

**PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERBASIS BEBRAS PADA PEMBELAJARAN MATEMATIKA
DI KELAS V**

SKRIPSI

diajukan untuk memenuhi sebagian syarat memperoleh gelar
Sarjana Program Studi Pendidikan Guru Sekolah Dasar



Oleh
Lilis Halimatusyadiyah
2005677

**PROGRAM STUDI S1 PENDIDIKAN GURU SEKOLAH DASAR
UNIVERSITAS PENDIDIKAN INDONESIA
KAMPUS TASIKMALAYA
2024**

LEMBAR HAK CIPTA

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERBASIS BEBRAS PADA PEMBELAJARAN MATEMATIKA
DI KELAS V

Oleh
Lilis Halimatusyadiyah
2005677

Diajukan untuk memenuhi sebagian dari syarat untuk memperoleh gelar
Sarjana Pendidikan pada Program Studi Pendidikan Guru Sekolah Dasar

© Lilis Halimatusyadiyah
Universitas Pendidikan Indonesia
2024

Hak Cipta dilindungi oleh Undang-undang.
Skripsi ini tidak diperbolehkan seluruhnya atau sebagian, dengan dicetak ulang,
difotokopi, atau cara lainnya tanpa izin dari penulis.

Lilis Halimatusyadiyah, 2024

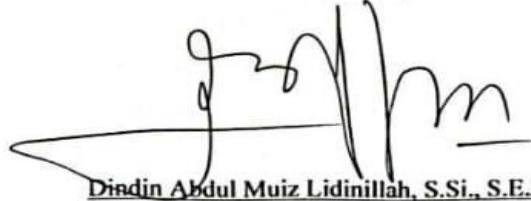
**PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONALBERBASIS BEBRAS PADA PEMBELAJARAN
MATEMATIKA DI KELAS V**

Universitas Pendidikan Indonesia | repository.upi.edu | perpustakaan.upi.edu

LILIS HALIMATUSYADIAH
PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERBASIS BEBRAS PADA PEMBELAJARAN MATEMATIKA DI KELAS 5

Disetujui dan disahkan oleh pembimbing:

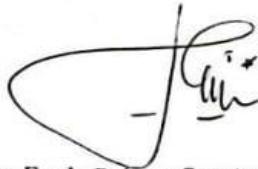
Pembimbing I



Dindin Abdul Muiz Lidinillah, S.Si., S.E., M.Pd.

NIP 197901132005021002

Pembimbing II



Dr. Erwin Rahayu Saputra, M.Pd.

NIP 920200419920416101

Mengetahui,

Ketua Program Studi SI PGSD
UPI Kampus Tasikmalaya



Dr. Ghulam Hamdu, M.Pd.

NIP 198006222008011004

Lilis Halimatusyadiyah, 2024

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL BERBASIS BEBRAS PADA PEMBELAJARAN MATEMATIKA DI KELAS V

Universitas Pendidikan Indonesia | repository.upi.edu | perpustakaan.upi.edu

ABSTRAK

Pemecahan masalah menjadi salah satu keterampilan penting yang harus dimiliki peserta didik. Berpikir komputasional sangat penting dalam transisi dari revolusi industri 4.0 ke 5.0, yang mendukung pemecahan masalah. Bebras merupakan sebuah inisiatif internasional yang berfokus pada promosi berpikir komputasional di kalangan peserta didik, memainkan peran penting dalam menumbuhkan minat dan keterampilan di bidang berpikir komputasional. Bebras juga berhubungan erat dengan matematika karena mengandung unsur logika, pemecahan masalah, serta pola dan struktur. Berdasarkan hal tersebut, penelitian ini bertujuan untuk mengembangkan bahan ajar yang mengintegrasikan konsep berpikir komputasional berbasis bebras dengan pada pembelajaran matematika materi bangun datar di kelas V. Penelitian ini menggunakan metode *Educational Design Research* (EDR) model Mckenney & Reeves. Teknik pengumpulan data yang digunakan yaitu observasi, wawancara, angket, studi dokumentasi, dan judgment. Hasil penelitian menunjukkan bahwa bahan ajar yang dikembangkan memberi dampak positif dengan membantu peserta didik mengembangkan keterampilan pemecahan masalah, serta meningkatkan minat mereka terhadap matematika.

