

DAFTAR PUSTAKA

- Adilah, G. P., & Rosyida, F. (2024). Peningkatan Kemampuan Berpikir Kritis Geografi: Model Pembelajaran Berbasis Masalah Berbantuan Microlearning di MAN 1 Malang. *Al Qalam: Jurnal Ilmiah Keagamaan dan Kemasyarakatan*, 18(1), 466. <https://doi.org/10.35931/aq.v18i1.2759>
- Agustini, K., & Ngarti, J. G. (2020). Pengembangan video pembelajaran untuk meningkatkan motivasi belajar siswa menggunakan model R&D. *Jurnal Imiah Pendidikan dan Pembelajaran*, 4(1), 62–78.
- Agustini, K., Santyasa, I. W., Tegeh, I. M., Santyadiputra, G. S., & Mertayasa, I. N. E. (2022). Quantum Flipped Learning and Students' Cognitive Engagement in Achieving Their Critical and Creative Thinking in Learning. *International Journal of Emerging Technologies in Learning (iJET)*, 17(18), 4–25. <https://doi.org/10.3991/ijet.v17i18.32101>
- Agustini, K., Wahyuni, D. S., Mertayasa, I. N. E., Wedhanti, N. K., & Sukrawarpala, W. (2021). Student-centered learning models and learning outcomes: Meta-analysis and effect sizes on the students' thesis. *Journal of Physics: Conference Series*, 1810(1), 012049. <https://doi.org/10.1088/1742-6596/1810/1/012049>
- Aisyah, A., Setiawan, A., & Rozak, R. W. A. (2025). Development of Information Technology Application in Education in Indonesia. *Jurnal DIALEKTIKA: Jurnal Ilmu Sosial*, 23(1), 108–126.
- Albana, L. F. A. N. F., & Sujarwo. (2021). Pengembangan e-modul interaktif untuk meningkatkan kemandirian belajar desain grafis. *Jurnal Kependidikan*, 5(2), 223–236.
- Aldosemani, T. I. (2019). Microlearning for Macro-outcomes: Students' Perceptions of Telegram as a Microlearning Tool. In T. Våljataga & M. Laanpere (Eds.), *Digital Turn in Schools—Research, Policy, Practice* (pp. 189–201). Springer Singapore.
- Ali, M. S. B., Yasmeen, R., & Munawar, Z. (2023). The Impact of Technology Integration on Student Engagement and Achievement in Mathematics Education: A Systematic Review. *International Journal on Integrated Education*, 6(3), 222–232.
- Alias, N. F., & Razak, R. A. (2023). Exploring The Pedagogical Aspects of Microlearning in Educational Settings: A Systematic Literature Review. *Malaysian Journal of Learning and Instruction*, 20(2), 267–294. <https://doi.org/10.32890/mjli2023.20.2.3>

- Alviana, M., Sukmawati, A., & Amalia, R. (2024). Pengembangan e-modul konteks lahan basah menggunakan flipbook pada materi persamaan kuadrat. *JURMADIKTA*, 4(1), 63–72. <https://doi.org/10.20527/jurmadikta.v4i1.2271>
- Amalia, Z., Yulianti, D., Rohman, F., & Nurhanurawati, N. (2023). Pengembangan E-Modul Berbasis Project Based Learning untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Kelas V. *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah*, 7(4), 1875. <https://doi.org/10.35931/am.v7i4.2739>
- Ambarwati, S., Suhartono, S., & Nurhasanah, N. (2021). Pengaruh Kepercayaan Diri dan Motivasi Belajar terhadap Kemampuan Berpikir Kritis pada Siswa Sekolah Dasar. *EDUKATIF : JURNAL ILMU PENDIDIKAN*, 3(4), 1974–1984. <https://doi.org/10.31004/edukatif.v3i4.1047>
- Ananda, O. T., Mahanal, S., & Susanto, H. (2023). Literasi Digital Siswa: Studi Deskriptif pada Pembelajaran Biologi di SMA. *Bioscientist : Jurnal Ilmiah Biologi*, 11(2), 1100. <https://doi.org/10.33394/bioscientist.v11i2.8815>
- Apriadi, R., Agustini, K., & Parwati, N. N. (2024). E-Modul Fikih Berbasis Problem Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Madrasah Ibtidaiyah. *Jurnal Media dan Teknologi Pendidikan*, 4(4), 589–596. <https://doi.org/10.23887/jmt.v4i4.83690>
- Ariadi, N. M., Parwati, N. N., & Agustini, K. (2024). Dampak Model Discovery Learning Berbantuan Media Audiovisual terhadap Keterampilan Menulis Laporan dan Minat Belajar Siswa Sekolah Menengah Atas. *Jurnal Media dan Teknologi Pendidikan*, 4(2), 183–194. <https://doi.org/10.23887/jmt.v4i2.81456>
- Ariantini, N. P. D., Sudatha, I. G. W., & Tegeh, I. M. (2019). Pengembangan Animasi Pembelajaran Berbasis Microlearning Padaa Kelas III Sekolah Dasar Mutiara Singaraja Tahun Pelajaran 2018/2019. *Jurnal EDUTECH*, 7(1), 22–32.
- Armianti, Martin, S. N., Putri, A. R., & Restu, D. A. (2025). Pelatihan Perancangan Bahan Ajar Matematika Berbasis Kontekstual untuk Guru SMK di Dharma Raya. *Jurnal Nuansa Akademik*, 10(1), 145–154.
- Artha, I. D. N. M. W., Agung, A. A. G., & Simamora, A. H. (2024). Media Video Pembelajaran Interaktif Berbasis Problem Based Learning Pada Mata Pelajaran IPAS. *Jurnal Penelitian dan Pengembangan Sains dan Humaniora*, 8(3), 327–338. <https://doi.org/10.23887/jppsh.v8i3.84831>
- Aryaningsyih, S., & Silviana, D. (2023). Penerapan Metode Jigsaw Untuk Meningkatkan Kemampuan Berpikir Kritis dan Hasil Belajar Matematika

pada Materi Persamaan Kuadrat Siswa Kelas XI Multimedia SMK Negeri 3 Kota Bima. *Griya Journal of Mathematics Education and Application*, 3(2), 273–285. <https://doi.org/10.29303/griya.v3i2.317>

Asmarawati, E. (2022). Implementation Of The Independent Curriculum In Mathematics Learning For Class X Vocational School In The Administrative City Of East Jakarta. *International Journal of Educational Research*, 3(5), 1915–1919.

Asrial, A., Syahrial, S., Maison, M., Kurniawan, D. A., & Piyana, S. O. (2020). Ethnoconstructivism E-Module to Improve Perception, Interest, and Motivation of Students in Class V Elementary School. *JPI (Jurnal Pendidikan Indonesia)*, 9(1), 30. <https://doi.org/10.23887/jpi-undiksha.v9i1.19222>

Aulia, J., Ramdani, A., & Artayasa, I. P. (2022). Pengembangan Elektronik Modul pada Mata Pelajaran IPA Materi Pencemaran Lingkungan Berbasis Inkuiri. *Journal of Classroom Action Research*, 4(3), 87–91. <https://doi.org/10.29303/jcar.v4i3.2566>

Azizah, Z., & Rachmadiarti, F. (2023). Kelayakan Teoretis E-Modul Berbasis Inkuiri Materi Perubahan Lingkungan Untuk Melatihkan Keterampilan Berpikir Kritis Siswa Kelas X. *Bioedu: Berkala Ilmiah Pendidikan Biologi*, 12(3), 842–849.

