

## DAFTAR PUSTAKA

- Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for Learning: Methods and Development* (3rd Editio). Pearson Education Company.
- Ansarian, L., & Teoh, M. L. (2018). *Problem-based language learning and teaching*. [https://doi.org/10.1007/978-981-13-0941-0\\_2](https://doi.org/10.1007/978-981-13-0941-0_2)
- Arends, R. I. (2015). *Learning to teach* (tenth). McGraw-Hill Education.
- Argaw, A. S., Haile, B. B., Ayalew, B. T., & Kuma, S. G. (2017). The effect of problem based learning (PBL) instruction on students' motivation and problem solving skills of physics. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(3), 857–871. <https://doi.org/10.12973/eurasia.2017.00647a>
- Asunda, P. A., & Walker, C. (2019). Integrated STEM: Views and Challenges of Engineering and Technology Education K-12 Teachers. *Career and Technical Education Research*, 43(2), 179–194. <https://doi.org/10.5328/cter43.2.179>
- Azizah, R., Yuliati, L., & Latifah, E. (2015). Kesulitan Pemecahan Masalah Fisika Pada Siswa Sma. *Jurnal Penelitian Fisika Dan Aplikasinya (JPFA)*, 5(2), 44. <https://doi.org/10.26740/jpfa.v5n2.p44-50>
- Bano, M., Zowghi, D., Kearney, M., Schuck, S., & Aubusson, P. (2018). Mobile learning for science and mathematics school education: A systematic review of empirical evidence. *Computers and Education*. <https://doi.org/10.1016/j.compedu.2018.02.006>
- Bartling, M., Steven, S., Eitzinger, A., & Atzmanstorfer, K. (2016). Press the Button: Online/Offline Mobile Applications in an Agricultural Context. *GI Forum*, 1, 106–116. <https://doi.org/10.1553/giscience2016>
- Bates, T. A. . (2005). *Technology, e-learning and distance education* (Second). Routledge.
- Bencsik, A., Juhász, T., & Horváth-Csikós, G. (2016). Y and Z Generations at Workplaces. *Journal of Competitiveness*, 6(3), 90–106. <https://doi.org/10.7441/joc.2016.03.06>
- Bybee, R. W. (2013). *The Case for STEM Education: Challenges adn Opportunity*. (VI). National Science Teachers Association (NSTA) Press.
- Chiappetta, Eugene L. Koballa, T. R. (2014). *Science Instruction in the Middle and Secondary Schools: Developing Fundamental Knowledge and Skills for Teaching*. Pearson Education Inc.
- Churchill, D., Lu, J., Chiu, T. K. F., & Fox, B. (2016). Mobile Learning Design. *Mobile Learning Design: Theories and Application*, 63–82. <https://doi.org/10.1007/978-981-10-0027-0>
- Crompton, H. (2013). *A historical overview of mobile learning : Toward learner-centered education*. Routledge.
- Darmawan, D. (2016). *Buku Mobile Learning ; Sebuah Aplikasi Teknologi Pembelajaran*. PT. Raja Grafindo Persada.
- Dasilva, B. E., Ardiyati, T. K., Suparno, Sukardiyono, Eveline, E., Utami, T., & Ferty, Z. N. (2019). Development of Android-based Interactive Physics Mobile Learning Media (IPMLM) with scaffolding learning approach to improve HOTS of high school students. *Journal for the Education of Gifted Young Scientists*, 7(3), 659–681. <https://doi.org/10.17478/jegys.610377>

- Deruxes, H. (1986). *Kompendium Didaktik Fisika*. Remaja Karya.
- Dick, W., Luo, C., & Carey, J. O. (2015). *The Systematic Desin of Instruction* (Eighth Edi). Pearson.
- Ekici, E. (2016). "Why Do I Slog Through the Physics?": Understanding high school students' difficulties in learning physics. *Journal of Education and Practice*, 7(7), 95–107.
- Ellen, J., & Clarebout, G. (2008). *Theory development, handbook of research of educational communnication adn technology* (J. M. Spector (ed.)). Lawrence Erlbaum Associates.
- Elsayary, A., Forawi, S., & Mansour, N. (2015). *STEM Education and Problem-Based Learning*. January.
- Felder, R. M., & Brent, R. (2016). *Teaching and Learning STEM: a Practical Guide*. Jossey-Bass A Wiley Brand.
