

Games and Game Design

The first commercially successful video game, Pong, was released in 1972. Basically a simple paddle and ball tennis emulator, it was an instant success. Pong marked the first time television became interactive, “transforming viewers into players, permitting them not to just watch a media image, but to play with it” (Salen & Zimmerman, 2004, p. xiv). The instructions were simple: “Avoid missing the ball for high score” (Salen & Zimmerman, 2004, p. xiii).

Game-based learning has been proliferating the educational landscape since Oregon Trail was published in the 1970s (Salen, Torres, Wolozin, Rufo-Tepper, & Shapiro, 2011, p. 29). Game-based learning describes “the integration of games or gaming mechanics into educational experiences” (*New Media Consortium Horizon Report*, 2013). According to the New Media Consortium Horizon Report, higher education should expect to embrace games within the next two of three years (2013). As with other types of learning, one can expect this adoption to find its way to all K-12 classrooms, as well. In order to best implement game-based learning, one needs to understand why video games are engaging to play.

Game-based learning can be viewed as a system that delivers intrinsic rewards. Game players seek the intrinsic reward from earned satisfactions. Intrinsic rewards include “satisfying work, the experience, or at least the hope, of being successful, social connection, and meaning” (McGonigal, 2011, p. 49). This is akin to enjoying a task, rather than working towards a good grade or a paycheck. “Systems thinking” is a way to view the entirety of how things interconnect, such as game worlds (Senge, 2006, p. 69).

Well-designed video games are engaging because they involve the player in a system of “meaningful play.” Meaningful play occurs when the “actions and outcomes in a game are both discernable and integrated into the larger context of the game” (Salen & Zimmerman, 2004, p. 34). To fully understand game-based learning systems, one must focus on how designers apply positive behavioral psychology, along with educational content, into the game environments.

In games, players voluntarily attempt to conquer unnecessary obstacles. Salen & Zimmerman define games as a system in which “players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome” (2004, p. 80). The boundaries of this definition have been challenged as game worlds have evolved into social and casual platforms. Furthermore, video games differ from non-digital games in that the rules of the game are presented after play begins (McGonigal, 2011, p. 26). Although this may seem counterintuitive, it is the goal that players learn as they go and to receive intrinsic rewards along the way.

The player is constantly prompted to survey his or her environment to see what is possible. This process can be divided into four steps: “probe, hypothesize, reprobe, rethink” (Gee, 2007, p. 92). In a game-set system, designers plan the “player journey” in a similar fashion to how an author might write a hero’s quest (Schell, 2008, p. 273). Game worlds require the player to “make active and critical choices about the system” (Gee, 2007, p. 94). Video games task people to “perform complex tasks within rich and highly immersive multimedia-driven, interactive environments” (Salen, Torres, Wolozin, Rufo-Tepper, & Shapiro, 2011, p. 37). Experimenting with one’s new surroundings is similar to how the scientific method is applied to test data (Gee, 2007, p. 98).

Well-designed games employ the psychological concept of happiness known as “flow.” Flow can best be described as “the way people describe their state of mind when consciousness is harmoniously ordered, and they want to pursue whatever they are doing for its sake” (Csikszentmihalyi, 1990, p. 6). On a diagram, one can plot the “flow channel” between the two axes of “Challenge” and “Skills” (Csikszentmihalyi, 1990, p. 74). In the flow channel, people feel fulfilled because they are so involved in an experience. Flow represents intrinsic satisfaction. Applied to video game systems, the flow channel is used to describe the environment where the skill and the difficulty increase just enough to ensure that an experience is neither frustrating nor boring (Bateman, p. 13). The goal of a well-crafted game is to keep the play within the flow channel (McGonigal, 2011, p. 49).

People in game communities sometimes refer to new a player as a “newbie.” As a game progresses through the flow channel, the newbie is given more information and increasingly complex tasks until mastery level is reached. The “boss level” is where all of the learning comes together. Succeeding at a boss level should give the player the emotion “fiero,” the Italian word that describes the what one feels after overcoming a difficult challenge (Bateman, 2009, p. 11). Fiero, not the high score, is the ultimate intrinsic reward for accomplishment.

Part of the allure of gaming is the emotional satisfaction players receive. Game designer Nicole Lazarro posited that emotional feedback should be the desired result of player decisions (2004). Video games create a feedback system of emotions with players (Salen, Torres, Wolozin, Rufo-Tepper, & Shapiro, 2011, p. 37). Feedback loops are a major component in systems thinking (Senge, 2006). Lazarro referred to this system as

the “Player Experience (PX)” (2004). Lazarro’s firm, XEO Design, scientifically researched facial expressions and emotions during game play (Bateman, 2009, p. 9).

