

INSTITUTE FOR ESPORTS LEADERSHIP

Serious Games: Beyond the Hype

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2016

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Executive Summary

Serious Games are powerful tools for learning, both for their ability to increase engagement and for their ability to deliver complex information in a digestible format. However, serious games are not a silver bullet, and if misused, they have the potential to do serious damage.

Understanding the potential of serious games and the use of game elements in a business setting is increasingly important in the management of technology intensive enterprises. Serious games can be used in a variety of industries to increase engagement of customers or employees. As we will discuss, serious games can also have positive neurochemical effects that affect happiness and feelings of well-being. Finally, serious games are of particular interest because of the specific challenges facing the education industry. There are numerous applications for serious games, and the nascent serious games industry is continuing to develop in new and exciting ways.

Serious games have enormous potential; however, like most powerful tools, they can also be dangerous if used incorrectly. The hype surrounding the potential of these games – in motivation, brain chemistry, and specifically applied to education – are not without drawbacks or dangers. Managers of technology intensive enterprises should be aware of the potential pitfalls and should take steps to mitigate the risks involved in adopting these powerful tools.

This report examines serious games as they are used to increase motivation generally, the neurochemical drivers behind those effects, and the application of these benefits in an educational context. We will also examine the current state of the rapidly evolving serious games industry, address the primary dangers of implementing serious games for motivation and engagement in an educational environment, and discuss some steps to avoid them. Through industry analysis, as well as in-depth understanding of some of the critical aspects of games, we hope to stimulate an informed discussion on the pursuit of serious games in an educational context.

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Industry Overview

To understand the importance of serious games with respect to technological trends and market developments, it is necessary to examine the industry as a whole. Serious games, defined as games designed for a purpose beyond pure entertainment, can range from business simulations and role-playing scenarios to video games. They are not limited to a specific platform or technology. Serious games are not a new development; one of the earliest recorded serious games comes from the Greek historian Herodotus, who claimed that the ancient Greeks used dice to help overcome famine by alternating their days between eating and playing games.[1] Indeed, it is difficult to trace back the origin of games, as one might say the concept of play is intrinsically ingrained in every human being from birth.

Nearly everyone participates in games in some form, whether they be sporting events, card games, board games, or others. As people move toward computer interfaces, their games increasingly include computer and video games. According to the Entertainment Software Association (ESA), 67% of American households play computer and video games as of 2010. The ESA finds that gamers include people of all ages, with 25% of gamers under the age of 18, 49% between the ages of 18 and 49, and 26% aged 50 and over.[2]

While games have typically been considered male-dominated, this trend is also changing due to the accessibility of online games; in 2010, 40% of gamers were female. Furthermore, 46% of game purchasers are female, and the average age for the most frequent game buyers is 40.[3] Video and computer games are already a huge industry, and growth is accelerating. IBISWorld's March 2011 report on the U.S. video games industry shows that games are a $40.7 billion industry, growing at 4.6% annually from 2006 to 2011, with expected growth to climb to 8.2% between 2011 and 2016.[4]

Applications for serious games encompass industries from health to research to advertising.

	Games for Health	Advergames	Games for Training	Games for Education	Games for Science and Research	Production	Games as Work
Government & NGO	Public Health Education & Mass Casualty Response	Political Games	Employee Training	Inform Public	Data Collection/ Planning	Strategic & Policy Planning	Public Diplomacy, Opinion Research
Defense	Rehabilitation & Wellness	Recruitment & Propaganda	Soldier/ Support Training	School House Education	Wargames/ Planning	War planning & weapons research	Command & Control
Healthcare	Cybertherapy/ Exergaming	Public Health Policy & Social Awareness Campaigns	Training Games for Health Professionals	Games for Patient Education and Disease Management	Visualization & Epidemiology	Biotech manufacturing & design	Public Health Response Planning & Logistics
Marketing & Communications	Advertising Treatment	Advertising, marketing with games, product placement	Product Use	Product Information	Opinion Research	Machinima	Opinion Research
Education	Inform about diseases/risks	Social Issue Games	Train teachers/ Train workforce skills	Learning	Computer Science & Recruitment	P2P Learning Constructivism Documentary	Teaching Distance Learning
Corporate	Employee Health Information & Wellness	Customer Education & Awareness	Employee Training	Continuing Education & Certification	Advertising/ visualization	Strategic Planning	Command & Control
Industry	Occupational Safety	Sales & Recruitment	Employee Training	Workforce Education	Process Optimization Simulation	Nano/Bio-tech Design	Command & Control

Figure 1. Taxonomy of Serious Games – by Serious Games Initiative founder Ben Sawyer and colleague Peter Smith [5]

Serious games can influence lives and culture in a variety of important ways, as seen in Figure 1. Understanding the incredible breadth of potential applications of games is the most critical takeaway here.

