DAFTAR PUSTAKA

Ahyar, Hardani, and Dkk. 2020. *Buku Metode Penelitian Kualitatif & Kuantitatif*. Yogyakarta: CV. Pustaka Ilmu.

Air Quality Index. (2022). AQI Air Quality Index: Real-time Air Polution Level. https://www.aqi.in/air-quality-map.

Aktamis, H., & Ergin, O. (2008). The effect of scientific process skills education on students' scientific creativity, science attitudes and academic achievements. *Asia-Pacific Forum on Science Learning and Teaching, 9*(1), 1-21.

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Addison Wesley Longman, Inc.

Arikunto, S., Suhardjono, & Supardi. (2010). *Penelitian tindakan kelas*. Jakarta: PT Bumi Aksara.

Ashari, I. F., & Muharram, R. R. (2022). Pengembangan antarmuka pengguna Kolepa Mobile App menggunakan metode design thinking dan system usability scale. *JSiI (Jurnal Sistem Informasi)*, 9(2), 168-176.

Asmuniv. (2015). *Listrik & Elektro*. Retrieved from Vedc Malang.

Azizia, A. J., Kusmaryono, I., Maharani, H. R., & Arifuddin, A. (2023). Students' computational thinking process in solving PISA problems of change and relationship content reviewed from students' self-efficacy. *Eduma: Mathematics Education Learning and Teaching*, 12(1), 112–125. https://doi.org/10.24235/eduma.v12i1.13132

Brown, T. (2008). Design thinking. *Harvard Business Review*, 86(6), 84-92.

Capraro, R. M., Capraro, M. M., Morgan, J. R., & Slough, S. W. (2013). *STEM project-based learning: An integrated science, technology, engineering, and mathematics (STEM) approach*. Rotterdam: Sense Publisher.

Callahan, K. C. (2019). Design thinking in curricula. In *The international encyclopedia of art and design education* (pp. 1–6). Wiley. https://doi.org/10.1002/9781118978061.ead069

Chang, Raymond. (2005). *Kimia Dasar*. Jakarta: Erlangga. Corey. (1986). Belajar dan Pembelajaran. Bandung: Alpabeta

Conradty, C., Sotiriou, S. A., & Bogner, F. X. (2020). How creativity in STEAM modules intervenes with self-efficacy and motivation. *Education Sciences, 10*(3), 70. https://doi.org/10.3390/educsci10030070

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

Creswell, J. W. (2013). *Research design: Pendekatan kualitatif, kuantitatif, dan mixed*. Yogyakarta: Pustaka Pelajar.

Darmawan, S. (2008). *Sifat arang aktif tempurung kemiri dan pemanfaatannya sebagai penyerap emisi formaldehida papan serat berkerapatan sedang* (Tesis, Sekolah Pascasarjana, Institut Pertanian Bogor).

Henriksen, D. (2017). Creating STEAM with design thinking: Beyond STEM and arts integration. *STEAM*, 3(1), 1–11. https://doi.org/10.5642/steam.20170301.11

Herawati, R. F. (2013). Pembelajaran kimia berbasis multipel representasi ditinjau dari kemampuan awal terhadap prestasi belajar laju reaksi siswa SMA Negeri 1 Karang Anyar tahun pelajaran 2012/2013. *Jurnal Pendidikan Kimia, 2*(2). Semarang: Universitas Sebelas Maret.

Kalelioğlu, F. (2018). Characteristics of studies conducted on computational thinking: A content analysis. In M. S. Khine (Ed.), *Computational thinking in the STEM disciplines: Foundations and research highlights* (pp. 11–29). Springer International Publishing. https://doi.org/10.1007/978-3-319-93566-9_2

Litia, N., Sinaga, B., & Mulyono, M. (2023). Profil berpikir komputasi siswa dengan menggunakan model pembelajaran problem based learning (PBL) ditinjau dari gaya belajar di SMA N 1 Langsa. *Jurnal Cendekia: Jurnal Pendidikan Matematika, 7*(2), 1508–1518. https://doi.org/10.31004/cendekia.v7i2.2270

