

UNDERSTANDING THE REAL-WORLD USING COMPUTATIONAL THINKING

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Integrating computational thinking (CT) in K-12 education has become a global initiative (Gannon & Buteau, 2018). While integrating CT in the K-12 curriculum, the typical approach emphasizes teaching programming and applications like games, robots, and simulations. However, computing and computational ideas can also be essential in facilitating the teaching and learning in other school disciplines. For example, CT provides a variety of affordances, such as agency, access, abstraction, automation, and audience, in teaching-learning mathematics. Therefore, integrating CT concepts and tools in the curriculum, specifically coding, is gaining momentum. With this momentum, it has become necessary to explore the current understanding of integrating CT in school disciplines, such as mathematics, and explore the further affordances of using CT concepts and tools in teaching and learning. Hence, it is essential to provide an overview of the current state of the integration of CT into school mathematics and an insight into the vast offerings of CT, which might exceed the expectations of current curricula content and skills learning expectations (Sezer, 2022).

Mathematics is an essential aspect of almost everything humans do in today's world. The most important thing about teaching and learning mathematics is acquiring the ability to read mathematics in our immediate environment. The COVID-19 outbreak bombards politicians, policymakers, and society with mathematical artifacts based on mathematical models of the epidemic, which explain the rates and probabilities of spread, track the outbreak's progress, and report the efficiency of the interventions. However, the complexity of mathematics used in many artifacts makes it hard to comprehend the data

and the dynamics behind these artifacts for non-experts. Integration of CT concepts and tools with mathematics concepts in programming tools will aid in illustrating the dynamics of the outbreak. It also demonstrates the effects of responses or controls needed to slow down the outbreak rate (Sezer, 2022).

Teachers can use CT concepts and tools to model and simulate mathematics in the real world. Many of these simulations modeling real-life events are available on online platforms focused on the use of coding or simulation apps. The simulations available in numerous online sources include dynamic pictorial, numerical, and graphical displays and offer easy access to the code. CTs and simulations allow one to understand the basis of the recommended actions and policies during a pandemic while promoting learners' mathematical and computational skills (Sezer, 2022).

The crisis presents unprecedented challenges and unexpected opportunities in classroom settings (Resnick, 2020). Implementing computational tools during this period of global health crisis offers a better understanding of the current health crisis. In addition, it has helped us understand other interrelated crises in the post-pandemic world. To demonstrate the specific applications of their mathematical and computational knowledge and skills, teachers may integrate the computational tools related to the pandemic and other crises into discussion and learning tasks to appreciate real-world contexts. Teaching mathematical modeling and computational thinking in the general context of disease spreading may catalyze student empowerment. Applying mathematical models and computational thinking concepts could be helpful for students to realize the use of mathematics in reading, understanding, and experimenting with simulations of magnitude, dynamics, and recommended responses to facilitate informed decision-making during crises (Sezer, 2022).

References:

Resnick, M. (2020, March 17). Scratch epidemic simulator. MIT Media Lab.

<https://www.media.mit.edu/posts/scratch-epidemic-simulator/>

Sezer, Hatice Beyza, "The Integration of Computational Thinking in Mathematics

Education: The Current State of Practices in School, Outreach, and Public Educational

Settings" (2022). Electronic Thesis and Dissertation Repository. 8498.