DAFTAR PUSTAKA

Abid, A. M. (2020). *The effect of socio-scientific issue (SSI) based discussion: A student-centered approach to the teaching of argumentation.* https://www.researchgate.net/publication/352350451

Afifah, N. L., Murtono, Santoso, & Ardianti, S. D. (2021). Development of Pocket Book Based on Science Literacy. *Journal of Physics: Conference Series*, *1823*(1). https://doi.org/10.1088/1742-6596/1823/1/012075

Agustina, L., & Ro'isatin, U. A. (2024). The Efficacy of Case-Based Learning Model Integrated with Critical Thinking Skills to Improve EFL Learners' Reading Comprehension. *JOLLT Journal of Languages and Language Teaching*, *12*(3), 1443–1454. https://doi.org/10.33394/jollt.v%vi%i.11619

Aka, K. A. (2019). Integration Borg & Gall (1983) and Lee & Owen (2004) models as an alternative model of design-based research of interactive multimedia in elementary school. *Journal of Physics: Conference Series*. https://doi.org/10.1088/1742-6596/1318/1/012022

Akker, J. van den, Branch, R. M., Gustafson, K., Nieven, N., & Plomp, T. (1999). Design Approaches and Tools in Education and Training. In *Design Approaches and Tools in Education and Training*. Springer Netherlands. https://doi.org/10.1007/978-94-011-4255-7

Alsaleh, N. J. (2020). Teaching Critical Thinking Skills: Literature Review. In *TOJET: The Turkish Online Journal of Educational Technology* (Vol. 19, Issue 1).

Ambrose, S. A., Bridges, M. W., Dipietro, M., Lovett, M. C., Norman, M. K., & Mayer, R. E. (2010). *How Learning Works*.

Ananda, L. R., Rahmawati, Y., & Khairi, F. (2023a). Critical Thinking Skills of Chemistry Students by Integrating Design Thinking with STEAM-PJBL. *Journal of Technology and Science Education*, *13*(1), 352–367. https://doi.org/10.3926/jotse.1938

Ananda, L. R., Rahmawati, Y., & Khairi, F. (2023b). Critical Thinking Skills of Chemistry Students By Integrating Design Thinking with STEAM-PJBL. *Journal of Technology and Science Education*, *13*(1), 352–367. https://doi.org/10.3926/jotse.1938

Angelo, T. A., & Cross, K. P. (1993). *Classroom Assessment Techniques*. Jossey-Bass Publishers.

Ariza, M. R., Christodoulou, A., van Harskamp, M., Knippels, M. C. P. J., Kyza, E. A., Levinson, R., & Agesilaou, A. (2021). Socio-scientific inquiry-based learning as a means toward environmental citizenship. *Sustainability (Switzerland)*, *13*(20). https://doi.org/10.3390/su132011509

Asmianto, Hafiizh, M., Rahmadani, D., Pusawidjayanti, K., & Wahyuningsih, S. (2022). Developing Android-Based Interactive E-Modules on Trigonometry to Enhance the Learning Motivation of Students. *International Journal of Interactive Mobile Technologies*, *16*(2), 159–170. https://doi.org/10.3991/ijim.v16i02.27503

Balitbang. (2020). *Ujian yang Ideal di Masa Mendatang.* https://puslitjakdikbud.kemdikbud.go.id

Biggs, J., & Tang, C. (2011). *Teaching for Quality Learning at University Fourth Edition The Society for Research into Higher Education* (4th ed.). Bell and Bain Ltd, Glasgow. www.openup.co.uk

Branch, R. M., & Dousay, T. A. (2015). *Survey of instructional design models.* https://aect.org/survey_of_instructional_design.php

Bright, T. M., & Hadden, L. (2017). Safewalk: Improving Enrichment and Adoption Rates for Shelter Dogs by Changing Human Behavior. *Journal of Applied Animal Welfare Science*, *20*(1), 95–105. https://doi.org/10.1080/10888705.2016.1247353

Brookhart, S. M. (2010). *How to Assess Higher-Order Thinking Skills in Your Classroom*. ASCD. www.ascd.org/memberbooks

Bryce, T. G. K., & Blown, E. J. (2024). Ausubel's meaningful learning re-visited. *Current Psychology*, *43*(5), 4579–4598. https://doi.org/10.1007/s12144-023-04440-4

BSKAP. (2022). *Capaian Pembelajaran Mata Pelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) Fase A-Fase C Untuk SD/MI/Program Paket A*.

