

**PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERMUATAN ELEMEN BILANGAN MATEMATIKA
BERBASIS CS *UNPLUGGED* PADA FASE C DI SEKOLAH DASAR**

SKRIPSI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
Sarjana Program Studi S1 Pendidikan Guru Sekolah Dasar



oleh
Aulia Rahma Syadila
NIM 2008022

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

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERMUATAN ELEMEN BILANGAN MATEMATIKA
BERBASIS CS UNPLUGGED PADA FASE C DI SEKOLAH DASAR

oleh
Aulia Rahma Syadila

diajukan untuk memenuhi sebagian syarat untuk memperoleh
gelar Sarjana Program Studi S1 Pendidikan Guru Sekolah Dasar

© Aulia Rahma Syadila
Universitas Pendidikan Indonesia
Agustus 2024

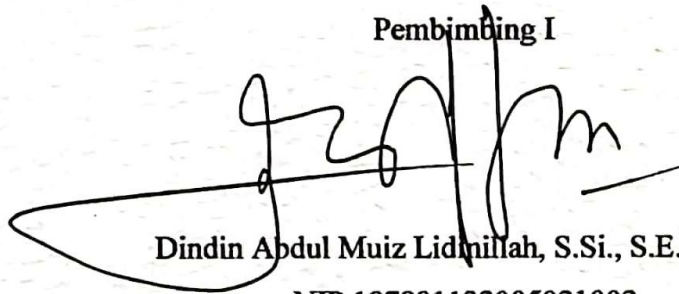
Hak cipta dilindungi oleh undang-undang.
Skripsi ini tidak boleh diperbanyak seluruh atau sebagian, dengan dicetak ulang,
difotokopi, atau cara lainnya tanpa izin dari peneliti

AULIA RAHMA SYADILA

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL
BERMUATAN ELEMEN BILANGAN MATEMATIKA
BERBASIS CS UNPLUGGED PADA FASE C DI SEKOLAH DASAR

disetujui dan disahkan oleh dosen pembimbing:

Pembimbing I



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

NIP 197901132005021002

Pembimbing II



Asep Nuryadin, S.Pd., M.Ed.

NIP 920200819931110101

Mengetahui,

Ketua Program Studi S1 PGSD
UPI Kampus Tasikmalaya



Dr. Ghullam Hamdu, M.Pd.

NIP. 198006222008011004

ABSTRAK

Penelitian ini dilandasi oleh adanya kebutuhan bahan ajar pembelajaran informatika yang belum tersedia di sekolah. Di tengah perkembangan teknologi yang kian pesat, proses berpikir komputasional merupakan keterampilan fundamental pada abad 21. Penelitian ini bertujuan untuk mengembangkan bahan ajar berpikir komputasional bermuatan elemen bilangan matematika berbasis *CS Unplugged* pada fase C di sekolah dasar. Bahan ajar ini mengintegrasikan pembelajaran informatika yang menjadi fokus utama, dengan pembelajaran matematika yang diambil beberapa muatannya. Penelitian ini menggunakan metode *Educational Desain Reasearch* (EDR). Dengan menggunakan EDR, terdapat tiga tahapan, diantaranya adalah *Analysis and Exploration, Design and Construction, Evaluation and Reflection*. Data dalam penelitian ini dikumpulkan melalui wawancara pendidik, studi dokumentasi, validasi para ahli, dan angket respon pendidik serta peserta didik saat uji coba. Hasil validasi para ahli, bahan ajar mendapatkan hasil persentase 79% dari ahli materi pembelajaran informatika dengan kategori layak, 71% dari ahli materi pembelajaran matematika dengan kategori layak, dan 84% dari ahli desain bahan ajar dengan kategori sangat layak. Adapun, pada saat implementasi siklus satu mendapatkan persentase 88% dari respon pendidik dengan kategori sangat baik dan 56% dari peserta didik dengan kategori cukup. Pada siklus dua, 98% dari pendidik dengan kategori sangat baik, dan 89% dari peserta didik dengan kategori sangat baik. Dari data yang telah dihimpun menunjukkan bahwa Bahan Ajar Berpikir Komputasional Bermuatan Elemen Bilangan Matematika Berbasis *CS Unplugged* Pada Fase C di Sekolah Dasar layak dan sangat baik untuk digunakan dalam integrasi pembelajaran informatika dengan pembelajaran matematika.

