

## DAFTAR PUSTAKA

- A'yun, D. Q., Sukarmin, & Suparni. (2015). Pengaruh pembelajaran fisika menggunakan model modified free inquiry dan guided inquiry terhadap kemampuan multirepresentasi ditinjau dari kemampuan awal dan keterampilan proses sains. *Jurnal Inkuiri*, 4(1), 1–10. Retrieved from <https://jurnal.uns.ac.id/inkuiri/article/view/9526/8456>
- Abdurrahman, Liliarsi, Rusli, A., & Waldrip, B. (2011). Implementasi pembelajaran berbasis multi representasi untuk peningkatan penguasaan konsep fisika kuantum. *Jurnal Ilmiah Pendidikan*, (1), 30–45. Retrieved from <https://journal.uny.ac.id/index.php/cp/article/view/4189/pdf>
- Alake-tuenter, E., Biemans, H. J. A., Tobi, H., Wals, A. E. J., Ooesterheert, I., & Mulder, M. (2012). Inquiry-based science education competencies of primary school teachers: A literature study and critical review of the american national science education standards. *International Journal of Science Education*, 34(17), 2609–2640. <https://doi.org/10.1080/09500693.2012.669076>
- Albe, V., Venturini, P., & Lascours, J. (2001). Electromagnetic concepts in mathematical representation of physics. *Journal of Science Education and Technology*, 10(2), 197–203. <https://doi.org/10.1023/A:1009429400105>
- Albers, R., Davison, C. J., & Johnson, B. (2015). Inquiry-based learning: Emirati university students choose WhatsApp for collaboration. *Learning and Teaching in Higer Education: Gulf Perspectives*, 14(2), 1–17. <https://doi.org/10.18538/lthe.v14.n2.275>
- Allchin, D. (2014). From science studies to scientific literacy: A view from the classroom. *Science and Education*, 23(9), 1911–1932. <https://doi.org/10.1007/s11191-013-9672-8>
- Amry, A. B. (2014). The impact of WhatsApp mobile social learning on the achievement and attitudes of female students compared with face to face learning in the classroom. *European Scientific Journal*, 10(22), 116–136. <https://doi.org/10.5539/elt.v9n2p199>
- Anggraini, B. (2017). Model Pembelajaran inquiry training menggunakan mind mapping dan kemampuan berpikir formal terhadap keterampilan proses sains. *Jurnal Pendidikan Fisika*, 6(1), 1–7. <https://doi.org/10.22611/jpf.v6i1.6337>
- Arifin, Z. (2009). *Evaluasi pembelajaran, prinsip, teknik, prosedur*. Bandung: Remaja Rosdakarya.
- Aslan, O. (2015). How do turkish middle school science coursebooks present the science process skills?. *International Journal of Environmental and Science Education*, 10(6), 829–843. <https://doi.org/10.12973/ijese.2015.279a>

- Bernstein, J. L. & Flinders, B. A. (Eds). (2016). *Enhancing teaching and learning through collaborative structure*. San Francisco: Jossey-Bass. Retrieved from <http://ebookcentral.proquest.com/lib/uny-ebooks/detail.action?docID=4789046>
- Bouhnik, D., & Deshen, M. (2014). WhatsApp goes to school: Mobile instant messaging between teachers and students. *Journal of Information Technology Education: Research*, 13, 217–231. <https://doi.org/10.1016/j.iheduc.2016.06.001>
- Brendzel, S. (2005). *Strategies for successful science teaching*. Lanham: University Press of America.
- Buxton, C. A. & Provenzo E. F. (2007). *Teaching science in elementary and middle school: A cognitive and cultural approach*. Thousand Oaks: Sage Publications.