Çalik, M., & Özgür Karataş, F. (2019). Does a "Science, Technology and Social Change" Course Improve Scientific Habits of Mind and Attitudes towards Socioscientific Issues? In *Australian Journal of Teacher Education* (Vol. 44, Issue 6).

Cervetti, G. N., Barber, J., Dorph, R., Pearson, P. D., & Goldschmidt, P. G. (2012). The impact of an integrated approach to science and literacy in elementary school classrooms. *Journal of Research in Science Teaching*, *49*(5), 631–658. https://doi.org/10.1002/tea.21015

Cheung, D. (2018). The key factors affecting students' individual interest in school science lessons. *International Journal of Science Education*, *40*(1), 1–23. https://doi.org/10.1080/09500693.2017.1362711

Chew, S. W., Huang, X. Y., Hsu, F. H., & Chen, N. S. (2020). Enhancing critical thinking skills of elementary school students through collaborative learning. *Proceedings - IEEE 20th International Conference on Advanced Learning Technologies, ICALT 2020*, 249–253. https://doi.org/10.1109/ICALT49669.2020.00082

Chin, C., & Brown, D. E. (2000). Learning in Science: A Comparison of Deep and Surface Approaches. In *J Res Sci Teach* (Vol. 37).

Choi, S. Y., Won, A. R., Chu, H. E., Cha, H. J., Shin, H., & Kim, C. J. (2021). The Impacts of a Climate Change SSI-STEAM Program on Junior High School Students' Climate Literacy. *Asia-Pacific Science Education*, *7*(1), 96–133. https://doi.org/10.1163/23641177-bja10019

Damayanti, G. A., & Muhroji, M. (2022). The Difficulties of Elementary School Teacher in Developing Thematic Learning Tools for the Merdeka Curriculum. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *8*(3), 703. https://doi.org/10.33394/jk.v8i3.5770

Davies, M., & Barnett, R. (2015). The palgrave handbook of critical thinking in higher education. In *The Palgrave Handbook of Critical Thinking in Higher Education*. Palgrave Macmillan. https://doi.org/10.1057/9781137378057

Davut Gul, M., & Akcay, H. (2020). Structuring a new socioscientific issues (SSI) based instruction model: Impacts on pre-service science teachers' (PSTs) critical thinking skills and dispositions. *International Journal of Research in Education and Science*, *6*(1), 141–159. https://doi.org/10.46328/ijres.v6i1.785

Dawson, V., & Carson, K. (2020). Introducing Argumentation About Climate Change Socioscientific Issues in a Disadvantaged School. *Research in Science Education*, *50*(3), 863–883. https://doi.org/10.1007/s11165-018-9715-x

Dayan, E., & Tsybulsky, D. (2024). Designing and teaching socio-scientific issues online: digital curation in the science classroom. *International Journal of Science Education*. https://doi.org/10.1080/09500693.2024.2381133

Desstya, A. (2014). Kedudukan dan Aplikasi Pendidikan Sains di Sekolah Dasar. *Profesi Pendidikan Dasar*, *1*(2), 193–200.

