

DAFTAR PUSTAKA

- Allen, M. F., & Allen, E. B. (2017). Mycorrhizal Mediation of Soil Fertility Amidst Nitrogen Eutrophication and Climate Change. In *Mycorrhizal Mediation of Soil: Fertility, Structure, and Carbon Storage* (pp. 213–231). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-804312-7.00012-7>
- Anderson, L., Krathwohl, D., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., Rath, J., & Wittrock, M. (2001). *A Taxonomy for Learning, Teaching, and Assessing*. David McKay Company.
- Arends, R. I. (2015). *Learning to Teach* (10th ed.). McGraw-Hill Education.
- Arends, R. I., & Kilcher, A. (2010). Teaching for student learning: Becoming an accomplished teacher. In *Teaching for Student Learning: Becoming an Accomplished Teacher*. <https://doi.org/10.4324/9780203866771>
- Battelle for Kids. (2019). *P21 Partnership for 21st Century Learning A Network of BattelleforKids*. Battelle for Kids.
- Brookhart, S. M. (2010). *How to Assess Higher-Order Thinking Skills in Your Classroom* (J. Houtz (ed.)). Scott Willis.
- Budiarti, R. S., & Harlis, D. N. (2020). High order thinking skills for biology education: Applied microbiology learning videos based on Jambi local wisdom. *Universal Journal of Educational Research*, 8(2), 689–694. <https://doi.org/10.13189/ujer.2020.080242>
- Cohen, L., Manion, L., & Morrison, K. (2007). Research Method In Education. In *Research Methods in Physical Activity and Health* (6th ediyio). Taylor and Francis.
- Diansari, A. A. R., Suratman, B., & Soejoto, A. (2017). The Effect of Problem-Based Learning Model, Learning Audio Visual Media and Internship on Student's Soft Skill. *International Journal of Academic Research in Business and Social Sciences*, 7(9), 333–341. <https://doi.org/10.6007/ijarbss/v7-i9/3329>
- Eliyasni, R., Kenedi, A. K., & Sayer, I. M. (2019). Blended Learning and Project Based Learning: The Method to Improve Students' Higher Order Thinking Skill (HOTS). *Jurnal Iqra': Kajian Ilmu Pendidikan*, 4(2), 231–248. <https://doi.org/10.25217/ji.v4i2.549>
- Fauzi, A., Ghofar, A., Wicaksono, C., Education, B., & Malang, U. M. (2021). *Biosfer: Jurnal Pendidikan Biologi to higher-thinking biology questions*. 14(2), 144–153.
- Gayatri, T., Soegiyanto, H., & Rintayati, P. (2018). Development of Contextual Teaching Learning-Based Audio Visual Adobe Flash Media to Improve Critical Thinking Ability of Geography Learning at Senior High School.

IOP Conference Series: Earth and Environmental Science, 145(1).
<https://doi.org/10.1088/1755-1315/145/1/012004>

Ghanizadeh, A., Al-Hoorie, A. H., & Jahedizadeh, S. (2020). *Second Language Learning and Teaching Higher Order Thinking Skills in the Language Classroom: A Concise Guide*. Springer Nature Switzerland.
<https://doi.org/https://doi.org/10.1007/978-3-030-56711-8>

Gultom, S. T., Siahaan, P., & Suhandi, A. (2021). Effect of PBL Hybrid Learning on the Higher Order Thinking Skills of Seventh Grade Students in Global Warming and Their Environmental Care Attitudes. *Jurnal Penelitian Pendidikan IPA*, 7(SpecialIssue), 272–280.
<https://doi.org/10.29303/jppipa.v7ispecialissue.1012>

Hake, R. R. (2002). *Analyzing Change/Gain Score*. Indiana Univ.

Hamdi, S., Suganda, I. A., & Hayati, N. (2018). Developing higher-order thinking skill (HOTS) test instrument using Lombok local cultures as contexts for junior secondary school mathematics. *Research and Evaluation in Education*, 4(2), 126–135. <https://doi.org/10.21831/reid.v4i2.22089>

Handayani, D., & Alperi, M. (2021). Problem solving learning model using video application. *Journal of Physics: Conference Series*, 1731(1).
<https://doi.org/10.1088/1742-6596/1731/1/012024>

Hasan, M., Milawati, Darodjat, & Harahap, T. (2021). *Media Pembelajaran*. Tahta Media Group.