- Cartrette, D. P., & Bodner, G. M. (2010). Non-mathematical problem solving in organic chemistry. *Journal of Research in Science Teaching*, 47(6), 643–660. <https://doi.org/10.1002/tea.20306>
- Chien, Y.-T., & Chang, C.-Y. (2012). Comparison of different instruction multimedia designs for improving student science-process skill learning. *Journal of Science Education and Technology*, 21(1), 106–113. <https://doi.org/10.1007/S10956-01>
- Cock, M. De. (2012). Representation use and strategy choice in physics problem solving. *Physical Review Special Topics-Physics Education Research*, 020117(November), 1–15. <https://doi.org/10.1103/PhysRevSTPER.8.020117>
- Dewi, I., Saragih, S., & Khairani, D. (2017). Analisis peningkatan kemampuan representasi matematis siswa sma ditinjau dari perbedaan gender. *Jurnal Didaktik Matematika*, 4(2), 115–124. <https://doi.org/10.24815/jdm.v4i2.8863>
- Duruk, U., Akgün, A., Doğan, C., & Gülsuyu, F. (2017). Examining the learning outcomes included in the turkish science curriculum in terms of science process skills: A document analysis with standards-based assessment. *International Journal of Environmental and Science Education*, 12(2), 117–142.
- Dwianto, A., Wilujeng, I., Prasetyo, Z. K., & Suryadarma, I. G. P. (2017). The development of science domain based learning tool which is integrated with local wisdom to improve science process skill and scientific attitude. *Jurnal Pendidikan IPA Indonesia*, 6(1), 23–31. <https://doi.org/10.15294/jpii.v6i1.7205>
- Ergul, R., Simsekli, Y., & Ozdilek, Z. D. (2011). The effects of inquiry-based science teaching on elementary school student's science process skills and science attitudes. *Bulgarian Journal of Science and Education Policy*, 5(1), 48–68. <https://doi.org/10.1016/j.sbspro.2010.03.170>

- Fattah, S. F. E. S. A. (2015). The effectiveness of using WhatsApp messenger as one of mobile learning techniques to develop student's writing skills. *Journal of Education and Practice*, 6(32), 115–127. <https://doi.org/10.1111/j.1365-2729.2005.00129.x>
- Ghumdia, & Adams, A. (2016). Effects of inquiry-based teaching strategy on student's science process skills acquisition in some selected biologi concepts in secondary schools in Borno state. *International Journal of Scientific Research*, I(2), 96–106. Retrieved from [journalijsr.com/content/2016/IJSR13.pdf](http://journalijsr.com/content/2016/IJSR13.pdf)
- Gultepe, N. (2016). High school science teacher's views on science process skills. *International Journal of Environmental and Science Education*, 11(5), 779–800. <https://doi.org/10.12973/ijese.2016.348a>
- Hall, C. S. & Lindzey, G. (1993). *Psikologi kepribadian 2: Teori-teori holistik (organismik-fenomenologis)* (Terjemahan Supratiknya). Yogyakarta: Kanisius. (Edisi asli diterbitkan tahun 1978 oleh John Wiley & Sons: New York).
- Hand, B., McDermott, M., & Prain, V. (Eds). (2016). *Using multimodal representations to support learning in the science classroom*. New York. Springer.
- Handayani, H. (2015). Pengaruh pembelajaran kontekstual terhadap kemampuan pemahaman dan representasi matematis siswa sekolah dasar. *Jurnal Pendidikan Guru Sekolah Dasar*, I(1), 142–149. Retrieved from <http://www.jurnalstkipsbang.ac.id/index.php/jurnal/article/view/16>
- Harahap, R., Sirait, M., & Bukit, N. (2017). The effects of inquiry training learning model assisted mind map for conceptual knowledge and science process skills. *IOSR Journal of Research and Method in Education (IOSR-JRME)*, 7(5), 26–31. <https://doi.org/10.9790/7388-0705022631>
- Hardianti, T., & Kuswanto, H. (2017). Difference among levels of inquiry : Process skills improvement at senior high school in indonesia. *International Journal of Instruction*, 10(2), 119–130. Retrieved from [http://www.e-iji.net/dosyalar/iji\\_2017\\_2\\_8.pdf](http://www.e-iji.net/dosyalar/iji_2017_2_8.pdf)
- Hifni, M., & Turnip, B. M. (2015). Efek model pembelajaran *inquiry training* menggunakan media macromedia flash terhadap keterampilan proses sains dan kemampuan berpikir logis. *Jurnal Pendidikan Fisika*, 4(1), 9–16. <https://doi.org/10.22611/jpf.v4i1.2563>
- Hisbullah & Selvi, N. (2018). *Pembelajaran ilmu pengetahuan alam di sekolah dasar*. Makassar: Aksara Timur.