Desstya, A., Sayekti, I. C., Rahmawati, F. P., Hidayati, Y. M., Kaltsum, H. U., Mahya, Y. M. Z., Kamila, S. J. P., Khotimah, N. A., Fidyastuti, N., & Diaz, A. M. (2024). Development of a Natural and Social Sciences Learning Model Based on Socio Scientific Issues to Strengthen Scientific Literacy of Islamic Elementary School Students. *Jurnal Penelitian Pendidikan IPA*, *10*(11), 8703–8711. https://doi.org/10.29303/jppipa.v10i11.9094

Dick, W. (1996). The Dick and Carey Model: Will It Survive the Decade? In *ETR&D* (Vol. 44, Issue 3).

Dick, W., Carey, L., & Carey, J. O. (2015). *The Systematic Design of Instruction* (Sixth edition). Pearson.

Dyaning Wijayanti, I., & Ekantini, A. (2023). Implementasi Kurikulum Merdeka Pada Pembelajaran IPAS MI/SD. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *8*.

Eggen, P. D. ., & Kauchak, D. P. . (2012). *Strategies and models for teachers : teaching content and thinking skills*. Pearson.

Ennis, R. (2011a). *Critical Thinking: Reflection and Perspective Part II* (Vol. 26, Issue 2).

Ennis, R. (2011b). *Critical Thinking: Reflection and Perspective Part II* (Vol. 26, Issue 2).

Erten, S. (2021). *Different Perspectives on Environmental Education*. www.isres.org

Fang, S. C., Hsu, Y. S., & Lin, S. S. (2019). Conceptualizing Socioscientific Decision Making from a Review of Research in Science Education. *International Journal of Science and Mathematics Education*, *17*(3), 427–448. https://doi.org/10.1007/s10763-018-9890-2

Fitriani, A., Zubaidah, S., Susilo, H., & Al Muhdhar, M. H. I. (2020). PBLPOE: A learning model to enhance students' critical thinking skills and scientific attitudes. *International Journal of Instruction*, *13*(2), 89–106. https://doi.org/10.29333/iji.2020.1327a

Frey, N., Fisher, D., & Hattie, J. (2017). Surface, Deep, and Transfer? Considering the Role of Content Literacy Instructional Strategies. *Journal of Adolescent and Adult Literacy*, *60*(5), 567–575. https://doi.org/10.1002/jaal.576

Friedman, A., & Schneider, E. (2018). Developing a Visualization Education Curriculum in the Age of Big Data Using the Dick and Carey Model. *Visual Communication Quarterly*, *25*(4), 250–256. https://doi.org/10.1080/15551393.2018.1530115

Friedrichsen, P. J., Ke, L., Sadler, T. D., & Zangori, L. (2021). Enacting Co-Designed Socio-Scientific Issues-Based Curriculum Units: A Case of Secondary Science Teacher Learning. *Journal of Science Teacher Education*, *32*(1), 85–106. https://doi.org/10.1080/1046560X.2020.1795576

Fryer, L. K., Shum, A., Lee, A., & Lau, P. (2021). Mapping students' interest in a new domain: Connecting prior knowledge, interest, and self-efficacy with interesting tasks and a lasting desire to reengage. *Learning and Instruction*, *75*. https://doi.org/10.1016/j.learninstruc.2021.101493

Fullan, M., Quinn, J., & Mceachen, J. (2018). *Praise for Deep Learning: Engage the World Change the World*.

Gallardo-Estrada, C., Nussbaum, M., Pinto, M., Alvares, D., & Alario-Hoyos, C. (2024). Enhancing Grit and Critical Thinking in Rural Primary Students: Impact of a Targeted Educational Intervention. *Education Sciences*, *14*(9), 1009. https://doi.org/10.3390/educsci14091009

Gay, L. R., Mills, G. E., & Airasian, P. (2011). Educational Research: Competencies for Analysis and Applications (Tenth ed.). In *Upper Saddler River, New Jersey: Pearson Education Inc.*

Georgiou, Y., & Kyza, E. A. (2023). Fostering Chemistry Students' Scientific Literacy for Responsible Citizenship through Socio-Scientific Inquiry-Based Learning (SSIBL). *Sustainability (Switzerland)*, *15*(8). https://doi.org/10.3390/su15086442