However, there are challenges in delivering content as intended through the use of serious games. In a true serious game, the relevant content is built into the simulation model of the game and is experienced indirectly by the player through exploration and interaction; this style is known as incidental learning, rather than explicit information transfer more common in other media, and it carries risks as well as advantages.

NOTES

1. McGonigal, Jane. *Reality Is Broken: Why Games Make Us Better and How They Can Change the World.* p 13
2. The Entertainment Software Association. 2010 Sales, Demographic and Usage Data: Essential Facts about the Computer and Video Game Industry. www.theesa.com
3. The Entertainment Software Association. 2010 Sales, Demographic and Usage Data: Essential Facts about the Computer and Video Game Industry. www.theesa.com
4. Casey Thormahlen. IBISWorld Industry Report NN003: Video Games in the US
5. Ben Sawyer, Presentation at MIT Business in Gaming Conference, March 10, 2011

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Aspects of Games

What is a Game?

To understand the importance of games as a means for education and change, we must first establish a working definition of "game." Psychologist Bernard Suits said that "playing a game is the voluntary attempt to overcome unnecessary obstacles."[1] The idea behind this statement is a powerful one. When players engage in a game, they are challenging themselves to work hard at something in order to feel productive. Games allow players to feel in control of their productivity, because gameplay is always voluntary. The need to be challenged is very strong in the human psyche,[2] and games can create challenges that players find interesting and rewarding. As Jane McGonigal writes in her book *Reality is Broken*, "all games share four defining traits: a goal, rules, a feedback system, and voluntary participation."[3] This set of traits provides useful guidelines and a litmus test for identifying games and distinguishing them from game-like activities.

Motivation

Serious Games have significant power to alter our motivation to participate in a given activity. According to Jane McGonigal, "When an experience is difficult for us, offering challenging goals, tracking points and levels and achievements, and providing virtual rewards can make it easier to get through the experience."[4]

When we engage in an activity because of our own inherent enjoyment of the activity, we are acting due to an intrinsic motivation. When we act instead because of the anticipation of some external reward for completion or participation, we are acting out of extrinsic motivation.[5]

The potential for games or game mechanics to increase engagement and motivation is a driving force behind the hype of gamification. Many of these mechanics have been used for years in customer loyalty programs, and the adoption of gamification is viewed as something between a formalization of the field of practice and a rebranding of an old idea. This focus on gamification is parallel to the shift in popularity from TQM to Six Sigma.

GAMIFICATION VERSUS SERIOUS GAMES

The recent trend of "gamification" and its confusion with serious games is one potential pitfall in harnessing the power of games. Gamification is an industry buzzword, and usually refers to the application of game mechanics to everyday activities in an effort to increase a player's motivation for the tasks chosen by the designer. The set of assumptions in gamification are

more overt than those built into the game system in true serious games, as prizes are assigned for explicit achievements, but there is still a danger of over-justification, as discussed below.[6] Serious games don't rely on mechanics to drive motivation; instead, the mechanics are used as feedback in the exploration of the game system.

PITFALLS IN MOTIVATING THROUGH GAMES

The promise of games to increase motivation is compelling, but the reality is less overwhelmingly positive. Social psychologists warn that organizers should be careful about using reward mechanisms for behaviors that are already intrinsically motivated; studies show that rewards can reduce intrinsic motivation to complete a task in the future, particularly when the behavior rewarded is a common one (Eisenberger & Shanock, 2003).

