

DAFTAR PUSTAKA

- Abdurrachman;, I. H. D. and P. W. R. (2017). Anatomi dan Kinematik Gerak Pada Manusia_compressed. In *Anatomi dan Kinematik Gerak Pada Manusia* (Vol. 1, Issue Intelgensia media, pp. xii–152).
- Adlini, M. N. (2022). *Buku Penuntun Praktikum Anatomi Dan Fisiologi Manusia*. 48.
- Adnan, M., Md Ibharim, L. F., Wong, Y. S., Yee, I., & Sukirman. (2025). Development and usability of a traditional game simulation module with augmented reality technology (AR-SiGaSTEM) in online learning to strengthen STEM skills among students. *LUMAT: International Journal on Math, Science and Technology Education*, 12(4), 12. <https://doi.org/10.31129/LUMAT.12.4.2226>
- Akeel, M. A. (2021). Exploring students' understanding of structured practical anatomy. *Journal of Taibah University Medical Sciences*, 16(3), 318–327. <https://doi.org/https://doi.org/10.1016/j.jtumed.2020.12.006>
- Al-Rahmi, A. M., Al-Rahmi, W. M., Alturki, U., Aldraiweesh, A., Almutairy, S., & Al-Adwan, A. S. (2022). Acceptance of mobile technologies and M-learning by university students: An empirical investigation in higher education. *Education and Information Technologies*, 27(6), 7805–7826.
- Al Azka, H. H., Setyawati, R. D., & Albab, I. U. (2019). Pengembangan Modul Pembelajaran. *Imajiner: Jurnal Matematika Dan Pendidikan Matematika*, 1(5), 224–236.
- Ali, S., & Khaeruddin. (2012). *Evauasi Pembelajaran* (B. sari Fatmawati (ed.); I). Bumi Aksara.
- Alimuddin, A., Nazri, S. B. M., Liza, L., Pebriyani, D., & Muchlis, A. P. (2024). Physical education and sport essential as transversality and body integration in the learning process: A systematic review. *Retos*, 58, 20–27.
- Altmeyer, K., Brünken, R., Kuhn, J., & Malone, S. (2024). The role of cognitive learner prerequisites for cognitive load and learning outcomes in AR-supported lab work. *Education Sciences*, 14(11), 1161.
- Anderson, P. D. (1996). *Anatomi dan Fisiologi Tubuh Manusia* (I). Kedokteran EGC.
- Apriyanti, E., Agustina, D. K., Kuntoadi, G. B., Pora, Y. D., Wida, A. S. W. D., Nua, E. N., Adesta, R. O., Guru, Y. Y., Pitang, Y., & Azis, P. A. (2021). *Teori anatomi tubuh manusia*. Yayasan Penerbit Muhammad Zaini.

- Arici, F., Yilmaz, R. M., & Yilmaz, M. (2021). Affordances of augmented reality technology for science education: Views of secondary school students and science teachers. *Human Behavior and Emerging Technologies*, 3(5), 1153–1171.
- Arofah, N. (2020). *Pengembangan Instrumen Skala Disiplin Belajar Pada Siswa Sekolah Menengah Pertama (SMP)*. Universitas Pendidikan Ganesha.
- Artanayasa, I. W., Kusuma, K. C. A., Satyawan, I. M., & Mashuri, H. (2023). The android-based Instrumen for performance assessment of football. *Cakrawala Pendidikan*, 42(1), 110–119.
- Artayasa, I. K., Parwata, I. G. L. A., & Ratnaya, I. G. (2023). The Influence of Project-Based Learning on Entrepreneurial Crafts Learning Outcomes through Learning Independence. *Interdisciplinary Social Studies*, 2(10), 2501–2516.
- Asrul, Ananda, R., & Rosinta. (2014). Evaluasi Pembajalaran. In *Ciptapustaka Media*. Citapusaka Media.
- Astini, P. S., Kanca, I. N., & Semarayasa, I. K. (2022). Model Pembelajaran Hybrid Learning Terhadap Hasil Belajar Teknik Dasar Passing Bola Basket Kelas X SMA. *Jurnal Ilmu Keolahragaan Undiksha*, 10(2), 128–137.
- Ayre, C., & Scally, A. J. (2014). Critical values for Lawshe's content validity ratio: revisiting the original methods of calculation. *Measurement and Evaluation in Counseling and Development*, 47(1), 79–86.
- Azuma, R., Billinghurst, M., & Klinker, G. (2011). Special section on mobile augmented reality. In *Computers & Graphics* (Vol. 35, Issue 4, pp. vii–viii). Pergamon.
- Bacca, J., Baldiris, S., Fabregat, R., & Graf, S. (2014). *Augmented reality trends in education: a systematic review of research and applications*.
- Baharuddin, N., Rosli, H., & Juhan, M. S. (2020). Constructivism Learning Environment by Using Augmented Reality in Art History Course. *International Journal of Academic Research in Business and Social Sciences*. <https://doi.org/10.6007/ijarbss/v10-i8/7497>
- Barmaki, R. L., Kim, K., Guo, Z., Wang, Q., Yu, K., Pearlman, R., & Navab, N. (2023). A large-scale feasibility study of screen-based 3d visualization and augmented reality tools for human anatomy education: exploring gender perspectives in learning experience. *ArXiv Preprint ArXiv:2307.14383*.
- Bhatla, S., & Tripathi, V. (2021). Development of Anatomy Learning System based on Augmented Reality. *2021 8th International Conference on Signal Processing and Integrated Networks (SPIN)*, 812–817. <https://doi.org/10.1109/SPIN52536.2021.9566077>