Hancock, T. S., Friedrichsen, P. J., Kinslow, A. T., & Sadler, T. D. (2019). Selecting Socio-scientific Issues for Teaching: A Grounded Theory Study of How Science Teachers Collaboratively Design SSI-Based Curricula. *Science and Education*, *28*(6–7), 639–667. https://doi.org/10.1007/s11191-019-00065-x

Haryono, T. (2015). *Penyajian Buku Bermutu Menurut SNI dan ISO Rekomendasi Menuju Perbaikan Berkelanjutan* (Vol. 22, pp. 30–39). Media Pustakawan.

Häyrynen, S., Keinonen, T., & Kärkkäinen, S. (2021). Promoting Environmental Citizenship Through Local Socio-Cultural Traditions in Science Education. *Discourse and Communication for Sustainable Education*, *12*(2), 5–30. https://doi.org/10.2478/dcse-2021-0013

Herawati, H., Hakim, A., & Nurhadi, M. (2020). The effectiveness of inquiry-based learning with multiple representation to improve critical thinking skill in learning electrochemistry. *AIP Conference Proceedings*, *2215*. https://doi.org/10.1063/5.0001060

Herman, B. C., Poor, S. V., Oertli, R. T., & Schulte, K. (2023). Promoting Young Learners' NOS Views Through Place-Based SSI Instruction. *Science and Education*, *32*(4), 947–992. https://doi.org/10.1007/s11191-022-00353-z

Herman, B. C., Zeidler, D. L., & Newton, M. (2020). Students' Emotive Reasoning Through Place-Based Environmental Socioscientific Issues. *Research in Science Education*, *50*(5), 2081–2109. https://doi.org/10.1007/s11165-018-9764-1

Högström, P., Gericke, N., Wallin, J., & Bergman, E. (2024). Teaching Socioscientific Issues: A Systematic Review. *Science and Education*. https://doi.org/10.1007/s11191-024-00542-y

Inch, E. S. ., & Tudor, K. H. . (2015). *Critical thinking and communication : the use of reason in argument*. Pearson.

Indrašienė, V., Jegelevičienė, V., Merfeldaitė, O., Penkauskienė, D., Pivorienė, J., Railienė, A., & Sadauskas, J. (2023). Critical Reflection in Students' Critical Thinking Teaching and Learning Experiences. *Sustainability (Switzerland)*, *15*(18). https://doi.org/10.3390/su151813500

Joyce, B., Weil, M., & Calhoun, E. (2015). *Models of Teaching*. Perason.

Karpudewan, M., & Chan, L. H. (2022). Educating primary students on infectious diseases and nurturing character and values using socioscientific instruction. *Journal of Public Health (Germany)*, *30*(4), 885–895. https://doi.org/10.1007/s10389-020-01368-y

Kasih, A. P., & Nurcahyo, H. (2020). Pengembangan Model Pembelajaran ADEL (Active and Delightful Learning) pada Materi Organel Sel Kelas VII SMP. *EDUSAINS*, *12*(1), 135–144. https://doi.org/10.15408/es.v12i1.14041

Ke, L., Sadler, T. D., Zangori, L., & Friedrichsen, P. J. (2020). Students' perceptions of socio-scientific issue-based learning and their appropriation of epistemic tools for systems thinking. *International Journal of Science Education*, *42*(8), 1339–1361. https://doi.org/10.1080/09500693.2020.1759843

Ke, L., Sadler, T. D., Zangori, L., & Friedrichsen, P. J. (2021). Developing and Using Multiple Models to Promote Scientific Literacy in the Context of Socio-Scientific Issues. *Science and Education*, *30*(3), 589–607. https://doi.org/10.1007/s11191-021-00206-1

Kemdikdasmen. (2025). *Naskah Akdemik Pembelajaran Mendalam*.

