

DAFTAR PUSTAKA

- (NCQTL), N. C. on Q. T. and L. (2012). *Learning activity using the scientific method*.
- A. Loshchilova, A. (2019). Practice-Oriented Educational Program of Activities of the Children Environmental Association As a Tool To Form the Seventh and Eighth-Graders' Environmental Responsibility. *Nuances: Estudos Sobre Educação*, 30(1), 601–631. <https://doi.org/10.32930/nuances.v30i1.7095>
- Abdi, A. (2012). A Study on the Relationship of Thinking Styles of Students and Their Critical Thinking Skills. *Procedia - Social and Behavioral Sciences*, 47(1987), 1719–1723. <https://doi.org/10.1016/j.sbspro.2012.06.889>
- Aboulail, Fa. S., & Tajuddin, A. J. A. (2021). Ocean Literacy of Primary Students of Internastional Schools in Riyadh, Saudi Arabia. *Journal of Nusantara Studies*, 6(2), 403–423.
- Adams, J. W. (2013). *A Case Study : Using Lesson Study To Understand Factors That Affect Teaching Creative And Critical Thinking n The Elementary Classroom* (Issue March). Drexel University.
- Aizikovitsh-Udi, E., & Cheng, D. (2015). Developing Critical Thinking Skills from Dispositions to Abilities: Mathematics Education from Early Childhood to High School. *Creative Education*, 06(04), 455–462. <https://doi.org/10.4236/ce.2015.64045>
- Allina, B. (2018). The development of STEAM educational policy to promote student creativity and social empowerment. *Arts Education Policy Review*, 119(2), 77–87. <https://doi.org/10.1080/10632913.2017.1296392>
- Almeida L., P. L. (2007). Creativity: The question of its construct validity. *The BERA Annual Conference*.
- Almeida, L. S., Prieto, L. P., Ferrando, M., Oliveira, E., & Ferrándiz, C. (2008). Torrance Test of Creative Thinking: The question of its construct validity. *Thinking Skills and Creativity*, 3(1), 53–58. <https://doi.org/10.1016/j.tsc.2008.03.003>
- Andrews, K. E., Tressler, K. D., & Mintzes, J. J. (2008). Assessing environmental understanding: an application of the concept mapping strategy. *Environmental Education Research*, 14(5), 519–536. <https://doi.org/10.1080/13504620802278829>
- Arcury, T. A., & Christianson, E. H. (1990). Environmental Worldview in Response to Environmental Problems Kentucky 1984 and 1988 Compared. *Env*, 22(3), 387–407.
- Ardoin, N. M., & Bowers, A. W. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review*, 31(January).

- Astuti, A. T., Supahar, Mundilarto, & Istiyono, E. (2020). Development of assessment instruments to measure problem solving skills in senior high school. *Journal of Physics: Conference Series*, 1440(1). <https://doi.org/10.1088/1742-6596/1440/1/012063>
- Atsnan, M. F., & Gazali, R. Y. (2013). Penerapan Pendekatan Scientific Dalam Pembelajaran Matematika SMP Kelas VII Materi Bilangan (Pecahan). *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika Pendidikan Matematika, I(I)*, 429–436.
- Aubrey, C., Ghent, K., & Kanira, E. (2012). Enhancing thinking skills in early childhood. *International Journal of Early Years Education*, 20(4), 332–348. <https://doi.org/10.1080/09669760.2012.743102>
- Bailey, K. G. D. (2012). Faith-Learning Integration, Critical Thinking Skills, and Student Development in Christian Education. *Journal of Research on Christian Education*, 21(2), 153–173. <https://doi.org/10.1080/10656219.2012.698831>
- Barnes, J., FakhrHosseini, M. S., Vasey, E., Duford, Z., & Jeon, M. (2017). Robot theater with children for STEAM education. *Proceedings of the Human Factors and Ergonomics Society, 2017-October*(Figure 1), 875–879. <https://doi.org/10.1177/1541931213601511>
- Barraza, L. (1999). Children's drawings about the environment. *Environmental Education Research*, 5(1), 49–66. <https://doi.org/10.1080/1350462990050103>
- Barraza, L., & Cuarón, A. D. (2004). How values in education affect children's environmental knowledge. *Journal of Biological Education*, 39(1), 18–23. <https://doi.org/10.1080/00219266.2004.9655949>
- Bartlett, C., & Bos, L. (2018). STEAM Around the World: Successfully Incorporating Hands-On Learning and Diversity into Children's Programming. *Journal of Library Administration*, 58(2), 174–182. <https://doi.org/10.1080/01930826.2017.1392223>
- Bautista, A. (2021). STEAM education: contributing evidence of validity and effectiveness (Educación STEAM: aportando pruebas de validez y efectividad). *Infancia y Aprendizaje*, 44(4), 755–768. <https://doi.org/10.1080/02103702.2021.1926678>
- Belbase, S., Mainali, B. R., Kasemsukpipat, W., Tairab, H., Gochoo, M., & Jarrah, A. (2021). At the dawn of science, technology, engineering, arts, and mathematics (STEAM) education: prospects, priorities, processes, and problems. *International Journal of Mathematical Education in Science and Technology*, May. <https://doi.org/10.1080/0020739X.2021.1922943>
- Betz, F. (2011). *Managing science: Innovation, technology, and knowledge management*. Springer.
- Blocker, T. J., & Eckberg, D. L. (1989). Environmental Issues as Women's Issues: general Concerns and Local Hazards. *Social Science Quarterly*, 70(3).

- Blum, A. (1987). Students' Knowledge and Beliefs concerning Environmental Issues in Four Countries. *The Journal of Environmental Education*, 18(3), 7–13. <https://doi.org/10.1080/00958964.1987.9942734>
- Boag S. (2015). Conscious, Preconscious, and Unconscious. In *Encyclopedia of Personality and Individual Differences*.
- Bodrova, E., & Leong, D. J. (2005). The importance of play: Why children need to play. *Early Childhood Today*, 20(1), 6–7.
- Boubonari, T., Markos, A., & Kevrekidis, T. (2013). Greek pre-service teachers' knowledge, attitudes, and environmental behavior toward marine pollution. *Journal of Environmental Education*, 44(4), 232–251. <https://doi.org/10.1080/00958964.2013.785381>
- Bourke, J. (2017). Children's experiences of their everyday walks through a complex urban landscape of belonging. *Children's Geographies*, 15(1), 93–106. <https://doi.org/10.1080/14733285.2016.1192582>
- Bowker, R. (2007). Children's perceptions and learning about tropical rainforests: an analysis of their drawings. *Environmental Education Research*, 13(1), 75–96. <https://doi.org/10.1080/13504620601122731>
- BPLHD. (2008). *Status Lingkungan Hidup Tahun 2008 Laut dan Pesisir* (Issue 27).
- Bransford, J. D. and B. S. S. (1984). *The Ideal Problem Solver, A Guide for Improving Thinking, Learning and Creativity* (First). WH Freeman Company.
- Brennan, A., & Lo, Y. S. (2010). *Understanding environmental philosophy*. Routledge, Taylor and Francis.
- Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, 6(1), 97–113. <https://doi.org/10.1177/1468794106058877>
- Burhanuddin, Syamaun, A., & Erdiana, N. (2018). The Implementation of Scientific Approach in Teaching English Based on 2013 Curriculum at SMAN 1 2x11 Kayutanam. *Research in English and Education (READ)*, 3(August), 178–183. <https://doi.org/10.2991/assehr.k.200819.023>
- Burke, L. A., & Williams, J. M. (2012). Two thinking skills assessment approaches: "Assessment of Pupils' Thinking Skills" and 'Individual Thinking Skills Assessments.'" *Thinking Skills and Creativity*, 7(1), 62–68. <https://doi.org/10.1016/j.tsc.2011.11.002>
- Bush, S. B., & Cook, K. L. (2019a). *Step into STEAM, grades K-5: Your standards-based action plan for deepening mathematics and science learning*. Corwin, A SAGE Company and NCTM.
- Bush, S. B., & Cook, K. L. (2019b). Structuring STEAM Inquiries: Lessons Learned from Practice. In M. S. Khine & S. Arepattamanni (Eds.), *STEAM Education Theory and Practice* (pp. 26–42). https://doi.org/10.1007/978-3-030-04003-1_2

