

## DAFTAR PUSTAKA

- Abell, N., & Springer, D. W. (2009). *Developing and Validating Rapid Assessment Instruments* (Oxford Uni).
- Agung, I. D. G., Suardana, I. N., & Rapi, N. K. (2022). E-Modul IPA dengan Model STEM-PjBL Berorientasi Pendidikan Karakter untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Imiah Pendidikan Dan Pembelajaran*, 6(1), 120. <https://doi.org/10.23887/jipp.v6i1.42657>
- Agustianti, R., Abyadati, S., Nussifera, L., Irvani, A. I., Handayani, D. Y., Hamdani, D., Amarulloh, R. R., Asri, Y. N., & Melian, I. (2022). *Asesmen Dan Evaluasi Pembelajaran*. TOHAR MEDIA. <https://books.google.co.id/books?id=3dSUEAAAQBAJ>
- Ahmed, V., Opoku, A., Olanipekun, A., & Sutrisna, M. (2022). *Validity and Reliability in Built Environment Research: A Selection of Case Studies*. CRC Press. <https://books.google.co.id/books?id=cAQDEQAAQBAJ>
- Andhianto, P. A., Fitriani, Y., & Nuroniah, P. (2024). Penerapan pembelajaran STEAM berbasis proyek penguatan profil pelajar pancasila (P5) di satuan PAUD. *Murhum: Jurnal Pendidikan Anak Usia Dini*, 5(1), 314–326.
- Andrich, D. (1988). *Rasch models for measurement: Sage publications*. Sage Publications.
- Anggrella, D. P., Rahmasiwi, A., Suyatman, A. K. S., & Sudrajat, A. K. (2024). Sosialisasi dan pelatihan pendekatan interdisipliner pada pembelajaran IPAS di pendidikan dasar. *KACANEGARA Jurnal Pengabdian Pada Masyarakat*, 7(3), 327–336.
- Arifin, Z., Sukarmin, S., Sarwanto, S., & Sani, D. M. (2021). Analysis of the need to development an assessment integrated with STEM literacy. *Journal of Physics: Conference Series*, 2098(1). <https://doi.org/10.1088/1742-6596/2098/1/012036>
- Arywiantari, D., Agung, A. A. G., & Tastra, I. D. K. (2015). Pengembangan multimedia interaktif model 4D pada pembelajaran IPA di SMP Negeri 3 Singaraja. *Jurnal Edutech Undiksha*, 3(1).
- Asghar, A., Ellington, R., Rice, E., Johnson, F., & Prime, G. M. (2012). Supporting STEM education in secondary science contexts. *Interdisciplinary Journal of Problem-Based Learning*, 6(2), 4.

- Astuti, N. D., Hapsan, A., Herianto, Mutmainna, Warsyidah, A. A., Riskawati, Mahmud, N., Febriana, B. W., & Toron, V. B. (2024). *PRINSIP-PRINSIP PENGUKURAN DAN EVALUASI PENDIDIKAN: Disertai dengan contoh kasus*. CV. Ruang Tentor. <https://books.google.co.id/books?id=8esFEQAAQBAJ>
- Azwar, S. (2013). *Penyusunan Skala Psikologi*. Pustaka Pelajar.
- Bauer, M. W. (2009). The evolution of public understanding of science—discourse and comparative evidence. *Science, Technology and Society*, 14(2), 221–240.
- Beers, S. Z. (2011). *21st century skills: Preparing students for their future*. <https://www.mheducation.com/>
- Bennett, D., & Monahan, P. (2013). NYSCI design lab: No bored kids! In *Design, make, play* (pp. 34–49). Routledge.
- Bevan, B. (2017). The promise and the promises of making in science education. *Studies in Science Education*, 53(1), 75–103.
- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H., & Young, S. L. (2018). Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. *Frontiers in Public Health*, 6(149). <https://doi.org/https://doi.org/10.3389/fpubh.2018.00149>
- Bond, T. G., & Fox, C. M. (2013). *Applying the Rasch model: Fundamental measurement in the human sciences*. Psychology Press.
- Boone Jr, H. N., & Boone, D. A. (2012). Analyzing likert data. *The Journal of Extension*, 50(2), 48.
- Borg, W. R., & Gall, M. D. (1984). Educational research: An introduction. *British Journal of Educational Studies*, 32(3).
- Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research, Second Edition*. Guilford Publications. <https://books.google.co.id/books?id=tTL2BQAAQBAJ>
- Bybee, R. W. (2010a). Advancing STEM education: A 2020 vision. *Technology and Engineering Teacher*, 70(1), 30.
- Bybee, R. W. (2010b). What is STEM education? In *Science (New York, N.Y.)* (Vol. 329, Issue 5995, p. 996). <https://doi.org/10.1126/science.1194998>