Kemendikbud. (2022). Ilmu Pengetahuan Alam dan Sosial (IPAS) SD-SMA. *Merdeka Mengajar*. https://guru.kemdikbud.go.id/kurikulum/referensi-penerapan/capaian-pembelajaran/sd-sma/ilmu-pengetahuan-alam-dan-sosial-ipas/

Kemendikbud. (2023). *Rapor Pendidikan Indonesia*.

Kemendikbudristek BSKAP. (2022). Salinan Keputusan Kepala Badan Standar, Kurikulum, dan Asesmen Pendidikan, Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Nomor 008/H/KR/2022 Tentang Capaian Pembelajaran Pada Pendidikan Anak Usia Dini Jenjang Pendidikan Dasar dan Jenjang Pendid. In *Kemendikbudristek* (Issue 021).

Kim, J.-U., & Kim, C.-J. (2021). *Exploring Elementary Students' Positioning in a Context of Socio-scientific Issues (SSI) Education: Focus on an Action-oriented Climate Change Club Activity*. https://doi.org/10.14697/jkase.2021.41.6.501

Kinoshita, H. (2022). Teaching of Critical Thinking Skills by Science Teachers in Japanese Schools. *Journal of Baltic Science Education*, *21*(5), 801–816. https://doi.org/10.33225/jbse/22.21.801

Kinslow, A. T., Sadler, T. D., & Nguyen, H. T. (2019). Socio-scientific reasoning and environmental literacy in a field-based ecology class. *Environmental Education Research*, *25*(3), 388–410. https://doi.org/10.1080/13504622.2018.1442418

Klosterman, M. L., & Sadler, T. D. (2010). Multi-level assessment of scientific content knowledge gains associated with socioscientific issues-based instruction. *International Journal of Science Education*, *32*(8), 1017–1043. https://doi.org/10.1080/09500690902894512

Krems, J. A., Kenrick, D. T., & Neel, R. (2017). Individual Perceptions of Self-Actualization: What Functional Motives Are Linked to Fulfilling One's Full Potential? *Personality and Social Psychology Bulletin*, *43*(9), 1337–1352. https://doi.org/10.1177/0146167217713191

Lave, J., & Wenger, E. (1991). *Situated Learning Legitimate Peripheral Participation* (J. S. Brown, Ed.). Cambridge University Press.

Lee, E. A., & Brown, M. J. (2018). Connecting Inquiry and Values in Science Education: An Approach Based on John Dewey's Philosophy. *Science and Education*, *27*(1–2), 63–79. https://doi.org/10.1007/s11191-017-9952-9

Lee, Y. H. (2018). Scripting to enhance university students' critical thinking in flipped learning: implications of the delayed effect on science reading literacy. *Interactive Learning Environments*, *26*(5), 569–582. https://doi.org/10.1080/10494820.2017.1372483

Lestari, I. (2019). *Berpikir Kritis dalam Konteks Pembelajaran*. https://www.researchgate.net/publication/335320458

Liang, W., & Fung, D. (2021). Fostering critical thinking in English-as-a-second-language classrooms: Challenges and opportunities. *Thinking Skills and Creativity*, *39*. https://doi.org/10.1016/j.tsc.2020.100769

London, M., Sessa, V. I., & Shelley, L. A. (2023). Developing Self-Awareness: Learning Processes for Self- and Interpersonal Growth. In *Annual Review of Organizational Psychology and Organizational Behavior* (Vol. 10, pp. 261–288). Annual Reviews Inc. https://doi.org/10.1146/annurev-orgpsych-120920-044531

Mang, H. M. A., Chu, H. E., Martin, S. N., & Kim, C. J. (2021). An SSI-Based STEAM Approach to Developing Science Programs. *Asia-Pacific Science Education*, *7*(2), 549–585. https://doi.org/10.1163/23641177-bja10036

Marks, R., Bertram, S., & Eilks, I. (2008). Learning chemistry and beyond with a lesson plan on potato crisps, which follows a socio-critical and problem-oriented approach to chemistry lessons - A case study. *Chemistry Education Research and Practice*, *9*(3), 267–276. https://doi.org/10.1039/b812416g

