SP - (16584) - CREATIVE-COMPUTATIONAL THINKING IN UNPLUGGED PROGRAMMING

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Short Abstract

Computational thinking (CT) is a form of problem-solving that can be enacted by a human or a computer agent. While creative thinking (CrT) is an essential part of CT, manifestations of CT do not generally take into account the creativity inherent in developing such solutions. In this paper, we investigate the creative nature of CT in STEM by making use of the PISA competency model of CrT as well as Selby's and Woollard's model of CT to unpack student meaning-making as they participate in a design-based task. We explore selected video excerpts in which primary students undertook unplugged programming (UP) activities which we analyse, using micro-ethnographic methods, to investigate specific instances in which CrT and CT overlap and how creativity can empower student agency within a STEM context. In particular, we unpack the specific aspects of CrT that are afforded by the hands-on nature of UP as a particular manifestation of CT. Our findings show that CT in the form of decomposition, abstraction, logical thinking and algorithmic thinking provides opportunities for students to be creative as they generate diverse ideas, which can be genuinely creative ideas, and evaluate their ideas to improve them. We consider this research as contributing to ongoing efforts of the CT community to make clear what this approach adds to accounts of the creative nature of STEM, in particular for supporting teachers to identify and support the development of students' creative-computational thinking as they foster children's resilience and their use of 21st century learning skills.