Kata Kunci: Bebras; berpikir komputasional; pemecahan masalah

ABSTRACT

Problem-solving is a crucial skill for students, especially in the rapidly evolving educational landscape. With the ongoing transition from the industrial revolution 4.0 to 5.0, computational thinking has become increasingly vital, as it underpins effective problem-solving abilities. Bebras, an international initiative, plays a key role in promoting computational thinking among students, fostering both interest and skills in this area. Bebras challenges are particularly aligned with mathematics, incorporating elements of logic, problem-solving, and recognition of patterns and structures. Given this synergy, this study aims to develop teaching materials that integrate computational thinking concepts, inspired by Bebras, into mathematics education for fifth-grade students, specifically focusing on the topic of flat shapes. The research employs the Educational Design Research (EDR) method, following the McKenney & Reeves model. Data collection was conducted through a combination of observations, interviews, questionnaires, documentation studies, and expert judgment. The findings indicate that the developed teaching materials not only enhance students problem-solving abilities but also significantly boost their engagement and interest in mathematics. These results underscore the potential of integrating computational thinking into mathematics education to better equip students with the skills needed for future challenges.

Keywords: computational thinking; Bebras; problem-solving

DAFTAR ISI

LEMBAR PERNYATAAN	i
KATA PENGANTAR.....	ii
UCAPAN TERIMA KASIH.....	iii
ABSTRAK	v
ABSTRACT	vi
DAFTAR ISI.....	vii
DAFTAR TABEL	ix
DAFTAR GAMBAR.....	x
DAFTAR LAMPIRAN	xii
BAB I PENDAHULUAN.....	1
1.1 Latar Belakang Penelitian	1
1.2 Rumusan Masalah.....	6
1.3 Tujuan Penelitian.....	6
1.4 Manfaat Penelitian	6
1.5 Struktur Organisasi Skripsi.....	7
BAB II KAJIAN PUSTAKA.....	9
2.1 Berpikir Komputasional	9
2.2 Pembelajaran Berpikir Komputasional di SD.....	11
2.3 Pembelajaran Pemrograman di SD	41
2.4 Pembelajaran Berpikir Komputasional Tipe <i>Unplugged</i>	41
2.5 Pembelajaran Matematika Fase C	44
2.6 Berpikir Komputasional Dalam Pembelajaran Matematika	47

Lilis Halimatusyadiyah, 2024

**PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONALBERBASIS BEBRAS PADA PEMBELAJARAN
MATEMATIKA DI KELAS V**

Universitas Pendidikan Indonesia | repository.upi.edu | perpustakaan.upi.edu

2.7	Bangun Datar	49
2.8	Bahan Ajar	54
2.9	Bebras	54
2.10	Penelitian Relevan	54
2.11	Kerangka Berpikir	54
BAB III METODE PENELITIAN		66
3.1	Desain Penelitian	66
3.2	Lokasi dan Subjek Penelitian	67
3.3	Teknik Pengumpulan Data	68
3.3	Instrumen Penelitian	70
3.4	Analisis Data dan Pengolahan Data	75
BAB IV TEMUAN DAN PEMBAHASAN		79
4.1	Temuan	79
4.2	Pembahasan	115
BAB V SIMPULAN, IMPLIKASI, DAN REKOMENDASI		120
5.1	Simpulan	120
5.2	Implikasi	120
5.3	Rekomendasi	121
DAFTAR PUSTAKA		122
LAMPIRAN – LAMPIRAN		127
RIWAYAT HIDUP		190