- Bölek, K. A., Jong, G. De, & Henssen, D. (2021). The effectiveness of the use of augmented reality in anatomy education: a systematic review and meta-analysis. In *Scientific Reports*. nature.com. <https://www.nature.com/articles/s41598-021-94721-4>
- Branch, R. M. (2009). *Instructional design: The ADDIE approach* (Vol. 722). Springer.
- Bryce, T. G. K., & Blown, E. J. (2023). Ausubel's meaningful learning re-visited. *Current Psychology (New Brunswick, N.J.)*, 1–20. <https://doi.org/10.1007/s12144-023-04440-4>
- Buchner, J., & Kerres, M. (2023). Media comparison studies dominate comparative research on augmented reality in education. *Computers & Education*, 195, 104711. <https://doi.org/https://doi.org/10.1016/j.compedu.2022.104711>
- Burton, T., Uchida, T. K., & Doumit, M. (2025). Simulation of Hip Abduction-Adduction Exoskeletons for Assisting Frontal-Plane Stability in Elderly Individuals. *IEEE Access*, 13, 40044–40053. <https://doi.org/10.1109/ACCESS.2025.3546257>
- Bustamam, N., & Purwaningastuti, dan D. A. (2021). The usage of Anatomage and plastination in anatomy learning: student perceptions and learning outcomes. *Jurnal Pendidikan Kedokteran Indonesia: The Indonesian Journal of Medical Education*, 10, 105.
- Cahyadi, R. A. H. (2019). Pengembangan bahan ajar berbasis ADDIE model. *Halaqa: Islamic Education Journal*, 3(1), 35–42.
- Cahyono, T. T., Resita, C., & Hidayat, A. S. (2021). Penggunaan Media Pembelajaran dalam Pembelajaran Pendidikan Jasmani Olahraga dan Kesehatan di Masa Pandemi Covid-19. *Jurnal Patriot*. <http://patriot.ppj.unp.ac.id/index.php/patriot/article/view/806>
- Candiasa, I. M. (2020). *Analisis Data dengan Statistik Multivariat*. Bali: UNDIKSHA Press.
- Carroll, M. A., McKenzie, A., & Tracy-Bee, M. (2022). Movement System Theory and Anatomical Competence: Threshold Concepts for Physical Therapist Anatomy Education. *Anatomical Sciences Education*, 15(2), 420–430. <https://doi.org/10.1002/ase.2083>
- Chang, H.-Y., Binali, T., Liang, J.-C., Chiou, G.-L., Cheng, K.-H., Lee, S. W.-Y., & Tsai, C.-C. (2022). Ten years of augmented reality in education: A meta-analysis of (quasi-) experimental studies to investigate the impact. *Computers & Education*, 191, 104641. <https://doi.org/https://doi.org/10.1016/j.compedu.2022.104641>

- Chang, K.-E., Zhang, J., Huang, Y.-S., Liu, T.-C., & Sung, Y.-T. (2020). Applying augmented reality in physical education on motor skills learning. *Interactive Learning Environments*, 28(6), 685–697.
- Chytas, D., Johnson, E. O., Piagkou, M., Mazarakis, A., Babis, G. C., Chronopoulos, E., Nikolaou, V. S., Lazaridis, N., & Natsis, K. (2020). The role of augmented reality in Anatomical education: An overview. *Annals of Anatomy - Anatomischer Anzeiger*, 229, 151463. <https://doi.org/10.1016/j.aanat.2020.151463>
- Clark, J. M., & Paivio, A. (1991a). Dual coding theory and education. *Educational Psychology Review*, 3(3), 149–210.
- Clark, J. M., & Paivio, A. (1991b). Dual coding theory and education. *Educational Psychology Review*, 3(3), 149–210. <https://doi.org/10.1007/BF01320076>
- Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. In Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203771587>
- Cook, M., Payne, A., Seo, J. H., Pine, M., & McLaughlin, T. (2019). Innervate AR: Mobile augmented reality for studying motor nerve deficits in anatomy education. In *ICCE 2019 - 27th International Conference on Computers in Education, Proceedings* (Vol. 1). Springer International Publishing. <https://doi.org/10.1007/978-3-030-23528-4>
- Dantes, N., Handayani, N. N. L., & Muliastri, N. K. E. (2021). Pelatihan Validasi Tes Kognitif Berbantuan Aplikasi SPSS 17.0 dan Aplikasi Anates Pada Guru SMAN 1 Singaraja. *Patria: Jurnal Pengabdian Kepada Masyarakat*, 3(2), 116–123.
- Danuri, & Maisaroh, S. (2019). *Metodologi Penelitian Pendidikan*. Samudra Biru (Anggota Biru).
- Darwish, M., Kamel, S., & Assem, A. M. (2023). A theoretical model of using extended reality in architecture design education. *Engineering Research Journal (Shoubra)*, 52(1), 36–45.
- Depdiknas. (2008). *Teknik Penyusunan Modul*. 1–14.
- Dervić, D., & Mešić, V. (2019). Cognitive load in multimedia learning: An example from teaching about lenses. *Journal of Education in Science Environment and Health*, 5(1), 102–118.
- Dick, W., Carey, L., & Carey, J. O. (1985). *The systematic design of instruction*. Scott, Foresman Glenview, IL.
- DIIP, D. (2020). Panduan Penulisan Modul. *Direktorat Inovasi Dan*

Pengembangan, 1–9.