- Huda, M. (2013). *Model-model pengajaran dan pembelajaran: Isu-isu metodis dan paradigmatis*. Yogyakarta: Pustaka Pelajar.

- Hutabarat, F. I., & Juliani, R. (2017). Pengaruh model pembelajaran inquiry training terhadap hasil belajar siswa pada materi pengukuran. *Jurnal Pendidikan Fisika*, 6(1), 13–19. <https://doi.org/10.24114/inpafi.v4i4.5642>
- Indahwati, T. S. J., Sunarno, W., & Sajidan. (2012). Penerapan model inquiry training melalui teknik peta konsep dan teknik puzzle ditinjau dari tingkat keberagaman aktivitas belajar dan kemampuan memori. *Jurnal Inkuiri*, 1(3), 258–265.
- Joyce, B., Weil, M., & Calhoun, E. (2011). *Model-model Pengajaran*. (Terjemahan Achmad Fawaid dan Ateilla Mirza). Yogyakarta: Pustaka Pelajar.
- Kartikawati, S., & Pratama, H. (2017). Pengaruh penggunaan WhatsApp messenger sebagai mobile learning terintegrasi metode group investigation terhadap kemampuan berpikir kritis. *Jurnal Pendidikan Teknik Elektro*, 2(2), 33–38. <http://doi.org/10.25273/jupiter.v2i2.1797>
- Katz, J. D. (2014). *Developing mathematical thinking: A guide to rethinking the mathematics classroom*. Lanham: Rowman & Littlefield.
- Kumari, U. N. & Rao, D. B. (2008). *Science process skills of school students*. New Delhi: Discovery Publishing House.
- Maknun, D., Surtikanti, R. R. H. K., Munandar, A., & Subahar, T. S. (2012). Keterampilan esensial dan kompetensi motorik laboratorium mahasiswa calon guru biologi dalam kegiatan praktikum ekologi. *Jurnal Pendidikan IPA Indonesia*, 1(2), 141–148. <https://doi.org/10.15294/jpii.v1i2.2131>
- Mbewe, S., Chabalengula, V. M., & Mumba, F. (2010). Pre-service teacher's familiarity, interest and conceptual understanding of science process skills. *Problems of Education in the 21st Century*, 22(22), 76–86. Retrieved from [www.scientiasocialis.lt/pec/files/pdf/vol22/76-86.Mbewe\\_Vol.22.pdf](http://www.scientiasocialis.lt/pec/files/pdf/vol22/76-86.Mbewe_Vol.22.pdf)
- McPadden, D., & Brewe, E. (2017). Impact of the second semester university modeling instruction course on students' representation choices. *Physical Review Physics Education Research*, 13(2), 1–15. <https://doi.org/10.1103/PhysRevPhysEducRes.13.020129>
- Morris, B. J., Croker, S., Zimmerman, C., Gill, D., & Romig, C. (2013). Gaming science: The “gamification” of scientific thinking. *Frontiers in Psychology*, 4(SEP), 1–16. <https://doi.org/10.3389/fpsyg.2013.00607>
- Mundilarto. (2013). Keefektifan pendekatan inquiry based learning untuk meningkatkan karakter peserta didik sma pada pembelajaran fisika. *Jurnal Pendidikan Matematika Dan Sains*, 24–30. Retrieved from <https://journal.uny.ac.id/index.php/jpms/article/view/12474>

- Murtono, Setiawan, A., & Rusdiana, D. (2014). Fungsi representasi dalam mengakses penguasaan konsep fisika mahasiswa. *Jurnal Riset Dan Kajian Pendidikan Fisika*, 1(2), 80–84. Retrieved from [http://journal.uad.ac.id/index.php/JRKPF/article/view/1990/pdf\\_1](http://journal.uad.ac.id/index.php/JRKPF/article/view/1990/pdf_1)
- National Research Council. (2000). *Inquiry and the national science education standards: A guide for teaching and learning*. Washington, DC: The National Academies Press.