- Butterworth, J., & Thwaites, G. (2013). Thinking skills Critical Thinking and Problem Solving. In *Debates in Religious Education* (Second). Cambridge University. <https://doi.org/10.4324/9780203813805-29>
- Campbell, L., Campbell, B. & Dickinson, D. (1996). *Teaching and learning through multiple intelligence*. Allyn and Bacon/Allyn and Bacon.
- Chakraverty, D., & Tai, R. H. (2013). Parental Occupation Inspiring Science Interest. *Bulletin of Science, Technology & Society*, 33(1-2), 44-52. <https://doi.org/10.1177/0270467613509367>
- Chen, C. L., & Tsai, C. H. (2015). Marine environmental awareness among university students in Taiwan: a potential signal for sustainability of the oceans. *Environmental Education Research*, 22(7), 958-977. <https://doi.org/10.1080/13504622.2015.1054266>
- Choe, J. H., Kim, C. H., & Ri, G. H. (2020). An investigation on the environmental knowledge and attitudes of senior middle school students in the Democratic People's Republic of Korea. *International Research in Geographical and Environmental Education*, 29(2), 146-162. <https://doi.org/10.1080/10382046.2019.1678276>
- Choi, G. Y., & Behm-Morawitz, E. (2017). Giving a new makeover to STEAM: Establishing YouTube beauty gurus as digital literacy educators through messages and effects on viewers. *Computers in Human Behavior*, 73, 80-91.
- Choi, G. Y., & Behm-Morawitz, E. (2017). Giving a new makeover to STEAM: Establishing YouTube beauty gurus as digital literacy educators through messages and effects on viewers. *Computers in Human Behavior*, 73, 80-91. <https://doi.org/10.1016/j.chb.2017.03.034>
- Clapp, E. P., & Jimenez, R. L. (2016). Implementing STEAM in maker-centered learning. *Psychology of Aesthetics, Creativity, and the Arts*, 10(4), 481-491. <https://doi.org/10.1037/aca0000066>
- Colucci, L., Burnard, P., Cooke, C., Davies, R., Gray, D., & Trowsdale, J. (2017). Reviewing the potential and challenges of developing STEAM education through creative pedagogies for 21st learning: how can school curricula be broadened towards a more responsive, dynamic, and inclusive form of education? *British Educational Research Association, August*, 1-105. <https://doi.org/10.13140/RG.2.2.22452.76161>
- Conradty, C., & Bogner, F. X. (2018). From STEM to STEAM: How to Monitor Creativity. *Creativity Research Journal*, 30(3), 233-240. <https://doi.org/10.1080/10400419.2018.1488195>
- Conradty, C., & Bogner, F. X. (2019). From STEM to STEAM: Cracking the Code? How Creativity & Motivation Interacts with Inquiry-based Learning. *Creativity Research Journal*, 31(3), 284-295. <https://doi.org/10.1080/10400419.2019.1641678>
- Cook, K. L., & Bush, S. B. (2018). Design thinking in integrated STEAM learning: Surveying the landscape and exploring exemplars in elementary grades.

School Science and Mathematics, 118(3–4), 93–103.
<https://doi.org/10.1111/ssm.12268>

- Corbi, A., & Burgos, D. (2017). Open distribution of virtual containers as a key framework for open educational resources and STEAM subjects. *Electronic Journal of ELearning*, 15(2), 126–136.
- Costantino, T. (2018). STEAM by another name: Transdisciplinary practice in art and design education. *Arts Education Policy Review*, 119(2), 100–106.
<https://doi.org/10.1080/10632913.2017.1292973>
- Cox, M. J. (1972). Environmental awareness projects for children. *School Health Review*, 3(4), 19–22. <https://doi.org/10.1080/00366579.1972.10612666>
- Craft, A. (2003). Creative thinking in the early years of education. *International Journal of Phytoremediation*, 21(1), 143–154.
<https://doi.org/10.1080/09575140303105>
- Creswell, J. W. (2012). *Educational Research Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (P. A. Smith (ed.); 4th ed.). Pearson.
- Creswell, J. W., & Clark, V. L. P. (2018). *Designing and Conducting Mixed Methods Research* (Third). SAGE Publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design Qualitative, Quantitative and Mix Methods Approaches* (5th ed.). SAGE Publication Ltd.
- Cruz, J. P., & Tantengco, N. S. (2017). Students' Environmental Awareness and Practices: Basis for Development of Advocacy Program. *Mimbar Pendidikan*, 2(1), 19–32. <https://doi.org/10.1016/j.apenergy.2015.03.087>
- De Alencar, E. M. L. S. (2007). Criatividade no contexto educacional: Três décadas de pesquisa. *Psicologia: Teoria e Pesquisa*, 23(SPECIAL), 45–49.
<https://doi.org/10.1590/S0102-37722007000500008>
- de la Garza, A. (2019). Internationalizing the Curriculum for STEAM (STEM + Arts and Humanities): From Intercultural Competence to Cultural Humility. *Journal of Studies in International Education*, 1–13.
<https://doi.org/10.1177/1028315319888468>
- DeJarnette, N. K. (2018). Implementing STEAM in the Early Childhood Classroom. *European Journal of STEM Education*, 3(3), 1–9.
<https://doi.org/10.20897/ejsteme/3878>
- Demirel, M., Derman, I., & Karagedik, E. (2015). A Study on the Relationship between Reflective Thinking Skills towards Problem Solving and Attitudes towards Mathematics. *Procedia - Social and Behavioral Sciences*, 197(February), 2086–2096. <https://doi.org/10.1016/j.sbspro.2015.07.326>
- den Besten, O. (2010). Local belonging and “geographies of emotions”: Immigrant children's experience of their neighbourhoods in paris and berlin. *Childhood*, 17(2), 181–195. <https://doi.org/10.1177/0907568210365649>

