Kuswati, T. M., dan Marwati, E., (2014), *Konsep dan Penerapan Kimia SMA/ MA Kelas X*, Bumi Aksara, Jakarta.
- Nugraha, T. S., dan Mahmudi, A., (2015), Keefektifan Pembelajaran Berbasis Masalah dan Problem Posing Ditinjau dari Kemampuan Berpikir Logis dan Kritis, *Jurnal Riset Pendidikan Matematika*, **2(1)**: 107 – 120.

- Nugraha, T. S., dan Muhammad, A., (2015), Keefektifan Pembelajaran Berbasis Masalah Dan Problem Posing Ditinjau Dari Kemampuan Berpikir Logis Dan Kritis, *Jurnal Riset Pendidikan Matematika*, **2(1)**: 107 – 120.
- Oloyede, O.I., (2012), The Relationship between Acquisition of Science Process Skills, Formal Reasoning Ability and Chemistry Achievement, *IJAAAS*, **8(1)** ; 1- 4
- Pesik, W. R., Penerapan Strategi Pembelajaran Berbasis Science Technology Society Pada Materi Minyak Bumi di SMU Advant Purwodadi, *Seminar ASEAN* Februari 2016.
- PISA, (2016), <https://www.oecd.org/pisa/PISA-2015-Indonesia.pdf>, diakses 26 Januari 2018 pukul 09.00 wib
- Pohan, D., (2017), The Effect Model Inquiry Training Media and Logical Thinking Ability to Student's Science Process Skill, *Jurnal Pendidikan Fisika*, **6(1)** : 50 – 54.
- Pritandhari, M., (2017), Implementasi Model Pembelajaran Direct Instruction Untuk Meningkatkan Kemampuan Berpikir Kreatif Mahasiswa, *Jurnal Pendidikan Ekonomi*, **5(1)**: 47 – 56.
- Purnawati, H., Ashadi., Susilowati, E., (2014), Pengaruh Model Pembelajaran Kooperatif Tipe Teams Games Tournament (TGT) Dengan Media Kartu Soal dan Ular Tangga Ditinjau Dari Kemampuan Analisis Siswa Terhadap Prestasi Belajar Siswa Pada Materi Pokok Reaksi Redoks Kelas X Semester 2 SMA Muhammadiyah 1 Karang Anyar Tahun Pelajaran 2013/2014, *Jurnal Pendidikan Kimia (JPK)*, **3(4)**: 100-108.
- Purwanto, A., Sistematis Berfikir Logis Menggunakan Media Simulasi Fisik Pada Siswa Kelas X di SMA Negeri 6 Kota Bengkulu, *Prosiding Seminar Nasional Fisika (E-Journal) SNF Oktober 2015*, **4**.
- Rojanavarakul, T., dan Jaroongkhongdach, W., Exploring logical thinking through the use of logical connectors in Thai and international research articles, *Online Proceedings of the International Conference 2017*.
- Roman, Y., Gein, A., dan Gerkerova, A., (2017), Matrix Tests as a Means of the Students' Level of Logical Thinking Diagnosis, *International Journal of Higher Education*, **6(2)** : 147 – 152.
- Rosnawati, R., (2011), Berpikir Lateral Dalam Pembelajaran Matematika. Prosiding, *Seminar Nasional Penelitian, Pendidikan dan Penerapan MIPA*, Fakultas MIPA, Universitas Negeri Yogyakarta.
- Ruwaidah, T., Ashadi, Sarwanto, (2012), Pembelajaran Kimia Dengan Metode Problem Posing dan Pemberian Tugas Ditinjau Dari Kemampuan Berpikir Analisa Dan Kreativitas Siswa, *Jurnal Inkuiri*, **1(1)**: 78 – 85

