

***Futura*: A Case Study in the Design of an Educational Multi-Touch Tabletop Game**

Joshua Tanenbaum, Alissa N. Antle, Katie Seaborn, Karen Tanenbaum, Allen Bevans, and Sijie Wang

The rise of Game Studies as a discipline has been paralleled by an increased interest in games for learning and education. Educational games, if done well, promise to couple the intrinsic appeal of strategic play with a pedagogical process: good educational games leverage ludic engagement into cognitive and emotional engagement with their subject matter. A number of factors must align in order for a game to accomplish this goal: it must be pedagogically appropriate for its intended audience, it must accurately represent its subject domain, and it must be intrinsically fun to play. Often designers of educational games only manage two of these three elements, creating games that are fun, but inaccurate, or games which are pedagogically sound, but boring. In this paper we present a case study of the design of *Futura*, an educational game intended for children between 9 and 12 years of age, designed to teach basic principles of sustainable development.

Futura was developed by an interdisciplinary team of researchers including specialists in education, game development, and sustainable design. We discuss the challenges of encoding the complexities of a problem like sustainable development into a simulation that is simultaneously enjoyable, accessible, and accurate. We interrogate our own shifting design assumptions as the project evolved from concept to reality, and evaluate the relationship between our design goals and the eventual implementation. We discuss how the process of developing *Futura* can inform future designs, and present several concrete design recommendations for the creation of learning games.

We contend that designing an effective educational game requires at least three high-level overlapping areas of expertise in order to achieve this goal. Crucially, these three interdisciplinary specialties should be in dialogue with each other throughout the design process. First, there must be some expertise in learning theory, pedagogy and child development, in order to make certain the different aspects of the game are appropriate to the learning styles and capabilities of the intended audience. Second, there must be some expertise in the specific subject domain around which the game's learning outcomes are structured, in order to make certain that the game does not inadvertently misinform the players or misrepresent the subject matter. Finally, there must be some expertise in game design, in order to make certain that the game is intrinsically pleasurable to play. It should be noted that this final area of expertise is *not* about the technical skills needed for the development of software, but instead about the dynamics of systems of play including: player motivation, rewards, reinforcement schedules, and feedback. There are additional essential specializations – primarily to do with implementation such as programming, asset creation, and interface design – which we exclude from this analysis. We argue that coordinating these three high-level perspectives is essential to the creation of a successful educational game, and provide some examples of how we balanced these roles in the design of *Futura*.