

The Imagination Toolbox: Designing and Using Science Simulations and Games with StarLogo TNG

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Introductory description and overall goals

Much is made of the skills of the Millennials or “digital natives”. They play games, create content online and network with each other. While many develop a full set of skills on their own or with their peers, others do not. There are opportunities for educators to help more students develop these skills, capture the interest of a generation, and connect interest in technology to the academic realm. Building this connection is the goal of The Imagination Toolbox (IT), an initiative built on the simulation and game-authoring tool, StarLogo TNG. StarLogo TNG builds on the tradition of Logo-based languages designed to facilitate the development and study of simulated systems in classrooms. This latest version provides several key advances including a graphical programming language and a game-inspired three-dimensional world. The blocks-based programming of StarLogo TNG puts programming aspects of the design and construction cycle into reach for most students and teachers, while the 3D world provides both motivation and perspective on simulation.

Method

This workshop will introduce participants to the IT approach that combines authoring and using games and simulations. This approach is based on the Simulation Cycle, a process that combines a scientific methodology with engineering design and play. Workshop leaders will demonstrate a variety of activities that provide different entry points into the Simulation Cycle. These activities are of two types. In Type 1, Game → Simulation, students explore a simulation by playing a pre-built game based on an academic topic. In Type 2, Simulation → Game, students explore a simulation by using the scientific inquiry processes (such as modifying parts of the model) and then applying the knowledge gained to solve game-like challenges based on that model. Workshop participants will work with partners do many of these activities, experiencing those activities as secondary school science students might experience them. In addition, leaders will offer the theoretical underpinning for these activities and consider practical concerns for their implementation.

Expected outcomes

The workshop assumes no prior knowledge of StarLogo TNG. It is open to novices, but will provide additional insights to those who have prior experience. It will start with some introduction to StarLogo TNG, including the programming paradigm and interface. It will then walk participants through one of the sample science units such as High School Physics (mechanics and projectile motion), Biology (evolution) or Middle School Earth Science.

Keywords

keyword; science, simulation, complex systems, games