- Bybee, R. W. (2013). *The case for STEM education: Challenges and opportunities*. National Science Teachers Association.
- Byrne, B. M. (2013). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. routledge.
- Calton, D., & Covert, R. W. (2007). *Designing and Constructing Instruments for Social Research and Evaluation*. John Wiley & Sons.
- Capraro, M. M., & Jones, M. (2013). Interdisciplinary STEM project-based learning. *STEM Project-Based Learning*, 51–58.
- Cattell, R. B. (1966). The Scree Test for the number of factors. *Multivariate Behavioral Research*, 1(August), 245–276. <https://doi.org/10.1207/s15327906mbr0102>
- Cavalcanti, M. A. L. (2017). *Assessing STEM literacy in an informal learning environment*.
- Chamrat, S., Manokarn, M., & Thammapratchee, J. (2019). STEM literacy questionnaire as an instrument for STEM education research field: Development, implementation and utility. *AIP Conference Proceedings*, 2081(1).
- Cohen, R. J., & Swerdlik, M. E. (2009). *Psychological Testing and Assessment: An Introduction to Tests and Measurement* (8th Editio). McGraw-Hill Primis.
- Colton, D., & Covert, R. W. (2007). *Designing and constructing instruments for social research and evaluation*. John Wiley & Sons.
- Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*, 10(1).
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). SAGE Publications.
- Crocker, L., & Algina, J. (2008). *Introduction to Classical and Modern Test Theory*. Cengage Learning.
- Deguchi, A., Hirai, C., Matsuoka, H., Nakano, T., Oshima, K., Tai, M., & Tani, S. (2020). What is society 5.0. *Society*, 5(0), 1–24.
- DeVellis, R. F. (2016). *Scale Development: Theory and Applications* (4th editio). SAGE Publications.

- DeVellis, R. F., & Thorpe, C. T. (2021). *Scale development: Theory and applications*. Sage publications.
- Dewey, J. (1909). Symposium on the purpose and organization of physics teaching in secondary schools. *School Science and Mathematics*, 9(3), 291–292.
- Dewi, S. N., Hamdiyati, Y., Education, B., Education, N. S., & Pendidikan, U. (2024). *Student STEM Literacy Ability Profile on Environmental Change Issues 1,2,3*. 16(2), 203–208. <https://doi.org/10.25134/quagga.v16i2.344>
- Diani, R. (2015). Pengembangan Perangkat Pembelajaran Fisika Berbasis Pendidikan Karakter dengan Model Problem Based Instruction. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, 4(2), 243–255. <https://doi.org/10.24042/jpifalbiruni.v4i2.96>
- DiStefano, C., & Morgan, G. (2011). Examining classification criteria: A comparison of three cut score methods. *Psychological Assessment*, 23(2), 354.
- Dito, S. B., & Pujiastuti, H. (2021). Dampak Revolusi Industri 4.0 Pada Sektor Pendidikan: Kajian Literatur Mengenai Digital Learning Pada Pendidikan Dasar dan Menengah. *Jurnal Sains Dan Edukasi Sains*, 4(2), 59–65. <https://doi.org/10.24246/juses.v4i2p59-65>
- Djaali, H., & Muljono, P. (2008). *Pengukuran dalam Bidang Pendidikan*. Grasindo. <https://books.google.co.id/books?id=3SuBDp8bo7gC>
- Dos, S., Marita, B., Tri, Z. N., Widiastuti, E. I., & Hapsan, A. (2025). *KONSTRUKSI INSTRUMEN PENDIDIKAN*. CV. Ruang Tentor. <https://books.google.co.id/books?id=Neg9EQAAQBAJ>
- Dou, R., & Cian, H. (2022). Constructing STEM identity: An expanded structural model for STEM identity research. *Journal of Research in Science Teaching*, 59(3), 458–490.
- Dwianto, A., Wilujeng, I., Prasetyo, Z. K., & Suryadarma, I. G. P. (2017). The development of science domain based learning tool which is integrated with local wisdom to improve science process skill and scientific attitude. *Jurnal Pendidikan IPA Indonesia*, 6(1).
- Earl, L. M. (2013). *Assessment as Learning: Using Classroom Assessment to Maximize Student Learning*. SAGE Publications. <https://books.google.co.id/books?id=XKhl7I01o6MC>

