

## Serious Games and Seriously Fun Games

### Can They Be One and the Same?

Cuihua Shen, Hua Wang, and Ute Ritterfeld

As already elaborated in the previous chapters of this volume, serious games have been acclaimed for playing an increasingly important role in learning, psychological development, and social change (see Ratan & Ritterfeld, this volume, chapter 2; Ritterfeld, Cody, & Vorderer, this volume, chapter 1). Serious games represent the effort to facilitate education through digital entertainment media, as explicated in entertainment education models (Ritterfeld & Weber, 2006; Wang & Singhal, this volume, chapter 17). These models suggest a sweet spot to perfectly blend entertainment and education together in one game experience. Through this entertainment education blend, the advantage of fun game play calls attention to some important social and educational issues, spurring deeper thinking, discussion, and learning, as well as creating opportunities for vicarious experiences that would be otherwise impossible.

Although this approach has a tremendous theoretical appeal, it still remains unclear whether and to what extent the educational enrichment of media content into an entertainment format impacts the entertainment value. Many so-called edutainment game titles are developed with a tight budget and suffer from poor game design and presentation. The fun experiences elicited by these games are rather limited, and the hope that players would select those games and deliberately play them is often not fulfilled (e.g., Moore, Rosenberg & Coleman, 2005). Games that exclusively rely on repetitive structures and practices can hardly provide an immersive and engaging space that enables joyful gaming experiences.

However, there has been a notable increase of more sophisticated serious games (e.g., *Re-Mission*, 2006) in recent years (Ratan & Ritterfeld, this volume, chapter 2), and those games also face the challenge of being successful entertainment education. The seriousness of serious games may already diminish the pleasure even in some sophisticated games. Such an unintended effect may result from two different processes: (1) the *serious* label and (2) the seriousness of serious games, which is absent in entertainment games. First, simply labeling a game as serious or educational may already reduce its appeal to a player. Digital game play emerged from purely leisure oriented cultural practices, and if learning is prescribed through gaming it may inhibit the fun experience

associated with deliberate leisurely game play. Second, the assumption that serious games can be modeled the same as entertainment games may not hold true. The educational enrichment may require changes in fundamental game features that ultimately compromise the entertainment experience.

Although researchers have looked at the effectiveness of serious games (e.g., Brown et al., 1997; Durkin, 2006; Lee & Peng, 2006; Lieberman, 2006a; Ritterfeld & Weber, 2006), the enjoyment of such games has received much less attention than their educational outcomes. Game play is often assumed to be enjoyable even with serious content. Some studies, however, reported low enjoyment values for serious games regardless of their successful educational impact (cf. Graesser, Chipman, Leeming, & Biedenbach, this volume, chapter 6; Wong et al., 2007). In this chapter, we examine case studies of seven serious games that aimed to explore enjoyment and the seeming differences between serious gaming and seriously fun gaming. Specifically, we explore whether the enjoyment value in serious games is inevitably encroached upon by their serious purpose and content and whether enjoyability of serious games is facilitated or inhibited by the same fun factors as in entertainment games.

In order to probe the enjoyability of serious games in more general terms, we examine games that cover a variety of subject matters. The great diversity of existing serious games makes it impossible to provide a representative sample in terms of subject matters, genres, underlying educational principles, targeted player populations, and game platforms. Therefore, we conducted in-depth examinations of selected examples from the 612 serious games identified by Ratan and Ritterfeld (this volume, chapter 2).

In order to acknowledge the complex character of game enjoyability, we applied Wang, Shen, and Ritterfeld's (this volume, chapter 3) fun factors which are grouped into five dimensions: technological capacity, game design, aesthetic presentation, game play entertainment experience, and narrativity. Although Wang, Shen, and Ritterfeld's enjoyability analysis referred to entertainment games exclusively and did not include any serious games, we need to establish the same benchmark for evaluation in order to answer the question of whether serious games can be as enjoyable as entertainment games. Our enjoyment assessment supplements the common averaged unidimensional enjoyment ratings (*not at all enjoyable* to *very enjoyable*) with multidimensional fun factors adapted from the Wang, Shen, and Ritterfeld study, thus ensuring comparability in the assessment of the entertainment value of both game genres.