- Direktorat Inovasi dan Pengembangan Pendidikan, U. A. (2022). Panduan Penulisan Bahan Ajar. *Universitas Airlangga*, 1–23.
- Dogomeo, J., & Aliazas, J. V. (2022). Dual coding cognition in devising infographics for an enhanced students' scientific knowledge. *International Journal of Science, Technology, Engineering and Mathematics*, 2(4), 1–17.
- Drake, R. L., McBride, J. M., Lachman, N., & Pawlina, W. (2009). Medical education in the anatomical sciences: The winds of change continue to blow. *Anatomical Sciences Education*, 2(6), 253–259. <https://doi.org/10.1002/ase.117>
- Duffy, T. M., & Jonassen, D. H. (2013). *Constructivism and the technology of instruction: A conversation*. Routledge.
- Ellenbecker, T. S., & Aoki, R. (2020). Step by step guide to understanding the kinetic chain concept in the overhead athlete. *Current Reviews in Musculoskeletal Medicine*, 13(2), 155–163.
- Fadhil, I. (2020). *Evaluasi Hasil*.
- Fauzan, I., Sintaro, S., & Surahman, A. (2022). Media Pembelajaran Anatomi Tulang Manusia Menggunakan Radio Frequency Identification (RFID) Berbasis Website (Studi Kasus Universitas XYZ). *Jurnal Teknologi Dan Sistem*
<http://jim.teknokrat.ac.id/index.php/sisteminformasi/article/view/1446>
- Feng, L., Chen, Z., & Bian, H. (2024). Skeletal muscle: molecular structure, myogenesis, biological functions, and diseases. *MedComm*, 5(7). <https://doi.org/10.1002/mco2.649>
- Floyd, R. T., & Thompson, C. W. (2009). *Manual of structural kinesiology* (Vol. 16). McGraw-Hill New York, NY.
- Gall, J. P., Gall, M. D., & Borg, W. R. (2014). Applying Educational Research: How to Read, Do, and Use Research to Solve Problems of Practice. In *New York and london. Longman publishing Inc*.
- Gallot, M., Di Rienzo, F., Binay, M., Collet, C., & Hoyek, N. (2024). Learning functional human anatomy with a new interactive three-dimensional digital tool. *Anatomical Sciences Education*, 17(3), 660–673.
- García-Robles, P., Cortés-Pérez, I., Nieto-Escámez, F., García-López, H., Obrero-Gaitán, E., & Osuna-Pérez, M. (2024). Immersive virtual reality and augmented reality in anatomy education: A systematic review and meta-analysis. *Anatomical Sciences Education*, 17, 514–528. <https://doi.org/10.1002/ase.2397>

- García-Robles, P., Cortés-Pérez, I., Nieto-Escámez, F. A., García-López, H., Obrero-Gaitán, E., & Osuna-Pérez, M. C. (2024). Immersive virtual reality and augmented reality in anatomy education: A systematic review and meta-analysis. *Anatomical Sciences Education*, 17(3), 514–528. <https://doi.org/10.1002/ase.2397>
- Garzón, J., & Acevedo, J. (2019). Meta-analysis of the impact of Augmented Reality on students' learning gains. *Educational Research Review*, 27, 244–260.
- Garzón, J., Pavón, J., & Baldiris, S. (2019). Systematic review and meta-analysis of augmented reality in educational settings. *Virtual Reality*, 23(4), 447–459.
- Gasmi, A., & Benlamri, R. (2022). *Chapter 4 - Augmented reality, virtual reality and new age technologies demand escalates amid COVID-19* (V. Chang, M. Abdel-Basset, M. Ramachandran, N. G. Green, & G. B. T.-N. A. I. and D. S. A. for S. in the E. of C.-19 Wills (eds.); pp. 89–111). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-323-90054-6.00005-2>
- Geng, X., & Yamada, M. (2020). An augmented reality learning system for Japanese compound verbs: study of learning performance and cognitive load. *Smart Learning Environments*, 7(1), 27.
- Gerditschke, L., Schrattnner, J. S., & Forman, D. A. (2024). Upper arm muscle activity is influenced by both forearm posture and wrist exertion direction during isometric wrist flexion and extension. *Journal of Electromyography and Kinesiology*, 79, 102919. <https://doi.org/10.1016/j.jelekin.2024.102919>
- Ghavifekr, S. (2020). COLLABORATIVE LEARNING: A KEY TO ENHANCE STUDENTS' SOCIAL INTERACTION SKILLS. *MOJES: Malaysian Online Journal of Educational Sciences*, 8(4), 9–21.
- Ginting, D. S., Indriani, R., Andera, N. A., Sendra, E., Rini, D. S., Setiyorini, E., Kartini, Juwariah, T., Kusumaningrum, V., Milasari, & Sulupadang, P. (2022). *Anatomi Fisiologi Tubuh Manusia Untuk Paramedis*. https://simdos.unud.ac.id/uploads/file_penelitian_1_dir/50ad33eccd269271ca585795f48cf2b4.pdf
- Grimshaw, P. (2019). Planes and axes of motion. In *Instant Notes in Sport and Exercise Biomechanics* (pp. 385–386). Garland Science. <https://doi.org/10.4324/9781315636764-41>
- Gultom, R. (2021). *Pengembangan Bahan Ajar Anatomi dan Fisiologi Tubuh Manusia Berbasis Literasi Sains*. UNIMED.
- H. Husain, I., D. Mamu, H., Mardin, H., Yasser Arafat, M., & Maryati Yusuf, F. (2025). VALIDITAS MODUL PEMBELAJARAN BERBASIS AUGMENTED REALITY PADA MATERI SEL KELAS XI SMA. *Jurnal Biogenerasi*, 10(1), 803–808.