While games and game mechanics can increase motivation for undesirable and novel tasks, this danger of "trying to improve an already enjoyable activity by adding points, levels, and achievements" remains a significant concern.[7] Consistent with the psychological concept of over-justification, Jane McGonigal explains that "Economists have demonstrated that offering people an extrinsic reward (like money or prizes) for something they're already doing—and already enjoying—actually makes them feel less motivated and less rewarded."[8] Numerous scientific studies have shown that compensation typically decreases a subject's motivation to engage in activities they would otherwise freely enjoy.[9] There is, then, a significant danger in applying either gamification or serious games indiscriminately to challenges of increasing motivation without analysing the reasons people participate in the first place.

It is possible to mitigate this risk of over-justification by limiting rewards of these games to "glory" or recognition instead of material goods, but this only diminishes the risk rather than eliminating it completely. As with material goods, recognition can potentially distract players from the initial reasons for participating, and in some cases can still permanently supplant intrinsic motivation with extrinsic motivation.[10]

Neurochemical Power of Games

Jane McGonigal notes that by tackling a voluntary obstacle, a player experiences a series of neurochemical effects that activate important centers of the brain. Games have the power to activate a series of neurological systems that, when used in the right combination, can prove extremely beneficial to feelings of well-being and happiness:

> *"By undertaking a difficult challenge, such as trying to finish a task in a shorter time than usual, we can produce in our own bodies a rush of adrenaline, the excitement hormone that makes us feel confident, energetic, and highly motivated.*

> *By accomplishing something that is very hard for us, like solving a puzzle or finishing a race, our brains release a potent cocktail of norepinephrine, epinephrine, and dopamine. These three neurochemicals in combination make us feel satisfied, proud, and highly aroused.*
>
> *When we make someone else laugh or smile, our brain is flooded with dopamine, the neurotransmitter associated with pleasure and reward. If we smile or laugh, too, the effect is even more pronounced."*[11]

Part of the power of serious games results from the fact that they are, as learning experiences go, enjoyable. This can lead to higher engagement and motivation among learners, but there are also biochemical benefits. When the brain releases "dopamine, a neurochemical released by our body which helps us experience enjoyment and happiness, [it] has an ancillary benefit: it activates the learning centers of the brain, allowing our brains to become intellectual sponges."[12]

ADDICTION

However, these biological benefits are not without their drawbacks. A potential pitfall is that, unchecked, these powerful neurochemical reactions can cause some players to seek repeated experiences to the point of addictive behavior. The game industry is very aware of player addiction as a potential problem, and works diligently to mitigate players' exclusive use of games (instead of other forms of interactions) to stimulate this brain-chemistry reaction. Most gamers find that after more than 20 hours of play, they experience "gamer regret," a term coined by technology journalist Clive Thompson meaning a feeling of loss when players realize how much time they've spent in the game world instead of the real world.[13]

Games, however, are still not classified as addictive. When the American Psychiatric Association reviewed whether or not video game addiction should be added to the Diagnostic and Statistical Manual for 2012, they concluded that game addiction was not a true disorder.[14] While some view games as escapist, and they may be for some gamers, the majority of people who play games are able to do so without loss of control, as with any enjoyable practice.

Educational

Serious games represent significant potential for innovation in education. They hold the possibility to bring the motivational benefits discussed above to the traditional education system, as well as to expand quality education beyond the reaches of current systems, and to reach students who do not learn as well in existing systems. However, as with many powerful tools, there is a significant possibility of doing unintended damage, if serious games are not used responsibly.

ENGAGEMENT IN LEARNING

Rob Lippincott, Senior Vice President of Education at PBS, predicts that if significant resources are not brought to bear on our learning challenges now, "we risk going from 30–35% high-school dropouts to 50–60% high-school dropouts [because] it's going to be boring."[15] Lippincott goes on to explain that the solution lies in bridging formal and informal learning environments, and serious games are one way to do this. He notes that "there are so many 9-year-olds who have two or three screens in their personal control at home, and yet at school, we expect children to power down their devices and learn."[16]

One school has already begun to experiment with bringing games to bear on this motivational challenge. Quest to Learn is a charter school in New York City designed entirely around games. The curriculum includes game design assignments and is itself designed to be more game-like than other schools. Jane McGonigal explains, "Quest to Learn is an example of an organizational [alternative reality game]. It uses game design as a guiding philosophy for creating new institutions and inventing new organizational practices."[17] The school is also experimenting with a leveling up system instead of traditional letter grades. The goal is to create a more egalitarian system that doesn't punish students for failing as long as they continue to work hard.[18] This type of incentive structure reinforces values that are desirable in innovators in the workforce. Allowing students to try and fail can reduce anxiety and encourage the type of experimentation that leads to innovations.