- Education, U. S. D. of. (2016). *STEM 2026: A vision for innovation in STEM education*. US Department of Education, Office of Innovation and Improvement Washington, DC.
- English, L. D. (2016). STEM education K-12: perspectives on integration. *International Journal of STEM Education*, 3(1), 1–8. <https://doi.org/10.1186/s40594-016-0036-1>
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272.
- Feinstein, N. (2011). Salvaging science literacy. *Science Education*, 95(1), 168–185.
- Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. Sage publications limited.
- Findell, B., Swafford, J., & Kilpatrick, J. (2001). *Adding it up: Helping children learn mathematics*. National Academies Press.
- Fitzpatrick, E. (2007). Innovation America: A Final Report. *National Governors Association*.
- Gee, J. P. (2000). Chapter 3: Identity as an analytic lens for research in education. *Review of Research in Education*, 25(1), 99–125.
- Gutiérrez, R. (2009a). Embracing the inherent tensions in teaching mathematics from an equity stance. *Democracy & Education*, 18(3), 9–16.
- Gutiérrez, R. (2009b). Framing equity: Helping students “play the game” and “change the game.” *Teaching for Excellence and Equity in Mathematics*, 1(1).
- Hair, J., Anderson, R., Black, B., & Babin, B. (2016). *Multivariate Data Analysis*. Pearson Education. <https://books.google.co.id/books?id=LKOSAgAAQBAJ>
- Hair Jr, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis. In *Multivariate data analysis* (p. 785).
- Haladyna, T. M. (2004). *Developing and Validating Multiple-Choice Test Items* (3rd editio). Routledge.

- Hall, N., Larson, J., & Marsh, J. (2003). *Handbook of Early Childhood Literacy*. SAGE Publications.  
<https://books.google.co.id/books?id=xQI8DZr-NTsC>
- Harpian, Suwarma, I. R., & Setiawan, A. (2023). The Application of STEM Learning to Improve Students' STEM Literacy in The Knowledge Aspect. *Journal of Innovation in Educational and Cultural Research*, 4(3), 450–457. <https://doi.org/10.46843/jiecr.v4i3.676>
- Hayford, B., Blomstrom, S., Mumpower, L. A., & Hayford, B. (2015). *Formation and Assessment of a Tool to Evaluate STEM Literacy in Service-Learning Projects* Formation and Assessment of a Tool to Evaluate STEM Literacy in Service-Learning Projects Sally Blomstrom. 26, 73–101.
- Hofmann, S. G., & DiBartolo, P. M. (2000). An instrument to assess self-statements during public speaking: Scale development and preliminary psychometric properties. *Behavior Therapy*, 31(3), 499–515.
- Honey, M. A., Pearson, G., & Schweingruber, H. (2014). *STEM integration in K-12 education: status, prospects, and an agenda for research*. <https://doi.org/10.17226/18612>
- Jablonka, E. (2003). Mathematical literacy. *Second International Handbook of Mathematics Education*, 75–102.
- Jackson, C. D., & Mohr-Schroeder, M. J. (2018). Increasing Stem Literacy Via an Informal Learning Environment. *Journal of STEM Teacher Education*, 53(1). <https://doi.org/10.30707/jste53.1jackson>
- Jauharyah, M. N. R., Madlazim, M., Hariyono, E., Lestari, N. A., Wardi, L. Z., Pradigdo, L. H., Santoso, I. Y., Aulia'Alifteria, F., & Mahmud, M. (2023). Pelatihan pembuatan modul proyek pembelajaran steam (science, technology, engineering, art, and mathematics) terintegrasi mitigasi bencana alam dalam kurikulum merdeka belajar. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 5(2), 710–727.
- Johns, G., & Mentzer, N. (2016). STEM integration through design and inquiry. *Technology & Engineering Teacher*, 76(3).
- Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396.
- Kaiser, H. F. (1974). An Index of Factorial Simplicity. *Psychometrika*, 39(1), 31–36.