XEO Design theorized that people feel different levels of fun during different types of play. The research led to a four-domain model of emotional responses, the “4 Keys 2 Fun”:

1. Hard Fun: Challenge, strategy, and problem solving, frequently generates emotions and experiences of frustration, and fiero.
2. Easy Fun: Intrigue and curiosity generate emotions and experiences of wonder, awe, and mystery.
3. Altered States: The internal experiences in reaction to the visceral, behavior, cognitive, and social properties.
4. The People Factor: Players use games as mechanisms for social experiences. (Lazarro, 2004)

Players interact differently when participating in multiplayer game environment systems (Bartle, 1996). For instance, some people play games for reasons other than the desire to win. Richard Bartle, a professor of artificial intelligence and virtual worlds, wrote an influential essay in which he constructed his “Player Type Model.” His model, originally intended for text-based multi-user dungeon (MUD) games, has been widely adopted by game world designers. (MUDs predate massively, multi-player online games with immersive, 3D graphics, such as the World of Warcraft.) Plotted on an x-, y-axis, Bartle compared the player actions, or interactions, of multi-players in game worlds (Bartle, 1996). The model, commonly known as Bartle’s Player Types, classified four types of players:

- Killers: those who act on, or against, other game players
- Achievers: those who build up their in-game status
- Explorers: those who gather artifacts and look around
- Socializers: those who build friendships (Bartle, 1996)

One of the goals of systems thinking is to create a functioning “learning community” that exchanges ideas (Senge, 2006, p. 307). Gamers collaborate beyond game worlds in learning communities, known as “affinity groups” (Gee, 2007, p. 27). An affinity group meets to collaborate ideas, solve problems, and encourage one another (Gee, 2007, p. 27). On entertainment wikis, like Wikia, gamers “make use of collective intelligence” (McGonigal, 2011, p. 233). This is the essence of a learning community. Contributing to this system gives participants an earned satisfaction, an intrinsic reward.

Casual, or social, games do not always follow the “win, lose, or tie” paradigm of traditional games. One such game type is the “non-zero-sum” game (Kim, 2013). Non-zero-sum games include karate tournaments, charity awareness walks, and “crowdfunding” campaigns, like Kickstarter, in which people invest in projects for the sole purpose of seeing them to completion (Kim, 2013). In non-zero-sum games, people may interact in a semi-competitive, virtual environment with the goal of simply “liking” other’s actions. They may also seek only to collaborate with others, or to modify, or “mod,” the overall experience.

Game achievement frequently employs a digital badge system to acknowledge player achievements. Digital achievements are aggregated and posted on leaderboards. Microsoft’s Xbox offers “Achievements,” while Sony’s PlayStation awards “Trophies.” Achievements and Trophies can also be shared on social networks. From a systems thinking perspective, sharing accomplishments brings the personal game experience to social spaces.

“Gamification” brings the intrinsic reward structures from the virtual world to the real world. The Pew Research Center defines gamification as an “interactive online

design that plays on people's competitive instincts and often incorporates the use of rewards to drive action” (2012). Game mechanics in the “real world” include the digital badge collection and missions to unlock. Gamified systems also are frequently social spaces.

The goal of gamifying commerce is to have a happy customer. Gamification in business puts the customer on a journey motivated by intrinsic, or personally meaningful, rewards. The Nike+ mobile application awards achievements to runners. Runners, in turn, can share their digital recognition across social media platforms, such as Facebook and Twitter. The “mayorship” badge, on the mobile application Foursquare, can be unlocked if someone frequently “checks-in” when visiting a physical location. The business networking website LinkedIn gamifies with progress bars to encourage users to complete their online profiles.

Behavioral neuropsychologist Amy Jo Kim updated Bartle’s Player Types to fit the gamification paradigm. Kim replaced the Bartle “Killer” type with “Express” – a much more business-friendly descriptor. Completing her axes, “Compete” took the place of “Achiever,” “Explore” replaced “Explorer,” and “Collaborate” replaced “Cooperate” (Kim, 2012). Kim added Social Engagement Verbs, which include “build, design, customize, challenge, curate, and share” (Kim, 2012). Social Engagement Verbs are similar to Bloom's Taxonomy of Learning Objectives.

Many of the most meaningful educational video games were originally intended for commercial purposes. For example, Valve’s puzzle game *Portal 2*, released in 2011, is an entertainment game of practical physics, spatial learning, and problem solving. In an interview with Joystiq magazine, Valve founder Gabe Newell stated that he believes

“the label ‘educational games’ is a way of being an excuse for bad game design or poor production values” (Gilbert, 2012). When choosing an appropriate game for the classroom, teachers must be cognizant of the intrinsic reward systems, not just the educational content that is delivered.