### Sample of Serious Games

Given the diverse nature of the serious games dataset generated by Ratan and Ritterfeld (this volume, chapter 2), we first decided to exclude games aimed only at children (61% of all games), including preschool and below, elementary school, middle school, and high school. This restriction eliminated the potential problem of assessing children's games from the perspective of adults.

In addition, non-PC games (5% of all games) and marketing games (less than 1% of all games) were excluded, as they only constituted a minimal portion of the serious games dataset (Ratan & Ritterfeld, this volume, chapter 2). From the remaining 215 games, we selected at least one game from each of the five primary content areas (academic education, occupation, health, social change, and military) identified by Ratan and Ritterfeld. We only included games that are freely accessible to the public, either through the World Wide Web (e.g., *Londoner*, 2007), or through freely distributed hard copies (e.g., *Re-Mission*, 2006). In addition, we included highly sophisticated, high-budget developments; for example, *America's Army—Operations* (2002) and *Re-Mission* (2006), as well as lower budget applications, such as *Darfur is Dying* (2006) and *Hate Comes Home* (2008). The following seven serious games were selected for case studies (see Table 4.1): *America's Army—Operations* (2002), *Objection* (2008), *Re-Mission* (2006), *Electrocardiogram* (2008), *Londoner* (2007), *Hate Comes Home* (2008), and *Darfur is Dying* (2006).

### Serious Games Enjoyability Assessment

In order to identify the enjoyability of the selected serious games and contrast those findings with play experiences in entertainment games, we used both quantitative and qualitative approaches. For both strategies, we selected a player with 10 years of experience playing digital games in all genres and relevant content areas. He was not biased toward our selected serious games as he had not played or discussed them prior to this study.

Table 4.1 Sample Description

	Primary Content Area	Producer	Website
<i>America's Army—Operations</i>	Military	United States Army	<a href="http://www.americasarmy.com/">http://www.americasarmy.com/</a>
<i>Objection</i>	Occupation	TransMedia Productions Inc.	<a href="http://www.objection.com/">http://www.objection.com/</a>
<i>Re-Mission</i>	Health	HopeLab	<a href="http://www.re-mission.net/">http://www.re-mission.net/</a>
<i>Electrocardiogram</i>	Academic education	Nobel Web AB	<a href="http://nobelprize.org/educational_games/medicine/ecg/">http://nobelprize.org/educational_games/medicine/ecg/</a>
<i>Londoner</i>	Academic education	Ramsbottom, J., Sidran, D. E., & Sharp, R. E., III	<a href="http://www.londonergame.com">http://www.londonergame.com</a>
<i>Hate Comes Home</i>	Social change	Will Interactive Inc.	<a href="http://www.willinteractive.com/hate-comes-home">http://www.willinteractive.com/hate-comes-home</a>
<i>Darfur is Dying</i>	Social change	mtvU & USC	<a href="http://www.darfurisdying.com/">http://www.darfurisdying.com/</a>

Our player was asked to play each of the seven serious games and report his enjoyment experiences afterwards. First, he had to rate the enjoyability of the serious game (quantitative strategy) and then to describe his experiences in a detailed written form (qualitative strategy). For quantitative assessment, our player's past experiences with entertainment games were used to establish a unidimensional scale to rate the enjoyability of digital game play. The scale was calibrated with entertainment games to ensure comparability of enjoyment ratings for serious games. To reasonably anchor our ratings on a 100-point scale, where 0 means not at all enjoyable, 50 means average, and 100 means very much enjoyable, we asked our player to think of two PC-based entertainment games for each of those three benchmarks on the enjoyability scale. Our player wrote down the name of the six games and provided a detailed reflection on why each game was fun or not fun for him. In so doing, the past experience was made salient to our player and the calibration of the scale was reinforced. In order to elicit a wide variety of enjoyment aspects, we provided our player with Wang, Shen, and Ritterfeld's (this volume, chapter 3) 27 specific fun factors along with the Big Five general conceptual dimensions extracted from a content analysis of 60 entertainment game reviews. Our player used this listing to supplement his own detailed explanations of the most enjoyable, average, and least enjoyable games where applicable. The resulting numerical scale, along with the detailed descriptions of examples at the lowest, middle, and highest points, were then used to anchor the enjoyability scale for the serious games rating (see Table 4.2). Thus, the enjoyability scale our player applied to serious games was reasonably comparable to the one for entertainment games.