- Kelley, T. R., & Knowles, J. G. (2016). A conceptual framework for integrated STEM education. *International Journal of STEM Education*, 3, 1–11.
- Kemendikbud. (2022a). *Kurikulum Merdeka: Pembelajaran dengan Paradigma Baru dan Berdiferensiasi*. Kemdikbud.Go.Id. <https://www.kemdikbud.go.id/main/blog/2022/02/kurikulum-merdeka-pembelajaran-dengan-paradigma-baru-dan-berdiferensiasi>
- Kemendikbud. (2022b). *Praktik Guru Gunakan Platform Merdeka Mengajar, Mudah dan Inspiratif*. Kementerian Pendidikan, Kebudayaan, Riset Dan Teknologi, Kementerian Pendidikan, Kebudayaan, Riset Dan Teknologi. <https://www.kemdikbud.go.id/main/blog/2022/02/praktik-guru-gunakan-platform-merdeka-mengajar-mudah-dan-inspiratif>
- Kemendikbud. (2023). *Majukan Pendidikan STEM di Asia Tenggara, SEAMOLEC Lakukan Proyek Penguatan Guru*. <https://www.kemdikbud.go.id/main/blog/2023/07/majukan-pendidikan-stem-di-asia-tenggara-seamolec-lakukan-proyek-penguatan-guru>
- Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American Journal of Health-System Pharmacy*, 65(23), 2276–2284.
- Kurniasih, I., & Sani, B. (2014). Implementasi Kurikulum 2013 Konsep dan Penerapan. *Kementrian Pendidikan Dan Kebudayaan*, 1–162.
- Laksana, D. N. L., Qondias, D., & Oka, G. P. A. O. (2025). *Desain Penelitian Pengembangan Pendidikan*. NEM Publisher.
- Land, M. H. (2013). Full STEAM ahead: The benefits of integrating the arts into STEM. *Procedia Computer Science*, 20, 547–552.
- Lemke, M., Sen, A., Pahlke, E., Partelow, L., Miller, D., Williams, T., Kastberg, D., & Jocelyn, L. (2004). International Outcomes of Learning in Mathematics Literacy and Problem Solving: PISA 2003 Results From the US Perspective. Highlights. NCES 2005-003. *US Department of Education*.
- Luthfi, M. B., Rochmadi, S., Daryono, R. W., & Saputra, R. P. S. (2021). The development of interactive media based on video animation in the use of a total station for measurement stake out the building. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 4(1), 597–605.
- Madden, M. E., Baxter, M., Beauchamp, H., Bouchard, K., Habermas, D., Huff, M., Ladd, B., Pearson, J., & Plague, G. (2013). Rethinking STEM

education: An interdisciplinary STEAM curriculum. *Procedia Computer Science*, 20, 541–546.

Maulani, G., Septiani, S., Susilowaty, N., Rusmayani, N. G. A. L., Evenddy, S. S., Nababan, H. S., Setiadi, K., & Rahayu, I. (2024). *Evaluasi Pembelajaran*. Sada Kurnia Pustaka.  
<https://books.google.co.id/books?id=ebQVEQAAQBAJ>

Maziyah, K. N., & Hidayati, F. H. (2022). Pengembangan e-modul dengan pendekatan STEM untuk memfasilitasi kemampuan berpikir kritis siswa pada materi trigonometri. *Jurnal Tadris Matematika*, 5(2), 241–256.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50(9), 741.