Kata Kunci: Bahan Ajar; Berpikir Komputasional; *CS Unplugged*; *Unplugged*;

ABSTRACT

This research is motivated by the need for instructional materials for informatiCS education that are currently unavailable in schools. Amid the rapid technological advancement, computational thinking is a fundamental skill in the 21st century. This study aims to develop instructional materials for computational thinking infused with mathematical number elements based on CS Unplugged for Phase C in elementary schools. The instructional materials integrate informatiCS learning, which is the primary focus, with elements of mathematiCS learning. This research employs the Educational Design Research (EDR) method. Utilizing EDR, the process consists of three stages: Analysis and Exploration, Design and Construction, and Evaluation and Reflection. Data for this study were collected through interviews with educators, documentation studies, validation from experts, and questionnaires from both educators and students during the trials. The results of expert validation indicated that the instructional materials received a percentage of 79% from informatiCS learning experts, categorized as feasible; 71% from mathematiCS learning experts, also categorized as feasible; and 84% from instructional design experts, categorized as very feasible. During the implementation phase, Cycle One received a percentage of 88% from educators, categorized as very good, and 56% from students, categorized as sufficient. In Cycle Two, the results improved to 98% from educators, categorized as very good, and 89% from students, categorized as very good. The collected data demonstrate that the instructional materials for computational thinking infused with mathematical number elements based on CS Unplugged for Phase C in elementary schools are suitable and highly effective for integrating informatiCS learning with mathematiCS education.

Keywords: Computational Thinking; CS Unplugged; Instructional Materials; Unplugged

DAFTAR ISI

KATA PENGANTAR	i
UCAPAN TERIMA KASIH.....	ii
ABSTRAK	v
ABSTRACT	vi
DAFTAR ISI.....	vii
DAFTAR TABEL	xi
DAFTAR GAMBAR	xiii
BAB I PENDAHULUAN	1
1.1 Latar Belakang Penelitian	1
1.2 Rumusan Masalah	4
1.3 Tujuan Penelitian	4
1.4 Manfaat Penelitian	5
1.4.1 Manfaat secara teoretis.....	5
1.4.2 Manfaat secara praktis.....	5
1.4.3 Manfaat dari segi kebijakan	6
1.5 Struktur Organisasi	6
BAB II KAJIAN PUSTAKA	8
2.1 Pembelajaran Informatika di Sekolah Dasar.....	8
2.1.1 Pengertian Berpikir Komputasional.....	9
2.1.2 Karakteristik Berpikir Komputasional	11
2.1.3 Komponen Berpikir Komputasional	12
2.1.4 Aspek Berpikir Komputasional.....	14
2.1.5 Keahlian Berpikir Komputasional.....	14
2.1.6 Urgensi Berpikir Komputasional	15

2.1.7 Tujuan Pembelajaran Berpikir Komputasional.....	16
2.1.8 Manfaat Pembelajaran Berpikir Komputasional.....	17
2.1.9 Strategi Pembelajaran Berpikir Komputasional.....	17
2.1.10 Pendekatan Berpikir Komputasional.....	19
2.2 Kegiatan <i>Computer Science Unplugged</i>	19
2.3 Pembelajaran Matematika di SD.....	25
2.3.1 Tujuan Pembelajaran Matematika.....	27
2.3.2 Karakteristik Pelajaran Matematika	27
2.4 Bahan Ajar	27
2.4.1 Komponen Bahan Ajar.....	28
2.4.2 Fungsi dan Manfaat Bahan Ajar	28
2.4.3 Jenis-Jenis Bahan Ajar	29
2.4.4 Kriteria Bahan Ajar yang Baik.....	29
2.4.5 Kriteria Pengembangan Bahan Ajar	30
2.4.6 Langkah-Langkah Pengembangan Bahan Ajar.....	30
2.4.7 Panduan Penulisan Bahan Ajar	30
2.4.8 Lembar Kegiatan Siswa	31
2.5 Penelitian Relevan.....	32
2.6 Kerangka Berpikir.....	33
BAB III METODE PENELITIAN.....	34
3.1 Desain Penelitian.....	34
3.2 Partisipan, dan Tempat Penelitian.....	36
3.2.1 Partisipan Penelitian.....	36
3.2.2 Tempat Penelitian.....	36
3.3 Prosedur Penelitian.....	37
3.3.1 Analysis and Exploration (Analisis dan Eksplorasi).....	37

