Got Game? The Use of Gaming in Learning and Development

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Introduction

The first patented video game, the “Cathode Ray Tube Amusement Device,” is celebrating its 65th birthday this year (Gettler, n.d.). This may come as a surprise to many, because people usually place the birth of video games in the 1970s or 1980s, when coin-operated video games became a mainstay in arcades, and the first game consoles appeared in American homes.

Video games—and the people who play them—have changed dramatically since 1948. Generations of gamers have grown up and entered the workplace, and video games have made the same transition, extending their influence into companies around the globe. Many organizations are increasingly using gaming technology in their learning and development programs to help build the next generation of business leaders.

This white paper:

- Explores the popularity of video games and the characteristics of the people who play them.
- Reviews different types of games and defines some video game terminology.
- Discusses how serious games can be used to develop organizational talent.
- Provides examples of companies using serious games to develop skills and behaviors.
- Examines the future of serious games in learning and development.
Games Are Big Business

Video games today are ubiquitous. Just about every electronic device with a screen—TVs, PCs, tablets, and smart phones—have games installed and ready to play, and people are taking advantage of their accessibility. A recent study by the NPD Group, a market tracking firm, found that 211.5 million—or two-thirds—of Americans play video games (Boorstin, 2012). Americans aren’t just playing the free, preloaded games; they are buying them in droves. According to the Entertainment Software Association (ESA), consumers spent $24.75 billion on video games in 2011 (ESA staff, 2012).

Puzzle games, board games, trivia, and card games are the most commonly played games (42 percent), but 25 percent of gamers also play action, sports, strategy, and role-playing games. The ESA also found that 62 percent of gamers play with others, either in-person or online, and most do so for at least an hour a week.

Online simulation (sim) games have also grown in popularity, thanks in large part to the explosion of social media. Facebook, for example, boasts more than 100 sim games, among them Farmville 2, Airport City, and FrontierVille. These popular sim games were designed to entertain but have an educational component and are sometimes called edutainment games. In Farmville 2, for example, players create and manage their own farms; in Airport City, gamers manage a busy city airport; and in FrontierVille, players “tame the wilderness and build a town.”

Gaming Terms Defined

**Game:** A competitive activity that involves skill, chance, or endurance.

**Video game:** A game played by electronically manipulating images produced by a computer program on a television screen or display.

**Simulation game:** A game that attempts to represent real or hypothetical processes, mechanisms, or systems.

**Serious game:** Computer or video games designed for a primary purpose other than pure entertainment; often designed for the purpose of education and/or solving a problem.

**Alternate reality game:** An interactive game that uses the real world as a platform, often involving multiple media to tell a story.

**MMORPGs:** Massively multiplayer online role-playing games.
As video games grow in popularity and sophistication, an increasing number of organizations and government agencies have embraced them to support learning and development efforts. A recent ESA study found that 70 percent of major U.S. employers use interactive software and games for L&D purposes, and nearly eight out of 10 U.S. employers plan on doing so in 2013 (Steinberg, 2012).

Who Plays Video Games?

Video games have changed and matured over the years, and so have users. The average game player today is 30 years old. Sixty-eight percent of gamers are 18 years of age or older, and 37 percent are over the age of 35. Just over half of gamers are men, according to the ESA, but women gamers are gaining fast. Forty-seven percent of all players are women, and women over the age of 18 are one of the industry’s fastest growing demographics. In fact, women now represent a significantly larger portion of the game-playing population (30 percent) than boys age 17 or younger (18 percent). Perhaps the most interesting characteristic of gamers is that the average adult gamer has been playing video games for 14 years. That’s a lot of game time.

What’s in a Game?

There are three types of video games: casual games, advergames, and serious games.

**Casual games** are intended for entertainment purposes and can include everything from the solitaire game that comes pre-loaded on most computers to complex multi-player games like *Uncharted, Call of Duty: Modern Warfare 3, and Battlefield 3*. These games are available in a number of formats, including PC, game console, and mobile. Although learning can occur when playing casual games, it is not an intended outcome (Derryberry, 2007).

