

DTiF

Digital Technologies in focus

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Voskoglou, M. & Buckley, S. 2012, 'Problem solving and computational thinking in a learning environment', *Egyptian Computer Science Journal*, vol. 36, issue 4, pp. 28–46. Retrieved from: <https://arxiv.org/abs/1212.0750>

Summary

This article explores the relationship between computation and critical thinking as it applies to solving technological problems. Research evidence derived from classroom experiments strongly suggests that using computers to solve problems enhances students' abilities in solving real-world problems involving mathematical modelling.

Analysis

The authors contend that while there is no universally accepted definition of *critical thinking*, there is a general consensus that it involves the skills of making judgements, analysis and synthesis, generalisations and drawing conclusions – thinking rationally to draw conclusions that are substantiated using valid information.

However, the authors argue that when solving technological problems, this requires a combination of critical thinking and computational thinking (CT). This is because technical problems require a more pragmatic or practical way of thinking, drawing on mathematical, engineering and computer science concepts and techniques. The authors define CT broadly – as the ability to formulate a problem and express a solution that can be carried out by a digital system.

The authors (page 35) argue that CT is 'an important, essential and very 21st century skill' and that the best way of teaching this is through active and regular learning. Together, computational thinking and critical thinking support the solving of technical problems, and in today's world a life without computers is unthinkable.

According to the authors, CT needs to be taught early and often as we need to skill students who are not only good at using digital tools but also at creating digital tools/solutions.

Reflection

The conclusions drawn by the article show that critical thinking plays an active role in knowledge creation and combined with computational thinking will support students in solving real, complex technological problems, which is at the core of the Australian Curriculum: Digital Technologies curriculum. Together, the Critical and Creative Thinking general capability and Digital Technologies support knowledge creation and problem-solving in a contemporary, technological world.