Azrai, E. P., Suryanda, A., Wulaningsih, R. D., & Sumiyati, U. K. (2020). Kemampuan Berpikir Kritis dan Literasi Sains Siswa SMA di Jakarta Timur. *EDUSAINS*, 12(1), 89–97. <https://doi.org/10.15408/es.v12i1.13671>

Baidowi, Sarjana, K., Apsari, R. A., Novitasari, D., & Kertiyan, N. M. I. (2021). Tingkat Kemampuan Berpikir Kritis Matematika Siswa Sekolah Menengah Kejuruan. *Evolusi: Journal of Mathematics and Sciences*, 5(2), 95–101.

Balasundaram, S., Mathew, J., & Nair, S. (2024). Microlearning and Learning Performance in Higher Education: A Post-Test Control Group Study. *Journal of Learning for Development*, 11(1), 1–14. <https://doi.org/10.56059/jl4d.v11i1.752>

Barana, A., Marchisio, M., & Sacchet, M. (2021). Interactive Feedback for Learning Mathematics in a Digital Learning Environment. *Education Sciences*, 11(6), 279. <https://doi.org/10.3390/educsci11060279>

Barta, A., Fodor, L. A., Tamas, B., & Szamoskozi, I. (2022). The development of students critical thinking abilities and dispositions through the concept mapping learning method – A meta-analysis. *Educational Research Review*, 37, 100481. <https://doi.org/10.1016/j.edurev.2022.100481>

- Bassham, G., Irwin, W., Nardone, H., & Wallace, J. M. (2023). *Critical thinking: A students introduction* (Seventh edition). McGraw-Hill Education.
- Baxter, K. A., Sachdeva, N., & Baker, S. (2025). The Application of Cognitive Load Theory to the Design of Health and Behavior Change Programs: Principles and Recommendations. *Health Education & Behavior*, 10901981251327185. <https://doi.org/10.1177/10901981251327185>
- Benyamin, Qohar, A., & Sulandra, I. M. (2021). Analisis Kemampuan Berpikir Kritis Siswa SMA Kelas X Dalam Memecahkan Masalah SPLTV. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 52(02), 909–922.
- Butterworth, J., & Thwaites, G. (2013). *Thinking Skills* (Full-colour edition). Cambridge University Press.
- Carroll, K. A., & Harris, C. M. (2021). Using a Repetitive Instructional Intervention to Improve Students' Higher-Order Thinking Skills. *College Teaching*, 69(2), 82–90. <https://doi.org/10.1080/87567555.2020.1823310>
- Carter, J. W., & Youssef-Morgan, C. (2022). Psychological capital development effectiveness of face-to-face, online, and Micro-learning interventions. *Education and Information Technologies*, 27(5), 6553–6575. <https://doi.org/10.1007/s10639-021-10824-5>
- Citia, E. E. (2023). *Developing critical thinking skills-infused and microlearning-based english reading materials for 8th grades* [Thesis]. Universitas Negeri Jakarta.
- Corbett, F., & Spinello, E. (2020). Connectivism and leadership: Harnessing a learning theory for the digital age to redefine leadership in the twenty-first century. *Heliyon*, 6(1), e03250. <https://doi.org/10.1016/j.heliyon.2020.e03250>
- Cottrell, S. (2023). *Critical Thinking Skills* (4th ed.). Bloomsbury Publishing Plc.
- Cui, R., & Teo, P. (2021). Dialogic education for classroom teaching: A critical review. *Language and Education*, 35(3), 187–203. <https://doi.org/10.1080/09500782.2020.1837859>
- Danuri, D., & Nurjanah, E. (2022). Pengembangan E-Modul Model Flipped Classroom Pada Pembelajaran Untuk Meningkatkan Kemampuan Penalaran Matematis Siswa Sekolah Dasar. *Edukasi: Jurnal Penelitian dan Artikel Pendidikan*, 14(2), 85–98. <https://doi.org/10.31603/edukasi.v14i2.7906>
- Dari, R. T. U., & Sudatha, I. G. W. (2022). Upaya Meningkatkan Semangat Belajar Siswa melalui E-Modul Berorientasi Discovery Learning. *Jurnal Edutech Undiksha*, 10(2), 205–214. <https://doi.org/10.23887/jeu.v10i1.43966>

- Denojean-Mairet, M., López-Pernas, S., Agbo, F. J., & Tedre, M. (2024). A literature review on the integration of microlearning and social media. *Smart Learning Environments*, 11(1), 46. <https://doi.org/10.1186/s40561-024-00334-5>
- Desnita, D., Festiyed, F., Novitra, F., Ardiva, A., & Yussavel Navis, M. (2022). The Effectiveness of CTL-based Physics E-module on the Improvement of the Creative and Critical Thinking Skills of Senior High School Students. *TEM Journal*, 802–810. <https://doi.org/10.18421/TEM112-38>
- Diachenko, I., Kalishchuk, S., Zhylin, M., Kyyko, A., & Volkova, Y. (2022). Color education: A study on methods of influence on memory. *Heliyon*, 8(11), e11607. <https://doi.org/10.1016/j.heliyon.2022.e11607>
- Dziubaniuk, O., Ivanova-Gongne, M., & Nyholm, M. (2023). Learning and teaching sustainable business in the digital era: A connectivism theory approach. *International Journal of Educational Technology in Higher Education*, 20(1), 20. <https://doi.org/10.1186/s41239-023-00390-w>
- Elpina, N., & Haris, D. (2023). Pengembangan Modul Pembelajaran Mobile Berbasis Microlearning dalam Flipbook pada Materi Sistem Persamaan Linear Dua Variabel di Kelas X di SMAN 1 Sorkam. *Journal on Education*, 5(2), 3261–3267. <https://doi.org/10.31004/joe.v5i2.994>
- Emilia, Azizah, N., & Azmi, M. R. (2023). Konsep dan Falsafah Teknologi Pendidikan. *Jurnal Pendidikan Sosial Humaniora*, 1(1), 61–71.
- Facione, P. A., & Gittens, C. A. (2016). *Think critically* (Third edition). Pearson.
- Fajjriah, N., Atiqoh, A., & Hartono, H. (2023). Pengembangan E-Modul Ajar Informatika Untuk Meningkatkan Minat Belajar Dasar Program Keahlian SMK. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 6(4), 218. <https://doi.org/10.17977/um038v6i42023p218>
- Fania, G. I., Khasanah, R. N., Salsabila, U. H., Azizah, R. H., & Listiyani, A. (2021). Urgensi Teknologi Pendidikan Dalam Peningkatan Kualitas Pembelajaran Daring. *Jurnal Pendidikan dan Kewirausahaan*, 9(2), 575–590. <https://doi.org/10.47668/pkwu.v9i2.320>
- Farida, Pratiwi, D. D., Andriani, S., Pramesti, S. I. D., Rini, J., WKuswanto, C., & Sutrisno, E. (2020). Development of Interactive Mathematics E-Module Using Visual Studio. *Journal of Physics: Conference Series*, 1467(1), 012017. <https://doi.org/10.1088/1742-6596/1467/1/012017>
- Fatmawati, C., Ramdhani, S., & Sugiarni, R. (2022). Kemampuan Berpikir Kritis Matematis dan Kemandirian Belajar Siswa SMK Melalui Pembelajaran E-