3.3.2 Design and Construction (Desain dan Pembangunan).....	38
3.3.3 Evaluation and Reflection (Evaluasi dan Refleksi)	38
3.4 Pengumpulan Data	40
3.4.1 Teknik Pengumpulan Data	40
3.4.2 Instrumen Penelitian.....	42
3.5 Teknik Analisis Data	49
3.5.1 Analisis Data Kualitatif.....	49
3.5.2 Analisis Data Kuantitatif.....	50
BAB IV TEMUAN DAN PEMBAHASAN	53
4.1 Temuan.....	53
4.1.1 Analisis dan Eksplorasi (<i>Analysis and Exploration</i>).....	53
4.1.2 Desain dan Konstruksi (<i>Design and Construction</i>)	55
4.1.3 Evaluasi dan Refleksi (<i>Evaluation and Reflection</i>)	110
4.2 Pembahasan.....	132
4.2.1 Analisis dan eksplorasi masalah bahan ajar berpikir komputasional bermuatan elemen bilangan matematika berbasis CS Unplugged pada fase C di Sekolah Dasar	133
4.2.2 Rancangan bahan ajar berpikir komputasional bermuatan elemen bilangan matematika berbasis CS Unplugged pada fase C di Sekolah Dasar	135
4.2.3 Uji dan perbaikan produk berupa bahan ajar berpikir komputasional bermuatan elemen bilangan matematika berbasis CS Unplugged pada fase C di Sekolah Dasar	137
BAB V KESIMPULAN	140
5.1 Simpulan	140
5.2 Implikasi.....	140
5.3 Rekomendasi	141

DAFTAR PUSTAKA	143
LAMPIRAN-LAMPIRAN.....	150

DAFTAR TABEL

Tabel 3. 1 Capaian Pembelajaran Fase C Elemen Berpikir Komputasional.....	41
Tabel 3. 2 Capaian Pembelajaran Fase C Elemen Bilangan	42
Tabel 3. 3 Instrumen Penelitian	42
Tabel 3. 4 Kisi-Kisi Pedoman Wawancara Studi Pendahuluan dengan Pendidik Kelas V SD.....	43
Tabel 3. 5 Kisi-Kisi Pedoman Observasi Proses Pembelajaran Di Kelas V SD....	44
Tabel 3. 6 Kisi-kisi penilaian Bahan Ajar oleh Ahli Materi Pembelajaran Informatika.....	45
Tabel 3. 7 Kisi-kisi penilaian Bahan Ajar oleh Ahli Materi Pembelajaran Matematika.....	45
Tabel 3. 8 Kisi-Kisi Penilaian Bahan Ajar oleh Ahli Desain.....	46
Tabel 3. 9 Kisi-Kisi Angket Pendidik.....	47
Tabel 3. 10 Kisi-Kisi Angket Peserta Didik	49
Tabel 3. 11 Tabel Skala Penilaian.....	51
Tabel 3. 12 Kriteria Hasil.....	51
Tabel 3. 13 Skala Penilaian.....	52
Tabel 3. 14 Kriteria Hasil.....	52
Tabel 4. 1 Kajian Dokumen	54
Tabel 4. 2 Capaian Pembelajaran Fase C Elemen Berpikir Komputasional dan Algoritma & Pemrograman.....	57
Tabel 4. 3 Capaian Pembelajaran Fase C Elemen Bilangan	58
Tabel 4. 4 Kegiatan pembelajaran 1.....	60
Tabel 4. 5 Kegiatan Pembelajaran 2	65
Tabel 4. 6 Jenis dan Ukuran Huruf	78
Tabel 4. 7 Kode Warna dalam Bahan Ajar	82
Tabel 4. 8 Hasil Pengembangan Bahan Ajar	83
Tabel 4. 9 Hasil Validasi Ahli Materi Pembelajaran Informatika	96
Tabel 4. 10 Hasil Validasi Ahli Materi Pembelajaran Informatika	97
Tabel 4. 11 Hasil Validasi Ahli Desain Bahan Ajar	98
Tabel 4. 12 Hasil Angket Respon Pendidik Siklus 1	123
Tabel 4. 13 Hasil Angket Respon Peserta Didik Siklus 1.....	123

Tabel 4. 14 Angket Pendidik Siklus 2.....	131
Tabel 4. 15Angket Peserta Didik Siklus 2	132