There is still a debate about whether badges can serve as both an educational assessment tool and an intrinsic motivator is still not settled. Digital Media Learning (DML) pioneer Henry Jenkins has voiced criticism about the use of badges to gamify informal learning. Jenkins’s view is that “informal learning works because it is informal” (2012). The overuse of badges bears the risk of becoming an extrinsic motivator that can actually stifle the free exchanges of ideas (Jenkins, 2012). Similar to Jenkins, Mitch Resnick voiced concerns on the HASTAC website. HASTAC is a partner organization in the Mozilla Open Badges project. Resnick worried “that students will focus on accumulating badges rather than making connections with the ideas and material associated with the badges – the same way that students too often focus on grades in a class rather than the material in the class, or the points in an educational game rather than the ideas in the game” (2012). Resnick’s colleague at DML Central, Cathy Davidson, responded by observing that badge systems that work most effectively are the ones “best recognize competencies, skills, training, collaborative abilities, character, personal contribution, participatory energy, leadership and motivational skills, and other so-called ‘hard’ and ‘soft’ individual and cooperative talents” (Davidson, 2012).

Awarding badges for academic accomplishments is one method to gamify education. Badges “support connected learning environments by motivating learning and signaling achievement both within particular communities as well as across communities

and institutions” (*Open Badges for Lifelong Learning*, 2012). Teachers can aggregate and publish student accomplishments on virtual “leaderboards.” By adding game elements, teachers can create lessons and activities that offer more engagement with deeper intrinsic satisfaction. After all, video games are systems in which players are encouraged to learn as they go. This is the very definition of constructivist learning.

Game-based learning systems are optimal when the player feels the intrinsic reward for their accomplishments. Effective game design must account for the player’s experience and his or her emotional connection to the virtual world. By applying systems thinking to the relation of flow, fun, and feedback loops, teacher, like game designers, can bring meaningful participation and satisfaction to learning.

References

- Anderson, J., & Rainie, L. (2012, May 18). The Future of Gamification. Retrieved July 22, 2013, from Pew Internet and American Life Project website:
<http://www.pewinternet.org/Reports/2012/Future-of-Gamification.aspx>
- Bartle, R. (1996, April). Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs. Retrieved July 22, 2013, from <http://www.mud.co.uk/richard/hcdfs.htm>
- Bateman, C. (Ed.). (2009). *Beyond game design: Nine steps towards creating better videogames*. Boston, MA: Charles River Media/Cengage Technology.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Davidson, C. (2012, February 21). Can Badging Be the Zipcar of Testing and Assessment? Retrieved July 31, 2013, from DML Central website:
<http://dmlcentral.net/blog/cathy-davidson/can-badging-be-zipcar-testing-and-assessment>
- Gee, J. P. (2007). *What video games have to teach us about learning and literacy* (Rev. and updated ed.). New York: Palgrave Macmillan.
- Gilbert, B. (2011, June 23). Newell sees no distinction "between games and educational games". Retrieved July 28, 2013, from Joystiq website:
<http://www.joystiq.com/2011/06/23/newell-sees-no-distinction-between-games-and-educational-games/>
- Jenkins, H. (2012, March 5). How to Earn Your Skeptic "Badge" [Blog post]. Retrieved from Confessions of an Aca-Fan: The Official Weblog of Henry Jenkins website:
http://henryjenkins.org/2012/03/how_to_earn_your_skeptic_badge.html

- Kim, A. J. (2012, September 19). Social Engagement: who's playing? how do they like to engage? [Blog post]. Retrieved from Amy Jo Kim website:
<http://amyjokim.com/2012/09/19/social-engagement-whos-playing-how-do-they-like-to-engage/>
- Lazzaro, N. (2004, March 8). *Why we play games: Four keys to more emotion without story*. Retrieved July 24, 2013, from XEO Design website:
http://www.xeodesign.com/xeodesign_whyweplaygames.pdf
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. New York: Penguin Press.
- New Media Consortium. (2013). Retrieved July 22, 2013, from Horizon Report: Higher Education Edition 2013. website: <http://www.nmc.org/pdf/2013-horizon-higher-ed-shortlist.pdf>
- Open Badges for Lifelong Learning. (2012, August 27). Retrieved July 22, 2013, from MozillaWiki website: https://wiki.mozilla.org/images/5/59/OpenBadges-Working-Paper_012312.pdf
- Resnick, M. (2012, February 27). Still a Badge Skeptic. Retrieved July 31, 2013, from HASTAC website: <http://www.hastac.org/blogs/mres/2012/02/27/still-badge-skeptic>
- Salen, K., Torres, R., Wolozin, L., Rufo-Teppe, R., & Shapiro, A. (2011). *Quest to learn: Developing the school for digital kids*. Cambridge, Mass.: MIT Press.
- Salen, K., & Zimmerman, E. (2003). *Rules of play: Game design fundamentals*. Cambridge, Mass.: MIT Press.

Schell, J. (2008). *The art of game design: A book of lenses*. Amsterdam: Elsevier/Morgan Kaufmann.

Senge, P. M. (2006). *The fifth discipline: The art and practice of the learning organization* (Rev. and updated. ed.). New York: Doubleday/Currency.