<https://doi.org/10.30605/biogenerasi.v10i1.5379>

- H Syaifudin. (2006). *ANATOMI FISILOGI untuk Mahaiswa Keperawatan* (p. 370). Buku Kedokteran ECG.
- Hadie, S. N. H. (2020). Five Tips for Managing Diagrams in Anatomy Lecture: The Cognitive Load Theory Perspective. *Education in Medicine Journal*, 12(4).
- Hair, J. F. (2011). Multivariate data analysis: An overview. *International Encyclopedia of Statistical Science*, 904–907.
- Hall, J. E., & Hall, M. E. (2020). *Guyton and Hall textbook of medical physiology e-Book*. Elsevier Health Sciences.
- Hall, S. J. (2015). The biomechanics of the human spine. *Basic Biomechanics*, 7th Edn. McGraw Hill Education, New York, 267–307.
- Han, Y., Shi, D., Shao, Y., Feng, Y., Ding, X., & Zhang, W. (2025). Design and Evaluation of a Soft Knee Exosuit for Reducing Knee Medial Compartment Load During Walking. *IEEE Transactions on Biomedical Engineering*, 72(5), 1740–1749. <https://doi.org/10.1109/TBME.2024.3520213>
- Hanfstingl, B., Arzenšek, A., Apschner, J., & Göllly, K. I. (2021). Assimilation and accommodation. *European Psychologist*.
- Hartono, S. (2007). *Anatomi Dasar Panggul Kinesuilogi*. unesa university press.
- Hasibuan, S., & Chairad, M. (2023). The Development of Augmented Reality (AR) in Anatomy Course. *International Journal of Education in Mathematics, Science and Technology*, 11(3), 744–754.
- Hastuti. (2022). Buku Ajar Anatomi Fisiologi. Yogyakarta: Zahir Publishing, 5(3), 248–253. <https://repository.poltekkespalembang.ac.id/files/original/2f78c229942eb9c65238559d5cbb1867.pdf>
- Indarta, Y., Jalinus, N., Waskito, W., Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi Kurikulum Merdeka Belajar dengan Model Pembelajaran Abad 21 dalam Perkembangan Era Society 5.0. *Edukatif: Jurnal Ilmu Pendidikan*, 4(2), 3011–3024. <https://doi.org/10.31004/edukatif.v4i2.2589>
- Irfannudin, M., & Zakariyah, M. (2024). Aplikasi Augmented Reality Pengenalan Sistem Musculoskeletal Pada Tubuh manusia Berbasis Android. *Smart Comp: Jurnalnya Orang Pintar Komputer*, 13(1), 142–149.
- Kalthur, S. G., Pandey, A. K., & Prabhath, S. (2022). Benefits and pitfalls of learning anatomy using the dissection module in an indian medical school: A millennial Learner's perspective. *Translational Research in Anatomy*, 26, 100159. <https://doi.org/10.1016/j.tria.2021.100159>

- Khalid, F., Ali, A. I., Ali, R. R., & Bhatti, M. S. (2019). AReD: Anatomy learning using augmented reality application. ... *International Conference on* <https://ieeexplore.ieee.org/abstract/document/8711843/>
- Kharki, K. El. (2021). Design and implementation of a virtual laboratory for physics subjects in moroccan universities. *Sustainability (Switzerland)*, 13(7). <https://doi.org/10.3390/su13073711>
- Koć-Januchta, M. M., Höffler, T. N., Prechtel, H., & Leutner, D. (2020). Is too much help an obstacle? Effects of interactivity and cognitive style on learning with dynamic versus non-dynamic visualizations with narrative explanations. *Educational Technology Research and Development*, 68(6), 2971–2990.
- Komariah, Y. (2018). Jenis-Jenis Bahan Ajar. *Pengembangan Bahan Ajar Cerita Rakyat Kuningan Terintegrasi Nilai Karakter Dalam pembelajaran Apresiasi Sastra* Di Sm, 5, 11. <http://jurnal.ugj.ac.id/index.php/Deiksis/article/view/910/652#>
- Koo, M., & Yang, S.-W. (2025). Likert-Type Scale. *Encyclopedia*. <https://doi.org/10.3390/encyclopedia5010018>
- Koufi, F., Neri, I., Cercenelli, L., Marcuccio, M., Lodi, S., Fazio, A., Marvi, M. V., Marcelli, E., Billi, A. M., Ruggeri, A., Tarsitano, A., Manzoli, L., Badiali, G., & Ratti, S. (2024). Dissecting human anatomy learning process through anatomical education with augmented reality: AEducAR 2.0 , an updated interdisciplinary study. *Anatomical Sciences Education*, 17(4), 693–711. <https://doi.org/10.1002/ase.2389>
- Kurniawan, M. H., Suharjito, Diana, & Witjaksono, G. (2018a). Human Anatomy Learning Systems Using Augmented Reality on Mobile Application. *Procedia Computer Science*, 135, 80–88. <https://doi.org/https://doi.org/10.1016/j.procs.2018.08.152>
- Kurniawan, M. H., Suharjito, Diana, & Witjaksono, G. (2018b). Human Anatomy Learning Systems Using Augmented Reality on Mobile Application. *Procedia Computer Science*, 135, 80–88. <https://doi.org/10.1016/j.procs.2018.08.152>
- Kusmawati, W., & Zaini, M. (2023). Augmented Reality Application Material Validation in Human Anatomy Course for Sports Education Students. *PROSIDING SEMINAR NASIONAL PENDIDIKAN JASMANI DAN KEOLAHRAGAAN*, 1(1), 280–287. https://doi.org/10.33503/prosiding_penjas_pjkribu.v1i1.2326
- Kusumaningtyas, S., Ramadhan, M. I. A., Margiana, R., Wiyarta, E., Sutanto, R., & Liem, I. K. (2021). Anatomy visual learning: a new modality to enhance neuroanatomy learning in first-year medical students. *Jurnal Pendidikan Kedokteran Indonesia: The Indonesian Journal of Medical Education*, 10(1),

27.