- Learning Berbantuan Whatsapp. *Jurnal PEKA (Pendidikan Matematika)*, 5(2), 122–133. <https://doi.org/10.37150/jp.v5i2.1557>
- Fidan, M. (2023). The effects of microlearning-supported flipped classroom on pre-service teachers' learning performance, motivation and engagement. *Education and Information Technologies*, 28(10), 12687–12714. <https://doi.org/10.1007/s10639-023-11639-2>
- Firdaus, M., Mukhtar, Darari, M. B., & Azis, Z. (2021). Designing Interactive Videos in Online Multivariable Calculus Course to Support Student's Critical Thinking. *Journal of Physics: Conference Series*, 1819(1), 012057. <https://doi.org/10.1088/1742-6596/1819/1/012057>
- Fisher, A. (2009). *Berpikir Kritis Sebuah Pengantar*. Erlangga.
- Fitra, J., & Maksum, H. (2021). Efektivitas Media Pembelajaran Interaktif dengan Aplikasi Powtoon pada Mata Pelajaran Bimbingan TIK. *Jurnal Pedagogi dan Pembelajaran*, 4(1), 1. <https://doi.org/10.23887/jp2.v4i1.31524>
- Fitria, T. N. (2022). Microlearning in Teaching and Learning Process: A Review. *CENDEKIA: Jurnal Ilmu Sosial, Bahasa Dan Pendidikan*, 2(4), 114–135. <https://doi.org/10.55606/cendikia.v2i4.473>
- Gao, Y., Liang, J., & Yang, J. (2025). Color Palette Generation From Digital Images: A Review. *Color Research & Application*, 50(3), 250–265. <https://doi.org/10.1002/col.22975>
- Ginting, H. K., Susanti, L. R. R., & Chotimah, U. (2022). E-Modul Pembelajaran Pada Kewenangan Lembaga-Lembaga Negara dalam Pembelajaran PPKn. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 05(03), 232–244. <https://doi.org/10.17977/um038v5i32022p232>
- Gracin, D. G., & Trupčević, G. (2022). Time as a resource in mathematics education: Teachers' perspectives. *Asian Journal for Mathematics Education*, 1(2), 162–186. <https://doi.org/10.1177/27527263221109034>
- Gregory, R. J. (2015). *Psychological Testing: History, Principles, and Applications*. Pearson. <https://books.google.co.id/books?id=YrgeoAEACAAJ>
- Gulo, S., & Harefa, A. O. (2022). Pengembangan Media Pembelajaran Interaktif Berbasis Powerpoint. *Educativo: Jurnal Pendidikan*, 1(1), 291–299. <https://doi.org/10.56248/educativo.v1i1.40>
- Hadley, G., & Boon, A. (2022). *Critical Thinking* (1st ed.). Routledge. <https://doi.org/10.4324/9780429059865>

- Hake, R. R. (1998). *Interactive-engagement vs traditional methods: A six-thousand- student survey of mechanics test data for introductory physics courses* [Research]. National Science Foundation.
- Haryanto, A., Sunaryo, & Rustana, C. E. (2021). Development of E-Module with A Scientific Approach To Improve The Student's Critical Thinking Skills At Class Xi Student High School In Optical Tools Material. *Journal of Physics: Conference Series*, 2019(1), 012002. <https://doi.org/10.1088/1742-6596/2019/1/012002>
- Hasan, Y., Andayani, Y., & Susilawati. (2025). Pengembangan E-Modul Berbasis Etnosains Alat Transportasi Cidomo Dengan Model PBL Untuk Meningkatkan Kemampuan Berpikir Kritis Dan Kemampuan Pemecahan Masalah. *Jurnal Pendidikan, Sains, Geologi, dan Geofisika*, 6(2), 1033–1044. <https://doi.org/10.29303/Goescienceed.v6i2.994>
- Hati, F. K., & Setiaji, B. (2024). Pengembangan E-Modul Fisika Untuk Meningkatkan Kemandirian Belajar dan Kemampuan Berpikir Kritis Peserta Didik. *Junal Pendidikan Fisika*, 11(1), 56–65.
- Heliawati, L., Lidiawati, L., & Pursitasari, I. D. (2022). Articulate Storyline 3 multimedia based on gamification to improve critical thinking skills and self-regulated learning. *International Journal of Evaluation and Research in Education (IJERE)*, 11(3), 1435. <https://doi.org/10.11591/ijere.v11i3.22168>
- Hidayati, A., M. Tamrin, Arlina Yuza, & Ade Sri Madona. (2022). Pengembangan E-Modul Berbasis Nilai-Nilai Pendidikan Multikultural di Sekolah Dasar Islam. *Jurnal Pendidikan Agama Islam Al-Thariqah*, 7(2), 409–427. [https://doi.org/10.25299/al-thariqah.2022.vol7\(2\).10851](https://doi.org/10.25299/al-thariqah.2022.vol7(2).10851)
- Hlazunova, O. H., Schlauderer, R., Korolchuk, V. I., Voloshyna, T. V., & Saiapina, T. P. (2024). Microlearning technology based on video content: Advantages, methodology and quality factors. *Journal of Physics: Conference Series*, 2871(1), 012028. <https://doi.org/10.1088/1742-6596/2871/1/012028>
- Islahiyah, I., Pujiastuti, H., & Mutaqin, A. (2021). Pengembangan E-Modul dengan Model Pembelajaran Berbasis Masalah Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 10(4), 2107. <https://doi.org/10.24127/ajpm.v10i4.3908>
- Izzania, R. A., Sumarni, W., & Harjono, H. (2024). Pengembangan E-Modul Ajar Kimia Hijau Bermuatan Etno-STEM Berbasis Guided Inquiry untuk Membekali Kemampuan Berpikir Kritis Peserta Didik. *Jurnal Inovasi Pendidikan Kimia*, 18(1), 7–16. <https://doi.org/10.15294/jipk.v18i1.46536>

