Comparing Models of Professional Development for Teaching Computational Thinking through Game and STEM Simulation Design

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Mission: Reinvent computer science in public schools by motivating & educating all students including women and underrepresented populations to learn about computer science through game design starting at middle school.

http://scalablegamedesign.cs.colorado.edu

Scalable Game Design Strategy

1) Exposure: Develop a highly adoptable middle school Computational Thinking curriculum integrated into existing computer education and STEM courses so that a very large and diverse group of children is exposed to Computational Thinking concepts.

2) Motivation: Create a scalable set of game design activities ranging from low threshold to high ceiling activities so that students with no programming background can produce complete and exciting games in a short amount of time while still moving on a gradual trajectory to the creation of highly sophisticated games. Computational Thinking Tools used: 2D: AgentSheets; 3D: AgentCubes.

3) Education: Build computational instruments that analyze student produced projects so that learning outcomes can be objectively measured. These outcomes include learning trajectories and transfer of Computational Thinking concepts from game design to simulation building.

4) Pedagogy: Provide teacher development using new pedagogical approaches so that teachers can broaden participation. We developed a pedagogical approach that balanced programming skills and challenges in ways that made it possible for students and teachers with no programming background to jump into game design very quickly.

Building on our past work in Scalable Game Design, we are now studying the efficacy of alternative teacher training models—face-to-face, blended, and online—with respect to this curriculum.

We will determine the impact on classroom teaching and on student learning outcomes in various school contexts. Issues to be addressed in the research include access, capacity, replicability, fidelity, and cost.