

DAFTAR PUSTAKA

- Adeoye, M. A., Adrian, K., Indra, S., Satya, M. S., & Septiarini, N. I. (2024). *Revolutionizing Education : Unleashing the Power of the ADDIE Model for Effective Teaching and Learning*. 13(1), 202–209.
- Adha, T. Z., Asrizal, & Rahim, F. R. (2023). *Development of E-Module Integrated STEM Approach to Improve Students ' Critical and Creative Thinking Skills*. 1(2), 62–70.
- Ahlamy, S. M., Nasbey, H., & Fitri, U. R. (2025). *RANCANGAN SET PRAKTIKUM TRANSFER KALOR BERBASIS MIKROKONTROLER ARDUINO*. XIII, 48–58.
- Al-farzaq, A. A., Harmadi, H., & Elvaswer, E. (2022). *Wireless Data Logger Instrument for Indoor Acoustic Quality Measurement Based on Noise Background , Sound Distribution and Reverberation Time*. 14(1), 37–44.
- Amada, E., & Permana, H. (2025). Development of Student Worksheet for Magnetic Induction Practicum with Real-Time Data Logger Integration. *Current STEAM and Education Research*, 3(2), 89–100. <https://doi.org/10.58797/cser.030204>
- Amirudin, M. Z. Bin, Magfiroh, D. R., Savitri, I., & Rahman, S. M. I. B. (2022). *Analysis of The Application of The STEAM Approach to Learning In Indonesia : Contributions to Physics Education*. 1(1), 1–17.
- Amorim, marcio L. M., Lima, J. G., Nadia, N., Afonso, J. A., Lopes, S. F., P, P., Hartmann, L. V., Souto, C. R., Salvadori, F., Hideo, O., & Junior, A. (2024). *Open-Source Data Logger System for Real-Time Monitoring and Fault Detection in Bench Testing*.
- Anugrah, A., Herlina, K., & Suyatna, A. (2023). *Inquiry-Integrated STEM on Electronic Student Worksheet : An Effort to Stimulate Creative Thinking and Collaborative Skills*. 12(2), 251–263. <https://doi.org/10.24042/jipfalbiruni.v12i2.17306>
- Asmiliyah, Khaerudin, & Solihatin, E. (2021). *Mobile Learning with STEM Approach in Physics Learning*. 5(4), 606–613.
- Asnamawati, L., Susilowati, E., Nawati, S., & Mayasari, D. (2023). *JOTE Volume*

- 4 Nomor 4 Tahun 2023 Halaman 97-107 JOURNAL ON TEACHER EDUCATION Research & Learning in Faculty of Education Implementasi dan Evaluasi Student Centered Learning. 4, 97–107.
- Astalini, A., Darmaji, D., Kurniawan, D. A., Fitriani, R., & Pathoni, H. (2022). *Mathematics physics learning e-module : Differences in perceptions and interests based on gender*. 7(2), 226–242.
- Chiang, F. K., Zhang, Y., Zhu, D., Shang, X., & Jiang, Z. (2022). The Influence of Online STEM Education Camps on Students' Self-Efficacy, Computational Thinking, and Task Value. *Journal of Science Education and Technology*, 31(4), 461–472. <https://doi.org/10.1007/s10956-022-09967-y>
- Dikdasmen, D. (2017). *Panduan Praktis Penyusunan E-Modul*.
- Febrianti, W., Hendriansyah, E., Imani, K. A., & Harielpaniadi, M. A. (2024). Islamic Journal of Integrated Science Education (IJISE). *Islamic Journal of Integrated Science Education*, 4(1), 33–41.
- Firdaus, F., Susilawati, & Harjono, A. (2024). Validation of Physics Kit Based on Sensor and PjBL Model to Improve Students' Digital Literacy, Science Process Skills, and Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, 10(10), 7645–7651. <https://doi.org/10.29303/jppipa.v10i10.9222>
- Ghadzia, Husna, & Yanti, I. R. (2023). *The Development of Physics E-Module Based on Discovery Learning on Optics Materials in Senior High Schools*. 11(2), 161–172. <https://doi.org/10.26618/jpf.v11i2.8329>
- Herwinarso, Koswojo, J., & Pratidhina, E. (2023). *Development of an inquiry-based module with scientific equipment to facilitate primary school students learning the force concept*. 10(2), 314–322. <https://doi.org/10.20448/jeelr.v10i2.4617>
- Hikmah, N., Siregar, I. H., & Mufit, F. (2025). *The Effect of STEM Integration in Science and Physics Learning on Students' Scientific Attitudes : A Meta-Analysis*. 15(148), 175–184.
- Ibrahim, Fauzi, A., Bahtiar, & Maimun. (2024). *STEM Module Validation : Enhancing Physics Knowledge in Prospective Teacher Education*. 9(November).
- Ika, Y., & Pranyata, P. (n.d.). *KAJIAN TEORI KONSTRUKTIVIS SOSIAL DAN SCAFFOLDING DALAM*.