DAFTAR TABEL

Tabel 2.1 Komponen Berpikir Komputasional	11
Tabel 2.2 Berpikir Komputasional Berdasarkan Dimensinya.....	23
Tabel 3.1 Identitas Validator	44
Tabel 3.2 Kisi-Kisi Pedoman Wawancara	45
Tabel 3.3 Kisi-Kisi Angket Respon Peserta Didik.....	46
Tabel 3.4 Kisi-Kisi Lembar Validasi Ahli Materi.....	46
Tabel 3.5 Kisi-Kisi Lembar Validasi Ahli Media Pembelajaran	47
Tabel 3.6 Jenis Data, Teknik Pengumpulan Data, Instrumen, Sumber Data dan Tahapan.....	47
Tabel 3.7 Kriteria Pemberian Skor Jawaban Validitas	49
Tabel 3.8 Kriteria Validitas	50
Tabel 3.9 Kriteria Pemberian Skor Jawaban Validitas Respon	50
Tabel 3.10 Kriteria Respon	51
Tabel 4.1 Capaian Pembelajaran.....	55
Tabel 4.2 Tujuan Pembelajaran.....	55
Tabel 4.3 Kisi-Kisi Soal Bebras	56
Tabel 4.4 Jenis Huruf dan Ukuran	58
Tabel 4.5 Hasil Validasi Ahli Materi Matematika	62
Tabel 4.6 Hasil Validasi Ahli Materi Informatika	63
Tabel 4.7 Hasil Validasi Ahli Media Pembelajaran.....	64
Tabel 4.8 Hasil Angket Respon Peserta Didik I.....	80
Tabel 4.9 Hasil Angket Respon Pendidik I.....	81
Tabel 4.10 Hasil Angket Respon Peserta Didik II	87
Tabel 4.11 Hasil Angket Respon Pendidik II.....	87
Tabel 4.12 <i>Hypothetical Learning Trajectory</i> dan <i>Actual Learning Trajectory</i>	88

DAFTAR GAMBAR

Gambar 2.1	Bangun Datar Persegi	24
Gambar 2.2	Bangun Datar Persegi Panjang	24
Gambar 2.3	Bangun Datar Segitiga	25
Gambar 2.4	Bangun Datar Jajar Genjang	26
Gambar 2.5	Bangun Datar Belah Ketupat.....	26
Gambar 2.6	Bangun Datar Lingkaran	27
Gambar 2.7	Bangun Datar Layang-Layang	27
Gambar 2.8	Bangun Datar Trapesium	28
Gambar 2.9	Logo Bebras Indonesia	32
Gambar 2.10	Kerangka Berpikir	65
Gambar 3.1	Model Generic EDR McKenny & Reeves 2012	40
Gambar 4.1	Tampilan Cover Bahan Ajar	60
Gambar 4.2	Tampilan Isi Bahan Ajar (Pembelajaran 1).....	61
Gambar 4.3	Tampilan Isi Bahan Ajar (Pembelajaran 2).....	61
Gambar 4.4	Tampilan Cover Sebelum di Revisi.....	65
Gambar 4.5	Tampilan Cover Sesudah di Revisi	66
Gambar 4.6	Tampilan Capaian Pembelajaran dan Tujuan Pembelajaran Sebelum di Revisi	67
Gambar 4.7	Tampilan Capaian Pembelajaran dan Tujuan Pembelajaran Sesudah di Revisi	68
Gambar 4.8	Tampilan Kegiatan Pada Pembelajaran 1 Sebelum di Revisi	69
Gambar 4.9	Tampilan Kegiatan Pada Pembelajaran 1 Sesudah di Revisi	70
Gambar 4.10	Tampilan Kegiatan Pada Pembelajaran 2 Sebelum di Revisi	71
Gambar 4.11	Tampilan Kegiatan Pada Pembelajaran 2 Sesudah di Revisi	72
Gambar 4.12	Penjelasan Mengenai Materi Bangun Datar dan Bebras I.....	74
Gambar 4.13	Pengerjaan Soal Berpikir Komputasional Berbasis Bebras I	74
Gambar 4.14	Jawaban Kegiatan 1 Pembelajaran 1	75
Gambar 4.15	Jawaban I Pada Kegiatan 4 Pembelajaran 1	76
Gambar 4.16	Jawaban II Pada Kegiatan 4 Pembelajaran 1.....	77