DAFTAR GAMBAR

Gambar 2. 1 Elemen Mata Pelajaran Indormatika	9
Gambar 2. 2 Taksonomi Weintrop.....	13
Gambar 2. 3 Buku CS Unplugged tahun 1998.....	21
Gambar 2. 4 Buku CS Unplugged tahun 2015.....	21
Gambar 2. 5 Bagian dari dari buku CS Unplugged	23
Gambar 2. 6 Tampilan beranda situs CS Unplugged.....	24
Gambar 2. 7 Tampilan bagian “Topic” dari situs CS Unplugged.....	24
Gambar 2. 8 Teori Edgar Dale	25
Gambar 3. 1 Desain Penelitian Educational Design Reasearch (EDR).....	35
Gambar 4. 1 Berpikir Komputasional sebagai bentuk khusus penyelesaian masalah.....	59
Gambar 4. 2 Desain Layout Sampul Keseluruhan BahanAjar dan Sampul Setiap Kegiatan Bahan Ajar	81
Gambar 4. 3 Desain Layout Isi Bahan Ajar	81
Gambar 4. 4 Halaman Sampul Depan.....	99
Gambar 4. 5 Perbaikan Halaman Petunjuk Penggunaan.....	100
Gambar 4. 6 Perbaikan Halaman Capaian Pembelajaran.....	100
Gambar 4. 7 Perbaikan Halaman Alur Tujuan Pembelajaran	101
Gambar 4. 8 Perbaikan Halaman Harapan di Dalam Kelas	101
Gambar 4. 9 Perbaikan Halaman Sampul Kegiatan 1.....	102
Gambar 4. 10 Perbaikan Pada Isi Kegiatan 1.....	102
Gambar 4. 11 Perbaikan Pada Isi Kegiatan 1.....	103
Gambar 4. 12 Perbaikan Pada Isi Kegiatan 1.....	104
Gambar 4. 13 Perbaikan Pada Isi Kegiatan 1.....	105
Gambar 4. 14 Perbaikan Pada Isi Kegiatan 1.....	105
Gambar 4. 15 Perbaikan Pada Isi Kegiatan 1.....	106
Gambar 4. 16 Perbaikan Halaman Sampul Kegiatan 2.....	106
Gambar 4. 17 Perbaikan Pada Isi Kegiatan 2.....	107
Gambar 4. 18 Perbaikan Pada Isi Kegiatan 2.....	107
Gambar 4. 19 Perbaikan Pada Isi Kegiatan 2.....	108
Gambar 4. 20 Perbaikan Pada Isi Kegiatan 2.....	109

Gambar 4. 21 Perbaikan Pada Isi Kegiatan 2.....	109
Gambar 4. 22 Perbaikan Pada Lembar Biodata	110
Gambar 4. 23 Pengondisian Kelas	111
Gambar 4. 24 Penjelasan Langkah-Langkah Kegiatan.....	112
Gambar 4. 25 Kegiatan Pemilahan Jaringan Secara Berkelompok.....	112
Gambar 4. 26 Pelaksanaan Kegiatan 1.....	113
Gambar 4. 27 Pengerjaan Soal Interaktif Selama Kegiatan.....	113
Gambar 4. 28 Pengerjaan Soal Latihan.....	114
Gambar 4. 29 Peserta Didik Terbagi Menjadi Kelompok Kecil.....	115
Gambar 4. 30 Penjelasan Membuat Pohon Keputusan	115
Gambar 4. 31 Jawaban Pertanyaan Interaktif Kegiatan 1 Siklus 1	117
Gambar 4. 32 Jawaban Pertanyaan Interaktif Kegiatan 1 Siklus 1	118
Gambar 4. 33 Jawaban Pertanyaan Interaktif Kegiatan 1 Siklus 1	119
Gambar 4. 34 Jawaban Soal Latihan Siklus 1.....	119
Gambar 4. 35 Jawaban Soal Latihan Siklus 1.....	120
Gambar 4. 36 Jawaban Soal Latihan Siklus 1.....	120
Gambar 4. 37 Jawaban Soal Latihan Siklus 1.....	121
Gambar 4. 38 Jawaban Soal Latihan Siklus 1.....	121
Gambar 4. 39 Kegiatan 1 dalam siklus 2	124
Gambar 4. 40 Kegiatan 1 dalam Siklus 2.....	125
Gambar 4. 41 Kegiatan 1 Siklus 2	125
Gambar 4. 42 Kegiatan 1 Siklus 2	125
Gambar 4. 43 Kegiatan 2 Siklus 2	126
Gambar 4. 44 Kegiatan 2 Siklus 2	126
Gambar 4. 45 Kegiatan 2 Siklus 2	127
Gambar 4. 46 Soal Latihan Kegiatan 1 Siklus 2	128
Gambar 4. 47 Soal Latihan Kegiatan 1 Siklus 2	128
Gambar 4. 48 Soal Latihan Kegiatan 1 Siklus 2	129
Gambar 4. 49 Soal Latihan Kegiatan 1 Siklus 2	129
Gambar 4. 50 Soal Latihan Kegiatan 2 Siklus 2	130
Gambar 4. 51 Soal Latihan Kegiatan 2 Siklus 2	130
Gambar 4. 52 Soal Kegiatan 2 Siklus 2	131