- Langer, K., Lietze, S., & Krizek, G. C. (2020). Vector AR3-App—A good-practice example of learning with augmented reality. *European Journal of Open, Distance and E-Learning*, 23(2).
- Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28(4), 563–575.
- Lesmes, C. Z., Acosta-Solano, J., Benavides, L. B., & Umaña Ibáñez, S. F. (2022). Design and Production of Educational Video Games for the Inclusion of Deaf Children. *Procedia Computer Science*, 198, 626–631. <https://doi.org/https://doi.org/10.1016/j.procs.2021.12.297>
- Lieber, R. L. (2002). *Skeletal muscle structure, function, and plasticity*. Lippincott Williams & Wilkins.
- Logvinova, Y. (2022). USE OF COMPUTER TECHNOLOGIES DURING THE STUDY OF THE DISCIPLINE «ANATOMY WITH FUNDAMENTALS OF SPORTS MORPHOLOGY». *Academic Notes Series Pedagogical Science*, 1(201). <https://doi.org/10.36550/2415-7988-2021-1-201-101-104>
- Lombardi, D., & Shipley, T. (2021). The Curious Construct of Active Learning. *Psychological Science in the Public Interest*, 22, 8–43. <https://doi.org/10.1177/1529100620973974>
- Mahardika, I. P. A., Semarayasa, I. K., & Satyawan, I. M. (2024). Development of Video-Based Learning Media Tutorial Basketball Material (Shooting Skills) for Grade XI High School Students: Pengembangan Media Pembelajaran Berbasis Video Tutorial Materi Bolabasket (Shooting Skill) untuk Siswa Kelas XI SMA. *Jurnal IKA*, 22(2), 94–99.
- Marwan, I. (2008). Anatomi Manusia (Unit Osteologi, Arthologi, dan Miologi). In *Anatomi Manusia* (pp. 1–121). <http://repositori.unsil.ac.id/id/eprint/1340>
- Masoudi, P., Mansour Sohani, S., & Amiri, A. (2021). Evaluation of Hip Frontal Plane Flexibility and Strength in Male Sprinter Runners With Unilateral Patellofemoral Arthropathy: A Case-Control Study. *Function and Disability Journal*, 3(1), 195–204. <https://doi.org/10.32598/fdj.3.27>
- Maulana, M. A., Sujana, Y., & Budianto, A. (2019). Development of Module and Augmented Reality Based Android Aplication Computer Assembly For Vocational High School Student. *Journal of Informatics and Vocational Education (JOIVE)*, 2(2), 82–87.
- Mayer, R. E. (2009). Constructivism as a theory of learning versus constructivism as a prescription for instruction. In *Constructivist instruction* (pp. 196–212). Routledge.

- Mayer, R. E. (2021). *Multimedia learning (the 3rd edition)*. New York: Cambridge University.[Google Scholar].
- McGregor, M., Azzopardi, L., & Halvey, M. (2021). Untangling cost, effort, and load in information seeking and retrieval. *Proceedings of the 2021 Conference on Human Information Interaction and Retrieval*, 151–161.
- Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2023). *Clinically Oriented Anatomy Ninth Edition*.
- Moro, C., Birt, J., Stromberga, Z., Phelps, C., & ... (2021). Virtual and augmented reality enhancements to medical and science student physiology and anatomy test performance: A systematic review and meta-analysis. *Anatomical Sciences* <https://doi.org/10.1002/ase.2049>
- Moro, C., & Phelps, C. (2022). Smartphone-based augmented reality physiology and anatomy laboratories. *Medical Education*, 56(5), 575.
- Moro, C., Phelps, C., Redmond, P., & Stromberga, Z. (2021). HoloLens and mobile augmented reality in medical and health science education: A randomised controlled trial. *British Journal of Educational Technology*, 52(2), 680–694. <https://doi.org/10.1111/bjet.13049>
- Muhammad, I., Darmayanti, R., & Sugianto, R. (2023). Teori Vygotsky: Kajian bibliometrik penelitian cooperative learning di sekolah dasar (1987-2023). *Bulletin of Educational Management and Innovation*, 1(2), 81–98.
- Mukhoyyaro, Q., Nugraheni, L. S., Ripauji, R., & Sumedi, S. H. (2023). Development of Learning Modules Assisted by Augmented Reality (AR) to Improve Learning Outcomes of High School Students on the Concept of the Circulatory System. *Bioedukasi: Jurnal Pendidikan Biologi*, 16(2), 65–78.
- Muscolino, J. E. (2012). *Know the body: muscle, bone, and palpation essentials*.
- Na, D. E. C., & Hipertensiva, C. (2020). *Diktat Anatomi Manusia*. UNY Press.
- Nadi, D. P. M., Arnyana, I. B. P., & Adnyana, P. B. (2025). Validitas dan Kepraktisan Bahan Ajar Biologi pada Materi Sistem Pertahanan Tubuh Berbasis Augmented Reality (AR) untuk Peserta Didik Kelas XI SMA. *Wahana Matematika Dan Sains: Jurnal Matematika, Sains, Dan Pembelajarannya*, 19(2), 91–101.
- Nelson, S., Kurniawan, H., Bakhtiar, S., Komaini, A., & Lesmana, K. Y. P. (2023a). Karate in the digital age: Augmented reality for enhanced learning and performance. *Journal of Physical Education and Sport*, 23(12), 3235–3245.
- Nelson, S., Kurniawan, H., Bakhtiar, S., Komaini, A., & Lesmana, K. Y. P. (2023b). Karate in the digital age: Augmented reNelson, S., Kurniawan, H.,

- Bakhtiar, S., Komaini, A., & Lesmana, K. Y. P. (2023). Karate in the digital age: Augmented reality for enhanced learning and performance. *Journal of Physical Education and Sport*, 23(12), 3. *Journal of Physical Education and Sport*, 23(12), 3235–3245.
- Nerita, S., Ananda, A., & Mukhaiyar, M. (2023). Pemikiran konstruktivisme dan implementasinya dalam pembelajaran. *Jurnal Education and Development*, 11(2), 292–297.
- Neudorfer, C., Butenko, K., Oxenford, S., Rajamani, N., Achtzehn, J., Goede, L., Hollunder, B., Ríos, A. S., Hart, L., Tasserie, J., Fernando, K. B., Nguyen, T. A. K., Al-Fatly, B., Vissani, M., Fox, M., Richardson, R. M., van Rienen, U., Kühn, A. A., Husch, A. D., ... Horn, A. (2023). Lead-DBS v3.0: Mapping deep brain stimulation effects to local anatomy and global networks. *NeuroImage*, 268, 119862. <https://doi.org/https://doi.org/10.1016/j.neuroimage.2023.119862>
- Neumann, D. A., & Kelly, E. R. (2010). *Kinesiology of the musculoskeletal system: foundations for rehabilitation*.
- Noor, R., Djaiz, M., & Tapianto, T. (2019). Module Preparation Guide. *Kemenkes RI*, 4–6.
- Paivio, A. (1991). Dual coding theory: Retrospect and current status. *Canadian Journal of Psychology/Revue Canadienne de Psychologie*, 45(3), 255.
- Paivio, A., & Clark, J. M. (2006). Dual coding theory and education. *Pathways to Literacy Achievement for High Poverty Children*, 1, 149–210.
- Papanastasiou, G., Drigas, A., Skianis, C., Lytras, M., & Papanastasiou, E. (2019). Virtual and augmented reality effects on K-12, higher and tertiary education students' twenty-first century skills. *Virtual Reality*, 23(4), 425–436.
- Park, K., Keyak, J. H., & Powers, C. M. (2023). The influence of isolated femur and tibia rotations on patellar tendon stress: A sensitivity analysis using finite element analysis. *Journal of Orthopaedic Research*, 41(2), 271–277. <https://doi.org/10.1002/jor.25353>
- Pérez-Muñoz, S., Castaño Calle, R., Morales Campo, P. T., & Rodríguez-Cayetano, A. (2024). A systematic review of the use and effect of virtual reality, augmented reality and mixed reality in physical education. *Information*, 15(9), 582.
- Phakiti, A. (2020). *Likert-Type Scale Construction*. 102–114. <https://doi.org/10.4324/9781351034784-12>
- Piaget, J. (1970). *Science of education and the psychology of the child*. Trans. D. Coltman.