- NCTM. (2000). *Principles and Standards for School Mathematics*. United States of America: *Library of Congress Cataloguing*.
- Nilakusumawati, D. P. E., & Susilawati, M. (2017). Minimizing student's faults in determining the design of experiment through inquiry-based learning. *IOP Conference Series: Journal of Physics*, (893), 1–5. <https://doi.org/10.13140/RG.2.1.2166.5520>
- Nilsen, T., Angell, C., & Grønmo, L. S. (2013). Mathematical competencies and the role of mathematics in physics education: A trend analysis of TIMSS advanced 1995 and 2008. *Acta Didactica Norge*, 7(1), 1–21. <https://doi.org/10.5617/adno.1113>
- Ningrum, D. J., Mahardika, I. K., & Gani, A. A. (2015). Pengaruh model quantum teaching dengan metode praktikum terhadap kemampuan multirepresentasi siswa pada mata pelajaran fisika kelas di SMA Plus Darul Hikmah. *Jurnal Pendidikan Fisika*, 4(2), 116–120. Retrieved from <https://jurnal.unej.ac.id/index.php/JPF/article/view/1873>
- Noto, M. S., Hartono, W., & Sundawan, M. D. (2016). Analysis of students mathematical representation and connection on analytical geometry subject. *Infinity Journal of Mathematics Education*, 5(2), 99–108. <https://doi.org/10.22460/infinity.v5i2.216>
- OECD. (2012). Literacy, numeracy and problem solving in technology-rich environments: Framework for the oecd survey of adult skills, OECD Publishing. Diambil pada tanggal 28 Mei 2019, dari <http://dx.doi.org/10.1787/9789264128859-en>
- Ongowo, R. O., & Indoshi, F. C. (2013). Science process skills in the kenya certificate of secondary education biology practical examinations. *Creative Education*, 4(11), 713–717. <https://doi.org/10.4236/ce.2013.411101>
- Özgelen, S. (2012). Student's science process skills within a cognitive domain framework. *Eurasia Journal of Mathematics, Science and Technology Education*, 8(4), 283–292. <https://doi.org/10.12973/eurasia.2012.846a>
- Ozturk, N., Tezel, O., & Acat, M. B. (2010). Science process skills levels of primary school seventh grade students in science and technology lesson. *Journal of Turkish Science Education*, 7(3), 15–28.

- Pandey, A., Nanda, G. K., & Ranjan, V. (2011). Effectiveness of inquiry training model over conventional teaching method on academic achievement of science students in India. *Journal of Innovative Research in Education*, 1(1), 7–20.
- Peterson, D. (1996). *Forms of representation: An interdisciplinary theme for cognitive science*. Bristol: Intellect Books.
- 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. <https://doi.org/10.22611/jpf.v6i1.6345>
- Proctor, R. W. & Capaldi, E. J. (Eds). (2012). *Psychology of science: Implicit and explicit processes*. New York: Oxford University Press.