DAFTAR LAMPIRAN

Lampiran 1. 1 SK Dosen Pembimbing Skripsi	151
Lampiran 1. 2 Surat Izin Penelitian SDN 1 Sindangkasih	154
Lampiran 1. 3 Surat Keterangan Telah Melaksanakan Penelitian di SDN 1 Sindangkasih	155
Lampiran 2. 1 Instrumen Wawancara Studi Pendahuluan	157
Lampiran 2. 2 Instrumen Validasi Ahli Materi Pembelajaran Informatika	160
Lampiran 2. 3 Instrumen Validasi Ahli Materi Pembelajaran Matematika	165
Lampiran 2. 4 Instrumen Validasi Ahli Desain Bahan Ajar	170
Lampiran 2. 5 Instrumen Angket Pendidik	174
Lampiran 2. 6 Instrumen Angket Peserta Didik.....	180
Lampiran 3. 1 Hasil Wawancara Studi Pendahuluan SDN 1 Sindangkasih	183
Lampiran 3. 2 Hasil Validasi Ahli Materi Pembelajaran Informatika	188
Lampiran 3. 3 Hasil Validasi Ahli Materi Pembelajaran Matematika.....	193
Lampiran 3. 4 Hasil Validasi Ahli Desain Bahan Ajar	198
Lampiran 3. 5 Hasil Angket Respon Pendidik.....	202
Lampiran 3. 6 Hasil Angket Peserta Didik	214
Lampiran 4. 1 <i>Hypothetical Learning Trajectory</i> (HLT).....	223
Lampiran 4. 2 Sub-Capaian Pembelajaran Informatika dan Matematika	239
Lampiran 4. 3 Rencana Rubrik Soal Latihan Bahan Ajar.....	242
Lampiran 5. 1 Produk Bahan Ajar	245
Lampiran 5. 2 Dokumentasi Kegiatan	247

DAFTAR PUSTAKA

- Ambarwati, I., & Rochmawati. (2020). Buku Ajar Berbasis Contextual Teaching and Learning (CTL) Pada Mata Pelajaran Komputer Akuntansi Accurate. *Jurnal Mimbar Ilmu*, 25(3), 483–494. <https://ejournal.undiksha.ac.id/index.php/MI/article/view/28931>
- 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.
- Aprilia, T., Ardiansyah, A. R., & Riyanti, H. (2023). The Feasibility of Interactive Multimedia and Online Quiz Based Gamification on Learning Management System (LMS) Thematic Learning Courses. *Jurnal Prima Edukasia*, 11(1), 120–133. <https://doi.org/10.21831/jpe.v11i1.55533>
- Baeng, B., Situmorang, R., & Winarsih, M. (2022). Contextual ElectroniCS Learning Module in Sociology Learning at Senior High School. *Journal of Education Research and Evaluation*, 6(3), 509–519. <https://doi.org/10.23887/jere.v6i3.47405>
- Barr, V., & Stephenson, C. (2011). Bringing Computational Thinking to K-12: What is Involved and what is the Role of the Computer Science Education Ccommunity? *ACM Inroads*, 2(1), 48–54. <https://doi.org/10.1145/1929887.1929905>
- Bell, T, Witten, I. H., & Fellows, M. (1998). *Computer Science Unplugged: Off-line activities and games for all ages (original book)*.
- Bell, Tim, Alexander, J., Freeman, I., & Grimley, M. (2009). Computer Science Unplugged: School Students Doing Real Computing Without Computers. *Journal of Applied Computing and Information Technology*, 13(1), 20–29.
- Bell, Tim, Henderson, T., Roberts, J., Jones, M., Ghorbani, B., & Duncan, C. (2023a). *Classic Computer Science Unplugged / Principles*. University of Canterbury. <https://classic.CSunplugged.org/about/principles/>
- Bell, Tim, Henderson, T., Roberts, J., Jones, M., Ghorbani, B., & Duncan, C. (2023b). *Classic Computer Science Unplugged / The Book*. University of Canterbury. <https://classic.CSunplugged.org/books/>
- Bell, Tim, Henderson, T., Roberts, J., Jones, M., Ghorbani, B., & Duncan, C. (2023c). *Computer Science Without a Computer / Home*. University of Canterbury. <https://www.CSunplugged.org/en/what-is-computer-science/>
- Bell, Tim, Henderson, T., Roberts, J., Jones, M., Ghorbani, B., & Duncan, C.