- Freedman, R. A., & Ford, A. L. (2008). *Sears and Zemansky's University Physics* (12th ed.). Pearson Education Inc. <https://www.pdfdrive.com/sears-and-zemanskys-univ-physics-with-mod-physics-e188261277.html>
- Gagne, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design* (4th ed.). Harcourt Brace College Publishers.
- Gall, M., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). Pearson.
- García-Martínez, I., Fernández-Batanero, J. M., Sanchiz, D. C., & de la Rosa, A. L. (2019). Using mobile devices for improving learning outcomes and teachers' professionalization. *Sustainability (Switzerland)*, 11(24), 1–12. <https://doi.org/10.3390/su11246917>
- Giancoli, D. C. (2014). *Physics: Principles with Applications*. Pearson.
- Gómez, S., Zervas, P., Sampson, D. G., & Fabregat, R. (2014). Context-aware adaptive and personalized mobile learning delivery supported by UoLmP. *Journal of King Saud University - Computer and Information Sciences*, 26(1), 47–61. <https://doi.org/10.1016/j.jksuci.2013.10.008>
- Goyal, V., Movva, R., & Kunadharaju, A. (2017). *Android based Attendance Management System Offline and Online accessibility*. 19(4), 31–36. <https://doi.org/10.9790/0661-1904043136>
- Gustafson, K. L., & Branch, R. M. (2002). *Survey of instructional development models* (4th ed.). Eric Clearinghouse on Information & Technology.
- Guzey, S. S., Moore, T. J., Harwell, M., & Moreno, M. (2016). STEM Integration in Middle School Life Science: Student Learning and Attitudes. *Journal of Science Education and Technology*, 25(4), 550–560. <https://doi.org/10.1007/s10956-016-9612-x>
- Hake, R. R. (1999). ANALYZING CHANGE/GAIN SCORES. *American Educational Research Association's Division D, Measurement and Research Methodology (Archived)*, 1(1), 16–22. <https://doi.org/10.24036/ekj.v1.i1.a10>
- Halliday, D., Resnick, R., & Walker, J. (2011). Fundamentals of Physics. In *Antimicrobial Agents and Chemotherapy* (9th ed., Vol. 53, Issue 12). John Wiley & Sons, Inc. [www.wileyplus.com](http://www.wileyplus.com)
- Han, S., Capraro, R. M., & Capraro, M. M. (2016). How science, technology, engineering, and mathematics project based learning affects high-need students in the U.S. *Learning and Individual Differences*, 51, 157–166. <https://doi.org/10.1016/j.lindif.2016.08.045>

- Han, S., Yalvac, B., Capraro, M. M., & Capraro, R. M. (2015). In-service teachers' implementation and understanding of STEM project based learning. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(1), 63–76. <https://doi.org/10.12973/eurasia.2015.1306a>
- Hannafin, M. J., & Peck, K. L. (1988). *The Design, Development, and Evaluation of Instructional Software*. Macmillan Publishing Company.
- Hung, W., Jonassen, D. H., & Liu, R. (2008). *Problem based learning. Handbook of research on educational communication and technology* (Third Edit). Routledge.
- Hurlock, E. B. (2014). Masa - Masa Remaja. In *Psikologi Perkembangan* (5th ed.). Erlangga.
- Junindar. (2017). *Xamarin Forms: Membangun Aplikasi Mobile Cross-Platform (Android, iOS & Windows)*. [www.ebooku.id](http://www.ebooku.id)
- Kattayat, S., Josey, S., & Asha, J. V. (2017). Mobile learning apps in instruction and students achievement. *International Journal of Interactive Mobile Technologies*, 11(1), 143–147. <https://doi.org/10.3991/ijim.v11i1.6420>
- Koole, M. L. (2009). Mobile Learning - A Model for Framing Mobile Learning. *Mobile Learning: Transforming the Delivery of Education and Training*, 1(2), 25–47.
