

Educational Technology & Society
Integration of Technology to Advance Computational Thinking Education

Guest Editor:

Dr. Ahmed Tlili (corresponding guest editor)
Smart Learning Institute of Beijing Normal University, China

Dr. Daniel Burgos
Universidad Internacional de La Rioja (UNIR), Spain

Dr. Chee-Kit Looi
National Institute of Education, Nanyang Technological University, Singapore

1. Special-Issue Focus, Scope, and Rationale

With the world is becoming more complex and unpredictable, learners should acquire the basic skills to deal with it. The thinking processes associated with and the problem-solving approach of Computational Thinking (CT) allows learners to better deal with the complexity and open-ended non-trivial problems posed by the world and its emerging technologies (e.g., AI, big data, etc.). Therefore, several research studies advocated considering CT as an essential competence that should be included in all educational levels and in every student's skill set (Grover & Pea, 2018), as part of pathways to provide CT education and literacy. According to the International Computer and Information Literacy Study (ICILS) 2018, CT can be defined as the “ability to identify a problem, break it down into manageable steps, work out the important details or patterns, shape possible solutions and present these solutions in a way that a computer, human or both can understand” (PISA, 2019).

However, despite the increasing attention towards CT in education, it still has several gaps, from different perspectives, that should be addressed to better understand and advance this field. For example, in a recently published review, Tikva and Tambouris (2021) found that CT curricula are poorly conceptualized. In line with this, Lee et al. (2020) reported that several STEM classrooms are failing to integrate CT into their curricula. De Jong and Jeurig (2020), on the other hand, conducted a recent review of CT in Higher Education and revealed that more investigation is needed to identify the set of CT skills and the assessment methods to measure these skills. Additionally, Lyon and Magana concluded that interest in CT is growing, but there is a need for more concrete definitions and implementations (Lyon & J. Magana, 2020). Particularly, there are a number of challenges in ensuring that computing curricula, tools and environments embody appropriate progression and engender motivation for the topic across the years (Howland et al., 2019).

This Special Issue (SI) aims to advance the theoretical and practical knowledge related to the use of technology for CT in education. Research (including case studies, empirical studies, design-based research, design-based implementation research, and theoretical papers) on the following

topics (but not limited to) across different educational levels (e.g., primary, secondary, etc.) and types (e.g., formal, informal, etc.) are welcome:

- Design and implementation of CT tools and technologies for education
- Educational technologies and tools for CT development.
- Educational technologies and tools for CT assessment
- Educational technology and innovative instructional approaches as related to CT and teachers' education and training
- CT for STEM education
- Motivational and other issues related to learning CT, and how these might differ across age groups, gender, etc.
- Professional development of teachers and educators to do CT education
- Development of curricula for CT education
- CT development using educational robots and physical devices

References

de Jong, I., & Jeuring, J. (2020). Computational Thinking Interventions in Higher Education: A Scoping Literature Review of Interventions Used to Teach Computational Thinking. In *Koli Calling '20: Proceedings of the 20th Koli Calling International Conference on Computing Education Research* (pp. 1–10). doi:10.1145/3428029.3428055

Grover, S., & Pea, R. (2018). Computational Thinking: A competency whose time has come. *Computer science education: Perspectives on teaching and learning in school*, 19.

Howland, K., Good, J., Robertson, J., & Manches, A. (2019). Special Issue on Computational Thinking and Coding in Childhood. *International journal of child-computer interaction*, 19, 93-95.

Lee, I., Grover, S., Martin, F., Pillai, S., & Malyn-Smith, J. (2020). Computational thinking from a disciplinary perspective: Integrating computational thinking in K-12 science, technology, engineering, and mathematics education. *Journal of Science Education and Technology*, 29(1), 1-8.

Lyon, J. A., & J. Magana, A. (2020). Computational thinking in higher education: A review of the literature. *Computer Applications in Engineering Education*, 28(5), 1174-1189.

PISA. (2019). *PISA 2021 ICT FRAMEWORK*. Retrieved from <https://www.oecd.org/pisa/sitedocument/PISA-2021-ICT-Framework.pdf>

Tikva, C., & Tambouris, E. (2021). Mapping Computational Thinking through Programming in K-12 Education: A Conceptual Model based on a Systematic Literature Review. *Computers & Education*, 162(March, 104083).

2. Proposed Timeline of Special-Issue

| | |
|---|---|
| Manuscript Submission Due Date: | December 30, 2021 |
| 1st round Review Notification: | March 30, 2022 |
| 1st round Revision Submission Due Date: | May 15, 2022 |
| 2nd round Review Notification: | June 15, 2022 |
| 2nd round Revision Submission Due Date: | July 15, 2022 |
| Final Acceptance Notification: | August 15, 2022 |
| Final Camera-ready Manuscript Due Date: | September 05, 2022 |
| Editorial Preface Submission: | September 15, 2022 |
| Estimated Publication Date: | April 2023 (Volume 26, Issue 2)* |

**Please note that ET&S provides early-access to the recent published articles, and the accepted articles in this SI may appear earlier than this, as early-access.*

3. Paper Submission

All submissions to this Special Issue should be emailed to the editorial office etsct.submit@gmail.com with email subject [ETS_2021_CT] to clearly specify the Special Issue that you are submitting to and differentiate it from a regular paper submission.

Please note that all manuscripts must comply with the requirements stated in the Authors Guidelines: https://www.j-ets.net/author_guide

All submissions should fit within the scope of ET&S as described in the Aims and Scope of ET&S. Please see the full Aims and Scope of ET&S: https://www.j-ets.net/journal_info/scope

Please note that papers collected and analyzed only self-reported data that obtained from interview or questionnaire survey without a meaningful educational treatment are not within the scopes of ET&S or the current Special Issue.

4. Submission Inquiry

If you have any questions related to this Special Issue, please do not hesitate to contact the above guest editors.