To prime our player, the enjoyability scale and the fun factor categories were reviewed before playing each serious game. Our player tried each serious game in a random order with no defined time constraint so as to become familiar enough with the game content and rules to be able to assess its enjoyability. After game play, our player was asked to first rate the enjoyability of the serious game on the 100-point scale and then to write a detailed description of his experience that would particularly reflect on the specific factors contributing to or hindering its enjoyability. In the case of low enjoyment, he also provided suggestions for improvement. The assessment is included below with a brief description of each game's content, our player's enjoyability rating, and our player's evaluative remarks reflecting on the fun factor categories (in the order of technological capacity, game design, aesthetic presentation, game play entertainment experience, and narrativity) where applicable.

#### ***America's Army—Operations (70 out of 100)***

*America's Army—Operations* seeks to provide civilians with understandings of various aspects of soldiering by re-creating the experience of an army recruit. Players start the game as new recruits and role play from the first-person

Table 4.2 Calibration of Enjoyability Scale

Enjoyability	Examples of Entertainment Games (Producer, Release Date )	Descriptions
100	<ul style="list-style-type: none"> <li>-<i>Bioshock</i> (2k Boston, August 21, 2007)</li> <li>-<i>Counterstrike: Source</i> (Valve, October 7, 2004)</li> </ul>	<ul style="list-style-type: none"> <li>-The game design is original, with innovative features</li> <li>-The controls are very natural and simple</li> <li>-The game is non-linear and has many levels</li> <li>-Sophisticated AI</li> <li>-The game is challenging and winning is very gratifying</li> <li>-Very good graphic and sound effects</li> <li>-The game has a very intricate and deep storyline; there is no end to the game, it can be played indefinitely without losing its fun factor</li> <li>-The game maintains a high sense of immersion</li> </ul>
50	<ul style="list-style-type: none"> <li>-<i>Postal 2</i> (Running With Scissors, April 14, 2003)</li> <li>-<i>The Lord of the Rings: The Fellowship of the Ring</i> (Surreal Software, October 22, 2002)</li> </ul>	<ul style="list-style-type: none"> <li>-The game has decent graphic and sound effects, with some glitches (e.g., the camera is stuck on walls from time to time)</li> <li>-Controls and game mechanics are of average quality</li> <li>-Game play experience is exciting but is not sustained over time</li> <li>-There is not much immersion throughout game play</li> </ul>
0	<ul style="list-style-type: none"> <li>-<i>Beach Head 2000</i> (Digital Fusion, June 15, 2000)</li> <li>-<i>Driv3r</i> (Reflections Interactive, March 22, 2005)</li> </ul>	<ul style="list-style-type: none"> <li>-Simple, stiff and unnatural control</li> <li>-The game lacks complexity and replayability</li> <li>-It is not rewarding at all to advance to the next level</li> <li>-Sound and graphics are poor</li> <li>-The game is either too easy or too difficult, making it either boring or frustrating.</li> </ul>

perspective, engaging in training exercises and classroom sessions. The game is freely accessible to the public, and players can team up with and play against other players around the world.

*America's Army—Operations* was rated the most enjoyable game among the seven reviewed in this study. Enjoyability is related to the game's superior production quality and especially to the immersive environment created by great graphics and sound effects. The game also has a high level of complexity and flexibility to maneuver the character as our player describes: "...while the controls were a little cumbersome compared to other first-person shooter games I've played, I was willing to put up with them because of the level of control

they allowed me." Moreover, the game covers a wide spectrum of army operations with incredibly realistic details: "I was even required to buckle my seatbelt before driving any vehicle in the game. The exercises covered all aspects of military operations including basic maneuvering/obstacle courses, firearm and equipment training, vehicle operation, first aid, surveillance and covert operations training, parachuting, marksmanship, etc." According to our player, the underlying design mechanisms of the game incrementally advance player skills, preparing them for more complicated combat sequences in subsequent missions. The tasks can be quite difficult and they make winning rewarding. All vital game statistics (kills, deaths, time played, weapons used, accuracy, etc.) are recorded and used to produce a worldwide ranking system for each player. As the player's rank moves up, he or she is able to unlock new items, which "made the game much more enjoyable because it provided an objective to strive for, as well as a sense of competition."