Lin, K.-Y., Wu, Y.-T., Hsu, Y.-T., & Williams, P. J. (2021). Effects of infusing the engineering design process into STEM project-based learning to develop preservice technology teachers' engineering design thinking. *International Journal of STEM Education, 8*(1), 1. https://doi.org/10.1186/s40594-020-00258-9

Manalu, E., Silaban, S., Silaban, R., & Hutabarat, W. (2016). The development of chemical practice guidebook colloid system-based integrated contextual character values. *Jurnal Pendidikan Kimia, 8*(2), 87-89. https://doi.org/10.24114/jpkim.v8i2.4429Miles, M.B., Huberman, M.A., & Saldana, J. (2014). Qualitative Data Analysis (3rd ed.). SAGE Publications

OECD. (2022). *PISA 2022 results: Factsheets Indonesia*. Retrieved from https://www.oecd.org/publication/pisa-2022-results/country-notes/indonesia-c2e1ae0e/

Ozdemir, G., & Dikici, A. (2016). Relationships between scientific process skills and scientific creativity: Mediating role of nature of science knowledge. *Journal of Education in Science, Environment and Health, 3*(1), 52–52. https://doi.org/10.21891/jeseh.275696

Plattner, H. (2010). *An introduction to design thinking process guide*. Institute of Design at Stanford.

Repenning, A., Basawapatna, A., & Escherle, N. (2016). Computational thinking tools. In *2016 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)* (pp. 218–222). IEEE. https://doi.org/10.1109/VLHCC.2016.7739688

Sanders, M., Hyuksoo, K., Kyungsuk, P., & Hyonyong, L. (2011). Integrative STEM (Science, Technology, Engineering, and Mathematics) education: Contemporary trends and issues. *Secondary Education, 59*, 729-762.

So, W. W. M., Chen, Y., & Wan, Z. H. (2019). Multimedia e-learning and self-regulated science learning: A study of primary school learners' experiences and perceptions. *Journal of Science Education and Technology, 28*(5), 508–522. https://doi.org/10.1007/s10956-019-09782-y

Steggals, P., Lawler, S., & Graham, R. (2020). The social life of self-injury: Exploring the communicative dimension of a very personal practice. *Sociology of Health & Illness, 42*(1), 157–170. https://doi.org/10.1111/1467-9566.13014

Straker, K., Wrigley, C., & Rosemann, M. (2015). The role of design in the future of digital channels: Conceptual insights and future research directions. *Journal of Retailing and Consumer Services, 26*, 133–140. https://doi.org/10.1016/j.jretconser.2015.05.005

Stohlmann, M., Moore, T., & Roehrig, G. (2012). Considerations for teaching integrated STEM education. *Journal of Pre-College Engineering Education Research, 2*(1), 28–34. https://doi.org/10.5703/1288284314653

Taber, K. S. (2013). Revisiting the chemistry triplet: Drawing upon the nature of chemical knowledge and the psychology of learning to inform chemistry education. *Chemistry Education Research and Practice, 14*(2), 156–168. https://doi.org/10.1039/C3RP00012E

Tsalapatas, H., Heidmann, O., Pata, K., De Carvalho, C. V., Bauters, M., Papadopoulos, S., Katsimendes, C., Taka, C., & Houstis, E. (2019). Teaching design thinking through gamified learning. In *CSEDU 2019—*

Proceedings of the 11th International Conference on Computer Supported Education (pp. 278–283). Science and Technology Publications.

Wing, J. M. (2006). Computational thinking. *Communications of the ACM, 49*(3), 33–35. https://doi.org/10.1145/1118178.1118215

Wing, J. M. (2008). Computational thinking and thinking about computing. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 366*(1881), 3717–3725. https://doi.org/10.1098/rsta.2008.0118

Wing, J. M. (2011). Research notebook: Computational thinking—What and why? *The Link Magazine*. Retrieved from https://www.cs.cmu.edu/link/research-notebook-computational-thinking-what-and-why

Wrigley, C., & Straker, K. (2015). Design thinking pedagogy: The educational design ladder. *Innovations in Education and Teaching International, 54*(4), 1–12. https://doi.org/10.1080/14703297.2015.1108214

Wijayanti, R. (2009). *Arang aktif dari ampas tebu sebagai adsorben pada pemurnian minyak goreng bekas* (Skripsi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Pertanian Bogor).