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COMPUTATIONAL THINKING: THE THINKING PRECEDES THE DOING

Abstract

As positions in global industry evolve so does the demand for individuals with multi-disciplinary skills. One such skill that has been identified in literature is that of Computational Thinking. For those individuals to truly implement and master these skills, remaining relevant on that international stage, they must be developed and fostered within an educational environment from a young age. A recent review of the Digital Technologies and STEM initiatives in the Curriculum in the State of Victoria (Australia) is renewed focus on the teaching of cross-curricular skills surrounding computational thinking, and on immersing those at the forefront of the global digital economy: our students. To encourage teachers, and their students, to recognize that coding is one small part only of computational thinking, in 2016 the Victorian Space Science Education Centre (VSSEC) introduced a half-day program, for students in Years Five to Eight, giving it the title Tickle My Droid. This program places emphasis on analysis and design of a solution and its evolution towards implementation; the thinking precedes the doing. The program is supplemented by a teacher Professional Development course that outlines the underlying principles of Tickle. The course aims to encourage students to think computationally, drawing on their developing skills in collaboration, critical thinking, mathematics, basic physics and programming. Both the student program and the Professional Development have been provided for Teachers in Mexico and Adelaide during the 67th and 68th International Astronautical Congress. This paper outlines a qualitative case study of the development, teaching and evolution of Tickle My Droid. Through grounded analysis, the following categories associated with computational thinking were identified: developing teacher confidence, empowering students to think before doing and creating open-ended, problem-based units of work with variable foci. These categories are further discussed, introducing a computational thinking framework that focuses on developing teacher capacity in these three areas. A further study is proposed with two components: one that analyses the efficacy of this program in terms of whether the skills acquired continue to be used by participating students, strengthened by their teachers, in the classroom, and the applicability of computational thinking in non-traditional STEM subjects