**Theory**

**Exposure**: Develop a highly adaptable 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.

**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.

**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.

**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.

**Strategy**

**Results**

- **over 18,000 student** participants in inner city, remote rural, and Native American communities in 6 years
- **43% girls, 50% underrepresented**
- **23 states, 6 countries**: Alaska, California, Colorado, Ohio, Wyoming, Georgia, Ohio, South Dakota, Texas...Brazil, Mexico, Switzerland...
- **74% of boys, 64% of girls (100% for some schools); 69% of minority students want to continue**
- **used in elementary, middle, high schools, and university level**