Lilis Halimatusyadiyah, 2024

**PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONALBERBASIS BEBRAS PADA PEMBELAJARAN
MATEMATIKA DI KELAS V**

Universitas Pendidikan Indonesia | repository.upi.edu | perpustakaan.upi.edu

Gambar 4.17 Jawaban I Kegiatan 1 Pembelajaran 2.....	78
Gambar 4.18 Jawaban II Kegiatan 1 Pembelajaran	79
Gambar 4.19 Penjelasan Mengenai Materi Bangun Datar dan Bebras II	82
Gambar 4.20 Pengerjaan Soal Berpikir Komputasional Berbasis Bebras	82
Gambar 4.21 Jawaban Kegiatan 1 Pembelajaran 1	83
Gambar 4.22 Jawaban Kegiatan 3 Pembelajaran 1	84
Gambar 4.23 Jawaban Kegiatan 5 Pembelajaran 1	85
Gambar 4.24 Jawaban Kegiatan 3 Pembelajaran 2	86

DAFTAR LAMPIRAN

Lampiran 1 Administrasi Penelitian	127
Lampiran 2 Instrumen Penelitian	132
Lampiran 3 Data Hasil Penelitian	147
Lampiran 4 Data Hasil Uji Coba	161
Lampiran 5 Produk Bahan Ajar	176

DAFTAR PUSTAKA

- A study on developing computational thinking in junior high school based on bebras competition test questions. *Frontiers in Educational Research*, 6(15).
<https://doi.org/10.25236/fer.2023.061518>
- Angeli, C., Voogt, J., Fluck, A., Webb, M., Cox, M., Malyn-Smith, J., & Zagami, J. (2016). A K-6 Computational Thinking Curriculum Framework: Implications for Teacher Knowledge. *Educational Technology and Society*, 19(3), 47–57.
- Agustin, K., Madani, M., Sriwinarti, N., & Supatmiwati, D. (2022). Penguatan kemampuan computational thinking pada pemberdayaan guru dan siswa sekolah dasar di pulau lombok. *Transformasi Jurnal Pengabdian Masyarakat*, 18(2), 253-267.
<https://doi.org/10.20414/transformasi.v18i2.5034>
- Ayub, M., Wijanto, M., Adelia, A., Panca, B., Edi, D., Kasih, J., ... & Surjawan, D. (2021). Service learning in teachers and students mentoring for 2020 bebras challenge in pandemic era at maranatha bebras bureau christian university. *Journal of Innovation and Community Engagement*, 2(2), 75-88.
<https://doi.org/10.28932/jice.v2i2.3802>
- Barcelos, T. S., Munoz, R., Villarroel, R., Merino, E., & Silveira, I. F. (2018). Mathematics Learning Through Computational Thinking Activities: A Systematic Literature Review. *Journal of Universal Computer Science*, 24(7), 815–845.
- Barr, V., & Stephenson, C. (2011). Bringing Computational Thinking to K-12: What is Involved and what is the Role of the Computer Science Education Community? *ACM Inroads*, 2(1), 48–54.
<https://doi.org/10.1145/1929887.1929905>
- Berikan, B., & Özdemir, S. (2020). Investigating “Problem-Solving With Datasets” as an Implementation of Computational Thinking: A Literature Review. *Journal of Educational Computing Research*, 58(2), 502–534.
<https://doi.org/10.1177/0735633119845694>
- Bocconi, S., Chiocciariello, A., Dettori, G., Ferrari, A., Engelhardt, K., Kampylis, P., & Punie, Y. (2016). Developing Computational Thinking : Approaches and Orientations in K-12 Education. *Proceedings EdMedia 2016, June*, 1–7.
- Bilbao, J., Bravo, E., García, O., Varela, C., & Rebollar, C. (2017). Assessment of computational thinking notions in secondary school. *Baltic Journal of Modern Computing*, 5(4). <https://doi.org/10.22364/bjmc.2017.5.4.05>
- Çakıroğlu, Ü., & Kiliç, S. (2020). Assessing Teachers’ PCK to Teach Computational Thinking via Robotic Programming. *Interactive Learning Environments*, 0(0), 1–18. <https://doi.org/10.1080/10494820.2020.1811734>
- Chan, S., Looi, C., Ho, W., & Kim, M. (2022). Tools and approaches for integrating computational thinking and mathematics: a scoping review of current empirical studies. *Journal of Educational Computing Research*,