Another key difference between Quest to Learn and other schools is the approach to developing students' skills. The traditional educational model is focused on helping each student develop a baseline of skills across a wide variety of subjects, and students who fall behind are encouraged to spend more time on their weaknesses so that all students fulfill basic requirements in each subject. At Quest to Learn, there is a basic core curriculum, but students spend the majority of their time developing skills in subjects they already know how to do well, or for which they have a natural talent. The effects of this learning system are two-fold: first, students have an experience with developing mastery, which is far more compelling than focusing on addressing weaknesses; second, they are encouraged to work in teams, relying on each other's strengths, which more closely matches the type of environment they can expect when they enter the workforce.[19]

PITFALLS IN EDUCATIONAL APPLICATIONS

In the push to adopt serious games as a tool for education, a critical awareness must be developed of several potential pitfalls that could hinder success or even have unintended negative consequences.

First, the hype surrounding serious games in education often overlooks the fact that there is little hard evidence linking serious games to higher standardized test performance. Students at the Quest to Learn charter school in NYC don't significantly outperform students at similar schools on standardized tests.[20] Therefore, it is important not to promise increased test

performance as a result of curricular integration of serious games. However, the question of whether it is possible to measure improvements in creative problem solving, collaboration, and innovation with a standardized test remains open, which suggests that the true benefits of serious games in the educational context may not yet be fully realized.

A more insidious concern is the potential for delivering the wrong lesson either through inadequate game design knowledge or more nefarious interventions. The area of editorial standards in games is of growing concern, particularly as serious games tackle more controversial issues, as in PeaceMaker, an award winning game from Impact Games that puts players in the role of the Israeli or Palestinian leader in an attempt to negotiate a peaceful resolution to conflict in the Middle East. Asi Burak, founder of Impact Games, and now co-president of Games for Change, explains that the underlying assumptions upon which the game engine for PeaceMaker was designed were the result of many hours of research, and the end result was challenged by both parties portrayed in the game, which he takes as a sign that the game itself was well-balanced.[21]

In a serious game depicting social issues, the game engine requires much more approximation and estimation than an engine required only to model the physics of objects in virtual space. Social issues require assumptions about the nature of people's behavior, either as individuals or in the aggregate, and the outcomes of players' actions in the game can be vastly influenced by the assumptions used in the design of the game engine.

In incidences of gamification, the scoring methods are more overt, ascribing explicit value to the actions that players take, making it easy to infer the value system of the game designers. In serious games, in contrast, where outcomes may be the result of complex calculations and an element of chance, it is more likely for the values and positions of the designer to be absorbed as incidental learning without explicit examination by the players.

These incidental learning events are not always intentional, as was the case with PeaceMaker. Even well-intentioned parties can fall subject to the dangers of poorly designed games for education. In Norfolk, Virginia, a teacher attempted to bring greater engagement to her Civil War history lesson by simulating a slave auction. However, this teacher held perhaps too closely to historical accuracy and allowed her white students to "buy" black and mixed-race students.[22] The dangers of reinforcing racial stereotypes led to numerous parent complaints and disciplinary action on the part of the school.

Contrast this to the success of the eye-color discrimination experiment explored in the Frontline documentary "A Class Divided." In this simulation, Jane Elliot divided students based solely on eye-color, a trait believed by most to be purely superficial. She then proceeded to proclaim blue-eyed people superior to brown-eyed people for one day, and flipped her proclamation the next. The impact on students' performance was measurable, and the lesson

in discrimination stuck with many of those students for the rest of their lives.[23] The impact of the lessons in both these classrooms was amplified by the serious game elements, although the quality of the design determined whether that impact was positive or negative.

The need for editorial standards in game design is an area of growing concern that raises questions about the responsibility both of designers who create the simulation models and of educators teaching technology literacy. Educators should seek to enable players to identify the underlying assumptions of the game's design. Identifying the ideological bent of print, television and film media has been a skill taught in many schools for years, but the development of tools and skills to identify underlying assumptions and messages in interactive media is still immature. Authors like Greg Costikyan are working toward developing the language of game criticism.[24]

Educators must be vigilant in identifying and explaining the assumptions underpinning game systems so that the underlying design becomes a starting point for discussion instead of being accepted without examination. Likewise, game designers should be aware of both the intentional and unintentional messages their games may be communicating to players.