- Kortemeyer, G. (2016). The Losing Battle Against Plug-and-Chug. *The Physics Teacher*, 54(1), 14–17. <https://doi.org/10.1119/1.4937964>
- Kukulska-Hulme, A. (2005). Mobile usability and user experience. In *Mobile Learning: A Handbook for Educators and Trainers*. <https://doi.org/10.4324/9780203003428>
- Likert, R. (1932). "Technique for the Measurement of Attitudes, A." In *Encyclopedia of Research Design*. <https://doi.org/10.4135/9781412961288.n454>
- Luo, Y. F., & Yang, S. C. (2016). The effect of the interactive functions of whiteboards on elementary students' learning. *Journal of Educational Computing Research*, 54(5), 680–700. <https://doi.org/10.1177/0735633115628032>
- Maulina, H., Abdurrahman, A., Sukamto, I., Kartika, N., & Nurulsari, N. (2020a). Z-generation learner characteristic and expectation in the RI 4.0 era: A preliminary research in physics teacher college in Lampung. *Journal of Physics: Conference Series*, 1572(1), 0–6. <https://doi.org/10.1088/1742-6596/1572/1/012091>
- Maulina, H., Abdurrahman, A., Sukamto, I., Kartika, N., & Nurulsari, N. (2020b). Z-generation learner characteristic and expectation in the RI 4.0 era: A preliminary research in physics teacher college in Lampung. *Journal of Physics: Conference Series*, 1572(1). <https://doi.org/10.1088/1742-6596/1572/1/012091>
- Maurer, H., & Neuhold, C. (2014). *Problem-based learning in european studies: In book teaching and learning the european union* (9th ed.). Springer Science+Business Media.
- McQuiggan, S., Kosturko, L., McQuiggan, J., & Sabourin, J. (2015). *Mobile learning: A handbook for developers, educators, and learners* (Vol. 53, Issue 9). John Wiley & Sons, Inc. <http://publications.lib.chalmers.se/records/fulltext/245180/245180.pdf%0Aht>

- <https://hdl.handle.net/20.500.12380/245180> <http://dx.doi.org/10.1016/j.jsames.2011.03.003> <https://doi.org/10.1016/j.gr.2017.08.001> <http://dx.doi.org/10.1016/j.precamres.2014.12>
- Meltzer, D. E. (2002). The relationship between mathematics preparation and conceptual learning gains in physics: A possible “hidden variable” in diagnostic pretest scores. *American Journal of Physics*, 70(12), 1259–1268. <https://doi.org/10.1119/1.1514215>
- Moallem, M., Hung, W., & Dabbagh, N. (2019). The wiley handbook of problem based learning. In *The Wiley Handbook of Problem-Based Learning*. <https://doi.org/10.1002/9781119173243.ch4>
- Mundilarto. (2010). *Penilaian Hasil Belajar Fisika*. Pusat Pengembangan Instruksional Sains.
- Nadelson, L. S., & Seifert, A. L. (2017). Integrated STEM defined: Contexts, challenges, and the future. *Journal of Educational Research*, 110(3), 221–223. <https://doi.org/10.1080/00220671.2017.1289775>
- Ngabekti, S., Prasetyo, A. P. B., Hardianti, R. D., & Teampanpong, J. (2019). The development of stem mobile learning package ecosystem. *Jurnal Pendidikan IPA Indonesia*, 8(1), 81–88. <https://doi.org/10.15294/jpii.v8i1.16905>
- Nikolopoulou, K., & Kousoglou, M. (2019). Mobile Learning in Science: A Study in Secondary Education in Greece. *Creative Education*, 10(06), 1271–1284. <https://doi.org/10.4236/ce.2019.106096>
- Parno, Yulianti, L., & Ni'mah, B. (2019). *The influence of PBL-STEM on students' problem-solving skills in the topic of optical instruments* *The influence of PBL-STEM on students' problem-solving skills in the topic of optical instruments*. <https://doi.org/10.1088/1742-6596/1171/1/012013>
- Parno, Yulianti, L., Munfaridah, N., Ali, M., Rosyidah, F. U. N., & Indrasari, N. (2020). The effect of project based learning-STEM on problem solving skills for students in the topic of electromagnetic induction. *Journal of Physics: Conference Series*, 1521(2). <https://doi.org/10.1088/1742-6596/1521/2/022025>
- Polyanin, A. D., Chernoutsan, A. I., Egorov, A. ., & Manzhirov, A. . (2011). *A concise handbook of mathematics, physics, and engineering sciences* (A. D. Polyanin & A. I. Chernoutsan (eds.)). CRC Press.
- Putranta, H., & Jumadi. (2019). Physics teacher efforts of Islamic high school in Yogyakarta to minimize students' anxiety when facing the assessment of physics learning outcomes. *Journal for the Education of Gifted Young Scientists*, 7(2), 119–136. <https://doi.org/10.17478/JEGYS.552091>
- Reiser, A. R., & Dempsey, J. V. (2018). *Trends and Issues in Instructional Design and Technology* (Fourth). Pearson Education Inc.