- Ikhwanudin, A. H., & Oktanuriawan, J. (2024). *RANCANG BANGUN DAN UJI KINERJA DATA LOGGER SUHU*. 1(1), 1–8.
- Ilma, A. Z., Utami, E., & Kusumaningtyas, D. A. (2024). *STEM-Project based Learning in Physics Concept of Measurement to Enhance High School Students ' Scientific Literacy*. 10(2), 273–284.
- Ipa, J., Putri, R. M., Studi, P., Pendidikan, M., Fmipa, F., & Padang, U. N. (2022). *Metaanalisis Efek Pendekatan STEM pada Literasi Sains dan Pemahaman Konsep Peserta Didik di Setiap Satuan Pendidikan Pendahuluan*. 6(1), 86–98. <https://doi.org/10.24815/jipi.v6i1.23897>
- Khotimah, R. P., Adnan, M., Che Ahmad, C. N., & Murtiyasa, B. (2023). The effectiveness of the STEMDISLEARN module in improving students' critical thinking skills in the differential equations course. *Cogent Education*, 10(2). <https://doi.org/10.1080/2331186X.2023.2220233>
- Komalasari, Y., Nugraha, M. E., Danim, S., & Razak, A. Z. A. (2024). *IMPLEMENTATION OF STEM LEARNING WITH A SCIENTIFIC APPROACH TO IMPROVING CRITICAL, CREATIVE THINKING, AND LEARNING OUTCOMES*. 13(2), 182–194. <https://doi.org/10.15294/jpii.v13i2.3320>
- Lase, K. S., & Sudarma, I. K. (2023). *Interactive E-Module Based on Scientific Approach in Science Content Learning for Sixth-Grade Students*. 11(2), 175–183.
- Luo, R., Li, J., Zhang, X., Tian, D., & Zhang, Y. (2024). Effects of applying blended learning based on the ADDIE model in nursing staff training on improving theoretical and practical operational aspects. *Frontiers in Medicine*, 11(June), 1–10. <https://doi.org/10.3389/fmed.2024.1413032>
- Magdalena, E., Siswaningsih, W., & Kusrijadi, A. (2023). Pengembangan Instrumen Penilaian Keterampilan Berpikir Kritis Siswa SMA Pada Praktikum Hukum Gay Lussac (Perbandingan Volume) Berbasis Virtual Lab Development of High School Student Critical Thinking Skills Assessment Instrument in Gay Lussac Law Practicu. *Jurnal Riset Dan Praktik Pendidikan Kimia*, 11(1), 65–75.
- Makahinda, T., Dungus, F., Mokalu, Y. B., Fisika, P., Matematika, F., Alam, I. P.,

- Negeri, U., Matematika, F., Alam, I. P., & Negeri, U. (2023). *SCIENING : Science Learning Journal Pengembangan Perangkat Model Experiential Learning dan*. 4(2), 200–207. <https://doi.org/10.53682/slj.v4i2.8214>
- Nasbey, H., Sabrina, P. M., Sari, N. L. K., & Muliayati, D. (2024). The Implementation of the Dilemma-STEAM Model in Fluid Dynamics Subjects through the Archimedes Screw Project. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, 10(1), 185–200. <https://doi.org/10.21009/1.10116>
- Nasbey, H., Serevina, V., & Permata, C. I. (2024). *INTERAKTIF DIGITAL MODUL BERBASIS STEM - PROBLEM BASED LEARNING (PBL) PADA MATERI ENERGI TERBARUKAN UNTUK SISWA SMA*. XII, 167–174.
- Nurulwati, Halim, A., Mailizar, Syukri, M., & Saputri, M. (2024). Identification of Students' Misconceptions to the Kinetic Gas Theory in Physics. *Jurnal Penelitian Pendidikan IPA*, 10(6), 3113–3117. <https://doi.org/10.29303/jppipa.v10i6.8018>
- Putri, C., & Warty, Y. (2024). *Development of Static Fluid Practicum Modules in the Independent Curriculum to Improve Student Learning Outcomes*. 14, 481–488.
- Raharja, E. P., Irianti, M., Lestari, R. D., & Kabes, Y. (2024). *Development of a physics experiment module based on smartphone sensors on mechanics for high school students*. 11(1), 1–10. <https://doi.org/10.12928/jrpkpf.v11i1.634>
- Rahmandhani, H., & Utami, E. (2022). *COMPARATIVE ANALYSIS OF ADDIE AND ASSURE MODEL IN DESIGNING LEARNING MEDIA APPLICATION*. 7(2), 123–138.
- Ramadhani, S. B. A., Kuncoro, E. A., & Noverdita. (2025). *Development and Performance Evaluation of Arduino-Based Environmental Monitoring System Integrating BME280 Sensor and BN-220 GPS*. 19(5), 33–42. <https://doi.org/10.24198/jt.vol19n1.5>
- Riana, M., & Anggini. (2024). *Hukum-Hukum Gas Ideal*. 3, 1–7.
- Rivas, A. M. F., Vergini, E. G., Ermann, L., & Carlo, G. G. (2025). *Ideal Gas Law for a Quantum Particle*.
- Rustamana, A., Sahl, K. H., Ardianti, D., & Syauqi, A. H. (2024). *Penelitian dan Pengembangan (Research & Development) dalam Pendidikan*. 2(3).