- Chen, C. (2023). The effect of time management and help-seeking in self-regulation-based computational thinking learning in taiwanese primary school students. *Sustainability*, 15(16), 12494. <https://doi.org/10.3390/su151612494>
- Chen, G., Shen, J., Barth-Cohen, L., Jiang, S., Huang, X., & Eltoukhy, M. (2017). Assessing elementary students' computational thinking in everyday reasoning and robotics programming. *Computers & Education*, 109, 162-175. <https://doi.org/10.1016/j.compedu.2017.03.001>
- Chiazzese, G., Arrigo, M., Chifari, A., Lonati, V., & Tosto, C. (2019). Educational robotics in primary school: measuring the development of computational thinking skills with the bebras tasks. *Informatics*, 6(4), 43. <https://doi.org/10.3390/informatics6040043>
- Connolly, C., Neira, R., & Garcia-Iruela, M. (2021). Developing and assessing computational thinking in secondary education using a tpack guided scratch visual execution environment. *International Journal of Computer Science Education in Schools*, 4(4), 3-23. <https://doi.org/10.21585/ijcses.v4i4.98>
- Dagienė, V. (2016). Challenge to promote deep understanding in ict., 47-52. https://doi.org/10.1007/978-3-319-44447-5_5
- Dagienė, V., Sentance, S., & Stupurienė, G. (2017). Developing a two-dimensional categorization system for educational tasks in informatics. *Informatica*, 28(1), 23-44. <https://doi.org/10.15388/informatica.2017.119>
- Dagienė, V., Stupurienė, G., & Vinikienė, L. (2017). Implementation of dynamic tasks on informatics and computational thinking. *Baltic Journal of Modern Computing*, 5(3). <https://doi.org/10.22364/bjmc.2017.5.3.05>
- Deane, P., Sabatini, J., Feng, G., Sparks, J., Song, Y., Fowles, M., O'Reilly, T., Jueds, K., Krovetz, R., & Foley, C. (2015). Review of Literature on Computational Thinking. In *ETS Research Report Series* (Vol. 2015, Issue 2). <https://doi.org/10.2185/jjrm.64.718>
- Eloy, A., Achutti, C., Fernandez, C., & Lopes, R. (2021). A data-driven approach to assess computational thinking concepts based on learners' artifacts. *Informatics in Education*. <https://doi.org/10.15388/infedu.2022.02>
- Ezeamuzie, N. O., & Leung, J. S. C. (2021). Computational Thinking Through an Empirical Lens: A Systematic Review of Literature. *Journal of Educational Computing Research*, 0(0), 1–31. <https://doi.org/10.1177/07356331211033158>
- Fajri, M., & Yurniwati, Y. (2019). *Computational Thinking, Mathematical Thinking Berorientasi Gaya Kognitif pada Pembelajaran Matematika di Sekolah Dasar*.
- Fang, J., Shao, D., Hwang, G., & Chang, S. (2022). From critique to computational thinking: a peer-assessment-supported problem identification, flow definition, coding, and testing approach for computer programming instruction. *Journal of Educational Computing Research*, 60(5), 1301-1324. <https://doi.org/10.1177/07356331211060470>
- Gadanidis, G., Hughes, J. M., Minniti, L., & White, B. J. G. (2017). Computational Thinking, Grade 1 Students and the Binomial Theorem. *Digital Experiences in Mathematics Education*, 3(2), 77–96.