Meyers, E. M., Erickson, I., & Small, R. V. (2013). Digital literacy and informal learning environments: an introduction. *Learning, Media and Technology*, 38(4), 355–367.

Miller, J. D. (1998). The measurement of civic scientific literacy. *Public Understanding of Science*, 7(3), 203.

Ministry of Education and Culture. (2019). *Mengadaptasi Pembelajaran STEM: Kesiapan Guru Mengadaptasi Pembelajaran STEM pada Implementasi Kurikulum 2013*.  
[https://puslitjakdikbud.kemdikbud.go.id/assets\\_front/images/produk/1-gtk/kebijakan/PB\\_Adaptasi\\_STEM.pdf](https://puslitjakdikbud.kemdikbud.go.id/assets_front/images/produk/1-gtk/kebijakan/PB_Adaptasi_STEM.pdf)

Moje, E. B., & Luke, A. (2009). Literacy and identity: Examining the metaphors in history and contemporary research. *Reading Research Quarterly*, 44(4), 415–437.

Moore, T. J., Johnston, A. C., & Glancy, A. W. (2020). STEM integration: A synthesis of conceptual frameworks and definitions. In *Handbook of research on STEM education* (pp. 3–16). Routledge.

Muntazhimah. (2023). *Model Rasch: Pengembangan Instrumen Penelitian Pendidikan*. Deepublish Publisher.

Naga, D. S. (2013). *Teori Sekora pada Pengukuran Mental*. Nagarani Citrayasa.

Napitupulu, E. L. (2024). *Kurikulum Merdeka Resmi Jadi Kurikulum Nasional*. Kompas.

<https://www.kompas.id/baca/humaniora/2024/03/27/kurikulum-merdeka-resmi-jadi-kurikulum-nasional>

- Natalia, S., & Ditasona, C. (2019). Analysis of the difficulties in determining the right evaluation instrument in teaching practice student teachers of mathematics education study program. *International Journal of Innovation, Creativity and Change*, 5(3), 1003–1033.
- Newhouse, C. P. (2017). STEM the boredom: Engage students in the Australian curriculum using ICT with problem-based learning and assessment. *Journal of Science Education and Technology*, 26, 44–57.
- Nugroho, O. F., Permanasari, A., Firman, H., & Riandi, R. (2021). The Importance of Stem Based Education in Indonesia Curriculum. *Pedagonal: Jurnal Ilmiah Pendidikan*, 5(2), 56–61. <https://doi.org/10.33751/pedagonal.v5i2.3779>
- Nurlaely, N., Permanasari, A., & Riandi, R. (2017). Student's STEM Literacy in Biotechnology Learning at Junior High School. *Journal of Physics: Conference Series*, 895(1). <https://doi.org/10.1088/1742-6596/895/1/012155>
- Oktavia, R. (2019). Bahan Ajar Berbasis Science, Technology, Engineering, Mathematics (Stem) untuk Mendukung Pembelajaran IPA Terpadu. *Semesta: Journal of Science Education and Teaching*, 2(1), 32–36. <http://semesta.ppj.unp.ac.id/index.php/semesta>.
- Perignat, E., & Katz-Buonincontro, J. (2019). STEAM in practice and research: An integrative literature review. *Thinking Skills and Creativity*, 31, 31–43.
- Piaget, J. (1970). *Science of education and the psychology of the child*. Trans. D. Coltman.
- Prasetyo, E. (2015). *TERNYATA PENELITIAN ITU MUDAH: Panduan Melaksanakan Penelitian Bidang Pendidikan*. eduNomi. <https://books.google.co.id/books?id=XpWJDAAAQBAJ>
- Purwanto. (2010). *Instrumen Penelitian Sosial dan Pendidikan*. Pustaka Pelajar.
- Putri, H. A., & Siswanto, D. H. (2024). Teaching at the right level (TaRL) as an implementation of new education concepts in the insights of Ki Hajar Dewantara. *Indones. J. Educ. Sci. Technol*, 3(2), 89–100.