- (2023d). *Computer Science Without a Computer /CT and CS Unplugged*. University of Canterbury. <https://www.CSunplugged.org/en/computational-thinking/>
- Bell, Tim, Newton, H., Andreae, P., & Robins, A. (2012). The Introduction of Computer Science to NZ High Schools - an Analysis of Student Work. *ACM International Conference Proceeding Series*, 5–15. <https://doi.org/10.1145/2481449.2481454>
- Bell, Tim, Witten, I., & Fellows, M. (2015). CS Unplugged: An enrichment and extension programme for primary-aged students. In *Computer Science Unplugged*. Google, Inc. https://classic.CSunplugged.org/documents/books/english/CSUnplugged_OS_2015_v3.1.pdf
- Bennett, A., Burton, L., & Nelson, L. (2012). *MathematiCS for Elementary Teachers A Conceptual Approach* (S. Mattson (ed.)). McGraw-Hill.
- 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>
- Billstein, R., Libeskind, S., Lott, J. W., & Boschmans, B. (2016). A Problem Solving Approach to MathematiCS for Elementary School Teachers. In *Pearson Education, Inc. Pearson Education, Inc.* <https://doi.org/10.2307/3616943>
- Bocconi, S., Chiocciariello, A., Dettori, G., Ferrari, A., Engelhardt, K., Kampylis, P., & Punie, Y. (2016a). Developing Computational Thinking : Approaches and Orientations in K-12 Education. *Proceedings EdMedia 2016, June*, 1–7.
- Bocconi, S., Chiocciariello, A., Dettori, G., Ferrari, A., Engelhardt, K., Kampylis, P., & Punie, Y. (2016b). Developing Computational Thinking in Compulsory Education : Implications for policy and practice. In P. Kampylis & Y. Punie (Ed.), *European Commission, Joint Research Centre*. European Union. <https://doi.org/10.2791/792158>
- Bocconi, S., Chiocciariello, A., Dettori, G., Ferrari, A., Engelhardt, K., Kampylis, P., & Punie, Y. (2016c). Exploring the Field of Computational Thinking As a 21st Century Skill. *EDULEARN16 Proceedings*, 1(July), 4725–4733. <https://doi.org/10.21125/edulearn.2016.2136>
- Brackmann, C. P., Moreno-León, J., Román-González, M., Casali, A., Robles, G., & Barone, D. (2017). Development of computational thinking skills through unplugged activities in primary school. *ACM International Conference Proceeding Series*, 65–72. <https://doi.org/10.1145/3137065.3137069>

- Brennan, K., & Resnick, M. (2012). New Frameworks for Studying and Assessing the Development of Computational Thinking. *AERA 2012 - Proceedings of the 2012 Annual Meeting of the American Educational Research Association*, 1, 1–25.
https://web.media.mit.edu/~kbrennan/files/Brennan_Resnick_AERA2012_CT.pdf
- Brown, N. C. C., Sentance, S., Crick, T., & Humphreys, S. (2014). Restart: The Resurgence of Computer Science in UK Schools. *ACM Transactions on Computing Education*, 14(2), 1–22. <https://doi.org/10.1145/2602484>
- Chaeruman, U. A. (2022). Evaluasi Media Pembelajaran Articulate. *Teknologi Pendidikan*, 1(2), 13–22. <https://uia.e-journal.id/akademika/article/view/1683/1091>
- CSizmadia, A., Curzon, P., Humphreys, S., Ng, T., Selby, C., & Woollard, J. (2015). *Computational Thinking : A Guide for Teacher*. Computing At School. <https://www.computingschool.org.uk/media/kscbloob/computationalthinking.pdf>
- CSTA, & ISTE. (2011). *Computational Thinking : Teacher Resources* (Second Edi). National Science Foundation.
- Dasgupta, A., Rynearson, A. M., Purzer, S., Ehsan, H., & Cardella, M. E. (2017). Computational Thinking in K-2 Classrooms: Evidence from Student Artifacts (Fundamental) Computational Thinking in Kindergarten: Evidence from Student Artifacts (Fundamental). *American Society of Engineering Education*.
- Eunjung, O., Ji-Yeon, L., & Reeves, T. (2016). Revisiting Educational Design Research: From an Idealistic to a Viable Research Framework for Educational Researchers. *Journal of Educational Technology*, 32(1), 65–85. <https://doi.org/10.17232/KSET.32.1.065>
- 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., & Utomo, E. (2019). COMPUTATIONAL THINKING , MATHEMATICAL THINKING BERORIENTASI GAYA KOGNITIF PADA PEMBELAJARAN MATEMATIKA DI SEKOLAH DASAR. *Dinamika Sekolah Dasar*, 1(1), 1–18. <https://doi.org/10.21009/DSD.XXX>
- Falkner, K., Vivian, R., & Falkner, N. (2014). The Australian Digital Technologies Curriculum: Challenge and Opportunity. *Proceedings of the Sixteenth Australasian Computing Education Conference - Volume 148*, 163. <https://dl.acm.org/citation.cfm?id=2667491>

