


ORIGINAL MANUSCRIPT

Constructionist co-design: A dual approach to curriculum and professional development

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Abstract

This paper reports on the first iteration of the Computational Thinking Summer Institute, a month-long programme in which high school teachers co-designed computationally enhanced mathematics and science curricula with researchers. The co-design process itself was a constructionist learning experience for teachers resulting in constructionist curricula to be used in their own classrooms. We present three case studies to illustrate different ways teachers and researchers divided the labour of co-design and the implications of these different co-design styles for teacher learning and classroom enactment. Specifically, some teachers programmed their own computational tools, while others helped to conceptualise them but left the construction to their co-design partners. Results indicate that constructionist co-design is a promising dual approach to curriculum and professional development but that sometimes these two goals are in tension. Most teachers gained considerable confidence and skills in computational thinking, but sometimes the pressure to finish curriculum development during the institute led teachers to leave construction of computational tools to their co-design partners, limiting their own opportunities for computational learning.

Practitioner notes

What is already known about this topic?

- Computational tools can support constructionist science and math learning by making powerful ideas tangible.
- Supporting teachers to learn computational thinking and to use constructionist pedagogies is challenging.

What this paper adds?

- Constructionist co-design is a promising approach to simultaneously support curriculum development and professional development, but there are tensions to navigate in trying to accomplish both goals simultaneously.

Implications for practice and/or policy

- Designers of professional development should consider constructionist co-design as an approach but should be aware of potential tensions and prepare for them.

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