- Dilekli, Y., & Tezci, E. (2016). The relationship among teachers' classroom practices for teaching thinking skills, teachers' self-efficacy towards teaching thinking skills and teachers' teaching styles. *Thinking Skills and Creativity*, 21, 144–151. <https://doi.org/10.1016/j.tsc.2016.06.001>
- Dökme, M. D. & İ. (2016). The effect of the inquiry-based learning approach on student's critical-thinking skills. *Eurasia Journal of Mathematics, Science & Technology Education*, 12(12), 2887–2908.
- Dori, Y. J., Zohar, A., Fischer-Shachor, D., Kohan-Mass, J., & Carmi, M. (2018). Gender-fair assessment of young gifted students' scientific thinking skills. *International Journal of Science Education*, 40(6), 595–620. <https://doi.org/10.1080/09500693.2018.1431419>
- Douglas M. Amedeo, & Golledge, R. G. (2003). Environmental Perception and Behavioral Geography. In G. L. Gaile & C. J. Willmott (Eds.), *Geography in America at the Dawn of the 21st Century* (Vol. 4, Issue 1, pp. 133–148). Oxford University Press.
- Dunlap, R. E., & Van Liere, K. D. (1978). The “new environmental paradigm.” *Journal of Environmental Education*, 9(4), 10–19. <https://doi.org/10.1080/00958964.1978.10801875>
- E.A., F., & C.B, C. (1985). Exploring Vygotkian Perspectives in Education: The Cognitive Value of Peer Interaction. In J. V. Wertch (Ed.), *Culture, Communication, and Cognition: Vygotskian Perspective* (pp. 323–347). Cambridge University Press.
- Easman, E. S., Abernethy, K. E., & Godley, B. J. (2018). Assessing public awareness of marine environmental threats and conservation efforts. *Marine Policy*, 87(June 2017), 234–240. <https://doi.org/10.1016/j.marpol.2017.10.030>
- EducationCLOset. (2019). *What is STEAM?*
- Ellizar, E., Hardeli, H., Beltris, S., & Suharni, R. (2018). Development of Scientific Approach Based on Discovery Learning Module. *IOP Conference Series: Materials Science and Engineering*, 335(1). <https://doi.org/10.1088/1757-899X/335/1/012101>
- Ennis, R. H. (1996). *Critical Thinking*. Prentice-Hall.
- Eppinga, M. B., de Scisciolo, T., & Mijts, E. N. (2019). Environmental science education in a small island state: integrating theory and local experience. *Environmental Education Research*, 25(7), 1004–1018. <https://doi.org/10.1080/13504622.2018.1552248>
- Esa, N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, 19(1), 39–50. <https://doi.org/10.1080/10382040903545534>
- Facione, P. A. (2015). *Critical Thinking: What It Is and Why It Counts*. In *THINK_Critically* (pp. 1–28). Pearson Education.

<https://www.insightassessment.com/CT-Resources/Teaching-For-and-About-Critical-Thinking/Critical-Thinking-What-It-Is-and-Why-It-Counts/Critical-Thinking-What-It-Is-and-Why-It-Counts-PDF>

- Filloy, E., Puig, L., & Rojano, T. (2008). Teaching Models: Designing instruction for 21st century learners. In *Educational Algebra*. https://doi.org/10.1007/978-0-387-71254-3_5
- Fisman, L. (2005). The Effects of Local Learning on Environmental Awareness in Children: An Empirical Investigation. *Journal of Environmental Education*, 36(3), 39–50. <https://doi.org/10.3200/JOEE.36.3.39-50>
- Fletcher, S., Potts, J. S., Heeps, C., & Pike, K. (2009). Public awareness of marine environmental issues in the UK. *Marine Policy*, 33(2), 370–375. <https://doi.org/10.1016/j.marpol.2008.08.004>
- Foshay, R., & Kirkley, J. (2003). *Principles for Teaching Problem Solving A Guide to Incorporating PLATO Instructional Solutions, PLATO Assessment & Accountability Solutions, and PLATO Professional Services into Your School Improvement Interventions Technical Paper #4 Vice President, Inst.*
- Gelman, R., & Brenneman, K. (2004). Science learning pathways for young children. *Early Childhood Research Quarterly*, 19(1), 150–158.
- Gencer, A. A., & Gonen, M. (2015). Examination of The Effects of Reggio Emilia Based Projects on Preschool Children’s Creative Thinking Skills. *Procedia - Social and Behavioral Sciences*, 186(312), 456–460. <https://doi.org/10.1016/j.sbspro.2015.04.120>
- Gerde, H. K., Schachter, R. E., & Wasik, B. A. (2013). Using the Scientific Method to Guide Learning: An Integrated Approach to Early Childhood Curriculum. *Early Childhood Education Journal*, 41(5), 315–323. <https://doi.org/10.1007/s10643-013-0579-4>
- Giannelli, G. C., & Rapallini, C. (2018). *Parental Occupation and Children ’ s School Outcomes in Math* (Issue 11395).
- Grant, J., & Patterson, D. (2016). Innovative Arts Programs Require Innovative Partnerships: A Case Study of STEAM Partnering between an Art Gallery and a Natural History Museum. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 89(4–5), 144–152. <https://doi.org/10.1080/00098655.2016.1170453>
- Greiff, S., Fischer, A., Stadler, M., & Wüstenberg, S. (2015). Assessing complex problem-solving skills with multiple complex systems. *Thinking and Reasoning*, 21(3), 356–382. <https://doi.org/10.1080/13546783.2014.989263>
- Grinnell, S., & Angal, S. (2016). Luminous lighting. *Science and Children*, 53(6), 54.
- Gu, X., Dijksterhuis, A., & Ritter, S. M. (2019). Fostering children’s creative thinking skills with the 5-I training program. *Thinking Skills and Creativity*, 32(March), 92–101. <https://doi.org/10.1016/j.tsc.2019.05.002>

- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5(9), 444–454. <https://doi.org/10.1037/h0063487>
- Guyotte, K. W., Sochacka, N. W., Costantino, T. E., & Walther, J. (2014). Steam as Social Practice: Cultivating Creativity in Transdisciplinary Spaces. *Art Education*, 67(6), 12–19. <https://doi.org/10.1080/00043125.2014.11519293>
- Hacıoğlu, Y., & Suiçmez, E. (2022). STEAM education in preschool education: We design our school for our visually impaired friend. *Science Activities*, 59(2), 55–67. <https://doi.org/10.1080/00368121.2022.2056111>
- Haenilah, E. Y., Yanzi, H., & Drupadi, R. (2021). The Effect of the Scientific Approach-Based Learning on Problem Solving Skills in Early Childhood: Preliminary Study. *International Journal of Instruction*, 14(2), 289–304. <https://doi.org/10.29333/iji.2021.14217a>
- Halfin, H. H. (1973). *Technology: A Process Approach* [West Virginia University]. <https://researchrepository.wvu.edu/etd/8979>
- Hand, R. J. (1999). Science Education: consensus versus critique. *Teaching in Higher Education*, 4(4), 501–510. <https://doi.org/10.1080/1356251990040406>
- Hapidin, Gunarti, W., Pujianti, Y., & Syarah, E. S. (2020). STEAM to R-SLAMET Modification: An Integrative Thematic Play Based Learning with R-SLAMETS Content in Early Childhood Education. *Jurnal Pendidikan Usia*, 14(2), 262–274.
- Hapidin, Nurjannah, & Hartati, S. (2018). Pengembangan Model Pembelajaran Tematik Integratif berbasis proyek dalam menerapkan pendidikan kelautan pada anak di Kepulauan Seribu. *Jurnal Pendidikan Usia Dini*, 12(1), 51–65. <https://doi.org/10.21009/JPUD.121>
- Hapidin, Syarah, E. S., Pujianti, Y., & Gunarti, W. (2022). Instilling Children ' s Ocean Literacy Through Comic Media : STEAM to R-SLAMET Learning Design for ECE educators. *Jurnal Pendidikan Anak Usia Dini*, 16(1), 1–16. <http://journal.unj.ac.id/unj/index.php/jpud/article/view/26762%0Ahttp://journal.unj.ac.id/unj/index.php/jpud/article/download/26762/12491>
- Harlen, W., & Dakar, R. W. (1981). A scientific approach to the improvement of science teaching. *Journal of Curriculum Studies*, 13(2), 113–120. <https://doi.org/10.1080/0022027810130205>
- Hedawiyah, Z., Sada, C., & Fitriana, D. (2016). Penerapan Pendekatan Saintifik Terhadap Pemahaman Lingkungan Pada Anak Usia Dini Di TK Pelangi Nanga Pinoh. *Jurnal Pendidikan Dasar*, 4(1), 36–46.
- Helaiya, S. (2010). *Development and Implementation of Life Skills Programme for Student Teachers*. Maharaja Sayaji Rao University of Baroda, Vadodara.
- Henriksen, D., Richardson, C., & Mehta, R. (2017). Design thinking: A creative approach to educational problems of practice. *Thinking Skills and Creativity*, 26(October), 140–153. <https://doi.org/10.1016/j.tsc.2017.10.001>
- Herro, D., & Quigley, C. (2017). Exploring teachers' perceptions of STEAM

- teaching through professional development: implications for teacher educators. *Professional Development in Education*, 43(3), 416–438. <https://doi.org/10.1080/19415257.2016.1205507>
- Herro, D., Quigley, C., & Cian, H. (2018). The Challenges of STEAM Instruction: Lessons from the Field. *Action in Teacher Education*, 41(2), 172–190. <https://doi.org/10.1080/01626620.2018.1551159>
- Hidayat, T., Susilaningsih, E., & Kurniawan, C. (2018). The effectiveness of enrichment test instruments design to measure students' creative thinking skills and problem-solving. *Thinking Skills and Creativity*, 29, 161–169. <https://doi.org/10.1016/j.tsc.2018.02.011>
- Higgins, S. and Hall, E. and Baumfeld, V. and Moseley, D. (2005). *A meta-analysis of the impact of the implementation of thinking skills approaches on pupils* (Issue October).
- Hill, R. B. (1997). The Design of An Instrument to Assess Problem Solving Activities in Technology Education. *Journal of Technology Education*, 9(1), 31–46. <https://doi.org/10.21061/jte.v9i1.a.3>
- Hodson, D. (1996). Laboratory work as scientific method: Three decades of confusion and distortion. *Journal of Curriculum Studies*, 28(2), 115–135. <https://doi.org/10.1080/0022027980280201>
- Hosnan, M. (2014). *Pendekatan saintifik dan kontekstual dalam pembelajaran abad 21*. Ghalia Indonesia.
- Hotulainen, R., Mononen, R., & Aunio, P. (2016). Thinking skills intervention for low-achieving first graders. *European Journal of Special Needs Education*, 31(3), 360–375. <https://doi.org/10.1080/08856257.2016.1141541>
- Hunter-Doniger, T. (2018). Art Infusion: Ideal Conditions for STEAM. *Art Education*, 71(2), 22–27. <https://doi.org/10.1080/00043125.2018.1414534>
- Hunter-Doniger, T. (2021). Early Childhood STEAM Education: The Joy of Creativity, Autonomy, and Play. *Art Education*, 74(4), 22–27. <https://doi.org/10.1080/00043125.2021.1905419>
- Ifegbesan, A. P., & Rampedi, I. T. (2018). Understanding the role of socio-demographic and geographical location on pro-environmental behavior in Nigeria. *Applied Environmental Education and Communication*, 17(4), 335–351. <https://doi.org/10.1080/1533015X.2017.1419102>
- Kals, E., & Müller, M. M. (2021). Emotions and Environment. *Nuevos Sistemas de Comunicación e Información*.
- Kang, N. H. (2019). A review of the effect of integrated STEM or STEAM (science, technology, engineering, arts, and mathematics) education in South Korea. *Asia-Pacific Science Education*, 5(1). <https://doi.org/10.1186/s41029-019-0034-y>
- Kanu, M. A. (2015). The Limitations of Science: A Philosophical Critique of Scientific Method. *IOSR Journal Of Humanities And Social Science*, 20(7),

77–87. <https://doi.org/10.9790/0837-20717787>

- Karaarslan Semiz, G., & Teksöz, G. (2019). Developing the systems thinking skills of pre-service science teachers through an outdoor ESD course. *Journal of Adventure Education and Outdoor Learning*, 00(00), 1–20. <https://doi.org/10.1080/14729679.2019.1686038>
- Khan, S., Ayaz, M., Ghazi, S. R., Khan, I. U., & Khan, N. (2017). Impact of Parents' Occupation on Students Self-Concept at Secondary Level. *International Journal of Academic Research in Business and Social Sciences*, 7(1), 46. <https://doi.org/10.6007/IJARBS/v7-i1/2615>
- Kim, C. U., & Mardis, M. A. (2017). Are we having fun yet? Exploring definitions of fun for STEAM learning. *Proceedings of the Association for Information Science and Technology*, 54(1), 720–721. <https://doi.org/10.1002/pr2.2017.14505401130>
- Kim, D., & Bolger, M. (2016). Analysis of Korean Elementary Pre-Service Teachers' Changing Attitudes About Integrated STEAM Pedagogy Through Developing Lesson Plans. *International Journal of Science and Mathematics Education*, 15(4), 587–605. <https://doi.org/10.1007/s10763-015-9709-3>
- Kim, K. H. (2017). The Torrance Tests of Creative Thinking - Figural or Verbal: Which One Should We Use? *Creativity. Theories – Research - Applications*, 4(2), 302–321. <https://doi.org/10.1515/ctra-2017-0015>
- Kim, S.-W., & Lee, Y. J. (2015). The Analysis on Research Trends for STEAM education in Korea. *Proceedings of EdMedia 2015--World Conference on Educational Media and Technology*, 1800–1805.
- KKP. (2018). *REFLEKSI 2017 DAN OUTLOOK 2018 MEMBANGUN DAN MENJAGA EKOSISTEM LAUT INDONESIA BERSAMA DITJEN PENGELOLAAN RUANG LAUT*. KKP _ Kementerian Kelautan dan Perikanan.html
- Klimova, B. F. (2013). Developing Thinking Skills in the Course of Academic Writing. *Procedia - Social and Behavioral Sciences*, 93, 508–511. <https://doi.org/10.1016/j.sbspro.2013.09.229>
- Kuijper, M. W. M. (2003). Marine and coastal environmental awareness building within the context of UNESCO's activities in Asia and the Pacific. *Marine Pollution Bulletin*, 47(1–6), 265–272. [https://doi.org/10.1016/S0025-326X\(02\)00469-1](https://doi.org/10.1016/S0025-326X(02)00469-1)
- Kuldas, S., Hashim, S., & Ismail, H. N. (2015). Malaysian adolescent students' needs for enhancing thinking skills, counteracting risk factors and demonstrating academic resilience. *International Journal of Adolescence and Youth*, 20(1), 32–47. <https://doi.org/10.1080/02673843.2014.973890>
- Kurusu, K. (2015). *Pro- environmental Behaviors*. Springer.
- Lage-Gómez, C., & Ros, G. (2021). Transdisciplinary integration and its implementation in primary education through two STEAM projects (La