- Rahayu, W., Putra, M. D. K., Faturochman, Meiliasari, Sulaeman, E., & Koul, R. B. (2022). Development and validation of Online Classroom Learning Environment Inventory (OCLEI): The case of Indonesia during the COVID-19 pandemic. *Learning Environments Research*, 1–17.
- Rahmita, & Rosana, D. (2020). Profile analysis of data literacy capability based on NGSS junior high school students in Takalar, South Sulawesi. *Journal of Physics: Conference Series*, 1440(1), 0–9. <https://doi.org/10.1088/1742-6596/1440/1/012082>
- Ramaley, J. A. (2002). *Moving mountains: Institutional culture and transformational change*.
- Riawati, E., Rosadi, K. I., & Mahluddin, M. (2022). Penerapan Pembelajaran Science Technology Engineering and Mathematics (STEM) dalam Meningkatkan Keaktifan Belajar Anak Usia Dini. *Journal of Educational Research*, 1(2), 273–298.
- Richey, R. C., & Klein, J. D. (2014). *Design and Development Research: Methods, Strategies, and Issues*. Taylor & Francis. <https://books.google.co.id/books?id=kvkJBAAAQBAJ>
- Riduwan. (2015). *Skala Pengukuran Variabel-Variabel Penelitian*. Alfabeta.
- Roberts, A. (2012). A justification for STEM education. *Technology and Engineering Teacher*, 71(8), 1–4.
- Rochman, C., Nasudin, D., & Rokayah, R. (2019). Science literacy on science technology engineering and math (STEM) learning in elementary schools. *Journal of Physics: Conference Series*, 1318(1). <https://doi.org/10.1088/1742-6596/1318/1/012050>
- Salkind, N. J. (2010). *Encyclopedia of Research Design* (Issue v. 1). SAGE Publications. <https://books.google.co.id/books?id=HVmsxuaQ12oC>
- Santrock, J. W. (2003). *Adolescence* (W. Kristiaji & Y. Sumiharti, Eds.). Erlangga. <https://books.google.co.id/books?id=Z3LWS-xbTv4C>
- Sari, N. A., Mulyani, S., Hastuti, B., & Indriyanti, N. Y. (2021). Analysis of High School Students' STEM Literacy and Problem-Solving Skills in Chemistry. *Journal of Physics: Conference Series*, 1842(1). <https://doi.org/10.1088/1742-6596/1842/1/012064>
- Sastradika, D., Iskandar, I., Syefrinando, B., & Shulman, F. (2021). Development of animation-based learning media to increase student's

- motivation in learning physics. *Journal of Physics: Conference Series*, 1869(1), 12180.
- Seery, N., Gumaelius, L., & Pears, A. (2018). Multidisciplinary teaching: The emergence of an holistic STEM teacher. *2018 IEEE Frontiers in Education Conference (FIE)*, 1–6.
- Silalahi, U., & Atif, N. F. (2015). *Metode penelitian sosial kuantitatif*. Refika Aditama.
- Snow, C. E., & Uccelli, P. (2009). The challenge of academic language. *The Cambridge Handbook of Literacy*, 112, 133.
- Sohilait, E. (2020). *Metodologi Penelitian Pendidikan Matematika: Penelitian Pengembangan dan desain riset dalam pembelajaran Matematika*. Emy Sohilait. <https://books.google.co.id/books?id=iqhMEAAAQBAJ>
- Souza, A. C. de, Alexandre, N. M. C., & Guirardello, E. de B. (2017). Psychometric properties in instruments evaluation of reliability and validity. *Epidemiologia e Servicos de Saude*, 26, 649–659.
- Strickland, D. S., & Morrow, L. M. (1989). *Emerging literacy: Young children learn to read and write*. ERIC.
- Sudaryono. (2015). *Metodologi Riset di Bidang TI: (Panduan Praktis, Teori dan Contoh Kasus)*. Penerbit Andi. [https://books.google.co.id/books?id=\\_5lyDwAAQBAJ](https://books.google.co.id/books?id=_5lyDwAAQBAJ)
- Sugiyono. (2020). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Sunedi, S., & Syaflin, S. L. (2024). Pengembangan E-Modul Ajar Berbasis Etno STEM pada Kurikulum Merdeka di Sekolah Dasar. *JagoMIPA: Jurnal Pendidikan Matematika Dan IPA*, 4(2), 325–335. <https://doi.org/10.53299/jagomipa.v4i2.631>
- Surr, W., Loney, E., Goldston, C., Rasmussen, J., & Anderson, K. (2016). From career pipeline to STEM literacy for all: Exploring evolving notions of STEM. *Washington, DC: American Institutes for Research*.
- Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6. Bask1). *MA: Pearson*.
- Tabachnick, B. G., & Fidell, L. S. (2018). *Using Multivariate Statistics*. Pearson. <https://books.google.co.id/books?id=cev2swEACAAJ>

