Games as Well-Designed Teaching and Learning

James Paul Gee
Mary Lou Fulton Presidential Professor of Literacy Studies
Regents' Professor
Arizona State University
james.gee@asu,edu

Video games are big business in entertainment. And they are becoming a hot topic in education. To see why games are hailed as a new educational technology it is important to step back and ask what in essence a video game is. At heart a video game is a set of problems to solve—whether these are the problems of civilization in *Civilization*, building a family in *The Sims*, solving algebra problems in *Dragon Box*, developing physics savvy to escape a mad robot in *Portal*, or saving the human race in *Halo*. And in a 21st Century world filled with risk and complexity school should be about problem solving.

Games, even in the entertainment industry, face a problem: if no one can learn to master their problems, then no one will buy them. Thus, video game designers have gotten very good at designing teaching and learning. Good games teach in good ways and set up good learning in ways that are well supported by research in the Learning Sciences. Here are just a few examples of good teaching and learning principles baked into games at the design level: focus on facts and information as tools for problem solving so they are used and not just memorized; give verbal information "just in time" (a short amount given when it can be put to use and players can see what it really means) or "on demand" (a large amount when players know they need it and want it to progress towards mastery); give copious and actional feedback; lower the risk of failure so players will explore, take risks, and try alternate solutions; place learning in a social space where

players see multiple models of excellence and can teach and learn from each other; sequence problems so that earlier ones put players on a good path to solve harder ones later (this is called "level design"); create well-designed problems and help gamers' know how to manage their attention so as to avoid cognitive overload; assess performance on multiple variables and in terms of growth over time and multiple trajectories to excellence; and encourage players to think about the game as a system of interacting rules and to learn how they can leverage the interactions in this system to accomplish their goals and even to innovate new or better solutions. Games also often come with versions of the software by which they are made so that gamers can "mod" (change, redesign) the game, thereby joining the 21st Century Maker Movement.

In the current rush to explore games for education, some people have missed the fact that what is really important about game technologies is how they design teaching and learning. We want to bring such design skills and their concomitant teaching and learning principles to school for all sorts of curricular activities, not just games. Games are tools and we in school we want to network lots of good tools, texts, media, activities, and forms of participation into good learning systems.

There is another aspect of games that can be missed by non-gamers. Games are social. In a game players learn to solve problems, but they do not always gain a lot of conscious knowledge that they can articulate. Players, for example, can pick up lots of tacit knowledge about physics in *Portal*, but they turn to interest-driven fan sites—what I have elsewhere called "affinity spaces"—to discuss the game and its physics, as well as to share strategies and mod the game and its physics. On these often well-designed sites—sites that stress participation and

production, collaboration, and many types of mentoring and sharing—players learn to marry complex language to their in game knowledge as problem solvers. In the end, we want to bring both games and their accompanying learning-centered social interactions to school, not games alone as software.