- integración transdisciplinar y su aplicación en Educación Primaria a través de dos proyectos STEAM). *Infancia y Aprendizaje*, 44(4), 801–837. <https://doi.org/10.1080/02103702.2021.1925474>
- Lampe, M. (2012). Bugis–Makassar seamanship and reproduction of maritime cultural values in Indonesia. *Jurnal Humaniora*, 24(2), 121–132.
- Land, M. H. (2013). Full STEAM ahead: The benefits of integrating the arts into STEM. *Procedia Computer Science*, 20, 547–552. <https://doi.org/10.1016/j.procs.2013.09.317>
- Landmann, H. (2020). Emotions in the context of environmental protection: Theoretical considerations concerning emotion types, eliciting processes, and affect generalization. *Umweltpsychologie*, 24, 61–73. <http://umpps.de/php/artikeldetails.php?id=745>
- Lauren Weatherly, Vicki Oleson, and L. R. K. (2017). Engaging Preschoolers and Families in a Yearlong STEAM Investigation. *Young Children*, 72(5), 44–50. Published. <https://doi.org/10.1017/CBO9781107415324.004>
- Li, Y. (2018). Study of the effect of environmental education on environmental awareness and environmental attitude based on environmental protection law of the People’s Republic of China. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(6), 2277–2285. <https://doi.org/10.29333/ejmste/86214>
- Liao, W., Yang, L., Zhong, S., Hess, J. J., Wang, Q., Bao, J., & ... (2019). Preparing the next generation of health professionals to tackle climate change: are China’s medical students ready? *Environmental ...* <https://www.sciencedirect.com/science/article/pii/S0013935118305371>
- Lieten, G. K. (2000). Children, Work and Education-I: General Parameters. *Economic and Political Weekly*, 35(24), 2037–2043.
- Lin, Y.-S. (2011). Fostering Creativity through Education – A Conceptual Framework of Creative Pedagogy. *Creative Education*, 02(03), 149–155. <https://doi.org/10.4236/ce.2011.23021>
- Lindeman, K. W., Jabot, M., & Berkley, M. T. (2013). The Role of STEM (or STEAM) in The Early Childhood Setting. In *In Learning Across the Early Childhood Curriculum* (pp. 95–114). [https://doi.org/10.1108/s0270-4021\(2013\)0000017018](https://doi.org/10.1108/s0270-4021(2013)0000017018)
- Linder, S. M., & Eckhoff, A. (2020). *Breaking Down STEAM for Young Children*. NAEYC. <https://www.naeyc.org/resources/pubs/tyc/feb2020/breaking-down-steam#:~:text=STEAM for young children falls,solving%2C communication%2C and reflection.>
- Littlelydyke, M. (2008). Science education for environmental awareness: approaches to integrating cognitive and affective domains. *Environmental Education Research*, 14(1), 1–17. <https://doi.org/10.1080/13504620701843301>
- Ma, X., & Bateson, D. J. (1999). A multivariate analysis of the relationship between

- attitude toward science and attitude toward the environment. *Journal of Environmental Education*, 31(1), 27–32. <https://doi.org/10.1080/00958969909598629>
- MacDonald, A., Wise, K., Tregloan, K., Fountain, W., Wallis, L., & Holmstrom, N. (2020). Designing STEAM Education: Fostering Relationality through Design-Led Disruption. *International Journal of Art and Design Education*, 39(1), 227–241. <https://doi.org/10.1111/jade.12258>
- Machin, A. (2014). Implementasi pendekatan saintifik, penanaman karakter dan konservasi pada pembelajaran materi pertumbuhan. *Jurnal Pendidikan IPA Indonesia*, 3(1), 28–35. <https://doi.org/10.15294/jpii.v3i1.2898>
- Madhuri, G. V., Kantamreddi, V. S. S. N., & Prakash Goteti, L. N. S. (2012). Promoting higher order thinking skills using inquiry-based learning. *European Journal of Engineering Education*, 37(2), 117–123. <https://doi.org/10.1080/03043797.2012.661701>
- Maeda, J. (2013). STEM + Art = STEAM. *Steam*, 1(1), 1–3. <https://doi.org/10.5642/steam.201301.34>
- Magdalena, I., Vitaloka, D., Aji, K. S., & Rufaedah, S. (2020). Implementasi Kurikulum 2013 di Sekolah Dasar bagi Perkembangan Peserta Didik di SDN Sukasari 4. *Jurnal Halaqah*, 2(2), 116–125. <https://doi.org/10.5281/zenodo.3700509>
- Maharani, R., Marsigit, M., & Wijaya, A. (2020). Collaborative learning with scientific approach and multiple intelligence: Its impact toward math learning achievement. *Journal of Educational Research*, 113(4), 303–316. <https://doi.org/10.1080/00220671.2020.1806196>
- Margot, K. C., & Kettler, T. (2019). Teachers' perception of STEM integration and education: a systematic literature review. *International Journal of STEM Education*, 6(1). <https://doi.org/10.1186/s40594-018-0151-2>
- Marwiyah, S., & Fitria, N. J. L. (2022). The Urgency of Blue Economy-Based Sustainable Development Education in Higher Education. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, 8(3), 643–654.
- Mason, S., & Winkelman, J. (2017). Protecting the Environment: Awareness and Responsibility. *Journal of Vincentian Social Action*, 2(1), 6.
- Mcdonald, F. (2010). *An investigation of student' problem solving skills in an introductory physics class*. University of Central Florida Orlando, Florida.
- McKinley, E., & Fletcher, S. (2012). Improving marine environmental health through marine citizenship: A call for debate. *Marine Policy*, 36(3), 839–843. <https://doi.org/10.1016/j.marpol.2011.11.001>
- McLelland, C. (2006). Nature of science and the scientific method. *The Geological Society of America*, 1–11.
- McPherson, G. R. (2001). Teaching & Learning the Scientific Method. *The*

American Biology Teacher, 63(4), 242–245.