<https://doi.org/10.1007/s40751-016-0019-3>

- Kale, U., Akcaoglu, M., Cullen, T., Goh, D., Devine, L., Calvert, N., & Grise, K. (2018a). Computational What? Relating Computational Thinking to Teaching. *TechTrends*, 62(6), 574–584. <https://doi.org/10.1007/s11528-018-0290-9>
- Kale, U., Akcaoglu, M., Cullen, T., Goh, D., Devine, L., Calvert, N., & Grise, K. (2018b). Computational What? Relating Computational Thinking to Teaching. *TechTrends*, 62(6), 574–584. <https://doi.org/10.1007/s11528-018-0290-9>
- Kale, U., & Yuan, J. (2021). Still a New Kid on the Block? Computational Thinking as Problem Solving in Code.org. *Journal of Educational Computing Research*, 59(4), 620–644. <https://doi.org/10.1177/0735633120972050>
- Kartarina, K., Madani, M., Supatmiwati, D., Riberu, R., & Lestari, I. (2021). Sosialisasi dan pengenalan computational thinking kepada guru pada program gerakan pandai oleh bebras biro universitas bumigora. *Adma Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, 2(1), 27-34. <https://doi.org/10.30812/adma.v2i1.1271>
- Kalehoğlu, F., Doğan, D., & Gülbahar, Y. (2021). Snapshot of computational thinking in turkey: a critique of 2019 bebras challenge. *Informatics in Education*. <https://doi.org/10.15388/infedu.2022.19>
- Koh, K., Basawapatna, A., Bennett, V., & Repenning, A. (2010). Towards the automatic recognition of computational thinking for adaptive visual language learning.. <https://doi.org/10.1109/vlhcc.2010.17>
- Lee, C., & Chan, P. (2019). Mathematics Learning: Perceptions Toward the Design of a Website Based on a Fun Computational Thinking-Based Knowledge Management Framework. In H. Kong, Siu-cheung;Abelson (Ed.), *Computational Thinking Education* (1st ed., pp. 183–200). Springer Singapore. <https://doi.org/10.1007/978-981-13-6528-7>
- Lee, I., Martin, F., Denner, J., Coulter, B., Allan, W., Erickson, J., Malyn-Smith, J., & Werner, L. (2011). Computational thinking for youth in practice. *ACM Inroads*, 2(1), 32–37. <https://doi.org/10.1145/1929887.1929902>
- Lockwood, E., DeJarnette, A. F., & Thomas, M. (2019). Computing as a mathematical disciplinary practice. *Journal of Mathematical Behavior*, 54(January), 100688. <https://doi.org/10.1016/j.jmathb.2019.01.004>
- Maharani, S., Kholid, M. N., Pradana, L. N., & Nusantara, T. (2019). Problem Solving in the Context of Computational Thinking. *Journal of Mathematics Education*, 8(2), 109–116.
- Matsuzawa, Y., Murata, K., & Tani, S. (2019). Multivocal challenge toward measuring computational thinking., 56-66. https://doi.org/10.1007/978-3-030-23513-0_6
- Mukasheva, M. and Omirzakova, A. (2021). Computational thinking assessment at primary school in the context of learning programming. *World Journal on Educational Technology Current Issues*, 13(3), 336-353. <https://doi.org/10.18844/wjet.v13i3.5918>
- Nuraisa, D., Saleh, H., & Raharjo, S. (2021). Profile of students' computational thinking based on self-regulated learning in completing bebras tasks. *Prima Jurnal Pendidikan Matematika*, 5(2), 40.