- Javorcik, T., Kostolanyova, K., & Havlaskova, T. (2023). Microlearning in the Education of Future Teachers: Monitoring and Evaluating Students' Activity in a Microlearning Course. *Electronic Journal of E-Learning*, 21(1), 13–25. <https://doi.org/10.34190/ejel.21.1.2623>
- Jayanti, M. A., & Pertiwi, K. R. (2023). Pengembangan e-modul berbasis pbl untuk meningkatkan kemampuan analisis dan rasa ingin tahu siswa. *JINoP (Jurnal Inovasi Pembelajaran)*, 9(1), 112–127. <https://doi.org/10.22219/jinop.v9i1.23178>
- Jumhur, A. A., Avianti, R. A., Nurfitri, P. E., & Mahir, I. (2024). Implementation of Problem-based Learning to Improve Critical Thinking Ability of Vocational Students in Jakarta. *European Journal of Education and Pedagogy*, 5(5), 16–24. <https://doi.org/10.24018/ejedu.2024.5.5.860>
- Kalyuga, S. (2014). The Expertise Reversal Principle in Multimedia Learning. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (2nd ed., pp. 576–597). Cambridge University Press; Cambridge Core. <https://doi.org/10.1017/CBO9781139547369.028>
- Kapp, K. M., & Defelice, R. A. (2019). *Microlearning: Short and Sweet*. ATD Press.
- Khasanah, N. I., & Khaerunnisa, E. (2024). Pengembangan E-Modul Berbasis Problem Based Learning (PBL) Untuk Mendukung Literasi Numerasi Siswa. *Jurnal Pendidikan Tambusai*, 8(2), 18401–18411.
- Khoirunnisa, A. F., Iriawan, S. B., & Giwangsa, S. F. (2024). Pengembangan Bahan Ajar Digital Berbasis Microlearning dalam Pembelajaran Matematika di Sekolah Dasar. *Jurnal Pendidikan Guru Sekolah Dasar*, 9(1), 31–37.
- Kholifah, S. N., Sasomo, B., & Mashuri, A. (2024). Pengembangan E-Modul Berbasis Reciprocal Teaching untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik pada Matriks. *Jurnal Jendela Matematika*, 2(01), 55–66. <https://doi.org/10.57008/jjm.v2i01.577>
- Khuzaini, N. Q., & Hidayati, K. (2024). Komparasi minat belajar siswa kelas III di MI Ma'Arif Mayak Ponorogo dengan menggunakan alat peraga. *Indonesian Mathematics Education Journal*, 01(1), 11–22.
- Kresnadi, K. A., I Gede Margunayasa, & I Wayan Widian. (2022). Video Pembelajaran Perubahan Wujud Benda pada Pembelajaran IPA Kelas V SD Gugus III Kecamatan Buleleng. *Mimbar Pendidikan Indonesia*, 2(3), 241–254. <https://doi.org/10.23887/mpi.v2i3.44478>
- Kuras, P. (2023). *Penelitian dan Pengembangan*. Yrama Widya.

- Kurniawan, F. A., Nurfahrudianto, A., & Yohanie, D. D. (2023). Kemampuan berpikir kritis matematis ditinjau dari hasil belajar siswa. *Jurnal Ilmiah Pendidikan Citra Bakti*, 10(3), 636–649. <https://doi.org/10.38048/jipcb.v10i3.2077>
- Kurniawan, R. & Syafriani. (2021). The validity of e-module based on guided inquiry integrated ethnoscience in high school physics learning to improve students' critical thinking. *Journal of Physics: Conference Series*, 1876(1), 012067. <https://doi.org/10.1088/1742-6596/1876/1/012067>
- Kushendriawan, M. A., Santoso, H. B., Putra, & Martin Schrepp. (2021). Evaluating User Experience of a Mobile Health Application 'Halodoc' using User Experience Questionnaire and Usability Testing. *Jurnal Sistem Informasi*, 17(1), 58–71. <https://doi.org/10.21609/jsi.v17i1.1063>
- Laili, I. (2019). Efektivitas Pengembangan E-Modul Project Based Learning Pada Mata Pelajaran Instalasi Motor Listrik. *Jurnal Ilmiah Pendidikan dan Pembelajaran*, 3(3), 3.
- Laraphaty, N. F. R., Riswanda, J., Anggun, D. P., Maretha, D. E., & Ulfa, K. (2021). Review: Pengembangan Media Pembelajaran Modul Elektronik (E-Modul). *Prosiding Seminar Nasional Pendidikan Biologi 2021*, 145–156.
- Lastri, Y. (2023). Pengembangan dan pemanfaatan bahan ajar e-modul dalam proses pembelajaran. *Jurnal Citra Pendidikan*, 3(3), 1139–1146. <https://doi.org/10.38048/jcp.v3i3.1914>
- Lee, Y.-M., Jahnke, I., & Austin, L. (2021). Mobile microlearning design and effects on learning efficacy and learner experience. *Educational Technology Research and Development*, 69(2), 885–915. <https://doi.org/10.1007/s11423-020-09931-w>
- Lestari, D., Haryani, S., & Sumarti, S. S. (2020). Analysis of Critical Thinking Skills in Vocational High School Automotive Engineering Students. *Journal of Innovative Science Education*, 9(1), 103–108.
- Lestari, K. I., & Yudhanegara, M. R. (2015). *Penelitian Pendidikan Matematika* (1st ed.). PT Refika Aditama.
- Lestari, N. P. A. D., Adrianus, I. W. I. Y., & Simamora, A. H. (2024). E-Modul Berbasis Pendekatan Saintifik pada Tema 6 Kelas VI Sekolah Dasar. *Jurnal Media dan Teknologi Pendidikan*, 4(1), 80–87. <https://doi.org/10.23887/jmt.v4i1.59803>
- Lestari, N. P. Y., Arnyana, I. B. P., & Candiasa, I. M. (2024). Pengembangan Media Interaktif Berbasis Web Untuk Meningkatkan Hasil Belajar Sistem Organ

- Manusia. *PENDASI Jurnal Pendidikan Dasar Indonesia*, 8(1), 54–68.
https://doi.org/10.23887/jurnal_pendas.v8i1.3127
- Lestari, V. A., & Iryanti, S. S. (2024). Abad 21: Strategi Guru dalam Meningkatkan Kemampuan Berpikir Kritis Siswa pada Pembelajaran PAI melalui Literasi Digital. *Jurnal Pendidikan Tambusai*, 8(1), 6155–6165.
- Lin, Y. (2018). *Developing Critical Thinking in EFL Classes*. Springer Singapore.
<https://doi.org/10.1007/978-981-10-7784-5>
- Lingle, W. (2024). Teaching Critical Thinking Skills to EFL Learners via Micro-Lessons: In P. Ilic (Ed.), *Advances in Educational Technologies and Instructional Design* (pp. 214–233). IGI Global.
<https://doi.org/10.4018/979-8-3693-0195-1.ch012>
- Luo, H., & Li, W. (2025). Impact of microlearning on developing soft skills of university students across disciplines. *Frontiers in Psychology*, 16, 1491265. <https://doi.org/10.3389/fpsyg.2025.1491265>
- Lutfiana, D. (2022). Penerapan Kurikulum Merdeka Dalam Pembelajaran Matematika SMK Diponegoro Banyuputih. *VOCATIONAL: Jurnal Inovasi Pendidikan Kejuruan*, 2(4), 310–319.
<https://doi.org/10.51878/vocational.v2i4.1752>
- Maniq, L. N. K., Karma, I. N., & Rosyidah, A. N. K. (2022). Pengembangan E-Modul Matematika Pada Materi Pecahan. *Journal of Classroom Action Research*, 4(1), 83–88.
- Mardatillah, O., & Prayudha, S. J. (2024). The Importance Of Critical Thinking Skill To Vocational Students: Strategies And Benefits. *VOCATECH: Vocational Education and Technology Journal*, 5(2), 115–125.
<https://doi.org/10.38038/vocatech.v5i2.136>
- Margaretha, L., Pasaribu, F. T., & Ramalisa, Y. (2024). Pengembangan E-LKPD Berbasis STEM Berbantuan Video Animasi untuk Meningkatkan Kemampuan Berpikir Kritis Siswa SMA. *JURNAL PENDIDIKAN MIPA*, 14(1), 90–98. <https://doi.org/10.37630/jpm.v14i1.1475>
- Marti, N. W., I Gusti Putu Suharta, Ketut Agustini, I Komang Sudarma, I Nyoman Saputra Wahyu Wijaya, & Luh Putu Tuti Ariani. (2024). Development of the proposed microlearning-based dynamic intellectual learning system to actualize an effective learning process in online environment. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 21(1), 57–68.
<https://doi.org/10.23887/jptkuniksha.v21i1.75672>