Heong, Y. M., Othman, W. B., Yunos, J. B. M., Kiong, T. T., Hassan, R. Bin, & Mohamad, M. M. 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.
<https://doi.org/10.7763/ijssh.2011.v1i2.20>

Hung, W. (2015). Problem-Based Learning : Conception, Practice, and Future. In *Authentic Problem Solving and Learning in the 21st Century* (pp. 75–92). Springer Science Business Media Singapore 2. <https://doi.org/10.1007/978-981-287-521-1>

Ichsan, I., Sigit, D., & Miarsyah, M. (2019). Environmental Learning based on Higher Order Thinking Skills: A Needs Assessment. *International Journal for Educational and Vocational Studies*, 1(1), 21.
<https://doi.org/10.29103/ijevs.v1i1.1389>

Ichsan, I., Sigit, D., Miarsyah, M., Ali, A., Arif, W. P., & Prayitno, T. A. (2019). HOTS-AEP: Higher order thinking skills from elementary to master students in environmental learning. *European Journal of Educational Research*, 8(4), 935–942. <https://doi.org/10.12973/eu-jer.8.4.935>

Inganah, S., Darmayanti, R., & Rizki, N. (2023). Problems, Solutions, and Expectations: 6C Integration of 21 st Century Education into Learning

Mathematics. *JEMS (Journal of Mathematics and Science Education)*, 11(1), 220–238.

Jabarullah, N., & Hussain, H. (2019). The effectiveness of problem-based learning in technical and vocational education in Malaysia. *Education and Training*, 61(5), 552–567. <https://doi.org/10.1108/ET-06-2018-0129>

King, F. J. (2012). Redefining Scientific Thinking for Higher Education. In *Redefining Scientific Thinking for Higher Education*. <https://doi.org/10.1007/978-3-030-24215-2>

Komala, R., Heryanti, E., & Rinawati, A. (2021). Effect of problem-based learning model on biodiversity problem-solving skills. *Biosfer*, 14(1), 120–131. <https://doi.org/10.21009/biosferjpb.16325>

Lillo, E. (2023). Tutors' and Students' Views on Learning and Feedback in Problem-Based Learning. *European Journal of Educational Research*, 12(2), 749–758. <https://doi.org/doi.org/10.12973/eu-jer.12.2.705>

Ma, A., Bohan, D. A., Canard, E., Derocles, S. A. P., Gray, C., Lu, X., Macfadyen, S., Romero, G. Q., & Kratina, P. (2018). A Replicated Network Approach to 'Big Data' in Ecology. *Advances in Ecological Research*, 59, 225–264. <https://doi.org/10.1016/bs.aecr.2018.04.001>

Malmia, W., Makatita, S. H., Lisaholit, S., Azwan, A., Magfirah, I., Tinggapi, H., & Umanailo, M. C. B. (2019). Problem-based learning as an effort to improve student learning outcomes. *International Journal of Scientific and Technology Research*, 8(9), 1140–1143.

Mamoon-Al-Bashir, M., Kabir, M. R., & Rahman, I. (2016). The Value and Effectiveness of Feedback in Improving Students' Learning and Professionalizing Teaching in Higher Education. *Journal of Education and Practice*, 7(16), 38–41. www.iiste.org

Manurung, B., Gultom, T., & Haryati. (2017). The Effect of Learning Model on Higher Order Thinking and Student Science Process Skills in Ecology. *International Journal of Humanities, Social Sciences and Education*, 4(10), 150–155. <https://doi.org/10.20431/2349-0381.0410018>

Marganingsih, M., Hasani, A., & Riansi, E. (2022). *Increasing the Activity and Skills of Writing Hots Negotiating Text Through Audio-Visual Media*. 6(2), 100–107. <https://doi.org/https://doi.org/10.30998/jh.v6i2.1400>

Marlena, N., Dwijayanti, R., & Widayati, I. (2019). *Is Audio Visual Media Effective for Learning?* 335(ICESHum), 260–264. <https://doi.org/10.2991/icesshum-19.2019.42>

Marpanaji, E., Mahali, M. I., & Putra, R. A. S. (2018). Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants. *Journal of Physics: Conference Series*, 1140(1). <https://doi.org/10.1088/1742-6596/1140/1/012014>