**Advergames** are games designed to advertise a product, organization or cause (Derryberry, 2007). There are several types of advergames, but the goal is to promote a brand or organization while providing fun and entertainment.

**Serious games** are video games designed to improve learning, and players engage in serious games with that understanding (Derryberry, 2007). Also known as immersive learning simulations, digital
game-based learning, and gaming simulations, serious games are developed with specific learning outcomes in mind that will result in measurable, sustained changes in performance or behavior. Serious games have been used in emergency services training, military training, and health care settings to positive effect (Derryberry, 2007). According to Sue Bohle, executive director of the Serious Games Association, industry estimates range from $2-10 billion in revenue for serious games, depending on how much simulations and virtual worlds are included in the calculation (Maurer, 2012).

**Serious Games in Learning and Development**

Serious games can allow players to apply what they have learned in an L&D experience and apply it in a safe, simulated environment. For example, health care professionals can practice a new medical procedure using a serious sim game before introducing it in the workplace. There is also evidence that serious games can develop soft skills like emotional intelligence, communication management, and critical problem solving and collaboration skills (Marinho, 2012).

Some L&D professionals argue that video games can help develop the leadership skills that organizations will need in the future. Tomorrow’s workplace will be global, faster-paced, competitive, and more virtual than ever before. Online games, specifically massively multiplayer online role-playing games (MMORPGs), “offer a glimpse at how leaders develop and operate in environments that are highly distributed, global, hyper-competitive, and virtual.” (IBM & Seriosity staff, 2007).

There have been several studies conducted on learning and serious games, and results are encouraging. A recent study by the Office of Naval Research found that video game players performed 10-20 percent better in perceptual and cognitive ability than non-game players, and that video games helped adults process information faster (Steinberg, 2012). Another study by the Federation of American Scientists found that students remembered only 10 percent of what they read; 20 percent of what they heard; 30 percent if they used visuals related to what they heard; and 50 percent if they watched someone performing a task while explaining it. Students remembered 90 percent of what they learned, however, if they did the task themselves, even if it was as a simulation (IBM staff, n.d.).

A recent study reported in *Personnel Psychology* (Sitzmann, 2011) found that trainees using serious simulation games had improved post-training efficacy (20 percent), higher declarative knowledge (11 percent), improved procedural knowledge (14 percent), and better retention (9 percent) than trainees in a non-simulation comparison group. The study also found that trainees in the simulation
control group learned more when the game was used as a supplement to other instructional methods, rather than as stand-alone instruction.

In contrast, a study by Adams, Mayer, MacNamara, Koenig, and Wainess (2012) found that narrative educational games resulted in poorer learning and took longer to complete than simply showing content on a slide. Ruth Clarke, an instructional design and technical training consultant, gave a possible explanation in a recent American Society for Training & Development article exploring the results of the study. Clarke speculates that the reason for this lack of learning may be because some game features are at odds with the game's learning objectives. For example, many games time players, requiring them to complete tasks within a certain timeframe.

**Gamification Explained**

Gamification is the use of gaming techniques, game thinking, and game mechanics to enhance non-game contexts. Gaming techniques like questing, badging, and leader boards have been incorporated into workplace practices such as the onboarding process, career development, and performance evaluations. It should be noted that gamification techniques do not have to be rooted in technology. For example, leader boards can be visual aids posted in a department to motivate and inform workers about departmental goal achievement (such as sales). Gamification practices are particularly appealing to the Millennial generation who have grown up playing games that send them on quests, award them with badges, and post their achievements on leader boards, but the fundamental human need for recognition spans generations. Gamification can help fill that need and increase employee morale, retention, and job satisfaction.


For learning outcomes that are based on critical thinking skills, Clarke argues, timed games that reinforce speed are not a good match (Clarke, 2012). She recommends that HR and talent development professionals stick to serious games that emphasize drill and practice exercises for tasks that require immediate and accurate responses.