- Mercan, Z., & Kandır, A. (2022). The effect of the Early STEAM Education Program on the visual-spatial reasoning skills of children: research from Turkey. *Education 3-13*. <https://doi.org/10.1080/03004279.2022.2075906>
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis* (Third). SAGE Publications.
- MinistryofEducationNewZealand. (2019). *Future focused learning: STEM/STEAM*.
- Monkeviciene, O., Autukeviciene, B., Kaminskiene, L., & Monkevicius, J. (2020). Journal of Social Studies Education Research Impact of innovative STEAM education practices on teacher professional development and 3-6-year-old children's competence development. *Journal of Social Studies Education Research*, 2020(4), 1–27. www.jsser.org
- Montag-Smit, T., & Maertz, C. P. (2017). Searching outside the box in creative problem solving: The role of creative thinking skills and domain knowledge. *Journal of Business Research*, 81(July), 1–10. <https://doi.org/10.1016/j.jbusres.2017.07.021>
- Moyer, L., & Miller, T. (2017). Cultivating community resources: Formal and nonformal educators partner to change the world...one step at a time. *Children's Technology and Engineering*, 22(2), 16–19.
- Muckenhaupt, M. (1997). *Sigmund Freud. Explores of the Unconscious*. Oxford University Press.
- Muntomimah, S., & Wijayanti, R. (2021). The Importance of STEAM Loose Part Learning Effectiveness in Early Childhood Cognitive Learning. *Proceedings of the 2nd Annual Conference on Social Science and Humanities (ANCOSH 2020)*, 542(Ancosh 2020), 47–52. <https://doi.org/10.2991/assehr.k.210413.012>
- Ngang, T. K., Nair, S., & Prachak, B. (2014). Developing Instruments to Measure Thinking Skills and Problem Solving Skills among Malaysian Primary School Pupils. *Procedia - Social and Behavioral Sciences*, 116, 3760–3764. <https://doi.org/10.1016/j.sbspro.2014.01.837>
- Nilay Şener, Cumhuriyet Türk, E. T. (2015). Improving Science Attitude and Creative Thinking through Science Education Project: A Design, Implementation and Assessment. *Journal of Education and Training Studies*, 3(3).
- Nurani, Y. (2014). Hakikat Pengembangan Kognitif. In *Universitas Terbuka*. Universitas Terbuka.
- Nurani, Y., & Mayangsari, T. (2017). Pengembangan Model Kegiatan Sentra Bermain Dalam Mengembangkan Kreativitas Anak Usia Dini. *JPUD - Jurnal Pendidikan Usia Dini*, 11(2), 386–400. <https://doi.org/10.21009/jpud.112.15>
- Nurani, Y., & Utami, A. D. (2017). Early Childhood Education Teachers' Effective Communication Based Teaching Skill. *International Conference for Science*

Educators and Teachers (ICSET) Early, 118, 723–728.
<https://doi.org/10.2991/icset-17.2017.120>

- Ogunbode, C. A., & Arnold, K. (2012). A Study of Environmental Awareness and Attitudes in Ibadan, Nigeria. *Human and Ecological Risk Assessment*, 18(3), 669–684. <https://doi.org/10.1080/10807039.2012.672901>
- Omeroglu, E., Buyukozturk, S., Aydogan, Y., Cakan, M., Cakmak, E. K., Ozyurek, A., Akduman, G. G., Gunindi, Y., Kutlu, O., Coban, A., Yurt, O., Kogar, H., & Karayol, S. (2015). Determination and interpretation of the norm values of preschool social skills rating scale teacher form. *Kuram ve Uygulamada Egitim Bilimleri*, 15(4), 981–996. <https://doi.org/10.12738/estp.2015.4.2514>
- Özden, M. (2008). Environmental awareness and attitudes of student teachers: An empirical research. *International Research in Geographical and Environmental Education*, 17(1), 40–55. <https://doi.org/10.2167/irgee227.0>
- Ozkan, G., & Umdu Topsakal, U. (2020). Investigating the effectiveness of STEAM education on students' conceptual understanding of force and energy topics. *Research in Science and Technological Education*, 00(00), 1–20. <https://doi.org/10.1080/02635143.2020.1769586>
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health*, 42(5), 533–544. <https://doi.org/10.1007/s10488-013-0528-y>
- Paul, R., & Elder, L. (2009). *The Miniature Guide to Critical Thinking: Concepts and Tools* (6th ed.). Foundation for Critical Thinking.
- Perignat, E., & Katz-Buonincontro, J. (2019). STEAM in practice and research: An integrative literature review. *Thinking Skills and Creativity*, 31(October 2018), 31–43. <https://doi.org/10.1016/j.tsc.2018.10.002>
- Permatasari, A. K., Istiyono, E., & Kuswanto, H. (2019). Developing Assessment Instrument to Measure Physics Problem Solving Skills for Mirror Topic. *International Journal of Educational Research Review*, 358–366. <https://doi.org/10.24331/ijere.573872>
- Implementasi Kurikulum, Pub. L. No. Nomor 81 A Tahun 2013 (2013).
- Pedoman Pelaksanaan Pembelajaran Kurikulum 2013, Pub. L. No. No. 103 Tahun 2014 (2014).
- Pólya, G. (1957). *How to solve it : a new aspect of mathematical method*. Garden City, N.Y.
- Powell, R. B., Stern, M. J., Krohn, B. D., & Ardoin, N. (2011). Development and validation of scales to measure environmental responsibility, character development, and attitudes toward school. *Environmental Education Research*, 17(1), 91–111. <https://doi.org/10.1080/13504621003692891>
- Qondias, D., Kaka, P. W., & Nau, M. I. K. (2018). Studi Evaluasi Kurikulum 2013 Tingkat Sekolah Dasar di Wilayah Timur Indonesia. *Jurnal Pendidikan Dasar*

PerKhasa, 4(April), 63–72.

- Queiruga-Dios, M. Á., López-Iñesta, E., Diez-Ojeda, M., Sáiz-Manzanares, M. C., & Vázquez-Dorrío, J. B. (2021). Implementation of a STEAM project in compulsory secondary education that creates connections with the environment (Implementación de un proyecto STEAM en Educación Secundaria generando conexiones con el entorno). *Infancia y Aprendizaje*, 44(4), 871–908. <https://doi.org/10.1080/02103702.2021.1925475>
- Quigley, C. F., & Herro, D. (2016). “Finding the joy in the unknown”: Implementation of STEAM teaching practices in middle school science and math classrooms. *Journal of Science Education and Technology*. <https://doi.org/10.1007/s10956-016-9602-z>
- Quigley, C. F., Herro, D., & Baker, A. (2019). Moving toward transdisciplinary instruction: A longitudinal examination of STEAM teaching practices. *STEAM Education*. https://doi.org/10.1007/978-3-030-04003-1_8
- Quigley, C. F., Herro, D., & Jamil, F. M. (2017). Developing a Conceptual Model of STEAM Teaching Practices. *School Science and Mathematics*, 117(1–2), 1–12. <https://doi.org/10.1111/ssm.12201>
- Rabalais, M. E. (2014). STEAM: A National Study of the Integration of the Arts Into STEM Instruction and its Impact on Student Achievement. In *ProQuest Dissertations and Theses*.
- Radziwill, N., Benton, M., & Moellers, C. (2015). From STEM to STEAM: Reframing What it Means to Learn. *Steam*, 2(1), 1–7. <https://doi.org/10.5642/steam.20150201.3>
- Rahmawati, Y., Ridwan, A., Hadinugrahaningsih, T., & Soeprijanto. (2019). Developing critical and creative thinking skills through STEAM integration in chemistry learning. *Journal of Physics: Conference Series*, 1156(1). <https://doi.org/10.1088/1742-6596/1156/1/012033>
- Rannikko, P. (1996). Local Environmental Conflicts and the Change in Environmental Consciousness. *Acta Sociologica*, 39, 57–72.
- Relevansi, U. D. A. N., & Ahmad, T. A. (2017). Urgensi Dan Relevansi Pembelajaran Sejarah Maritim Untuk Wilayah Pedalaman. *Paramita: Historical Studies Journal*, 27(1), 113–126. <https://doi.org/10.15294/paramita.v27i1.9190>
- Rhosalia, L. A. (2017). Pendekatan Saintifik (Scientific Approach) Dalam Pembelajaran Tematik Terpadu Kurikulum 2013 Versi 2016. *JTIEE (Journal of Teaching in Elementary Education)*, 1(1), 59. <https://doi.org/10.30587/jtiee.v1i1.112>
- Rikoon, S., Finn, B., Jackson, T., & Inglese, P. (2018). Crosscutting Literature on STEAM Ecosystems, Expectancy Value Theory, and Social Emotional Learning: A Metadata Synthesis. *ETS Research Report Series*, 2018(1). <https://doi.org/10.1002/ets2.12223>