*America's Army—Operations* presents a sophisticated and realistic interactive digital world with a wide breadth of new scenarios for the player to explore, both individually and competitively. Coupled with good technological and aesthetic capacities, this game is enjoyable and has long lasting appeal, meaning that players are likely to repeatedly engage with the game.

### Objection (60 out of 100)

*Objection* is a set of games (*Criminal*, *Civil*, *Expert Witness*) designed to train lawyers in courtroom skills. In each game, the player must use trial skills to achieve the best possible jury verdict for his or her client. This game is designed for college students or adults and is certified by the Continuing Legal Education (CLE) to receive CLE credits throughout the United States.

Technologically, the game runs quite smooth and stable, with simple and intuitive controls. For this study, we utilized the free trial version of this game, which is identical to the full version in terms of technological capacity, game design, and game play experience. The trial version simulates the role of a defendant's attorney and allows the player to participate in the prosecutor's questioning of his first witness. The player must judge each of the prosecutor's 20 questions as either proper or as one of 12 objectionable categories. In the full version, obtaining a high score advances the player to a higher level. For someone with no background in law, this task is quite challenging and it took our player five times to reach a sufficient level of expertise to advance to the next level (not included in the trial version).

The game offers a variety of narratives and dialogues, increasing the appeal for game replay. A fairly fast pace also contributes to the game's enjoyability. In general, our player found the game "addictive," "rewarding," and "replayable," although, aesthetically, the game doesn't offer sophisticated sound or graphic effects. Our player described the graphics as "blocky and simplistic." However, our player thought the game had a nice style and humor. The theme song and

opening video even made our player “laugh out loud.” Therefore, even if the game lacks high quality sound or graphic effects, the simple but stylish artistic presentation contributed to the overall enjoyability of the game.

### **Re-Mission (50 out of 100)**

*Re-Mission* is a PC-based health-promotion game in which players control a nanobot who destroys cancer cells, battles bacterial infections, and realistically manages the life-threatening side effects associated with cancer. The primary goal of this game is to help young cancer patients better understand and manage their disease. Researchers have also used it to increase cancer related awareness and promote healthy lifestyle among youth in general (Lieberman, 2006b).

Our player complimented the originality of the game concept, but lamented about the lackluster game play. He completed all three tutorial missions as well as the first five levels of the game, but found the game not fun enough to advance further. In each mission, he went through a patient’s body to combat cancer cells. According to our player, the game play was “repetitive” and “difficult not in a skill mastery type of way, but rather in an awkward controls, hold down the fire button and hope for the best frustrating kind of way.” Our player characterized his experience in each mission as “flying through stages of identical looking tunnels killing identical looking enemies while picking up identical looking power-ups.” Conversely, an enjoyable element was the narrative elements of reading various patients’ biographies and detailed description of their ailments. Our player found the sound and voice acting “engaging and fairly immersive,” and the overall production of good quality. It was the monotonous and bland game play that inhibited his desire to play further.

### **Electrocardiogram (40 out of 100)**

*Electrocardiogram* teaches players 16 years and older the basic elements and operations of electrocardiograms (ECGs). The player assumes the role of a medical doctor and practices performing ECGs on various patients. There are three main tasks to complete: choose and interview a patient, prepare and administer the cardiogram, and finally diagnose the patient.