- Fessakis, G., Mavroudi, E., & Prantsoudi, S. (2017). Current conception of Computational Thinking at the K-12 classroom level curriculum. *Proceedings of the International Conference on InformatiCS in Schools: Situation, Evolution and Perspectives (ISSEP)*, 1–6. <http://issep2017.CS.helsinki.fi/files/short/current-conception-of-computational-thinking-at-the-k-12-classroom-level-curriculum.pdf>
- Fisher, L. M. (2016). A Decade of ACM Efforts Contribute to Computer Science for All. *Communications of the ACM*, 59(4), 25–27. <https://doi.org/10.1145/2892740>
- Grover, S., & Pea, R. (2013). Computational Thinking in K-12: A Review of the State of the Field. *Educational Researcher*, 42(1), 38–43. <https://doi.org/10.3102/0013189X12463051>
- Hickmott, D., Prieto-Rodriguez, E., & Holmes, K. (2018). A Scoping Review of Studies on Computational Thinking in K–12 MathematiCS Classrooms. *Digital Experiences in MathematiCS Education*, 4(1), 48–69. <https://doi.org/10.1007/s40751-017-0038-8>
- Jasute, E. (2020). Computational thinking unplugged in CS middle class lessons in Lithuania. In *Proceedings of International Teacher Forum on International Conference on Computational Thinking Education*.
- 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>
- Kemendikbudristek. (2022a). *Capaian Pembelajaran Mata Pelajaran Matematika Fase A - Fase F*.
- Kemendikbudristek. (2022b). *Perubahan Atas 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 Pendidikan Menengah Pada Kurikulum Merdeka*. https://kurikulum.kemdikbud.go.id/wp-content/uploads/2022/06/033_H_KR_2022-Salinan-SK-Kabupaten-tentang-Perubahan-SK-008-tentang-Capaian-Pembelajaran.pdf
- Kosasih, E. (2021). *Pengembangan Bahan Ajar* (B. S. Fatmawati (ed.)). PT Bumi Aksara.
- Kuster, C., Symms, J., May, C., & Hu, C. (2011). Developing computational thinking skills across the undergraduate curriculum. *Proceedings of the 2011 Midwest Instruction and Computing Symposium*, 13. <http://www2.CSs.edu/miCS/Submissions/submissions/Developing>

Aulia Rahma Syadila, 2024

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL BERMUATAN ELEMEN BILANGAN MATEMATIKA BERBASIS CS UNPLUGGED PADA FASE C DI SEKOLAH DASAR

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

Computational Thinking Skills across the Undergraduate Curriculum.pdf%0Ahttp://www2.CSs.edu/miCS/proceedings.html

- 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>
- Lestari, H., Pamungkas, A. S., & Alamsyah, T. P. (2019). Pengembangan Lembar Kerja Siswa Eksploratif Berkonteks Budaya Banten pada Mata Pelajaran Matematika di Sekolah Dasar. *Prisma Sains : Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 7(1), 48–59. <https://doi.org/10.33394/j-ps.v0i0.1401>
- McKenney, S., & Reeves, T. C. (2012). *Conducting educational design research* (1 ed.). Routledge. <https://doi.org/10.1080/09523987.2013.843832>
- McKenney, S., & Reeves, T. C. (2014). Educational design research. In *Handbook of Research on Educational Communications and Technology: Fourth Edition* (hal. 131–140). https://doi.org/10.1007/978-1-4614-3185-5_11
- Mosher, F. A., Maloney, A., & Petit, M. (2011). *Learning trajectories in math. January*. <https://doi.org/10.1207/s15327833mtl0602>
- Muhtarom., Y., Suharsono., S., & Syaefudin.F. (2022). Analisis Materi Buku Ajar Bahasa Arab Sekolah Menengah Pertama Terpadu Rabbi Radiyyah Rejang Lebong. *Lahjah Arabiyah: Jurnal Bahasa Arab dan Pendidikan Bahasa Arab*, 3(1), 55–61.
- Mvalo, S., & Bates, C. (2018). Students' understanding of computational thinking with a focus on decomposition in building network simulations. *CSEDU 2018 - Proceedings of the 10th International Conference on Computer Supported Education*, 1, 245–252. <https://doi.org/10.5220/0006693302450252>
- Nurafni, A., Pujiastuti, H., & Mutaqin, A. (2020). *Pengembangan Bahan Ajar Trigonometri Berbasis Kearifan Lokal*. 4(1), 71–80.
- Nurhopipah, A., Suhaman, J., & Humanita, M. T. (2021). PEMBELAJARAN ILMU KOMPUTER TANPA KOMPUTER (UNPLUGGED ACTIVITIES) UNTUK MELATIH KETERAMPILAN. *Jurnal Masyarakat Mandiri*, 5(5), 2603–2614. <https://doi.org/https://doi.org/10.31764/jmm.v5i5.5825>
- Papert, S. (1980). *Mindstorms: Children, Computers, and Powerful Ideas*. Basic Book, Inc. <http://worrydream.com/refs/Papert - Mindstorms 1st ed.pdf>
- Plomp, T. (2013). Educational Design Research: An Introduction. In T. Plomp & N. Nieveen (Ed.), *Educational Design Research : Part a : An Introduction* (hal. 10–51). <http://downloads.slo.nl/Documenten/educational-design->