Miner, A., & Nicodemus, B. (2021). *From the Classroom to the Community Situated Learning in Interpreter Education*. https://doi.org/https://doi.org/10.1007/978-3-030-68904-9

Mkimbili, S. T. (2019). Meaningful Science Learning by the Use of an Additional Language: A Tanzanian Perspective. *African Journal of Research in Mathematics, Science and Technology Education*, *23*(3), 265–275. https://doi.org/10.1080/18117295.2019.1654212

Monrat, N., Phaksunchai, M., & Chonchaiya, R. (2022). Developing Students' Mathematical Critical Thinking Skills Using Open-Ended Questions and Activities Based on Student Learning Preferences. *Education Research International*, *2022*. https://doi.org/10.1155/2022/3300363

Muchlas, A., Fadhlan, Lavicza, Z., & Anđić, B. (2023). Enhancing socio-scientific reasoning of elementary school students through educational comics: a comprehensive exploration across diverse domain of knowledge. *Education 3-13*. https://doi.org/10.1080/03004279.2023.2266457

Neumann, K., Kind, V., & Harms, U. (2019). Probing the amalgam: the relationship between science teachers' content, pedagogical and pedagogical content knowledge. *International Journal of Science Education*, *41*(7), 847–861. https://doi.org/10.1080/09500693.2018.1497217

Nuraeni, Y., MS, Z., & Boeriswati, E. (2020). A Case Study of Curriculum Implementation and K-13 Challenges in Indonesia. *International Journal for Educational and Vocational Studies*, *1*(8), 14. https://doi.org/10.29103/ijevs.v2i1.2263

OECD. (2023). *PISA 2022 Results Factsheets Indonesia PUBE*. https://oecdch.art/a40de1dbaf/C108.

O'Reilly, C., Devitt, A., & Hayes, N. (2022). Critical thinking in the preschool classroom - A systematic literature review. *Thinking Skills and Creativity*, *46*. https://doi.org/10.1016/j.tsc.2022.101110

Ozden, M. (2020). Elementary school students' informal reasoning and its' quality regarding socio-scientific issues. *Eurasian Journal of Educational Research*, *2020*(86), 61–84. https://doi.org/10.14689/ejer.2020.86.4

Patel, Charmi. (2018). *Situated Learning*. Macat Library.

Paul, R., & Elder. (2014). *Critical Thinking : Tools for Taking Charge of Your Professional and Personal Life* (second Edition). Pearson Education, Inc.

Paul, Richard., & Elder, Linda. (2019). *The nature and functions of critical & creative thinking*. Foundation for Critical Thinking Press.

Pendidikan, K., Kebudayaan, D., Penelitian, B., Pengembangan, D., Penelitian, P., & Pendidikan, K. (2017). *Buku Teks dan Pengayaan: Kelengkapan dan Kelayakan Buku Teks Kurikulum 2013 Serta Kebijakan Penumbuhan Minat Baca Siswa*. https://litbang.kemdikbud.go.id

Peters, M. A. (2018). Deep learning, education and the final stage of automation. In *Educational Philosophy and Theory* (Vol. 50, Issues 6–7, pp. 549–553). Routledge. https://doi.org/10.1080/00131857.2017.1348928

Plomp, T., & Nieveen, N. (2007). *An Introduction to Educational Design Research*.

Polman, J., Hornstra, L., & Volman, M. (2021). The meaning of meaningful learning in mathematics in upper-primary education. *Learning Environments Research*, *24*(3), 469–486. https://doi.org/10.1007/s10984-020-09337-8

Presley, Morgan. L., Sickle, AAron. J., Muslu, N., Johnson, D. M., Witzig, S. B., Izci, K., & Sadler, T. D. (2013). *A Framework for Socio-scientifi Issues Based Education*.

