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Summary

This article explores how the relationship between systems thinking and computational thinking would provide a conceptual basis for transformational change – change that considers the social and environmental impact of technology. The article contends that supplementing computational thinking with systems thinking will minimise the weakness of computational thinking, namely being reductionist in its focus (technological solutionism), to encourage the solving of 'wicked' problems or dilemmas that consider social and environmental sustainability. The focus on the optimisation and automation of existing ways of doing things associated with computational thinking should be counterbalanced by systems thinking that takes into account the dynamics of society and is future oriented.

Analysis

The author challenges the rise of computational thinking in educational programs because it assumes that complex problems can be solved through algorithmic means, which provides a 'selective view through which to view the world'. He contends that this eliminates ethical dilemmas, such as sustainability, because they have no computational solution. Easterbrook argues that computational thinking is often applied with limited consideration of the context within which solutions will apply.

Easterbrook challenges why there has been limited critical thinking about computational thinking, given its reductionist approach. He argues that computational thinking only considers how problems can be formulated in a way that enables us to use a computer to solve them; meaning that little thought is given to the ongoing relationships between the stakeholders who will be affected by the solutions. This he asserts means that reducing problems to their computational components leads to practices that undermine sustainability.

The author posits that 'wicked' (or dilemma) problems, namely ones that don't have clear problem definitions and objectively correct solutions, should feature more prominently in our teaching and learning programs, such as sustainability. He contends that systems thinking provides students with a toolkit for reasoning about how change happens in complex systems. Systems thinking brings a critical approach to solving wicked problems because it encourages exploring the interdependencies between components and systems, hence fostering a greater appreciation of the systemic effects of solutions.

Reflection

This article supports the inclusion of the three ways of thinking in the Digital Technologies curriculum (computational, design and systems thinking) and the focus on preferred futures. It provides a strong reminder of the complexity of some problems and how we should scaffold the types of problems solved by students through their learning journey (simple problems, simple solutions; complex problems, complex solutions). Posing some problems as dilemmas (or wicked problems) could encourage teachers and students to use a multifaceted approach to problem-solving.