Aulia Rahma Syadila, 2024

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL BERMUATAN ELEMEN BILANGAN MATEMATIKA BERBASIS CS UNPLUGGED PADA FASE C DI SEKOLAH DASAR

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

research-part-a.pdf

Prastowo, A. (2011). Panduan Kreatif Membuat Bahan Ajar Inovatif. In Yogyakarta: Diva Press.

Rismawati, Suhendri, H., & Zulkarnain, I. (2019). Pengembangan Desain Pembelajaran Matematika Kelas V SD Berbasis Etnomatematika. *MUST: Journal of MathematICS Education, Science and Technology*, 4(2), 230–250. <https://doi.org/http://dx.doi.org/10.30651/must.v4i2.3201>

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

Simatupang, A. M. (2023). Pengembangan Bahan Ajar Teks Cerita Pendek Berbasis Nilai Pendidikan Karakter Pada Siswa. *Jurnal Pendidikan Indonesia*, 4(7), 765–773. <https://doi.org/10.59141/japendi.v4i7.2125>

Strijker, A., & Fisser, P. (2019). A new curriculum for the Netherlands including Computational Thinking. *Proceedings of EdMedia + Innovate Learning 2019, 2011*, 510–515. <https://www.learntechlib.org/p/210253>

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D* (26 ed.). Penerbit Alfabeta.

Torres-Torres, Y. D., Román-González, M., & Pérez-González, J. . (2020). Unplugged Teaching Activities to Promote Computational Thinking Skills in Primary and Adults from a Gender Perspective. *Revista Iberoamericana de Tecnologías del Aprendizaje Unplugged*, 8540(c), 1932–8540. <https://doi.org/10.1109/RITA.2020.3008338>

Umutlu, D. (2021). An Exploratory Study of Preservice Teachers' Computational Thinking and Programming Skills. *Journal of Research on Technology in Education*, 0(0), 1–15. <https://doi.org/10.1080/15391523.2021.1922105>

Voskoglou, M. G., & Buckley, S. (2012). Problem Solving and Computational Thinking in a Learning Environment. *Egyptian Computer Science Journal*, 36(4), 28–46. <http://arxiv.org/abs/1212.0750>

Waterman, K. P., Goldsmith, L., Pasquale, M., Goldenberg, E. P., Malyn-smith, J., Demallie, A., Lee, I. A., & Lee, I. A. (2018). Integrating Computational Thinking into Elementary MathematICS and Science Curriculum Materials and Instruction. *The Future of Education 2018*, 1–5. <https://conference.pixel-online.net/FOE/files/foe/ed0008/FP/4648-ICL3076-FP-FOE8.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>

Aulia Rahma Syadila, 2024

PENGEMBANGAN BAHAN AJAR BERPIKIR KOMPUTASIONAL BERMUATAN ELEMEN BILANGAN MATEMATIKA BERBASIS CS UNPLUGGED PADA FASE C DI SEKOLAH DASAR

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

- Wijaya, A. (2009). *Hypothetical Learning Trajectory dan Peningkatan Pemahaman Konsep Pengukuran Panjang*.
- Wing, J. (2006a). Computational Thinking. *Communications of the ACM*, 49(3), 33–35. <https://cacm.acm.org/magazines/2006/3/5977-computational-thinking/fulltext>
- Wing, J. (2006b). Computational Thinking CS @ CMU and Grand Vision for the Field. *Communications of the ACM*, 49(3), 33–35.
- Wing, J. (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. (2017). *TOWARDS • COMPUTATIONAL • THINKING*. January, 6–7.
- Wing, J. (2019). A Conversation about Computational Thinking. In *Education Future Frontiers, NSW Department of Education*. https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/education-for-a-changing-world/media/documents/Computational-Conversation_1_A.pdf