- Plotkin, D. L., Roberts, M. D., Haun, C. T., & Schoenfeld, B. J. (2021). Muscle fiber type transitions with exercise training: shifting perspectives. *Sports*, 9(9), 127.
- Popescu, R., Cristea, S., Oleksik, V., Pascu, A. M., & Haritinian, E. G. (2021). Finite element analysis of the tibial component alignment in a transverse plane in total knee arthroplasty. *Journal of Applied Biomedicine*, 19(4), 234–239. <https://doi.org/10.32725/jab.2021.020>
- Pradana, F. A. P., & Mawardi, M. (2021). Pengembangan Instrumen Penilaian Sikap Disiplin Menggunakan Skala Likert dalam Pembelajaran Tematik Kelas IV SD. *FONDATIA*, 5(1), 13–29. <https://doi.org/10.36088/fondatia.v5i1.1090>
- Pratama, D., Parwata, I. G. L. A., & Suwiwa, I. G. (2021). Media Pembelajaran Teknik Dasar Passing Bolavoli Berbasis Video Tutorial. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 5(2), 263–269.
- Purnomo, E. (2019). *Dr. Eddy Purnomo, M.Kes.* 173.
- Pushpa, N. B., & Ravi, K. S. (2023). Visualization in anatomical sciences for effective teaching and learning. *Galician Medical Journal*, 30(2), E202321–E202321.
- Putra, K. I., Dawa, P. J. L., Burgos, Y. D., & Maulana, F. I. (2023a). Implementation of Augmented Reality in Study for Human Anatomy. *Procedia Computer Science*, 227, 709–717. <https://doi.org/10.1016/j.procs.2023.10.575>
- Putra, K. I., Dawa, P. J. L., Burgos, Y. D., & Maulana, F. I. (2023b). Implementation of Augmented Reality in Study for Human Anatomy. *Procedia Computer Science*, 227, 709–717. <https://doi.org/https://doi.org/10.1016/j.procs.2023.10.575>
- Putra, R. T., Utomo, A. W., & Primiani, C. N. (2022). *Anatomi Otot dan Latihan Beban Dalam Olahraga*.
- Putro, W. A. S., Sugiono, S., Istiyono, I., & Widiyaningsih, W. R. (2024). Literasi Sport Science dalam Bidang Olahraga pada Mahasiswa Pendidikan Guru Sekolah Dasar. *Jurnal Basicedu*, 8(1), 477–483.
- Qomariyah, I. N., & Widyaningrum, D. A. (2022). Pengembangan Modul Praktikum Anatomi Fisiologi Manusia Tingkat Perguruan Tinggi. *Paradigma: Jurnal Filsafat, Sains, Teknologi, Dan Sosial Budaya*, 28(4), 53–57.
- Ramadhani, I. K., & Rosy, B. (2023). The development of augmented reality (AR) based learning modules in office technology and correspondence subjects. *Jurnal Pendidikan Administrasi*

<https://journal.unesa.ac.id/index.php/jpap/article/view/25249>

- Rodriguez-Saavedra, M. O., Barrera Benavides, L. G., Cuentas Galindo, I., Campos Ascuña, L. M., Morales Gonzales, A. V., Lopez, J. W. M., & Arguedas-Catasi, R. W. (2025). Augmented Reality as an Educational Tool: Transforming Teaching in the Digital Age. *Information*, 16(5), 372.
- Rusli, R., Nalanda, D. A., Tarmidi, A. D. V., Suryaningrum, K. M., & Yunanda, R. (2023). Augmented reality for studying hands on the human body for elementary school students. *Procedia Computer Science*, 216, 237–244. <https://doi.org/https://doi.org/10.1016/j.procs.2022.12.132>
- Saguni, F. (2020). Penerapan teori konstruktivis dalam pembelajaran. *Paedagogia: Jurnal Pendidikan*, 8(2), 19–32.
- Saidin, N. F., Abd Halim, N. D., Yahaya, N., & Zulkifli, N. N. (2024). Enhancing Students' Critical Thinking and Visualisation Skills through Mobile Augmented Reality. *Knowledge Management & E-Learning*, 16(1), 1–41.
- Saputra, H. N., Salim, S., Idhayani, N., & A. (2020). Augmented Reality-Based Learning Media Development. *Al-Ishlah: Jurnal* <http://www.journal.staihubbulwathan.id/index.php/alishlah/article/view/258>
- Sari, P., Okra, R., Musril, H. A., & ... (2023). Perancangan Media Pembelajaran Animasi 3D Pada Mata Pelajaran Pendidikan Jasmani Olahraga Dan Kesehatan Di Mtsn 6 Agam. *Innovative: Journal Of* <http://j-innovative.org/index.php/Innovative/article/view/1939>
- Satyawan, I. M., Artanayasa, I. W., Lumintuharso, R., Syahrudin, S., & Astra, I. K. B. (2025). Effects of Interactive Multimedia-Assisted Learning Model and Kinaesthetic Talent on Learning Achievement and Collaborative Skills. *Jurnal Pendidikan Jasmani Dan Olahraga*, 10(2).
- Satyawan, I. M., Lasmawan, I. W., Artanayasa, I. W., Swadesi, I. K. I., & Yoda, I. K. (2023). The development of interactive multimedia in e-learning Undiksha to improve soccer learning outcomes in FOK Undiksha. *Journal of Physical Education and Sport*, 23(12), 3468–3477.
- Scarr, G., Blyum, L., Levin, S. M., & de Solórzano, S. L. (2024). Moving beyond Vesalius: Why anatomy needs a mapping update. *Medical Hypotheses*, 183, 111257. <https://doi.org/https://doi.org/10.1016/j.mehy.2023.111257>
- Schnotz, W., Hauck, G., & Schwartz, N. H. (2022). Multiple mental representations in picture processing. *Psychological Research*, 86(3), 903–918.
- Schorr, I., Plecher, D. A., Eichhorn, C., & Klinker, G. (2024). Foreign language learning using augmented reality environments: a systematic review. *Frontiers in Virtual Reality*, 5, 1288824.

- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832.
- Selvakumar, S., & Sivakumar, P. (2023). Immersive learning: unlocking the future of education. *Thiagarajar College of Preceptors Edu Spectra*, 5, 12–20.
- Senthilkumar C, Abinesh R S, Arunesh R, Dinesh Kumar S K, & Giri Sakthi A S. (2025). Human Anatomy Augmented Reality Viewer. *International Research Journal on Advanced Engineering and Management (IRJAEM)*, 3(03), 816–818. <https://doi.org/10.47392/IRJAEM.2025.0131>
- Setiadi. (2007). *Anatomi & fisiologi manusia* (Issue December 2018, pp. 1–308).
- Shamsuddin, S. A., Woon, C. K., & Hadie, S. N. H. (2023). Feedback from medical student on an interactive online anatomy practical using the Google Jamboard platform. *Journal of Taibah University Medical Sciences*, 18(2), 234–243. <https://doi.org/https://doi.org/10.1016/j.jtumed.2022.08.007>
- Sri Handayani. (2021). *Anatomi dan Fisiologi Tubuh Manusia*. CV. Media Sains Indonesia.
- Stiller, K. D., & Schworm, S. (2019). Game-based learning of the structure and functioning of body cells in a foreign language: Effects on motivation, cognitive load, and performance. *Frontiers in Education*, 4, 18.
- Suardana, I. N., Semarayasa, I. K., Muliarta, I. W., & Ariani, L. P. T. (2025). Development of Digital-Based Teaching Materials (Flipbooks) as an Effort to Help Students Learn Service and Smash Skills in Sepak Takraw. *Journal of Physical Education Health and Sport*, 12(2), 654–660.
- Suardipa, I. P. (2020). Proses scaffolding pada zone of proximal development (ZPD) dalam pembelajaran. *Widyacarya: Jurnal Pendidikan, Agama Dan Budaya*, 4(1), 79–92.
- Sudeni, L. M. S., Nitiasih, P. K., & Budiarta, L. G. R. (2022). Developing authentic assessment rubric for assessing 5th grade elementary school students at Buleleng Regency. *Jurnal Inovasi Dan Teknologi Pembelajaran*, 9(2), 126–135.
- Sudjana, & Nana. (2010). *Evaluasi Proses dan Hasil Pembelajaran* (A. Habibi, F. Saudagar, & B. Indrayana (eds.)). Program Studi Pendidikan Biologi FKIP Universitas Jambi bersama Salim Media Indonesia ISBN.
- Sugiyono. (2018). *metode penelitian pendidikn pendekatan kantitatif,kualitatif, dan R&B*. alfabeta.
- Suhendi, A., Purwarno, P., & Chairani, S. (2021). Constructivism-based teaching and learning in Indonesian education. *KnE Social Sciences*, 76–89.

- Sun, C., Qiu, Y., Liu, C., Zheng, X., Wu, J., & Zhang, X. (2024). Experimental modal analysis of the seated human body during whole-body vibration: Effect of vibration direction and magnitude. *Journal of Low Frequency Noise, Vibration and Active Control*, 43(4), 1654–1671. <https://doi.org/10.1177/14613484241258103>
- Suresh, D., Aydin, A., James, S., Ahmed, K., & Dasgupta, P. (2023). The role of augmented reality in surgical training: a systematic review. *Surgical Innovation*, 30(3), 366–382.
- Suryana, E., Aprina, M. P., & Harto, K. (2022). Teori konstruktivistik dan implikasinya dalam pembelajaran. *JHIP-Jurnal Ilmiah Ilmu Pendidikan*, 5(7), 2070–2080.
- Suwiwa, I. G., Astra, I. K. B., Yoda, I. K., & Satyawan, I. M. (2023). The Effect of Project Based Learning Assisted with Flashcards towards Students' Learning Outcomes in Learning Pencak Silat. *Physical Education and Sports: Studies and Research*, 2(2), 72–82.
- Swadesi, I. K. I., & Kanca, I. N. (2020). The Development of Physical Sports and Health Education Learning Media Based on Android Applications. *3rd International Conference on Innovative Research Across Disciplines (ICIRAD 2019)*, 373–378.
- Sweller, J. (2011a). Cognitive load theory. In *Psychology of learning and motivation* (Vol. 55, pp. 37–76). Elsevier.
- Sweller, J. (2011b). Cognitive load theory and E-learning. *International Conference on Artificial Intelligence in Education*, 5–6.
- Sweller, J., Van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*, 31(2), 261–292.
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research Instrumens in science education. *Research in Science Education*, 48(6), 1273–1296.
- Talip, S. B., Ismail, Z. I. M., Yusoff, M. S. B., Hapidin, H., Noor, N. F. M., & Hadie, S. N. H. (2022). Elements of Effective Teaching in Higher Education: Implication to Anatomy Education. *Education in Medicine Journal*, 14(3).
- Thangavel, S. (2025). Revolutionizing education through augmented reality (AR) and virtual reality (VR): innovations, challenges and future prospects. *Challenges and Future Prospects (March 03, 2025)*.
- Thompson, P., Xiu, Y., Tsotsoros, J. D., & Robertson, M. A. (2021). The effect of designing and segmenting instructional video. *Journal of Information Technology Education: Research*, 20.