- Risen, H. K., & Alyassri, S. (2020). Use of Instrumental Enrichment strategy and its impact on achievement and thinking skills in mathematics. *Journal of Xi'an University of Architecture & Technology*, XII(II).
- Rosnani, H., & Suhailah, H. (2003). The teaching of thinking in Malaysia. *Kuala Lumpur: International Islamic University Malaysia.*, 11(1), 668–676.
- Rusbult, C. (2020). *Thinking Skills in Education and Life*. The American Scientific Affiliation. <https://www.asa3.org/ASA/education/think/index.html>
- S, K. (2010). Qualitative interviewing techniques and styles. In D. R. and de V. R. Bourgeault I (Ed.), *The Sage Handbook of Qualitative Methods in Health Research*. SAGE Publication.
- Sahin-Kalyon, D. (2021). Teaching Science: Who Am I? What Do I Plan? *International Online Journal of Education and Teaching*, 8(3), 2150–2175.
- Sakhuja, V. (2016). Blue Economy : Awareness , Education and Financing. *National Maritime Foundation, August*, 1–3.
- Sakurai, R., Uehara, T., & Yoshioka, T. (2018). Students' perceptions of a marine education program at a junior high school in Japan with a specific focus on Satoumi. *Environmental Education Research*, 25(2), 222–237. <https://doi.org/10.1080/13504622.2018.1436698>
- Sani, R. A. (2014). *Pembelajaran saintifik : untuk implementasi kurikulum 2013*. Bumi Aksara.
- Sanz de Acedo Lizarraga, M. L., Sanz de Acedo Baquedano, M. T., & Oliver, M. S. (2010). Psychological intervention in thinking skills with primary education students. *School Psychology International*, 31(2), 131–145. <https://doi.org/10.1177/0143034309352419>
- Sasson, I., Yehuda, I., & Malkinson, N. (2018). Fostering the skills of critical thinking and question-posing in a project-based learning environment. *Thinking Skills and Creativity*, 29, 203–212. <https://doi.org/10.1016/j.tsc.2018.08.001>
- Schahn, J., & Holzer, E. (1990). Studies of Individual Environmental Concern. The Role of Knowledge, Gender, and Background Variables. *Environment and Behavior*, 22(6), 767–786.
- Schools.com., A. E. (2019). *Resources for current and future STEAMeducators*.
- Sherry, E., & Myers, H. (2002). Traditional environmental knowledge in practice. *Society and Natural Resources*, 15(4), 345–358. <https://doi.org/10.1080/089419202753570828>
- Snyder, L. G. S. M. J. (2008). Teaching critical thinking and Problem solving skills. *The Delta Pi Epsilon Journal*, 50(2), 90–99. <https://doi.org/10.1177/0021955X7000600203>
- Sochacka, N. W., Guyotte, K. W., & Walther, J. (2016). Learning Together: A Collaborative Autoethnographic Exploration of STEAM (STEM + the Arts)

- Education. *Journal of Engineering Education*, 105(1), 15–42. <https://doi.org/10.1002/jee.20112>
- Sofyan, A. (2016). The Implementation of Scientific Approach in English Teaching Based on Curriculum 2013 in Smk Negeri 2 Sragen in the Academic Year of 2015/ 2016. *Universitas Muhammadiyah Surakarta*, 3(3), 16.
- Somerville, M., & Williams, C. (2015). Sustainability education in early childhood: An updated review of research in the field. *Contemporary Issues in Early Childhood*, 16(2), 102–117. <https://doi.org/10.1177/1463949115585658>
- Sternberg, R. J. (2005). Creativity or creativities? *International Journal of Human Computer Studies*, 63(4-5 SPEC. ISS.), 370–382. <https://doi.org/10.1016/j.ijhcs.2005.04.003>
- Stinner, A. (2003). Scientific Method, Imagination, and The Teaching of Physics. *La Physique Au Canada*, 59(6).
- Stoll, L., & Temperley, J. (2009). Creative Leadership : A Challenge of our Times. *School Leadership and Management*, 29(1), 63–76.
- Stylianidou, F., Glauert, E., Rossis, D., Compton, A., Cremin, T., Craft, A., & Havu-Nuutinen, S. (2018). Fostering Inquiry and Creativity in Early Years STEM Education: Policy Recommendations from the *Creative Little Scientists* Project. *European Journal of STEM Education*, 3(3). <https://doi.org/10.20897/ejsteme/3875>
- Susantini, E., Faizah, U., Prastiwi, M. S., & Suryanti. (2016). Developing educational video to improve the use of scientific approach in cooperative learning. *Journal of Baltic Science Education*, 15(6), 725–737. <https://doi.org/10.33225/jbse/16.15.725>
- Syarah, E. S., Yetti, E., Fridani, L., Yufiarti, Hapidin, & Pupala, B. (2019). Electronic comics in elementary school science learning for marine conservation. *Jurnal Pendidikan IPA Indonesia*, 8(4), 500–511. <https://doi.org/10.15294/jpii.v8i4.19377>
- Tang, X., Coffey, J. E., Elby, A., & Levin, D. M. (2009). The scientific method and scientific inquiry: Tensions in teaching and learning. *Science Education*, 94(1), 29–47. <https://doi.org/10.1002/sc.20366>
- Taylor, P. C., & Taylor, E. (2019). Transformative STEAM education for sustainable development. *Empowering Science and Mathematics for Global Competitiveness, 2018*, 125–131. <https://doi.org/10.1201/9780429461903-19>
- Thuneberg, H. M., Salmi, H. S., & Bogner, F. X. (2018). How creativity, autonomy and visual reasoning contribute to cognitive learning in a STEAM hands-on inquiry-based math module. *Thinking Skills and Creativity*, 29(April), 153–160. <https://doi.org/10.1016/j.tsc.2018.07.003>
- Tillery, B. W. (2006). *Problem solving techniques*. <http://www.dushkin.com/online/study/problemsolving,mhtml>.
- Torkar, G., & Bogner, F. X. (2019). Environmental values and environmental

