

# Learning Computational Thinking through A Collaborative Mobile Serious Game

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## ABSTRACT

**Purpose** – This study aimed to create a mobile serious game that incorporates a learning framework, particularly collaborative learning theory, to develop students' computational thinking skills.

**Methodology** – Based on the framework of Brennan and Resnick, an adaptation was made within the context of a mobile serious game mapping the different dimensions of Computational Thinking: computational concepts, practices, and perspectives within different game tasks. Different game tasks were developed to foster more collaboration among the two players. In order to obtain initial feedback on its effectivity on translating different Computational Thinking skills into game tasks, 12 pairs of Grade 12 students with prior programming knowledge were asked to play a sample level of the game and evaluate the game task's skills.

**Findings** – The results showed that the students generally felt that the game would help other students acquire skills corresponding to Brennan and Resnick's framework ( $\bar{x} = 4.36$ ), and believed that the collaborative aspect was generally effective in highlighting the different skills in solving the game ( $\bar{x} = 4.2$ ). Furthermore, different qualitative feedback was gathered that supported evidence of the three dimensions of Computational Thinking proposed by Brennan and Resnick as the students played the sample level.

**Significance** – Computer programming presents an essential skill to learn not only because of the demand in the industry, but moreover it imparts important skills such as abstraction, generalization, modularization, and automation. The creation of a game that imparts Computational Thinking skills can be a way for students to get comfortable and accustomed to programming skills and logic, which in turn can be a stepping stone to using computation as a tool for problem solving within their respective disciplines.

**Keywords:** Computational thinking, Collaborative learning, Game design, Serious games