Sanctuary: Asymmetric Interfaces for STEM Learning

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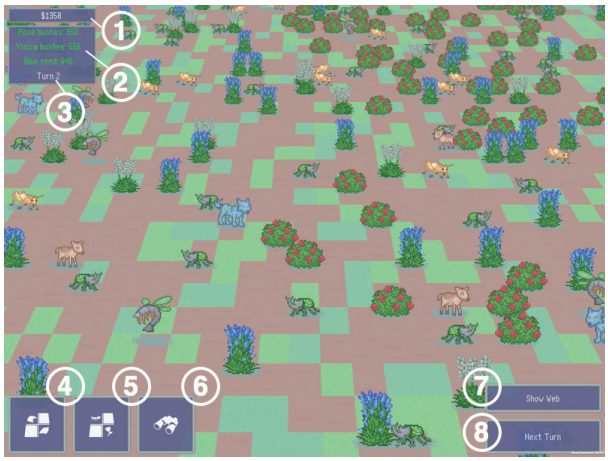
SANCTUARY is a multiplayer game designed to encourage science learning for 10th grade math and biology students, attempting to promote greater public understanding of science and interest in Science, Technology, Engineering, and Mathematics (STEM) learning. The design descends in part from Elliot Aronson's work on the Jigsaw Classroom (2011). It requires a group task to be completed by students with a shared goal but with individual accountability (through specialized roles). The game is played by two co-located players on two tablet computers (iPads in this version). While both players are seeing the same simulated world, each player has a different set of tools with which to act in that world. The purpose is to elicit quality communication, arguments, coordination, and co-strategization (planning ahead for future turns) between participants. This is an advance over single-player or multiplayer learning game experiences, in which players are rarely required to verbally express and formalize their strategies during play. The project is also intended to provide a counter to a "one-size-fits-all" status quo in learning games.



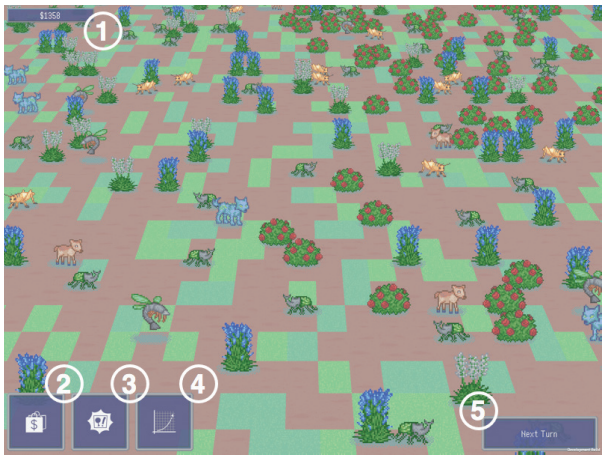


Figure 1: (left) The biologist's interface. Figure 2: (right) the mathematician's interface.

My project is to question is whether, by providing players with two points of view on a shared scientific problem via asymmetric interfaces, under the conditions of play, the challenges of epistemological pluralism can be made into a virtue for science learning, forcing quality communication, arguments, coordination, and co-strategization amongst participants. By provoking these behaviors, I expect that the game will overcome a chief challenge of experiential learning activities—the creation of tacit, unformalized experience and knowledge. To this end, I built *Sanctuary*, an ecological simulation with one biology-themed and one mathematics-themed interface for two players. By requiring players to express their beliefs about the game world to one another in language in order to be successful, the design of the game encourages players to formalize their intuitions and experiences. I believe this to be an advance over existing learning game experiences, in which players are rarely required to formalize their strategies. I see this as a naturalistic advance over other metacognitive interventions in which a play experience is literally halted in order to solicit formalized thoughts from players. If this approach is successful, then it may be applied further to an increasing range of epistemological frames and better science education. This has the potential to build cooperative, thriving learning communities with shared learning experiences.

References

Aronson, E. & Patnoe, S. (2011). Cooperation in the classroom: The jigsaw method. London: Pinter & Martin.