- Putri, M. K. (2017). Pengaruh model scientific inquiry terhadap keterampilan proses sains siswa SMA ditinjau dari argumentasi ilmiah. *Jurnal Pendidikan Fisika*, 6(1), 20–26. <https://doi.org/10.22611/jpf.v6i1.6340>
- Ramadiani. (2018). E-learning and smartphone penetration. *Universitas Mulawarman*, 1–6. Retrieved from <https://www.researchgate.net/publication/324516452>
- Ramayanti, D., Utari, S., & Saepuzaman, D. (2017). Training student's science process skills through didactic design on work and energy. *Journal of Physics: Conference Series*, 1–7. <https://doi.org/10.1088/1742-6596/895/1/012110>
- Rambe, P., & Bere, A. (2013). Using mobile instant messaging to leverage learner participation and transform pedagogy at a south african university of technology. *British Journal of Educational Technology*, 44(4), 544–561. <https://doi.org/10.1111/bjet.12057>
- Ratnasari, D., Sukarmin, S., Suparmi, S., & Aminah, N. S. (2017). Student's Conception on Heat and Temperature toward Science Process Skill. *Journal of Physics: Conference Series*, 895(1), 1–6. <https://doi.org/10.1088/1742-6596/895/1/012044>
- Rauf, R. A. A., Rasul, M. S., Mansor, A. N., Othman, Z., & Lyndon, N. (2013). Inculcation of science process skills in a science classroom. *Asian Social Science*, 9(8), 47–57. <https://doi.org/10.5539/ass.v9n8p47>
- Rizky, G., Tomo, D., & Tms, H. (2014). Kemampuan multirepresentasi siswa sma dalam menyelesaikan soal-soal hukum newton. *Jurnal Pendidikan Dan Pembelajaran*, 3(8), 1–10. Retrieved from [jurnal.untan.ac.id/index.php/jpdpb/article/download/6733/6967](https://jurnal.untan.ac.id/index.php/jpdpb/article/download/6733/6967)

- Safi'isrofiyah, Budiasih, E., & Wonorahardjo, S. (2016). WhatsApp (WA) pada pembelajaran kimia untuk meningkatkan motivasi dan hasil kognitif pada materi stokiometri. *Pros. Semnas. Pend. IPA Pascasarjana UM*, 3, 681-687. Retrieved from [pasca.um.ac.id/wp-content/uploads/2017/02/Safiisrofiyah-681-687.pdf](http://pasca.um.ac.id/wp-content/uploads/2017/02/Safiisrofiyah-681-687.pdf)
- Savinainen, A., Nieminen, P., Mäkynen, A., & Viiri, J. (2013). Teaching and evaluation materials utilizing multiple representations in mechanics. *Physics Education*, 48(3), 372–377. <https://doi.org/10.1088/0031-9120/48/3/372>
- Setiyawati, S. F., & Kuswanto, H. (2015). Pengembangan buku pedoman guru pada pembelajaran fisika sma menggunakan model problem solving level inkuiri. *Jurnal Inovasi Pendidikan IPA*, 1(2), 225–236. Retrieved from <https://journal.uny.ac.id/index.php/jipi/article/view/7509/6503>
- Settlage, J. & Southerland, S. A. (2007). *Teaching science to every child: Using culture as a starting point*. London: Rotledge.
- Siahaan, P., Suryani, A., Kaniawati, I., Suhendi, E., & Samsudin, A. (2017). Improving student's science process skills through simple computer simulations on linear motion conceptions. *Journal of Physics: Conference Series*, 812(1), 1–5. <https://doi.org/10.1088/1742-6596/812/1/012017>
- Silitonga, P., Harahap, M. B., & Derlina. (2016). Pengaruh model pembelajaran inquiry training dan kreativitas terhadap keterampilan proses sains. *Jurnal Pendidikan Fisika*, 5(1), 44–50. Retrieved from <https://media.neliti.com/media/publications/121474-ID-effect-of-inquiry-training-learning-mode.pdf>
- Sirait, R. (2012). Pengaruh model pembelajaran inquiry training terhadap hasil belajar siswa pada materi pokok usaha dan energi kelas VIII MTS N-3 Medan. *Jurnal Pendidikan Fisika*, 1(1), 21–26. <https://doi.org/10.22611/jpf.v1i1.3377>
- Sudjana, N. (2014). *Penelitian Hasil Proses Belajar Mengajar*. Bandung: PT Remaja Rosdakarya.
