Computational Thinking and Mathematical Thinking

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Background

In technology-rich mathematics education, mathematics teachers nowadays experience two related challenges: fostering both *mathematical thinking* (**Figure 1**), central in the new Dutch mathematics curricula, and *computational thinking* (**Figure 2**), stressed in the Dutch informatics curriculum and the curriculum.nu reform.

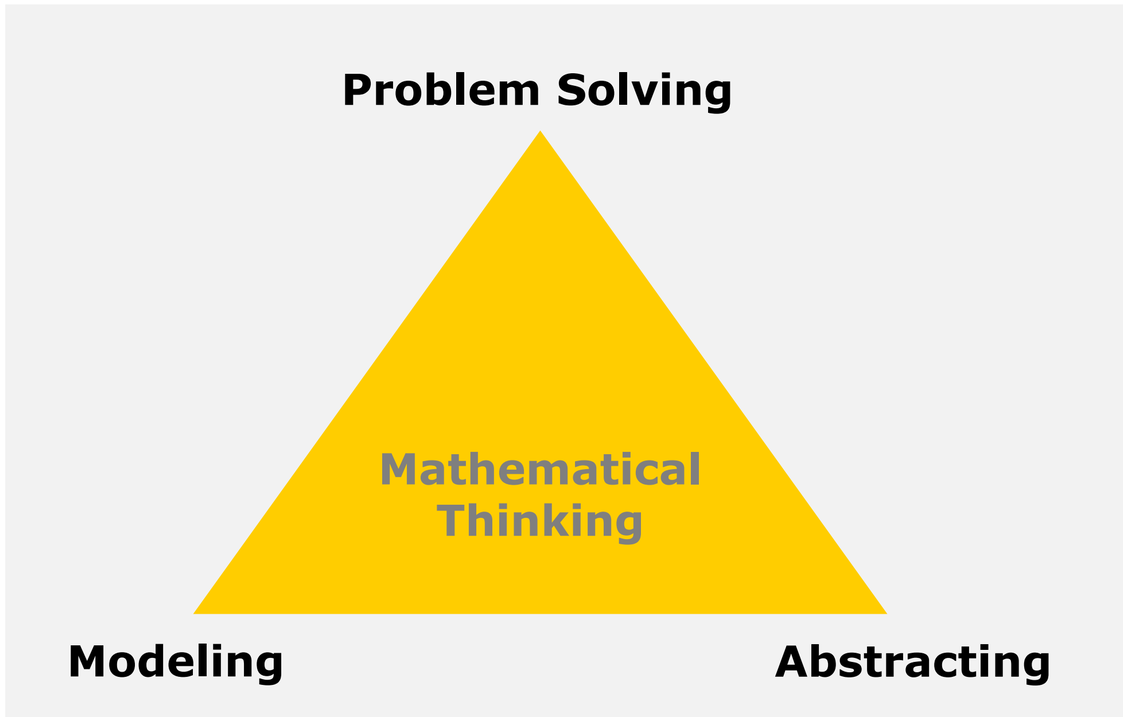

Figure 1
Process of Mathematical Thinking.

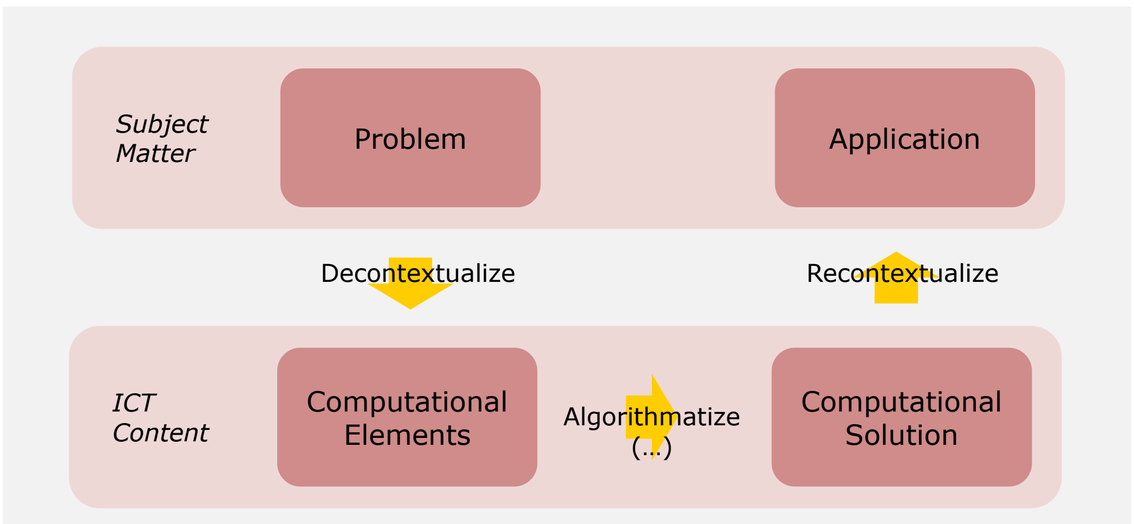

Figure 2
Process of Computational Thinking.

Research Question

How can a teaching-learning strategy, focusing on the use of digital tools, support 16-17 years old pre-university students in developing computational thinking skills related to mathematical thinking in pure and applied mathematics courses?

Delphi Study on Aspects Computational Thinking

A group of 9 teachers and 16 researchers agreed on the following aspects characterizing computational thinking in mathematics education:

- **abstraction**
- **decomposition**
- **pattern recognition**
- **algorithmic thinking**
- **modelling**
- **logical thinking**

Aimed Results

- Theory-informed, practice-oriented list of key elements of computational thinking related to mathematical thinking;
- Empirically validated learning activities for upper secondary pre-university education students;
- Instruments to assess the related learning outcomes;
- Teacher guide on learning activities targeting computational thinking and mathematical thinking using digital tools;
- Policy document to inform upcoming curriculum reform.

References

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