- McNeill, L., & Fitch, D. (2023). Microlearning through the Lens of Gagne's Nine Events of Instruction: A Qualitative Study. *TechTrends*, 67(3), 521–533. <https://doi.org/10.1007/s11528-022-00805-x>
- Mertayasa, I. N. E. (2019). E-Modul Interaktif Berorientasi VAK Content Mata Pelajaran Komunikasi Data. *Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI)*, 8(3), 208–217.
- Mirayani, P., Widana, I. W., & Purwati, N. K. R. (2021). Pengaruh Model Pembelajaran Problem Solving dan Kemampuan Berpikir Kritis Terhadap Hasil Belajar Matematika Siswa Kelas XI SMA Negeri 7 Denpasar Tahun Pelajaran 2020/2021. *Jurnal Widyadari*, 22(2), 429–438. <https://doi.org/10.5281/ZENODO.5550337>
- Mohammad Hosseini, H., Ejtehad, A., & Mohammad Hosseini, M. (2020). Flipping Microlearning-based EFL Classroom to Enhance Learners' SelfRegulation. *Language Teaching Research Quarterly*, 20, 43–59. <https://doi.org/10.32038/ltrq.2020.20.03>
- Monib, W. K., Qazi, A., & Apong, R. A. (2025a). Mapping microlearning development and trends across diverse contexts: A bibliometric analysis (2007–2023). *Interactive Learning Environments*, 33(3), 1865–1910. <https://doi.org/10.1080/10494820.2024.2402556>
- Monib, W. K., Qazi, A., & Apong, R. A. (2025b). Microlearning beyond boundaries: A systematic review and a novel framework for improving learning outcomes. *Heliyon*, 11(2), e41413. <https://doi.org/10.1016/j.heliyon.2024.e41413>
- Munawarah, N., Khaerudin, & Kusumawardani, D. (2024). Efektivitas Integrasi Microlearning dalam Model Blended Learning untuk Meningkatkan Hasil Belajar: Systematic Literature Review. *Didaktika: Jurnal Kependidikan*, 13(4), 5439–5448.
- Mutmainnah, Aunurrahman, & Warneri. (2021). Efektivitas Penggunaan E-Modul Terhadap Hasil Belajar Kognitif Pada Materi Sistem Pencernaan Manusia Di Madrasah Tsanawiyah. *Jurnal Basicedu*, 5(3), 1625–1631. <https://doi.org/10.31004/basicedu.v5i3.952>
- Naiditch, F. (Ed.). (2017). *Developing critical thinking: From theory to classroom practice* (1st ed.). Rowman & Littlefield, a wholly owned subsidiary of The Rowman & Littlefield Publishing Group, Inc.
- Nainggolan, S. S., Putri Johan, D. H., & Purwanto, A. (2023). Analisis Kemampuan Berpikir Kritis Siswa Pada Materi Dinamika Rotasi dan Keseimbangan Benda Tegar di SMAN 7 Kota Bengkulu. *Jurnal Penelitian Pembelajaran Fisika*, 14(1), 39–48. <https://doi.org/10.26877/jp2f.v14i1.13617>

- Ngu, B. H., Phan, H. P., Usop, H., & Hong, K. S. (2023). Instructional efficiency: The role of prior knowledge and cognitive load. *Applied Cognitive Psychology*, 37(6), 1223–1237. <https://doi.org/10.1002/acp.4117>
- Nilson, L. B., & Zimmerman, B. J. (2023). *Creating Self-Regulated Learners: Strategies to Strengthen Students' Self-Awareness and Learning Skills* (1st ed.). Routledge. <https://doi.org/10.4324/9781003443803>
- Nitiasih, P. K., Santosa, M. H., Suarcaya, P., & Ratnaya, G. (2024). Micro Learning Media for Teaching English at Junior High School Students. *Journal of Education Technology*, 7(4), 629–635. <https://doi.org/10.23887/jet.v7i4.69627>
- Norsalam, A., & Rani, A. (2024). Penerapan E-Modul Pembelajaran Exe Learning Sebagai Website Responsive Digital dalam Membangun Pengetahuan Teks Eksplanasi Pada Pembelajaran Bahasa Indonesia. *Didaktika: Jurnal Kependidikan*, 13(4), 5677–5688.
- Novianingsih, G. A., Suharta, I. G. P., & Astawa, I. W. P. (2023). Pengembangan modul berbasis pendekatan analitik sintetik pada materi bangun ruang sisi datar untuk meningkatkan kemampuan berpikir kritis matematika. *Jurnal Pendidikan dan Pembelajaran Matematika Indonesia*, 12(1), 60–71. <https://doi.org/10.23887/jppmi.v12i1.982>
- Nowak, G., Speed, O., & Vuk, J. (2023). Microlearning activities improve student comprehension of difficult concepts and performance in a biochemistry course. *Currents in Pharmacy Teaching and Learning*, 15(1), 69–78. <https://doi.org/10.1016/j.cptl.2023.02.010>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory 3E*. Tata McGraw-Hill Education. https://books.google.co.id/books?id=_6R_f3G58JsC
- Nurfazirah, Fitriani, V., & Susanti, D. (2023). Pengembangan Media Pembelajaran Berbentuk Microlearning Pada Materi Keanekaragaman Hayati. *Jurnal Pendidikan, Sains, dan Teknologi*, 2(4), 1060–1070.
- Nurissamawati, B., Yuniawatika, Y., & Mas'ula, S. (2024). E-module development using problem-based learning approach to learn data processing in training students' critical thinking. *JINoP (Jurnal Inovasi Pembelajaran)*, 10(1), 62–79. <https://doi.org/10.22219/jinop.v10i1.28626>
- Nurlina, Nurfadilah, & Bahri, A. (2021). *Teori Belajar dan Pembelajaran*. LPP UNISMUH MAKASSAR.
- Nurpatri, Y., Muliani, D., & Indrawati, E. S. (2021). Implementation of constructivism approach in physics learning on students' critical thinking

