A Gateway Game to Make Computational Problem Solving Accessible and Engaging

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In this work, we seek to better understand how game design principles impact the effectiveness of a video game learning environment for computational problem solving. Video games naturally encourage problem solving and incremental learning of their game play systems, but it remains unclear how well that transfers to learning the structures and processes of computing. We are building a *gateway game* that establishes familiar problem solving game play, then expands player affordances to include the use of automation and abstraction. Programming in-game entities is presented to players as a constrained selection and refinement process, which they explore and master in order to achieve in-game goals. We are exploring whether computational problem solving can be cast as accessible, intrinsically engaging game play, by following principles of good game design: exploratory player-controlled pace and direction, encouraging trial and low-cost failure, immediate formative feedback, level-appropriate challenge, non-intrusive assessment and expanding affordances. The game we are building to evaluate these factors will be positioned as a bridge for middle- and early high-school students to engage with computational problem solving.