- Suhandi, A., & Wibowo, F. C. (2012). Pendekatan multirepresentasi dalam pembelajaran usaha-energi dan dampak terhadap pemahaman konsep mahasiswa. *Jurnal Pendidikan Fisika Indonesia*, 8, 1–7. <https://doi.org/10.15294/jpfi.v8i1.1988>
- Sulastri, Marwan, & Duskri, M. (2017). Kemampuan representasi matematis siswa SMP melalui pendekatan pendidikan matematika realistik. *Jurnal Tadris Matematika*, 10(1), 51–69. <https://doi.org/10.20414/betajtm.v10i1.101>
- Supardie, D. & Deni D. (2013). *Komunikasi pembelajaran*. Bandung: PT Remaja Rosdakarya.

- Suparno, P. (2007). *Metodologi pembelajaran fisika konstruktivistik dan menyenangkan*. Yogyakarta: USD.
- Ta'amneh, M. A. A. A. (2017). The effect of using WhatsApp messenger in learning english language among university students. *International Research in Education*, 5(1), 143–151. <https://doi.org/10.5296/ire.v5i1.10801>
- Treagust, D. F., Duit, R., & Fischer, H. E. (Eds). (2017). *Multiple representations in physics education*. New York: Springer.
- Tuminaro, J., & Redish, E. F. (2003). Understanding Student's poor performance on mathematical problem solving in physics. *Physics Education Research Conference*, 113-116. <https://doi.org/10.1063/1.1807267>
- Turnip, B., Wahyuni, I., & Tanjung, Y. I. (2016). The effect of *inquiry training* learning model based on just in time teaching for problem solving skill. *Journal of Education and Practice*, 7(15), 177–181.
- Tipler, P. A. 1991. *Fisika untuk Sains dan Teknik Edisi Ketiga Jilid 1*. (Terjemahan Lae Prasetio). Jakarta: Erlangga.
- Uno, H. B. & Nurdin M. (2013). *Belajar dengan pendekatan PAILKEM: Pembelajaran aktif, inovatif, lingkungan, kreatif, efektif, menarik*. Jakarta: Bumi Aksara.
- Vanaja, M. (2003). *Inquiry training model*. New Delhi: Discovery Publishing House.
- Vazquez-cano, E. (2014). Mobile distance learning with *smartphones* and apps in higher education. *Educational Sciences: Theory & Practice*, 14(4), 1505–1520. <https://doi.org/10.12738/estp.2014.4.2012>
- Wena, M. (2009). *Strategi pembelajaran inovatif kontemporer: Suatu tinjauan konseptual operasional*. Jakarta: Bumi Aksara.
- Widakdo, W. A. (2017). Mathematical representation ability by using project based learning on the topic of statistics. *Journal of Physics: Conference Series*, 1–7. <https://doi.org/10.1088/1742-6596/895/1/012055>
- Wilke, R. R., & Straits, W. J. (2005). Practical advice for teaching inquiry-based science process skills in the biological sciences. *The American Biology Teacher*, 67(9), 534–540. [https://doi.org/10.1662/0002-7685\(2005\)067\[0534:PAFTIS\]2.0.CO;2](https://doi.org/10.1662/0002-7685(2005)067[0534:PAFTIS]2.0.CO;2)
- Yang, K.-Y., & Heh, J.-S. (2007). The Impact of internet virtual physics laboratory instruction on the achievement in physics, science process skills and computer attitudes of 10th-grade students. *Journal of Science Education and Technology*, 16(5), 451–461. <https://doi.org/10.1007/s10956-007-9062-6>



- Yildirim, M., Calik, M., & Ozmen, H. (2016). A meta-synthesis of turkish studies in science process skills. *International Journal of Environmental and Science Education*, *11*(14), 6518–6539. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1115726.pdf>
- Yuwono, M. R., & Syaifuddin, M. W. (2017). Pengembangan problem based learning dengan assessment for learning berbantuan smartphone dalam pembelajaran matematika. *Jurnal Tadris Matematika*, *10*(2), 184–202. <https://doi.org/10.20414/betajtm.v10i2.116>
- Zengin, B., Arikan, A., & Dogan, D. (2011). Opinions of english major students about their department's websites. *Contemporary Educational Technology*, *2*(4), 294–307. Retrieved from <https://files.eric.ed.gov/fulltext/ED527861.pdf>