- ability of junior high school students. *Journal of Physics: Conference Series*, 1876(1), 012068. <https://doi.org/10.1088/1742-6596/1876/1/012068>
- Oksa, S., & Soenarto, S. (2020). Pengembangan e-modul berbasis proyek untuk memotivasi belajar siswa sekolah kejuruan. *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, 4(1), 99–111. <https://doi.org/10.21831/jk.v4i1.27280>
- Oktarina, R., Fitria, Y., Ahmad, S., & Zen, Z. (2023). Development of STEM-Oriented E-Modules to Improve Science Literacy Ability of Elementary School Students. *Jurnal Penelitian Pendidikan IPA*, 9(7), 5460–5465. <https://doi.org/10.29303/jppipa.v9i7.4503>
- Pagau, D. A., & Mytra, P. (2023). The effect of teknologi in mathematics learning. *Jurnal Penelitian Matematika dan Pendidikan Matematika*, 6(1), 287–296.
- Pande, M., & Bharathi, S. V. (2020). Theoretical foundations of design thinking – A constructivism learning approach to design thinking. *Thinking Skills and Creativity*, 36, 100637. <https://doi.org/10.1016/j.tsc.2020.100637>
- Parwati, N. N., Suharta, I. G. P., & Sudatha, I. G. W. (2023). TPACK Theoretical Correspondence with Learning Variables and Its Application Effectiveness in Learning. *Journal of Pedagogy and Education Science*, 2(03), 244–256. <https://doi.org/10.56741/jpes.v2i03.402>
- Parwati, N. N., Suryawan, I. P. P., & Apsari, R. A. (2018). *Belajar dan Pembelajaran*. Rajagrafindo Persada.
- Pitorini, D. E., Suciati, & Harlita. (2024). Students' Critical Thinking Skills Using an E-Module Based on Problem-Based Learning Combined with Socratic Dialogue. *Journal of Learning for Development*, 11(1), 52–65. <https://doi.org/10.56059/jl4d.v11i1.1014>
- Plomp, T., & Nieveen, N. (2013). *Educational Design Research*. Netherlands Institute for Curriculum Development. <http://international.slo.nl/publications/edr/>
- Pramudita, I. F. E., Praherdhiono, H., & Adi, E. P. (2021). Studi Keterampilan Abad 21 Mahasiswa Dalam Memilih Peminatan. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 4(3), 251–259. <https://doi.org/10.17977/um038v4i32021p251>
- Putri, L. F. D., Mustaji, M., & Sumarno, A. (2024). How Developing and Implementation Microlearning in Educational Setting?: A Literature Review. *Jurnal Teknologi Pendidikan : Jurnal Penelitian Dan Pengembangan Pembelajaran*, 9(3), 432. <https://doi.org/10.33394/jtp.v9i3.11698>

- Putri, S. R., & Syafriani, -. (2022). Pengembangan E-Modul Fisika Berbasis SETS (Science, Environment, Techonogy, So-ciety) untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik SMA/MA. *Jurnal Penelitian Pembelajaran Fisika*, 8(2), 142. <https://doi.org/10.24036/jppf.v8i2.119361>
- Raharjo, N. P., & Winarko, B. (2021). Analisis Tingkat Literasi Digital Generasi Milenial Kota Surabaya dalam Menanggulangi Penyebaran Hoaks. *Jurnal Komunika: Jurnal Komunikasi, Media dan Informatika*, 10(1), 33. <https://doi.org/10.31504/komunika.v10i1.3795>
- Rahmawati, S. M., Sutarni, N., Rasto, R., & Muhammad, I. (2023). Meningkatkan Kemampuan Berpikir Kritis Siswa melalui Model Contextual Teaching And Learning: Quasi-Eksperimen. *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, 4(2), 969–976. <https://doi.org/10.62775/edukasia.v4i2.378>
- Rahmawati, Y. P., & Salehudin, M. (2021). Optimalisasi pembelajaran abad 21 pada SMP dan SMA. *Journal of Instructional and Development Researches*, 1(3), 112–122. <https://doi.org/10.53621/jider.v1i3.67>
- Ramadansur, R., Sembiring, A. K., Rizky, R., & Nelvariza, N. (2023). Promoting Critical Thinking Skills through Contextual Teaching and Learning. *Lectura : Jurnal Pendidikan*, 14(2), 340–351. <https://doi.org/10.31849/lectura.v14i2.15030>
- Ramadhan, A. P., & Budiman, I. (2022). Kemampuan Berpikir Kritis Siswa Kelas XI SMK Negeri 1 Rawamerta Pada Materi Peluang. *PRISMA*, 11(1), 154. <https://doi.org/10.35194/jp.v11i1.2049>
- Raqzitya, F. A., & Agung, A. A. G. (2022). E-Modul Berbasis Pendidikan Karakter Sebagai Sumber Belajar IPA Siswa Kelas VII. *Jurnal Edutech Undiksha*, 10(1), 108–116. <https://doi.org/10.23887/jeu.v10i1.41538>
- Rasyid, A., & Wiyatmo, Y. (2024). Pengembangan E-Modul Fiska Berbasis PBL Berbantuan Aplikasi Canva Untuk Meningkatkan Keterampilan Berpikir Kritis dan Kemandirian Belajar Peserta Didik SMA. *Jurnal Pendidikan Fisika*, 11(1), 36–55.
- Rasyid, F., Aini, N., & Varghesse, K. (2023). Questioning Strategy That Works to Foster Critical Thinking Skills: A Study In Islamic University. *JEELS (Journal of English Education and Linguistics Studies)*, 10(2), 335–355. <https://doi.org/10.30762/jeels.v10i2.1048>
- Riskyniany, H. R., Novita, L., & Windiyani, T. (2024). Pengembangan E-Modul Berbasis Flipbook Materi Manusia dan Lingkungan. *Journal on Education*, 06(03), 16091–16099.

- Rismayanti, T. A., Anriani, N., & Sukirwan, S. (2022). Pengembangan E-Modul Berbantu Kodular pada Smartphone untuk Meningkatkan Kemampuan Berpikir Kritis Matematis Siswa SMP. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 6(1), 859–873. <https://doi.org/10.31004/cendekia.v6i1.1286>
- Rizal, R. P., Iskandar, I., & Sulistyaningrum, S. D. (2023). Investigating Critical Thinking Skills and Microlearning Integration in English Learning Material Web-Based of Eighth Graders. *Scope : Journal of English Language Teaching*, 8(1), 198. <https://doi.org/10.30998/scope.v8i1.17478>
- Romadhoni, S. D., Hakim, F., & Ningrum, L. S. (2025). The Effectiveness of The Problem-Based Learning Model Assisted by Interactive Videos on Critical Thinking Skills. *Jambura Journal of Educational Chemistry*, 7(1), 22–29. <https://doi.org/10.37905/jjec.v7i1.27651>
- Rosa, E., Destian, R., Agustian, A., & Wahyudin, W. (2024). Inovasi Model dan Strategi Pembelajaran dalam Implementasi Kurikulum Merdeka: Inovasi Model dan Strategi Pembelajaran dalam Implementasi Kurikulum Merdeka. *Journal of Education Research*, 5(3), 2608–2617. <https://doi.org/10.37985/jer.v5i3.1153>
- Rosnaeni. (2021). Karakteristik dan Asesmen Pembelajaran Abad 21. *Jurnal Basicedu*, 5(5), 4341–4350. <https://doi.org/10.31004/basicedu.v5i5.1548>
- Samala, A. D., Bojic, L., Bekiroğlu, D., Watrionthos, R., & Hendriyani, Y. (2023). Microlearning: Transforming Education with Bite-Sized Learning on the Go—Insights and Applications. *International Journal of Interactive Mobile Technologies (iJIM)*, 17(21), 4–24. <https://doi.org/10.3991/ijim.v17i21.42951>
- Sankaranarayanan, R., Leung, J., Abramienka-Lachheb, V., Seo, G., & Lachheb, A. (2023). Microlearning in Diverse Contexts: A Bibliometric Analysis. *TechTrends*, 67(2), 260–276. <https://doi.org/10.1007/s11528-022-00794-x>
- Santi, R. N., Situmorang, R., & Iriani, T. (2024). Potensi Model Microlearning sebagai Strategi Pembelajaran Inovatif untuk Bahan Pembelajaran: Systematic Review. *Didaktika: Jurnal Kependidikan*, 13(4), 1–12.
- Sari Dewi, P., & Kuswanto, H. (2023). The effectiveness of the use of augmented reality-assisted physics e-module based on pedicab to improve mathematical communication and critical thinking abilities. *Journal of Technology and Science Education*, 13(1), 53. <https://doi.org/10.3926/jotse.1714>
- Sari, E. N., & Listiadi, A. (2023). Pengembangan E-LKPD Berbasis Contextual Teaching and Learning Pada Materi Harga Pokok Proses Dalam Meningkatkan Kemampuan Berpikir Kritis Siswa SMK. *Jurnal Pendidikan*