- <https://doi.org/10.31000/prima.v5i2.4173>
- Panselinas, G., Mavrikis, M., Geraniou, E., Anastasiou, P., Tambouratzis, E., & Kartsonakis, E. (2020). Towards a teaching model for managing students' cognitive load in activities that integrate computational and mathematical thinking. *European Journal of Engineering and Technology Research*, 6-11. <https://doi.org/10.24018/ejers.2020.0.cie.1792>
- Panselinas, G., Mavrikis, M., Geraniou, E., Anastasiou, P., Tambouratzis, E., & Kartsonakis, E. (2020). Towards a teaching model for managing students' cognitive load in activities that integrate computational and mathematical thinking. *European Journal of Engineering and Technology Research*, 6-11. <https://doi.org/10.24018/ejers.2020.0.cie.1792>
- Piedade, J. and Dorotea, N. (2022). Effects of scratch-based activities on 4th-grade students' computational thinking skills. *Informatics in Education*. <https://doi.org/10.15388/infedu.2023.19>
- Ria, R. (2024). Computational thinking assessment: bibliometric analysis-vosviewer. *Jurnal Simki Pedagogia*, 7(1), 305-316. <https://doi.org/10.29407/jsp.v7i1.343>
- Selby, C., & Woollward, J. (2013). Computational Thinking : The Developing Definition. *ITiCSE Conference 2013, Juli*. https://eprints.soton.ac.uk/356481/1/Selby_Woollard_bg_soton_eprints.pdf
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D* (26th ed.). Penerbit Alfabeta.
- Sondakh, D., Osman, K., & Zainudin, S. (2020). A pilot study of an instrument to assess undergraduates' computational thinking proficiency. *International Journal of Advanced Computer Science and Applications*, 11(11). <https://doi.org/10.14569/ijacsa.2020.0111134>
- Sriwinarti, N., Apriani, A., Supatmawati, D., Kartarina, K., & Ismarmiaty, I. (2022). Pendampingan proses pembuatan soal berbasis computational thinking kepada guru pada guru-guru tingkat sd dan smp kecamatan sakra, kabupaten lombok timur. *Adma Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, 2(2), 209-220. <https://doi.org/10.30812/adma.v2i2.1568>
- The Royal Society. (2012). Shut Down or Restart? The Way Forward for Computing in UK Schools. In *British Journal of Educational Technology*. The Royal Academy of Engineering. <https://royalsociety.org/~media/education/computing-in-schools/2012-01-12-computing-in-schools.pdf>
- TOKI. (2018). *Tantangan Bebras Indonesia 2018 : Bahan Belajar Komputational Thinking* (2018th ed.). NBO Bebras Indonesia.
- Vaníček, J., Šimandl, V., & KLOFÁČ, P. (2021). A comparison of abstraction and algorithmic tasks used in bebras challenge. *Informatics in Education*, 20(4), 717-736. <https://doi.org/10.15388/infedu.2021.30>
- Vegt, W. (2018). How hard will this task be? developments in analyzing and predicting question difficulty in the bebras challenge. *Olympiads in Informatics*, 12, 119-132. <https://doi.org/10.15388/oi.2018.10>
- Weinberg, A. E. (2013). *Computational Thinking : An Investigation of The Existing Scholarship and Research* [Colorado State University]. <https://people.cs.vt.edu/~kafura/CS6604/Papers/CT-Existing-Scholarship-Research-Dissertation.pdf>

- Weintrop, D., Beheshti, E., Horn, M., Orton, K., Jona, K., Trouille, L., & Wilensky, U. (2016). Defining Computational Thinking for Mathematics and Science Classrooms. *Journal of Science Education and Technology*, 25(1), 127–147. <https://doi.org/10.1007/s10956-015-9581-5>
- Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33–35. <https://doi.org/10.1145/1118178.1118215>
- Wing, J. M. (2011). Research notebook: Computational thinking—What and why? *The Link Magazine*, June 23, 2015. [http://www.cs.cmu.edu/link/research-notebook-computational-thinking- what-and-whY](http://www.cs.cmu.edu/link/research-notebook-computational-thinking-what-and-whY)
- Yadav, A., Mayfield, C., Zhou, N., Hambruch, S., & Korb, J. (2014). Computational thinking in elementary and secondary teacher education. *Acm Transactions on Computing Education*, 14(1), 1-16. <https://doi.org/10.1145/2576872>