Simulations: A New Model of Content

Norman A. Garrett

Environments are not to be confused with *content*. In order to effectively use the new interactive environments that have been developed, we will need to build a new model of content that will lend itself to presentation within these new systems. We can design a virtual classroom, but if our content within that new virtual classroom is the same as before, we will be unable to take advantage of the new environment because we are saddled with the old content.

Clark Aldrich has developed a new model for thinking about content. He says that "sims, including stand-alone and as part of a virtual world, are a form of media that use *simulation elements* to model an abstracted reality, are surrounded by *pedagogical* and *game elements*, and are organized into *levels* to make the experience more instructional and enjoyable."

Simulation Components

Simulation Elements

Not only do simulation elements directly correspond to learning goals, but they model and present an abstracted reality of some kind. There are three layers to simulation elements:

1. Real-life actions (things the student can do and that are reflected in the interface and are accessible by normal input devices such as a mouse, keyboard, or other input devices).
2. The interaction of these actions with simulation systems such as maps, buildings, communities, etc.
3. The method for the systems to produce feedback and results

For a simulation to be stimulating, simulation elements must be mixed with game elements to make it engaging and pedagogical elements to make it effective. Simulation elements on their own do not stand well and are not engaging. The use of them as "stand-alone" simulations cannot be effective.

Game Elements

Game elements, simply put, make the experience engaging (fun). They provide a motivation for participation that complements any intrinsic motivation that may already exist. Game elements drive engagement by building good will and lowering tension. Game elements can be part of the aesthetics of a simulation, in that some elements are more pleasing to certain people than other elements. In a sense, it is like viewing art. One man's junk art is another man's treasure. Because of this, some game elements can be controversial, depending upon one's point of view. For example:

- Game elements dilute the learning: Anything that takes up both developer and learner time must be taking away from instructional design/objective design (on the part of the developer) or learning time.

- Game elements are subjective: Not all game elements appeal to everyone the same way. Some elements might appeal to one person, while being repugnant to another.
- Game elements can reduce the fidelity of the learning: Sometimes a developer will warp reality for the sake of the game. For example, something that might take place over a long period of time is shortened, or elements are removed for the sake of timing, decreasing the reality of the simulation.
- Learners can learn to game the game: Learners can learn shortcuts to the game aspects of the simulation (cheat or get help to achieve higher levels), which disengages them at certain game levels.
- Competitive game elements can turn the focus to score: If too much competition is built into a game element, the learner may start to focus on the score, rather than on the experience.
- Badly conceived and/or implemented elements can detract from the overall experience: It is better to have no game element than a bad one. But who defines bad?

If game elements can be equated to grades in a regular classroom setting, you can begin to understand how the game elements can provide intrinsic motivation. Consider a course without grades. What would happen to student motivation?

Pedagogical Elements

Simulations must be didactic. That is, they must lead to learning. These elements insure that a learner's time is used properly, that efforts are funneled in the right direction, and that access to certain knowledge is facilitated. In educational simulations and gaming, pedagogical elements help the learners do the following:

- Know what to do
- Know how to use the interface to the simulation or virtual world
- Avoid developing superstitious behavior, or behavior that applies erroneous cause/effect relationships
- See relationships between actions or items faster
- Work through frustration to achieve resolution
- Try different approaches to problem-solving
- Apply lessons to real-world situations

Tasks and Levels

Simulations are most often organized into tasks and levels. This allows for mastery of a level before moving to the next level. A simulation, much as life, must be a building block process. A student cannot, for example, take math courses in just any order. Rather, the student must demonstrate mastery at one level before the next level would make any sense.

Each level would follow a similar structure of background/introduction, followed by interaction (both strategic and tactical), followed by feedback (results).