Game-Based Learning

Joel Foreman, an Associate Professor of English at George Mason University, has written an interesting discussion of the future of higher education in the July/August 2003 issue of *Educause* entitled "NEXT-Generation Educational Technology versus the Lecture". The thesis of Foreman's essay is that the traditional large lecture format used for introductory courses is a fundamentally flawed instructional mechanism. This idea is not novel, anyone who has taught Physical Geology in a large lecture format is well aware of the limitations. Foreman goes on, however, to discuss how advances in computing and visualization technology are able to create immersive digital environments (the most extensive use of these advanced technologies has been in the video game industry) and to describe how these advances could be used to create digital worlds of learning.

While Foreman's vision describes a universally accepted immersive version of an introductory course (in his discussion he uses Psychology 101) I suggest there are other important pedagogical possibilities presented by the concept of game-based learning.

In order to further this discussion, it is necessary to more fully define what is meant by game-based learning and itt is essential to define this pedagogical approach in terms of its relation to the multi-player online games and web-enabled personal gaming platforms that have achieved great popularity. First, in game-based learning, the pedagogical objectives represent the "score keeping" of the experience. As such, the student/player advances through the digital environment by achieving predetermined learning outcomes. Second, the design of the system allows for student/player immersion into the digital environment. This allows for non-linear progression through the material with a near infinite set of pathways to achieving a single learning outcome. By allowing students/players flexibility and individuality in their learning environment, game-based learning helps create a personal pathway to knowledge, rather than the fixed learning sequence typically dictated by instructors. Third, game-based learning provides for immediate feedback, continual assessment of learning, and self-pacing - all three considered to be essential characteristics of ideal learning environments.

An interesting prototype of game-based learning is Kim Kastens' "Where Are We" map-skills software described in the May, 2001 issue of the JGE (Kastens et al., 2001, v. 49, p. 249-266). This program provides students with the ability to translate between a video-view of a park and a map of same area. This limited version of game-based learning is clearly a strong first step towards creating detailed digital learning enviornments. Likewise, Jonny Hesthammer's field simulators provide a more advanced version of learning through digital representation of the natural world (Hesthammer et al., 2000, v. 50, p. 528-538).

Geology is a science that is best learned by direct experience. Because of the importance of visual learning, our discipline is ideally suited to be active in the exploration of the role of game-based pedagogy in the modern curriculum. Nothing will ever replace field-based learning, however, the creation of a completely immersive digital environment for the teaching of Physical Geology would revolutionize the ways in which students learn - and could serve to significanly enhance the attractiveness of the Geosciences as a career option to students in our introductory classes.

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