- Martin, M. O., Mullis, I. V. S., Foy, P., & Hooper, M. (2016). *TIMSS 2015 International Results in Science - Eighth Grade Science*. 216.
- Moallem, M., Hung, W., & Dabbagh, N. (2019). Effect of PBL on Learning Outcomes, Knowledge Acquisition, and Higher-Order Thinking Skills. In *The Wiley Handbook of Problem-Based Learning*. John Wiley & Sons, Inc.
- Nabilah, S., Anwar, Y., & Riyanto, R. (2019). Motoric mechanism with problem based learning: impact on students' higher order thinking skill. *Biosfer*, 12(2), 182–193. <https://doi.org/10.21009/biosferjpb.v12n2.182-193>
- Naviri, S., Sumaryanti, S., & Paryadi, P. (2021). Explanatory Learning Research: Problem-Based Learning or Project-Based Learning. *Acta Facultatis Educationis Physicae Universitatis Comenianae*, 61(1), 107–121. <https://doi.org/10.2478/afepuc-2021-0010>
- Nicolaou, C., Matsiola, M., & Kalliris, G. (2019). *education sciences Technology-Enhanced Learning and Teaching Methodologies through Audiovisual Media*. 1992.
- Nofida, A., & Arif, S. (2020). the Effect of Problem Based Learning (Pbl) Model Based on Audio Visual Media To Creative Thinking Skills of Students. *INSECTA: Integrative Science Education and Teaching Activity Journal*, 1(1), 59. <https://doi.org/10.21154/insecta.v1i1.2057>
- Nur'aini, F., Ulumuddin, I., Sari, L. S., & Fujianita, S. (2021). Meningkatkan Kemampuan Literasi Dasar Siswa Indonesia Berdasarkan Analisis Data PISA 2018. *Pusat Penelitian Kebijakan*, 3, 1–10.
- Nurdyansyah. (2019). *Media Pembelajaran Inovatif*. UMSIDA Press.
- Nwankwoala, H. N. L. (2015). Causes of Climate and Environmental Changes: The Need for Environmental-Friendly Education Policy in Nigeria. *Journal of Education and Practice*, 6(30), 224–234. <https://eric.ed.gov/?id=EJ1081366>
- Pratama, A. (2018). Improving metacognitive skills using problem based learning at natural science of primary school. *Jurnal Pendidikan Biologi*, 2(11), 100–105. <https://doi.org/https://doi.org/10.21009/biosferjpb.v11n2.101-107>
- Purbarani, D. A., Dantes, N., & Adnyana, P. B. (2018). Pengaruh Problem Based Learning Berbantuan Media Audio Visual Terhadap Kemampuan Berpikir Kritis Dan Hasil Belajar Ipa Di Sekolah Dasar. *PENDASI: Jurnal Pendidikan Dasar Indonesia*, 2(1), 24–34. <https://doi.org/10.23887/jpdi.v2i1.2689>
- Puspita, I., & Raida, S. A. (2021). *Development of Video Stop Motion Graphic Animation Oriented STEAM (Science , Technology , Engineering , Arts , And Mathematics) on Global Warming Materials in Junior High School*. 4(4), 198–206.
- 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 Scientists*, 7(2), 137–158.

Ramdiah, S., Abidinsyah, H., & Mayasari, R. (2018). Problem-based learning: Generates higher-order thinking skills of tenth graders in ecosystem concept. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 4(1), 29–34. <https://doi.org/10.22219/jpbi.v4i1.5490>

Ramli, M. (2012). *Media Teknologi Pembelajaran*. Antasari Press.

Rani, W. J., Wusqo, I. U., Education, S., Program, S., Sciences, N., Semarang, U. N., & Info, A. (2021). *Journal of Environmental and Science Education Development of Problem-based Motion Graphic Video on the Global Warming Theme to practice High-Level Thinking Skills and Collaborative Ability for Junior High School Students*. 1(2), 41–51.

Retnawati, H., Djidu, H., Kartianom, Apino, E., & Anazifa, R. D. (2018). Teachers' knowledge about higher-order thinking skills and its learning strategy. *Problems of Education in the 21st Century*, 76(2), 215–230. <https://doi.org/10.33225/pec/18.76.215>

Riduwan. (2016). *Dasar-dasar Statistika*. Penerbit Alfabeta.