- Sada, A. M., Mohd, Z. A., dan Adnan, A., (2016), Prospects of Problem-Based Learning in Building Critical Thinking Skills among Technical College Students in Nigeria, *Mediterranean Journal of Social Sciences MCSEER Publishing, Rome-Italy*, **7 (3)**, 356 – 365.
- Schettino, C., (2016), A Framework for Problem-Based Learning Teaching Mathematics with a Relational Problem Based Pedagogy, *Interdisciplinary Journal of Problem-Based Learning*, **10(2)** : 1 – 27.
- Silitonga, P. Maulim, (2011), *Statistik Teori dan Aplikasi Dalam Penelitian*, FMIPA Unimed, Medan.
- Situmorang, M., (2010), *Penelitian Tindakan Kelas (PTK) untuk Mata Pelajaran Kimia*, Universitas Negeri Medan, Medan.
- Sudarmo, U., (2016), *Kimia Untuk SMA / MA Kelas X*, Erlangga, Jakarta.
- Sugiharti, G. dan Limbong E.R., (2018), Application of Learning Model with Virtual Lab and Motivation in Learning Chemistry, *Jurnal Pendidikan Kimia*, **10**: 362 – 365.
- Sugiharti, G., (2014), *Evaluasi dan Penilaian Hasil Belajar Kimia*, Unimed Press, Medan
- Sugiharti, G., dan Hasibuan, S.K., (2106), Pengaruh Model Pembelajaran Inkuiri Dengan Dan Kemampuan Berpikir Logis Terhadap Hasil Belajar Siswa Pada Materi Laju Reaksi, *Jurnal Pendidikan Kimia*, **9(1)** : 229 -235.
- Sugiharti, G., K.H.A., dan Mukhtar, The Effect of Learning Model and Mathematical Ability into Student's Learning Outcomes in Evaluation Course of Chemistry Education State University of Medan, *AISTEEL* 2017.
- Sumarsih, Budiyo, Indriati, D., (2018), Profile Of Mathematical Reasoning Ability of 8th Grade Students Seen from Communicational Ability, Basic Skills, Connection, and Logical Thinking, *Journal of Physics: Conference Series*, Conf.Series 1008.
- Suprijono, A., (2010), *Cooperative Learning*, Pustaka Belajar, Yogyakarta.
- Surat, I.M., (2016) Pembentukan Karakter dan Kemampuan Berpikir Logis Siswa Melalui Pembelajaran Matematika Berbasis Sainifik, *Jurnal EMASAINS*, **5(1)**: 57 – 65.
- Susilowati, N., dkk.,(2013), Perbedaan Penggunaan Laboratorium Real Dan Laboratorium Virtual Pada Keterampilan Proses Dan Hasil Belajar Siswa Materi Titrasi Asam Basa, *Jurnal Pendidikan Kimia*, **2(2)**: 191- 197.

Syaribuddin, Khaldun, I., dan Musri, (2016), Penerapan Model Pembelajaran Problem Based Learning (PBL) dengan Media Audio Visual pada Materi Ikatan Kimia Terhadap Penguasaan Konsep dan Berpikir Kritis Peserta Didik SMA Negeri 1 Panga, *Jurnal Pendidikan Sains Indonesia*, **4(2)** : 96 – 105.

Tosun, C., dan Erdal, S., (2013), The Effects of Problem-Based Learning on Metacognitive Awareness and Attitudes toward Chemistry of Prospective Teachers with Different Academic Backgrounds, *Australian Journal of Teacher Education*, **38(3)**: 61 – 73.

Tsankov, N. S., (2012), Students' Motivation in The Process of Problem-Based Education in Chemistry and Environmental Sciences, *International Journal of Humanities and Social Science*, **2(21)**: 155 – 166.

Wahyugie, Y. D., dan Muchlis, (2016), Penerapan Model Problem Based Learning (PBL) Pada Materi Pokok Larutan Elektrolit Dan Nonelektrolit Untuk Melatihkan Kemampuan Pemecahan Masalah Kelas X SMA Negeri 7 Kediri, *Unesa Journal Of Chemical Education*, **5(3)**: 538 – 545.

Wenno, H., (2014), Direct Instruction Model to Increase Physical Science Competence of Students as One Form of Classroom Assesment, *International Journal of Evaluation and Research in Education (IJERE)*, **13(3)**: 169 -174.