Purwanto, A., Rahmawati, Y., Rahmayanti, N., Mardiah, A., & Amalia, R. (2022). Socio-critical and problem-oriented approach in environmental issues for students' critical thinking skills development in chemistry learning. *Journal of Technology and Science Education*, *12*(1), 50–67. https://doi.org/10.3926/jotse.1341

Puslitjakdikbud. (2017). *Buku Teks dan Pengayaan: Kelengkapan dan Kelayakan Buku Teks Kurikulum 2013 Serta Kebijakan Penumbuhan Minat Baca Siswa*. https://litbang.kemdikbud.go.id

Putra, B. C., Alfarizqi, M., Ghiffari, N., & Salsabila, K. (2018). *Joyful Learning: Alternative Learning Models To Improving Student's Happiness*. *30*(2), 30–35.

Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2023). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, *31*(4), 2371–2391. https://doi.org/10.1080/10494820.2021.1884886

Rahmawati, A. P., & Wijayanti, P. R. (2022). Implementing Joyful Learning Strategy Using Wordwall in Order to Improve Reading Comprehension Skills. *Proceedings Series on Physical & Formal Sciences*, *3*, 32–35. https://doi.org/10.30595/pspfs.v3i.261

Ratcliffe, M., & Grace, M. (2003). *Science Education For Citizenship*. Open University Press.

Ratna Sari, W., & Adi Prayitno, B. (2024). *Pengembangan E-Modul Berbasis PjBL-STEM untuk Meningkatkan Keterampilan Berpikir Kritis dan Kreatif Peserta Didik SMK kelas X pada Materi Proyek IPAS*. *21*(1).

Reigeluth, C. M. (1999). *Instructional-design theories and models, Vol. II: A new paradigm of instructional theory (92)*. https://www.researchgate.net/publication/232486605

Retno, S., & Saputro, S. (2025). A Systematic Review on Integrating SSI into Science Education: Its Impact on 21 st Century Skills (2014-2024). *ESRJ*, *2*(1), 2025. https://doi.org/10.5281/zenodo.14693973

Rihayati, Utaminingsih, S., & Santoso. (2021). Improving Critical Thinking Ability through Discovery Learning Model Based on Patiayam Site Ethnoscience. *Journal*

of Physics: Conference Series, 1823(1). https://doi.org/10.1088/1742-6596/1823/1/012104

Sadler, T. D. (2011). *Socio-scientific Issues in the Classroom* (K. Tobin, Ed.; 39th ed., Vol. 39). Springer. www.springer.com/series/6512

Sadler, T. D., Foulk, J. A., & Friedrichsen, P. J. (2016). Evolution of a Model for Socio-Scientific Issue Teaching and Learning. *International Journal of Education in Mathematics, Science and Technology*, *5*(1), 75. https://doi.org/10.18404/ijemst.55999

Sadler, T. D., Romine, W. L., & Topçu, M. S. (2016). Learning science content through socio-scientific issues-based instruction: a multi-level assessment study. *International Journal of Science Education*, *38*(10), 1622–1635. https://doi.org/10.1080/09500693.2016.1204481

Sahin, D., & Yilmaz, R. M. (2020). The effect of Augmented Reality Technology on middle school students' achievements and attitudes towards science education. *Computers and Education*, *144*. https://doi.org/10.1016/j.compedu.2019.103710

Seels, B., & Richey, R. (1994). The 1994 Definition of the field. In *Instructional Technology: The definition and domains of the field*.

Shaw, A., Liu, O. L., Gu, L., Kardonova, E., Chirikov, I., Li, G., Hu, S., Yu, N., Ma, L., Guo, F., Su, Q., Shi, J., Shi, H., & Loyalka, P. (2020). Thinking critically about critical thinking: validating the Russian HEIghten® critical thinking assessment. *Studies in Higher Education*, *45*(9), 1933–1948. https://doi.org/10.1080/03075079.2019.1672640

Shiomi, M., Tamura, Y., Kimoto, M., Iio, T., Akahane-Yamada, R., & Shimohara, K. (2021). *Two is Better Than One: Verification of the Effect of Praise from Two Robots on Pre-school Children's Learning Time*.