- Sari, L. P. D. U. C., Agustini, K., & Pradnyana, I. M. A. (2019). Efektivitas Model Pembelajaran Tuntas dalam E-Modul Berbasis Project Based Learning. *Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI)*, 8(1), 35. <https://doi.org/10.23887/janapati.v8i1.16962>
- Scheiter, K. (2014). The Learner Control Principle in Multimedia Learning. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (2nd ed., pp. 487–512). Cambridge University Press. <https://doi.org/10.1017/CBO9781139547369.025>
- Seel, N. M. (Ed.). (2012). *Encyclopedia of the Sciences of Learning*. Springer US. <https://doi.org/10.1007/978-1-4419-1428-6>
- Senandheera, V. V., Muthukumarana, C. K., Ediriweera, D. S., & Rupasinghe, T. P. (2024). Impact of microlearning on academic performance of students in higher education: A systematic review and meta-analysis. *Journal of Multidisciplinary & Translational Research*, 9(1), 10–25. <https://doi.org/10.4038/jmtr.v9i1.2>
- Seruni, R., Munawaroh, S., Kurniadewi, F., & Nurjayadi, M. (2020). Implementation of e-module flip PDF professional to improve students' critical thinking skills through problem based learning. *Journal of Physics: Conference Series*, 1521(4), 042085. <https://doi.org/10.1088/1742-6596/1521/4/042085>
- Shida, N., Abdullah, A. H., Osman, S., & Ismail, N. (2023). Design and development of critical thinking learning strategy in integral calculus. *International Journal of Evaluation and Research in Education (IJERE)*, 12(1), 284. <https://doi.org/10.11591/ijere.v12i1.23779>
- Sholeh, B., Hufad, A., & Fathurrohman, M. (2023). Pemanfaatan E-Modul Interaktif dalam Pembelajaran Mandiri Sesuai Kapasitas Siswa. *Risalah: Jurnal Pendidikan dan Studi Islam*, 9(2), 665–672.
- Sholikhah, A. N. Y., & Arif, S. (2024). Pengembangan modul berbasis STEM 3D untuk meningkatkan kemampuan berpikir kritis siswa. *Jurnal Tadris IPA Indonesia*, 4(1), 127–140.
- Siagian, R. E. F., Marliani, N., & Lubis, E. M. (2021). Pengaruh Kemandirian Belajar Terhadap Kemampuan Berpikir Kritis Pada Siswa Sekolah Menengah Atas. *Jurnal Educatio FKIP UNMA*, 7(4), 1798–1805. <https://doi.org/10.31949/educatio.v7i4.1597>

- Silitonga, L. M., Wiyaka, Suciati, S., & Prastikawati, E. F. (2024). The Impact of Integrating AI Chatbots and Microlearning into Flipped Classrooms: Enhancing Students' Motivation and Higher-Order Thinking Skills. In Y.-P. Cheng, M. Pedaste, E. Bardone, & Y.-M. Huang (Eds.), *Innovative Technologies and Learning* (pp. 184–193). Springer Nature Switzerland.
- Simamora, A. H., Agustini, K., Sudatha, I. G. W., & Suartama, I. K. (2024). Enhancing teaching materials development course with the ICARE learning model in e-learning. *Journal of Education and Learning (EduLearn)*, 18(4), 1543–1552. <https://doi.org/10.11591/edulearn.v18i4.21304>
- Skalka, J., Drlik, M., Benko, L., Kapusta, J., Rodríguez Del Pino, J. C., Smyrnova-Trybulska, E., Stolinska, A., Svec, P., & Turcinek, P. (2021). Conceptual Framework for Programming Skills Development Based on Microlearning and Automated Source Code Evaluation in Virtual Learning Environment. *Sustainability*, 13(6), 3293. <https://doi.org/10.3390/su13063293>
- Sofia, N., Ritonga, M., Arita, S., Syahrul, S., Shalihah, M. A., Dewi, I. P., & Sofya, R. (2023). Peningkatan Keterampilan Berpikir Kritis Melalui Pengembangan E-Modul Perpajakan Berbasis Case Method. *Jurnal Ecogen*, 6(1), 54. <https://doi.org/10.24036/jmpe.v6i1.14185>
- Sofyan, H., Anggreni, E., & Saadiyah, J. (2019). Development of E-Modules Based on Local Wisdom in Central Learning Model at Kindergartens in Jambi City. *European Journal of Educational Research*, 8(4), 1137–1143. <https://doi.org/10.12973/eu-jer.8.4.1137>
- Soraya, I. I. D., Martono, K. T., & Eridani, D. (2020). User experience pada Implementasi Virtual Reality sebagai Media Pembelajaran Anak Pengidap Autisme. *Jurnal Komputer Terapan*, 6(1), 1–12. <https://doi.org/10.35143/jkt.v6i1.3396>
- Sosilo, H., Estriyanto, Y., & Utomo, A. B. (2025). Analisis Kefektifan Pembelajaran Microlearning Berbasis Multimedia Interaktif untuk Meningkatkan High Order Thingking Skill (HOTS) pada Siswa SMK 1 Muhammadiyah Cepu. *Jurnal Ilmiah Pendidikan Teknik dan Kejuruan*, 18(2), 163. <https://doi.org/10.20961/jiptek.v18i2.90810>
- Spector, J. M., Merrill, M. D., Elen, J., & Bishop, M. J. (Eds.). (2014). *Handbook of Research on Educational Communications and Technology* (4th ed.). Springer New York. <https://doi.org/10.1007/978-1-4614-3185-5>
- Suartama, I. K., Sudarma, I. K., Sudatha, I. G. W., Sukmana, A. I. W. I. Y., & Susiani, K. (2024). Student engagement and academic achievement: The effect of gamification on case and project-based online learning. *Journal of Education and Learning (EduLearn)*, 18(3), 968–982. <https://doi.org/10.11591/edulearn.v18i3.21349>