- Tishana, A., Alvendri, D., Pratama, A. J., Jalinus, N., & Abdullah, R. (2023). Filsafat Konstruktivisme dalam Mengembangkan Calon Pendidik pada Implementasi Merdeka Belajar di Sekolah Kejuruan. *Journal on Education*, 5(2), 1855–1867.
- Triansyah, A., & Haetami, M. (2020). Efektivitas stretching, passive activity dan VO2 Max dalam mencegah terjadinya delayed onset muscle soreness. *Jurnal Keolahragaan*, 8(1), 88–97.
- Triepels, C. P. R., Smeets, C. F. A., Notten, K. J. B., Kruitwagen, R. F. P. M., Futterer, J. J., Vergeldt, T. F. M., & Van Kuijk, S. M. J. (2020). Does three-dimensional anatomy improve student understanding? *Clinical Anatomy*, 33(1), 25–33. <https://doi.org/10.1002/ca.23405>
- Trikotama, R. M. A., Nurrohman, M. N., & Hutajulu, D. K. (2024). Application of augmented reality in education. *Hipkin Journal of Educational Research*, 1(3), 263–274.
- Truckenmueller, P., Krantchev, K., Rubarth, K., Früh, A., Mertens, R., Bruening, D., Stein, C., Vajkoczy, P., Picht, T., & Acker, G. (2024). Augmented 360° 3D virtual reality for enhanced student training and education in neurosurgery. *World Neurosurgery*. <https://doi.org/https://doi.org/10.1016/j.wneu.2024.01.092>
- Trypke, M., Stebner, F., & Wirth, J. (2023). Two types of redundancy in multimedia learning: a literature review. *Frontiers in Psychology*, 14, 1148035.
- Valley, J. P., & Joseph, S. (2024). *Cognitive Insights: Exploring the Influence of Segmented Documentary Videos on Students' Brain Activity during Encoding and Retrieval of Information*.
- Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.
- Winarno, M. E. (2015). Evaluasi Hasil Belajar Pendidikan Jasmani Olahraga dan Kesehatan. In *Universitas Negeri Malang* (Vol. 16, Issue 2). Uinersitas Negeri Malang.
- Wirth, J., Stebner, F., Trypke, M., Schuster, C., & Leutner, D. (2020). An interactive layers model of self-regulated learning and cognitive load. *Educational Psychology Review*, 32(4), 1127–1149.
- Xie, Z., Fei, T., Forney, C. F., Li, Y., & Li, B. (2023). Improved maceration techniques to study the fruit vascular anatomy of grape. *Horticultural Plant Journal*, 9(3), 481–495. <https://doi.org/https://doi.org/10.1016/j.hpj.2022.06.008>
- Yoda, I. K., Kasih, I., & Ilra, T. (2024). Developing an E-Module to Improve the

- Seventh-Grade Student's Bump Pass Skills in Volleyball. *Journal of Education and E-Learning Research*, 11(1), 17–25.
- Younis, S. B., & Al-Hemiary, E. H. (2022). Augmented Reality for Learning Human Body Anatomy and Total Hip Replacement Surgery. *Iraqi Journal of Information and Communication Technology*, 5(2), 21–31.
- Yudaparmita, G. N. A., Parwata, I. G. L. A., Sudiana, I. K., & Dharmadi, M. A. (2024). Innovative Physical Education Learning: A Collaborative Teamwork Model with Video Support. *Jurnal Ilmiah Pendidikan Dan Pembelajaran*, 8(1), 109–117.
- Yuri, L. R. dan Y. (2019). *Pengertian, Jenis-Jenis dan Karakteristik Bahan Ajar Cetak Meliputi Handout, Modul, Buku (Diktat, Buku Ajar, Buku Teks), LKS, Pamflet*.
- Zhang, J., Yen, S.-H., Liu, T.-C., Sung, Y.-T., & Chang, K.-E. (2022). Studies on Learning Effects of AR-Assisted and PPT-Based Lectures. *The Asia-Pacific Education Researcher*, 31(1), 11–10. <https://doi.org/10.1007/s40299-020-00533-x>
- Zhang, W., Liu, Y., & Liu, S. (2024). Application of 3D Motion Graphic Design Technology of Object Simulation Human Body in Sports Teaching. *International Journal of High Speed Electronics and Systems*. <https://doi.org/10.1142/S0129156425400488>
- Zhang, Y., Ji, Z., Zhou, P., Dong, L., & Chen, Y. (2023). Clinical anatomy teaching: A promising strategy for anatomic education. *Heliyon*, 9(3), e13891. <https://doi.org/https://doi.org/10.1016/j.heliyon.2023.e13891>
- Zhang, Z. (2020). Analysis on the Construction of Personalized Physical Education Teaching System Based on a Cloud Computing Platform. *Wireless Communications and Mobile Computing*, 2020. <https://doi.org/10.1155/2020/8854811>
- Zhu, J., Ye, Z., Ren, M., & Guodong. (2024). Transformative skeletal motion analysis: optimization of exercise training and injury prevention through graph neural networks. *Frontiers in Neuroscience*, 18. <https://doi.org/10.3389/fnins.2024.1353257>