The Federation of American Scientists, however, believes that serious games can have a broader L&D application and can teach higher-order thinking skills such as strategic thinking, interpretive analysis, problem solving, plan formulation and execution, and the ability to adapt to rapid change—skills U.S. employers increasingly look for in workers and new workforce entrants (Steinberg, 2012).
Business Review study concurs. The study, which focused on the leadership skills taught through the immensely popular video game, World of Warcraft, concluded that the game gave participants a sneak peek into tomorrow’s workplace. The game’s environment features fluid workforces, self-organized and collaborative work activities, and decentralized, nonhierarchical leadership; all features that will be prevalent in tomorrow’s business world. The game also allows for risk-taking and teaches participants how to work quickly and efficiently (Marinho, 2012).

MMORPGs can also help develop other desirable leadership skills. MMORPGs can closely match actual work environments and can be developed in such a way that the skills required to succeed in the game are similar to leadership skills employers want to see developed. These games can bring together millions of gamers who play the game through the use of avatars. Players interact with each other, form relationships, and join guilds (or teams) to collaboratively resolve missions (Melchor, 2012).

“MMORPGs mirror the business context more than you would assume,” says Byron Reeve, Ph.D., professor at Stanford University and faculty director of the Stanford Media X Partners Program. “They presage one possible future for business—one that is open, virtual, knowledge-driven, and comprised of a largely volunteer or at least transient workforce.” (IBM & Seriosity staff, 2007).

MMORPGs require cooperation and collaboration among many players to achieve a mission, and as such, can help teach such business skills as recruiting, organizing, and motivating and directing others to accomplish a shared goal in a safe environment where risk-taking, critical thinking, and creative problem solving is encouraged (Melchor, 2012).

Organizations Are Serious About Games

Serious games are increasingly being used by large U.S. employers to recruit, improve communication among managers and their staffs, and to train employees and new hires at all levels in their organizations (Derryberry, 2007). The U.S. Department of Defense, the U.S. Army, Nortel, Cold Stone Creamery, McKinsey & Co., SAS Institute, and Digital Equipment are just a few organizations using serious games in their workplaces (Derryberry, 2007; Maurer, 2012; Steinberg, 2012).

IBM and Farmers Insurance have used the IBM-developed serious game, INNOV8 to teach the effect of business decisions on their organizations’ ecosystems. INNOV8 is a sim-style serious game where players manipulate their business models to make their cities less congested, their supply chains more effective, and their customers happier (IBM staff, n.d.).
Northrop Grumman has also developed several serious games for use in development and recruitment. The award-winning Quality Tycoon game teaches players the effect that quality and ethical integrity have on business opportunities. Northrop Grumman’s Virtual Jet Works introduces students to engineering concepts and is demonstrated at college recruitment fairs (Serious Games Market staff, 2011). Cisco’s The Cisco Mind Share Game facilitates network certification. Ultimate Team Play is used by the Hilton Garden Inn to teach employees customer service skills (Steinberg, 2012). And Dublin-based Front Square teamed with Serious Games International to develop Teddy’s Chocco Shop, a game that teaches employees the basics of lean manufacturing (Marinho, 2012).

The U.S. Army was an early adopter of serious games. In fact, they are credited with coining the term “serious game.” The Army first released America’s Army in 2002 and updates the game every three to four months. Game versions include America’s Army: Special Forces and America’s Army: Overmatch. The Army also gained recognition from the Serious Games Market with First Person Cultural Trainer (FPCT), a 3-D cultural training simulation. The game places players in an unfamiliar community where they don’t know how members of the community feel about them or who the community leaders are. The game’s goals are to have players move through the community, learn social structures and issues, and then work with the community to affect missions.