- Salah, A. R. M. (2025a). *Combined Gas Law : Pressure , Volume , and Temperature Relationship Combined Gas Law : Pressure , Volume , and Temperature Relationship. September*. <https://doi.org/10.13140/RG.2.2.19195.58404>
- Salah, A. R. M. (2025b). *Gay-Lussac ' s Law : Pressure-Temperature Relationship in Gases Gay- Lussac ' s Law : Pressure -Temperature Relationship in Gases. September*. <https://doi.org/10.13140/RG.2.2.34714.50886>
- Sari, D. K. (2021). Pengembangan E-Modul Praktikum Fisika Dasar 1 dengan Pendekatan STEM untuk Menumbuhkan Kemandirian Belajar. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, 5. <https://doi.org/https://doi.org/10.20961/jdc.v5i1.50560>
- Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A Comparative Study of the ADDIE Instructional Design Model in Distance Education. *Information (Switzerland)*, 13(9), 1–20. <https://doi.org/10.3390/info13090402>
- Supawan, K., Tong-on, A., Saphet, P., & Suwandee, P. (2025). *Development of Ideal Gas Kit using Pressure and Temperature Sensors via Arduino*. 24(2), 1–5. <https://doi.org/10.14416/JASET.KMUTNB.2025.02.003>
- Susanti, S. D., Yuliati, L., Purwaningsih, E., & ... (2024). Enhancing Students' Concepts Mastery in Kinetic Theory of Gases Through the STEM-Discovery Learning Model. ... *Pendidikan Fisika*, 17(2), 71–82. <https://jurnal.umpwr.ac.id/index.php/radiasi/article/view/5056%0Ahttps://jurnal.umpwr.ac.id/index.php/radiasi/article/download/5056/2321>
- Susila, A. B., Indiyahni, I., & Bakri, F. (2021). *TPACK in Blended Learning Media : Practice 4C Skills for Rotational Dynamics in Senior High TPACK in Blended Learning Media : Practice 4C Skills for Rotational Dynamics in Senior High School*. <https://doi.org/10.1088/1742-6596/2019/1/012046>
- Syahbana, I. H., Permana, H., & Mulyati, D. (2023). *Desain Alat Praktikum Pada Materi Hukum Newton Berbasis Data Logger*. 69–76. <https://doi.org/10.58797/sppkm.01.09>
- Tufino, E., & Organtini, G. (2024). Evaluation of the Effectiveness of an Introductory Mechanics Laboratory with Arduino and Smartphone. *Challenges in Physics Education, Part F3953*, 161–174. https://doi.org/10.1007/978-3-031-72541-8_11

- Wahyuni, R. T., Subagiyo, H., & Huda, A. (2023). *The Design and Construction of A Dynamic Multi-Sensor and Multi-Storage Data Logger for Weather Parameters*. 14(1), 10–17.
- Wardani, S. K., Jufriadi, A., & Kurniawati, M. (2023). *Pengembangan Media Pembelajaran E-Modul Fisika Berbasis STEAM Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa*. 5(3).
- Waruwu, M. (2024). Metode Penelitian dan Pengembangan (R&D): Konsep, Jenis, Tahapan dan Kelebihan. *Jurnal Ilmiah Profesi Pendidikan*, 9(2), 1220–1230. <https://doi.org/10.29303/jipp.v9i2.2141>
- Wati, L., Bakri, F., & Nasbey, H. (2024). *THE MODERN PHYSICS PRACTICUM MODULE IS EQUIPPED WITH VIDEOS TO TRAIN HOTS*. XII, 255–262.
- Wulandari, A., Suharno, & Fauzi, A. (2024). *Jurnal Materi dan Pembelajaran Fisika Development of Electronic Physics Modules with a Scientific Approach Using the Lectora Inspire Application in Static Fluid Materials*. 14(1), 39–51.
- Zulkarnain, T. S., & Tanjung, I. F. (2023). *STEM Based Ecosystem Module : An Effort to Improve Students ' Science Process Skill*. 56, 33–44.

Intelligentia - Dignitas