- concern. *Environmental Education Research*, 25(10), 1570–1581. <https://doi.org/10.1080/13504622.2019.1649367>
- Torrance, E. P. (1969). *Creativity. What research says to the teacher*. National Education Association.
- Torrance, E. P. (1974). *Norms technical manual: Torrance Tests of Creative Thinking*. Ginn and Co.
- Torrance, E. P. (2014). *Torrance Tests of Creative Thinking (TTCT)*.
- Torres, H. R., Reynolds, C. J., Lewis, A., Muller-Karger, F., Alsharif, K., & Mastenbrook, K. (2019). Examining youth perceptions and social contexts of litter to improve marine debris environmental education. *Environmental Education Research*, 25(9), 1400–1415. <https://doi.org/10.1080/13504622.2019.1633274>
- Tran, K. C. (2006). Public Perception of Development Issues: Public Awareness Can Contribute to Sustainable Development of a Small Island. *Ocean & Coastal Management*, 49, 367–383.
- UNCLOS. (1982). *United Nations Convention on the Law of the Sea*. United Nations Convention on the Law of the Sea. <https://doi.org/10.1093/iclqaj/34.2.359>
- UNESCO. (2000). *World education report, 2000: The right to education; towards education for all throughout life*.
- Urbańska, M., Charzyński, P., Gadsby, H., Novák, T. J., Şahin, S., & Yilmaz, M. D. (2022). Environmental threats and geographical education: Students' sustainability awareness—evaluation. *Education Sciences*, 12(1). <https://doi.org/10.3390/educsci12010001>
- Vermeer, P. (2012). Meta-concepts, thinking skills and religious education. *British Journal of Religious Education*, 34(3), 333–347. <https://doi.org/10.1080/01416200.2012.663748>
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.
- Vygotsky, L. S. (1994). *The problem of the cultural development of the child* (R. Van Der & V. & J. Valsiner (eds.)). Blackwell.
- Wahidah, S., Sidiq, M. A. H., & Darwis, M. (2022). Motivasi Pendekatan Saintifik melalui Modulasi Pembelajaran al-Qur'an dan Hadis. *Attanwir : Jurnal Keislaman Dan Pendidikan*, 13(2), 207–215. <https://doi.org/10.53915/jurnalkeislamandanpendidikan.v13i2.249>
- Wahyono, Abdulhak, I., & Rusman. (2017). Implementation of scientific approach based learning. *International Journal of Education Research*, 5(8), 221–230.
- Wahyuningsih, S., Nurjanah, N. E., Rasmani, U. E. E., Hafidah, R., Pudyaningtyas, A. R., & Syamsuddin, M. M. (2020). STEAM Learning in Early Childhood Education: A Literature Review. *International Journal of Pedagogy and*

- Teacher Education*, 4(1), 33. <https://doi.org/10.20961/ijpte.v4i1.39855>
- Wallace, E. D., & Jefferson, R. N. (2013). Developing Critical Thinking Skills For Information Seeking Success. *New Review of Academic Librarianship*, 19(3), 246–255. <https://doi.org/10.1080/13614533.2013.802702>
- Waluya, B. (2007). Permasalahan Lingkungan Pesisir dan Laut. In *Pengelolaan Lingkungan Hidup untuk Tingkat SMA* (pp. 240–261).
- Wan, Z. H., & Cheng, M. H. M. (2018). Classroom learning environment, critical thinking and achievement in an interdisciplinary subject: a study of Hong Kong secondary school graduates. *Educational Studies*, 45(3), 285–304. <https://doi.org/10.1080/03055698.2018.1446331>
- Waseso, H. P. (2017). Studi Kritis terhadap Kurikulum 2013 MI/SD 2013. *Jurnal Pendidikan Dan Pembelajaran Dasar*, 4(1), 175–192.
- Wen, W. cheng, & Lu, S. yun. (2013). Marine environmental protection knowledge, attitudes, behaviors, and curricular involvement of Taiwanese primary school students in senior grades. *Environmental Education Research*, 19(5), 600–619. <https://doi.org/10.1080/13504622.2012.717219>
- Wertch, J. V., & Tulviste, P. (1992). Vygotsky and Contemporary Developmental Psychology. *Developmental Psychology*, 28, 548–557.
- Wieman, C. (2007). Why not Try a Scientific Approach to Science Education? *Change*, 82(3), 9–15. <https://doi.org/10.3109/17453674.2011.588864>
- Wiese, B. S., & Freund, A. M. (2011). Parents as role models: Parental behavior affects adolescents' plans for work involvement. *International Journal of Behavioral Development*, 35(3), 218–224. <https://doi.org/10.1177/0165025411398182>
- Williams, P. J. (2019). The principles of teaching and learning in STEM education. *AIP Conference Proceedings*, 2081(March). <https://doi.org/10.1063/1.5093996>
- Wong, K. K. (2003). The environmental awareness of university students in Beijing, China. *Journal of Contemporary China*, 12(36), 519–536. <https://doi.org/10.1080/10670560305472>
- Wong Li Jean and Yok Kee Jiar. (2012). Critical Thinking Skills in early years. *Semantics Scholar*, 1(1), 1–13.
- Woods, D. R., Hrymak, A. N., Marshall, R. R., Wood, P. E., Crowe, C. M., Hoffman, T. W., Wright, J. D., Taylor, P. A., Woodhouse, K. A., & Bouchard, C. G. K. (1997). Developing problem solving skills: The McMaster problem solving program. *Journal of Engineering Education*, 86(2), 75–91. <https://doi.org/10.1002/j.2168-9830.1997.tb00270.x>
- Wouthuyzen, S. R. M., Kistanto, N. H., Hartoko, A., & Wouthuyzen, S. (2017). Upaya Pengelolaan Pesisir dan Laut Berkelanjutan mellalui Pendidikan Konservasi sejak Dini di Pulau Pari, Kepulauan Seribu. *Coastal and Oceaan Journal*, 1(2), 157–168.

- Wulandari, C., Sunarso, A., & Mulyono, S. E. (2021). An Analysis of The Study Scientific Approach Implementation to Develop The Active Learning of Science in The Early Childhood. *Journal of Primary Education*, 10(1), 55–63.
- Yakman, G., & Lee, H. (2012). Exploring the Exemplary STEAM Education in the U.S. as a Practical Educational Framework for Korea. *J. KOrea Assoc. Sci. Edu.*, 32(6), 1072–1086. <https://www.ptonline.com/articles/how-to-get-better-mfi-results>
- Yeung, S. (1998). Environmental Consciousness among Students in Senior Secondary Schools: The Case of Hong Kong. *Environmental Education Research*, 4(251–268).
- Yeung, S. P. M. (1998). Environmental consciousness among students in senior secondary schools: The case of Hong Kong. *Environmental Education Research*, 4(3), 251–268. <https://doi.org/10.1080/1350462980040302>