"FPCT challenges the Army’s junior leaders to understand the consequences, good and bad, of their speech, body language, posture, temperament, and action," says Ben Jordan, director of TRISA’s Operational Environment Lab, the Army’s lead for the project. "It even replicates physical micro-expressions, which users learn to identify as possible cues for threatening or non-threatening behaviors." (Roth, 2011).
Generating New Insights and Solving Problems

Serious games can be an effective method to develop talent in an organization. They can also serve as a valuable information source for employers. Serious games can yield insights that organizations can use to assess performance, identify patterns, and predict behaviors in situations that may occur in the real world. L&D development professionals can use these insights to gain a better understanding of individual and organizational capabilities and to identify potential gaps.

Serious games can also serve as a source for new ideas, helping organizations become more innovative. Organizations are using serious games to tap into the knowledge and experience of the entire organization, and in some cases, beyond the organization to “crowd-source” new ideas. According to information technology research firm, Gartner, Inc., more than half of organizations that manage innovation processes will gamify those processes by 2015.

Organizations can also use serious games to analyze the abundance of data (such as operational, customer, and sales data) that organizations collect from various sources. Serious games can give employees access to real-world, real-time “Big Data” to make decisions and experiment in virtual environments without the risks and consequences that they would face in the “real world”. As players engage and interact in the virtual environment, both the players and the game become more sophisticated. In other words, the system gets “smarter” while the constant stream of new, real-time data continues to change the dynamics of the game.
Many organizations are already using serious games to gain new insights and solve real business challenges - and there are some who believe serious games have the potential to solve some of the world’s biggest problems. There are already games designed to fight AIDS, global poverty, water scarcity, and climate change. Many of these games are available online from anywhere in the world, empowering people from all over to come up with creative solutions to our most urgent social problems.

**FoldIt**

Foldit, an online puzzle video game developed by the Center for Game Science at the University of Washington in collaboration with the University’s Department of Biochemistry, encourages players to try to solve one of the hardest computational problems in biology, protein folding. Players try random combinations for folding proteins into different shapes. In 2011, players were credited with helping discover an enzyme involved in the reproduction of AIDS, opening the potential for development of new drugs to fight the disease. Scientists had previously pursued the creation of this enzyme for years but failed to find the right protein structure through other techniques, such as computer simulations. Guided by intuition and reasoning that computers can’t match, the players successfully configured the structure of the enzyme in 10 days.

Source: FoldIt staff, n.d.
Conclusion

Video games have been around for years, growing in popularity and sophistication. Most of today’s workers grew up playing these games, so it comes as no surprise that organizations have started to use gaming technology in new and exciting ways—including talent development. Well-crafted serious games are used to develop and reinforce skills and competencies. They can be used to safely practice tasks that require rapid and accurate responses, but their potential applications are much broader. Serious games can closely approximate actual working environments, while allowing players an opportunity to safely take risks, develop teamwork skills, creatively problem solve and collaborate, and to experiment and innovate.
About UNC Executive Development

Our approach to program design and delivery draws upon the power of real-world, applicable experiences from our faculty and staff, integrated with the knowledge our client partners share about the challenges they face.

We combine traditional with experiential and unique learning to ensure that all individuals gain relevant new skills that they can easily implement within their own organizations. Through action learning and business simulation activities, we challenge participants to think, reflect and make decisions differently.

Our Approach: The Partnership

Our team customizes each leadership program through a highly collaborative process that involves our clients, program directors, faculty and program managers. We are dedicated to following-up with our clients and individual participants to ensure that their learning experiences have been meaningful and impactful. This integrated approach consistently drives strong outcomes.

Our Approach: The Results

Our executive education programs are designed with results in mind, and we are focused on successfully meeting our clients’ business and academic expectations. Below are a few examples of the results our client partners have achieved:

- Leadership refocused with new strategy and cohesive vision
- Products redefined
- Strategic plans created for the global marketplace
- New markets targeted
- Supply chains streamlined
- Cost-saving measures developed
- Silos leveled
- Teams aligned

Participants leave empowered to bring in new ideas, present different ways to grow business and tackle challenges. The result is stronger individuals leading stronger teams and organizations.

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Sources


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