- Tenney, K., Stringer, B. P., LaTona-Tequida, T., & White, I. (2023). Conceptualizations and Limitations of STEM Literacy across Learning Theories. *Journal of Microbiology & Biology Education*, 24(1). <https://doi.org/10.1128/jmbe.00168-22>
- Thiagarajan, S. (1974). *Instructional development for training teachers of exceptional children: A sourcebook*.
- Tytler, R. (2020). *STEM Education for the Twenty-First Century* (pp. 21–43). [https://doi.org/10.1007/978-3-030-52229-2\\_3](https://doi.org/10.1007/978-3-030-52229-2_3)
- Tytler, R., Williams, G., Hobbs, L., & Anderson, J. (2019). Challenges and opportunities for a STEM interdisciplinary agenda. *Interdisciplinary Mathematics Education: The State of the Art and Beyond*, 51–81.
- Untari, R., Kamdi, W., Dardiri, A., Hadi, S., & Nurhadi, D. (2020). The development and application of interactive multimedia in project-based learning to enhance students' achievement for 2D animation making. *International Journal of Emerging Technologies in Learning (IJET)*, 15(16), 17–30.
- Vasquez, J. A. (2015). STEM--Beyond the Acronym. *Educational Leadership*, 72(4), 10–15.
- Wahyudi, I., Rusilowati, A., Nugroho, S. E., & Widiyatmoko, A. (2024). *Journal of Innovative Science Education Evaluation of STEM Literacy Test Instrument on Elements , Compounds and Mixtures Using Multidimensional Rasch Analysis*. 13(2), 55–63.
- Widiana, I. W., Gading, I. K., & Tegeh, I. M. (2023). *Validasi Penyusunan Instrumen Penelitian Pendidikan*. PT. RajaGrafindo Persada - Rajawali Pers. <https://books.google.co.id/books?id=aPLfEAAAQBAJ>
- Wilkins, J. L. M. (2000). Special issue article: preparing for the 21st century: the status of quantitative literacy in the United States: this article continues our October 2000 special issue theme of “A vision for science and mathematics education in the 21st century.” *School Science and Mathematics*, 100(8), 405–418.
- Wilkins, J. L. M. (2010). Modeling quantitative literacy. *Educational and Psychological Measurement*, 70(2), 267–290.
- Yasin, R. M., Yunus, F. A. N., Rus, R. C., Ahmad, A., & Rahim, M. B. (2015). Validity and reliability learning transfer item using Rasch measurement model. *Procedia-Social and Behavioral Sciences*, 204, 212–217.

Yusrizal, & Rahmawati. (2022). *Pengembangan Instrumen Afektif & Kuesioner*. Pale Media Prima.  
<https://books.google.co.id/books?id=Y0uVEAAAQBAJ>

Zaky, M., Jamhari, M., & Zaky, M. (2024). *STEM Literacy Proficiency in Prospective Physics Educator : A Comprehensive Analysis Using Rasch Measurement Theory*. 10(12), 10799–10810.  
<https://doi.org/10.29303/jppipa.v10i12.8970>

Zollman, A. (2012). Learning for STEM Literacy: STEM Literacy for Learning. *School Science and Mathematics*, 112(1), 12–19.  
<https://doi.org/10.1111/j.1949-8594.2012.00101.x>