Slavin, R. E. (2018). *Educational psychology: Theory and practice*. thuvienso.hoasen.edu.vn. https://thuvienso.hoasen.edu.vn/handle/123456789/7375

Sukarelawa, M. I., Pd, M., Toni, K., Indratno, M., Pd, S., Suci, M., Ayu, S., & Km, M. P. H. (2024). *N-Gain vs Stacking*.

Suparman, A. (2008). Enhancing Learning Support System through the Use of Information and Communication Technology: a Case at Universitas Terbuka. *Revista Brasileira de Aprendizagem Aberta e a Distância*. https://doi.org/10.17143/rbaad.v5i0.174

Supliyadi, Irham Baedhoni, M., & Wiyanto. (2017). *Penerapan Model Guided Discovery Learning Berorientasi Pendidikan Karakter untuk Meningkatkan Hasil Belajar Siswa Kelas XI SMA Negeri 1 Semarang Tahun Pelajaran 2017/2018*. https://journal.unnes.ac.id/nju/index.php/jpk

Surabaya, U. N. (2020). *Revitalization of Social Studies Education: A Developmental Study Based on Dick and Carey Instructional Design 1 st Muhammad Khoiron*.

Swanson, J. D., Brock, L., Van Sickle, M., Gutshall, C. A., Russell, L., & Anderson, L. (2020). A Basis for Talent Development: The Integrated Curriculum Model and Evidence-based Strategies. *Roeper Review*, *42*(3), 165–178. https://doi.org/10.1080/02783193.2020.1765920

Wahono, B., Chang, C. Y., & Khuyen, N. G. U. Y. E. N. T. T. (2021). Teaching socio-scientific issues through integrated STEM education: an effective practical averment from Indonesian science lessons. *International Journal of Science Education*, *43*(16), 2663–2683. https://doi.org/10.1080/09500693.2021.1983226

Walker, K. A., & Zeidler, D. L. (2007). Promoting discourse about socioscientific issues through scaffolded inquiry. *International Journal of Science Education*, *29*(11), 1387–1410. https://doi.org/10.1080/09500690601068095

Walter, D., Carey, L., & Carey, O. J. (2009). *Systematic Design of Instruction* (7th ed.). Pearson.

Wanti, L., & Chastanti, I. (2023). Analysis of preparation in the independent curriculum implementation: Case study on IPAS learning. *BIO-INOVED : Jurnal Biologi-Inovasi Pendidikan*, *5*(2), 250. https://doi.org/10.20527/bino.v5i2.15493

Widodo, A. (2021). *Pembelajaran Ilmu Pengetahuan Alam Dasar-Dasar untuk Praktik* (M. Iriany, Ed.). UPI PRESS.

Winje, Ø., & Løndal, K. (2020). Bringing deep learning to the surface: A systematic mapping review of 48 years of research in primary and secondary education. *Nordic Journal of Comparative and International Education*, *4*(2), 25–41. https://doi.org/10.7577/njcie.3798

Zakarina, U., Ramadya, D. A., Sudai, R., & Pattipeillohi. (2024). *Integrasi Mata Pelajaran IPA dan IPS dalam Kurikulum Merdeka dalam Upaya Penguatan Literasi Sains dan Sosial di Sekolah Dasar*. http://dx.doi.org/10.37905/dej.v4i1.2487

Zeidler, D. L. (2009). Socioscientific Issues: Theory and Practice. In *Journal of Elementary Science Education • Spring* (Vol. 21, Issue 2).

Zvoch, K., Holveck, S., & Porter, L. (2021). Teaching for Conceptual Change in a Density Unit Provided to Seventh Graders: A Comparison of Teacher- and Student-Centered Approaches. *Research in Science Education*, *51*(5), 1395–1421. https://doi.org/10.1007/s11165-019-09907-8