- Rikala, J. (2015). *Designing a Mobile Learning Framework for a Formal Educational Context* Jenni Rikala *Designing a Mobile Learning Framework for a Formal Educational Context*.
- Roblyer, M. D., & Doering, A. H. (2014). *Integrating educational technology into teaching*. Pearson.
- Savin, M.-B. (2007). Book Review: A Practical Guide to Problem-Based Learning Online. In *Interdisciplinary Journal of Problem-Based Learning*. Routledge. <https://doi.org/10.7771/1541-5015.1089>
- Seels, B., & Richey, R. (1994). *Teknologi Pembelajaran*. UNJ.

- Seemiller, Corey, M. G. (2019). *Generation Z - a century in the making*. Routledge.
- Serway, R. A., & Kirkpatrick, L. D. (1988). Physics for Scientists and Engineers with Modern Physics. In *The Physics Teacher* (Ninth Edit, Vol. 26, Issue 4). Physical Sciences: Mary Finch. <https://doi.org/10.1119/1.2342517>
- Sharples, M. (2016). *Mobile learning: The next generation* (Making sen). Routledge. <https://www.routledge.com/products/9780415658362>
- Shyshkanova, G., Zaytseva, T., & Frydman, O. (2017). Mobile technologies make education a part of everyday life. *Information and Learning Science*, 118(11–12), 570–582. <https://doi.org/10.1108/ILS-03-2017-0019>
- Siregar, E. (2018). *Pedoman Pelaksanaan Evaluasi Media Pembelajaran*. UNJ Press.
- Siregar, E., & Nara, H. (2017). *Teori Belajar dan Pembelajaran* (A. Jamaludin (ed.); Ketiga). Ghalia Indonesia.
- Smaldino, S. E., Lowther, D. L., Mims, C., & Russell, J. D. (2015). *Instructional Technology and Media For Learning*. Pearson Edison.
- Sugiyono. (2015). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*. Alfabeta.
- Tan, O. (2003). *Problem based learning innovation: Using problems to power learning in the 21st century*. Seng Lee Press.
- Tan, O. (2009). *Problem-based learning and creativity*. Cengage Learning Asia Pte Ltd.
- Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). Instructional development for training teachers of exceptional children: A sourcebook. In *Journal of School Psychology*. Indiana University. [https://doi.org/10.1016/0022-4405\(76\)90066-2](https://doi.org/10.1016/0022-4405(76)90066-2)
- Torlakson, T. (2014). Innovate A Blueprint for STEM Education - Science (CA Dept of Education). *Californians Dedicated to Education Foundation*, May, 52.
- Tseng, T. H., Tai, Y., Tsai, S. P., & Ting, Y. L. (2018). Students' self-authoring mobile App for integrative learning of STEM. *International Journal of Electrical Engineering Education*, 1–12. <https://doi.org/10.1177/0020720918800438>
- Veloo, A., Nor, R., & Khalid, R. (2015). Attitude towards physics and additional mathematics achievement towards physics achievement. *International Education Studies*, 8(3), 35–43. <https://doi.org/10.5539/ies.v8n3p35>
- Wahono, R. S. (2006). *Aspek dan kriteria penilaian media pembelajaran*. <https://romisatriawahono.net/2006/06/21/aspek-dan-kriteria-penilaian-media-pembelajaran/>
- Wang, Q. (2018). *Core Technologies in Mobile Learning*. October, 127–139. [https://doi.org/10.1007/978-981-10-6144-8\\_8](https://doi.org/10.1007/978-981-10-6144-8_8)
- Woodill, G. (2010). *The Mobile Learning Edge: Tools and Technologies for Developing Your Teams (Google eBook)*. <http://books.google.com/books?id=65bKPeCNaTEC&pgis=1>
- Zhang, Y. A. (2019). *Characteristics of Mobile Teaching and Learning*. 1–21.
- Zhuang, Y., Wang, L., & Chiang, F. (2018). The Design and Development of a Mobile Phone Application for STEM based on a Novel Engineering Approach. *International Journal of Advanced Corporate Learning (IJAC)*, 11(2), 16. <https://doi.org/10.3991/ijac.v11i2.9233>