STEM Through Games Program for High School Students

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Motivation

Computational thinking is a set of skills and practices to solve complex problems by breaking them into solvable steps and being able to translate problems and solutions into ways that a computer could also execute. One of the key benefits of computational thinking is how it enables real-world problem-solving.

Project Description

We propose to develop and pilot an immersive media design and research program that introduces high school students to computational thinking, foundations of programming, and cross-disciplinary academic STEM research through the design and implementation of digital games and immersive technologies such as augmented and virtual reality.

Context

- Much of high school and college computer science curriculum is based on the traditional bottom-up approach - instructors teach students about the fundamentals of programming without explaining how it applies to broader social problems.
- Students, however, perceive CS to be irrelevant, difficult, boring, and sometimes socially unacceptable.
- Games, on the other hand, provide innovative opportunities for educators and learners to grapple with difficult concepts.
- Learning to design and develop games can create space for students to participate in authentic, embodied, process-driven learning experiences.

University of Pittsburgh

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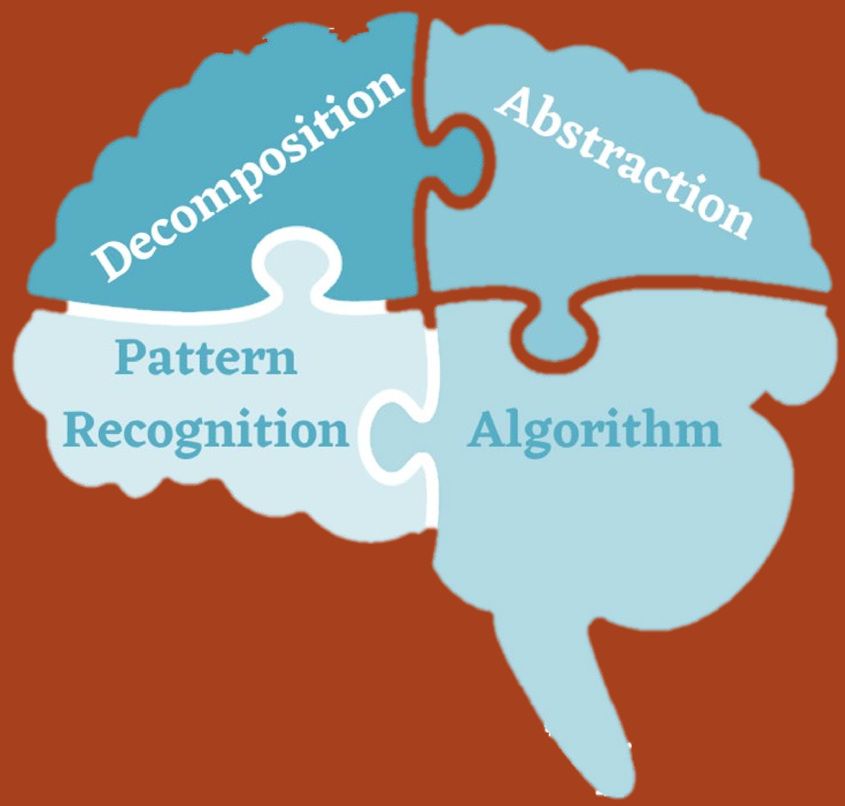

Project Deliverables

- (1) work with university faculty, graduate, and undergraduate students to develop an engaging and sustainable workshop curriculum designed to teach high school students about computing, science, and research through the design and development of digital games;
- (2) pilot the workshops with ten Pittsburgh area high school students;
- (3) engage high school students in academic research by integrating them into the existing game- or immersive media-related research projects;
- (4) continuously assess learning outcomes and self-efficacy;
- (5) Develop a sustainability, educator training, and dissemination plans.

Potential Impact

- (1) expose traditionally underrepresented students (women, students of color) to computing- and STEM-related fields through the design and development of digital games
- (2) increase data literacy and computational thinking skills among high school students
- (3) understand the efficacy of learning computational skills through in STEM self-efficacy in high school students, particularly those from groups not well represented in computing- and STEM-related fields.

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