Rudibyani, R. B., Sofya, E., & Efkar, T. (2021). *Implementation of PBL-based Audiovisual Media to improve Students' Critical Thinking Ability*. 10(3), 139–147. <https://doi.org/10.23960/jppk.v10.i3.2021.14>

Sarwinda, K., Rohaeti, E., & Fatharani, M. (2020). The development of audio-visual media with contextual teaching learning approach to improve learning motivation and critical thinking skills. *Psychology, Evaluation, and Technology in Educational Research*, 2(2), 98. <https://doi.org/10.33292/petier.v2i2.12>

Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teaching and Learning in Nursing*, 16(1), 85–88. <https://doi.org/10.1016/j.teln.2020.09.002>

Setyani, W. A., Jumadi, & Darmawan, A. S. (2021). The Implementation of Audio Visual Media in Problem Based Learning Model to Improve the Problem Solving Skills. *Proceedings of the 6th International Seminar on Science Education (ISSE 2020)*, 541(Isse 2020), 563–568. <https://doi.org/10.2991/assehr.k.210326.081>

Simamora, R. E., Saragih, S., & Hasratuddin, H. (2018). Improving Students' Mathematical Problem Solving Ability and Self-Efficacy through Guided Discovery Learning in Local Culture Context. *International Electronic Journal of Mathematics Education*, 14(1), 61–72.

- Smaldino, S. E., Lowther, D. L., & Russel, J. D. (2014). *Instructional Technology and Media for Learning* (10th ed.). Pearson Education Limited.
- Sulastrri, A. (2017). Penerapan Model Pembelajaran Langsung Dalam Meningkatkan Kemampuan Menginterpretasi PETA. *Ilmiah Pro Guru*, 3(2), 157–165. <http://journal2.um.ac.id/index.php/jipg/article/view/19981>
- Sulastrri, & Pertiwi, F. (2020). Problem Based Learning Model Through Constextual Approach Related With Science Problem Solving Ability of Junior High School Students. *INSECTA: Integrative Science Education and Teaching Activity Journal*, 1(1), 50. <https://doi.org/10.21154/insecta.v1i1.2059>
- Sunaryo, S., Kushermawati, A., & Delina, M. (2017). *Unveil E-Module Global Warming based on Problem Based Learning to Improve Students ' Higher Order Thinking Skills (HOTS)*.
- Sutarto, Indrawati, Prihatin, J., & Dwi, P. A. (2018). Geometrical optics process image-based worksheets for enhancing students' higher-order thinking skills and self-regulated learning. *Jurnal Pendidikan IPA Indonesia*, 7(4), 376–382. <https://doi.org/10.15294/jpii.v7i4.14563>
- Syarifah, R., & Ritonga, W. (2020). Application of Problem Based Learning Model on Student Learning Outcomes on Momentum and Impulse Materials. *IPER (Indonesian Physics Education Research)*, 1(1), 19–26. <https://doi.org/10.24114/iper.v1i1.14193>
- Utami, R., Rosyida, A., Arlinwibowo, J., & Fatima, G. N. (2022). The effectivity of problem-based learning to improve the HOTS: A meta-analysis. *Psychology, Evaluation, and Technology in Educational Research*, 5(1), 43–53. <https://doi.org/10.33292/petier.v5i1.147>
- Wijiasih, R., Rusdiati, & Suhandini, P. (2019). *Application of Audio Visual Assisted Problem-based Learning Model on Problem-solving Ability , and Social Science Learning Motivation*. 8(3), 101–110. <https://journal.unnes.ac.id/sju/index.php/jess/article/view/33832>
- Yasin, Y., Syamsudin, A., Arifin, D., & Warta, W. (2021). The Effect of Audiovisual Learning System on Self-Efficacy and Critical Thinking Ability in Science Lessons on Human Digestive System Materials Science. *Journal of Sosial Science*, 2(3), 328–339. <https://doi.org/10.46799/jsss.v2i3.135>
- Yuliantaningrum, L., Sunarti, T., Fisika, J., & Surabaya, U. N. (2020). *Yuliantaningrum 2020*. 09(02), 76–82.
- Zohar, A. (2004). *Higher Order Thinking in Science Classrooms: Students' Learning and Teachers' Professional Development* (1st ed.). Springer Science Business Media.