NOTES

1. McGonigal. *Reality is Broken.*
2. McGonigal. *Reality is Broken.* p 13
3. McGonigal. *Reality is Broken.* p 19
4. Casey Thormahlen. IBISWorld Industry Report NN003: Video Games in the US
5. Eisenberger & Shanock, 2003
6. Eisenberger & Shanock, 2003
7. McGonigal. *Reality Is Broken*
8. McGonigal. *Reality Is Broken*
9. Deci, Edward L., Richard Koestner, and Richard M. Ryan. "A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation." *Psychological Bulletin*, November 1999, 125(6): 627-68. DOI: 10.1037/0033-2909.125.6.627.
10. McGonigal. *Reality is Broken.*
11. McGonigal. *Reality is Broken,* pp 47-48
12. Achor, Shawn. "Are Happy People Dumb?" *Harvard Business Review*
13. McGonigal. *Reality is Broken.* pp 35.
14. http://edugamesresearch.com/blog/2010/02/11/dsm-v-will-avoid-videogame-addiction/
15. Thai, A., Lowenstein, D., Ching, D., & Rejeski, D. (2009). *Game Changer: Investing in Digital Play to Advance Children's Learning and Health*, New York: The Joan Ganz Cooney Center at Sesame Workshop.
16. Thai, A., Lowenstein, D., Ching, D., & Rejeski, D. (2009). *Game Changer: Investing in Digital Play to Advance Children's Learning and Health*, New York: The Joan Ganz Cooney Center at Sesame Workshop.
17. McGonigal. *Reality is Broken.* Highlight Loc. 2370-71
18. McGonigal. *Reality is Broken.* Highlight Loc. 2162-63
19. McGonigal. *Reality is Broken.* Highlight Loc. 2192-94
20. http://projects.nytimes.com/new-york-schools-test-scores/counties/new-york/districts/new-york-city-district-2/schools/quest-to-learn
21. Conversation with Asi Burak, March 29, 2011
22. http://www.wusa9.com/news/local/story.aspx?storyid=146463

23. http://www.pbs.org/wgbh/pages/frontline/shows/divided/etc/script.html
24. Costikyan, Greg. “I Have No Words & I Must Design: Toward a Critical Vocabulary for Games.”

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Critical Takeaways

Serious games are a means for education and value creation in the world. While there is great potential here, games also need to be managed carefully by responsible designers and managers to get the best value and use for individual players as well as society more broadly.

It is easy to confuse useful games that teach something important for games that merely add mechanics onto an otherwise mundane activity. It is sometimes difficult to distinguish inspiring intrinsic motivation from adding a reward system that extrinsically motivates people into making poor decisions. It can be hard, too, to differentiate valuable learning lessons from lessons that can give a wrong impression – or at worst can be detrimental to society as a whole.

Serious Games have great potential to do good, as well as great potential to do harm. It is important, as this tectonic shift happens and games become more accessible, more motivational, and more interesting, that games are also being responsibly designed and managed.

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About The Authors

Teague Hopkins

Teague is the Executive Director of the Institute for Esports Leadership (IEL). He has consulted for the White House, AOL, and Deloitte, among others, and conducted research on the use of video games to teach entrepreneurship as a Fischer Fellow at Babson College's Serious Games Initiative.

He holds an MBA, cum laude, from Babson, and a BA in Computer Science from Wesleyan University.

Caroline Murphy

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Learn More

The Institute for Esports Leadership is a volunteer-run organization advancing the use of esports to develop leadership. We believe that esports offer opportunities to practice critical leadership skills including team building, communication, strategy development, and self-discipline.

Esports are as valuable for teaching leadership skills as physical sports, and in an era where more people are working on geographically distributed teams, and coordinating intellectual, rather than physical labor, esports may even have some advantages over physical sports.

The esports industry is at an inflection point where the most successful organizations are no longer led by hobbyists, but by professionals. Management and leadership are crucial to succeed in this evolving environment. We study and promote the intersection of esports and leadership, for the benefit of both.



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esportsleaders.com · First published 2016. Reset in 2026 with a new design; text as originally published, with typographical corrections.