- Suartama, I. K., Yasa, I. N., & Triwahyuni, E. (2024). Instructional Design Models for Pervasive Learning Environment: Bridging Formal and Informal Learning in Collaborative Social Learning. *Education Sciences*, 14(12), 1405. <https://doi.org/10.3390/educsci14121405>
- Sudarma, I. K., Prabawa, D. G. A. P., & Suartama, I. K. (2022). The Application of Information Processing Theory to Design Digital Content in Learning Message Design Course. *International Journal of Information and Education Technology*, 12(10), 1043–1049. <https://doi.org/10.18178/ijiet.2022.12.10.1718>
- Sudarma, I. K., & Sukmana, A. I. W. I. Y. (2022). Improving Children's Cognitive Ability Through Information Processing Theory-Based Digital Content. *International Journal of Elementary Education*, 6(1), 118–126. <https://dx.doi.org/10.23887/ijee.v6i1>
- Sugiyono. (2015). *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Alfabeta.
- Sujanem, R., & Putu Suwindra, I. N. (2023). Problem-based Interactive Physics E-Module in Physics Learning Through Blended PBL to Enhance Students' Critical Thinking Skills. *Jurnal Pendidikan IPA Indonesia*, 12(1), 135–145. <https://doi.org/10.15294/jpii.v12i1.39971>
- Sukendra, I. K., Surat, I. M., & Darmada, I. M. (2022). Pengembangan bahan ajar matematika vokasi digital berbasis STEM di SMK pada materi trigonometri. *Widyadari*, 23(1), 59–72. <https://doi.org/10.5281/ZENODO.6390927>
- Sulistyaningrum, S. D., Iskandar, I., & Dewanti, R. (2022). Analisis Pengembangan Materi Ajar Produksi Lisan Bahasa Inggris Berbasis Microlearning di SMP Kabupaten Agam. *Jurnal Ilmiah UPT P2M STKIP Siliwangi*, 9(2), 109–119.
- Suominen, S., Ikonen, K., Leinonen, R., Viholainen, A., & Asikainen, M. A. (2024). Vocational school students' use and opinions of voluntary-based online learning solutions presented in a mathematics course. *European Journal of Science and Mathematics Education*, 12(3), 394–410. <https://doi.org/10.30935/scimath/14751>
- Surjono, H. D. (2017). *Multimedia Pembelajaran Interaktif: Konsep dan Pengembangan* (1st ed.). UNY Press.
- Susilana, R., Dewi, L., Rullyana, G., Hadiapurwa, A., & Khaerunnisa, N. (2022). Can microlearning strategy assist students' online learning? *Jurnal Cakrawala Pendidikan*, 41(2), 437–451. <https://doi.org/10.21831/cp.v41i2.43387>

- Sutriani, Fakhruddin, Z., Dalle, A., Tjalla, M., & Arqam. (2024). EFL Teachers' Assessment Model of Higher Order Thinking Skills. *International Journal of Health, Economics, and Social Sciences (IJHES)*, 6(4), 964–970. <https://doi.org/10.56338/ijhess.v6i4.4822>
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12(2), 257–285. [https://doi.org/10.1016/0364-0213\(88\)90023-7](https://doi.org/10.1016/0364-0213(88)90023-7)
- Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive Load Theory*. Springer New York. <https://doi.org/10.1007/978-1-4419-8126-4>
- Taliwongso, H., Sugiarto, B. A., & Sengkey, D. (2022). An Interactive Application of the Animation of Cell Types and Components for 11th Grade High School Students. *Jurnal Teknik Informatika*, 17(1), 117–128.
- Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). *Instructional Development for Training Teachers of Exceptional Children: A Sourcebook*. Indiana University.
- Toker, S., & Baturay, M. H. (2022). Developing disposition to critical thinking and problem-solving perception in instructional design projects for producing digital materials. *International Journal of Technology and Design Education*, 32(2), 1267–1292. <https://doi.org/10.1007/s10798-020-09646-2>
- Torgerson, C., & Iannone, S. (2020). *Designing Microlearning*. ATD Press.
- Utama, C., Mashfufah, A., & Thohir, M. A. (2024). Digital Pedagogy in Primary Education: Developing SIPEJAR Microlearning to Cultivate Critical Thinking Skills. *JURNAL EDUSCIENCE*, 11(3), 747–762. <https://doi.org/10.36987/jes.v11i3.6598>
- Utami, N. L. G. S., Arnyana, I. B. P., & Candiasa, I. M. (2024). Meningkatkan Hasil Belajar Siswa Kelas VI SD Pada Topik Masa Pubertas Melalui Media POP-UP Book. *PENDASI Jurnal Pendidikan Dasar Indonesia*, 8(1), 94–110. https://doi.org/10.23887/jurnal_pendas.v8i1.3220
- Van Den Akker, J., Branch, R. M., Gustafson, K., Nieveen, N., & Plomp, T. (Eds.). (1999). *Design Approaches and Tools in Education and Training*. Springer Netherlands. <https://doi.org/10.1007/978-94-011-4255-7>
- Vygotskij, L. S., Lloyd, P., & Fernyhough, C. (1999). *Lev Vygotsky. 3. The zone of proximal development*. Routledge. <https://books.google.co.id/books?id=gQO3NAEACAAJ>
- Wahidin. (2023). Pelaksanaan Evaluasi Pembelajaran Berbasis Higher Order Thinking Skills (HOTS). *JURNAL ILMU PENDIDIKAN & SOSIAL (SINOVA)*, 1(3), 107–116. <https://doi.org/10.71382/sinova.v1i3.32>

- Wardani, I. U., Lasmawan, I. W., & Suastra, I. W. (2023). Guru dan Tantangan Kurikulum Baru: Analisis Peran Guru dalam Kebijakan Kurikulum Baru. *Jurnal Dharma Agung*, 31(5), 301–313. <https://dx.doi.org/10.46930/ojsuda.v31i5.3708>
- 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>
- Waswa, D. W., & Al-kassab, M. M. (2023). Mathematics Learning Challenges and Difficulties: A Students' Perspective. In D. Zeidan, J. C. Cortés, A. Burqan, A. Qazza, J. Merker, & G. Gharib (Eds.), *Mathematics and Computation* (pp. 311–323). Springer Nature Singapore.
- Widiana, F. H., & Rosy, B. (2021). Pengembangan E-Modul Berbasis Flipbook Maker pada Mata Pelajaran Teknologi Perkantoran. *Edukatif: Jurnal Ilmu Pendidikan*, 3(6), 3728–3739. <https://doi.org/10.31004/edukatif.v3i6.1265>
- Wigati, Iriani, T., & Khaerudin. (2023). Microlearning: The Future of Learning from the Perspective of Business, Technology, Educational Psychology. *International Journal of Social Science and Human Research*, 6(10). <https://doi.org/10.47191/ijsshr/v6-i10-02>
- Yerimadesi, Y., Warlinda, Y. A., Rosanna, D. L., Sakinah, M., Putri, E. J., Guspatni, G., & Andromeda, A. (2023). Guided Discovery Learning-Based Chemistry E-Module and Its Effect on Students' Higher-Order Thinking Skills. *Jurnal Pendidikan IPA Indonesia*, 12(1), 168–177. <https://doi.org/10.15294/jpii.v12i1.42130>
- Yunus, M. R., Daulay, I. S., Juspriansyah, R., Erlisnawati, E., & Erni, E. (2024). Implementasi Kurikulum Merdeka dalam Pembelajaran Matematika di SMP 23 Pekanbaru. *Indonesian Research Journal on Education*, 4(2), 459–467. <https://doi.org/10.31004/irje.v4i2.536>
- Yusnidar, Y., & Syahri, W. (2022). Implementasi Microlearning Berbasis Case Study Terhadap Hasil Belajar Mahasiswa Pendidikan Kimia. *Jurnal Studi Guru dan Pembelajaran*, 5(1), 71–77. <https://doi.org/10.30605/jsgp.5.1.2022.1530>
- Zakiah, L., & Lestari, I. (2019). *Berpikir Kritis Dalam Konteks Pembelajaran* (Vol. 1). Erzatama Karya Abadi.
- Zhang, J. (2020). Designing Microlearning Instruction for Professional Development Through a Competency Based Approach. *TechTrends*, 64, 310–318. <https://doi.org/10.1007/s11528-019-00449-4>

Zidan, Z., & Supriatno, B. (2023). Learning Model Innovation Analysis: Flipped Classroom Integration with Microlearning. *Indonesian Journal of Educational Research (IJER)*, 8(2), 129–136.