Overall, our player found the game interesting but lacking complexity. In terms of technological capacity, the game is generally stable, and the controls are both effective and easy to use. According to our player, *Electrocardiogram* has a solid design, where the tasks “were clean and easy to understand, and did not interfere with the message of the game.” Accomplishing a task such as correct diagnosis of a patient was rewarding because it required a fair amount of effort to make the right decision. Although our player spent much of his playtime reading detailed information rather than actually playing the game, he still found the game quite engaging: “I was intrigued enough to go back

through more quickly with the other patients to see if I could diagnose them correctly as well.” The main drawback of the game is its lack of complexity. There was very little actual game play and the game does not provide multiple levels. In addition, the game doesn’t have sound, and its visual artwork is not particularly sophisticated, but of decent quality.

### **Londoner (35 out of 100)**

*Londoner* is designed to supplement an undergraduate-level history class on 17th century England, and can be played by college students or adults. The player makes financial, career, and other life choices as a young Londoner in order to earn enough money for a living, raise a family, and increase social status. Different life choices are supposed to have different consequences, such as ending up in debtor’s prison or leading a prosperous life. Historical information about London in the 17th century is presented throughout the game.

Technologically, the game offered very limited options to control the character. Our player noted: “It quickly became obvious that the financial choices I made had little bearing on the game. Unless I was totally irresponsible with the money I had it was almost guaranteed that I would finish the game wealthy and married. Because of this there was no real challenge to the game, which was a letdown.” Because of the disconnect between the player’s decisions and the outcome of the game, the game failed to engage our player, to provide a sense of challenge and reward, or to offer a pleasant game play experience. The educational content, presented as historical information in the game, was not imbedded in the game play or correlated with outcome. Therefore, the player quickly skipped the educational content. Aesthetically, the game didn’t offer a rich representation of historical London since the only graphics employed are still images, and the game has no sound.

### **Hate Comes Home (20 out of 100)**

*Hate Comes Home* is a self-acclaimed serious game for social change, designed to educate middle/high school aged and above players on the dangers and consequences of discrimination. The technology behind this game is unique among the games rated in this study, because it is a series of short video clips that describe the scenarios and the different outcomes associated with the player’s choice. It offers very few opportunities to actually play the game, such as making decisions as to whether or not the player should stick to his or her values or to let discrimination go unchallenged.

The game design of *Hate Comes Home* is primitive and there is no interaction between the player and the development of the story. Despite the stability of the system, this game is not enjoyable to play or to contemplate replaying. Our player explained that “The only task in the game was choosing whether or not to do ‘the right thing’ by choosing what action to take when a situation

arose. While the ability to determine my own outcome in the game was a good idea, there were just not enough opportunities to do so. Out of the 35 minutes of total game time, I was only able to make 3 decisions about what to do. The rest of the time was filled with 12 videos ranging from 1 to 5 minutes in length as well as 14 pages of straight text.... While the videos were engaging to some extent (though fairly corny) I felt like I was just sitting there being lectured, not playing a game." Even when the player was given the opportunity to make a choice, there was little challenge involved since the right choice was crystal clear, which made the player felt "no sense of efficacy." Furthermore, the player's decision is completely disconnected from the outcome, as "discrimination still won" even if the player stood up for the right thing. Aesthetically, the videos are of decent quality, although our player described them as sometimes "cheesy and long."

### **Darfur is Dying (20 out of 100)**

*Darfur is Dying* is played from the perspective of a displaced Darfurian, where the player must negotiate forces that threatened the survival of his or her family as well as the refugee camp at large. It seeks to raise societal awareness of the genocide taking place in Darfur, Sudan. The game has two major tasks: to collect water and to bring that water to the village to create food or building materials. The main objective is to allow the village to survive for 7 days.

The game suffers from technical glitches. For example, it produces a massive harsh sound every time a militia vehicle drives straight into the camera. Our player also had difficulty using controls in certain modes.

Although the concept of the game is intriguing, the game play is repetitive and awkward, as described by our player:

The collecting of water was awkward and seemed superfluous, and I lost attention fairly quickly. In fact after collecting water a few times I just let my avatar get hit by the militia's truck so that I could advance to the village mode. As disappointing as the collecting water task was, the village mode was even worse. Moving my avatar around the map was frustrating at best, and although you could complete different objectives like bring water to the fields to create food, or bring water to a housing plot to allow for the construction of new houses, the tasks were exactly the same.

In addition, our player found little connection between the tasks and the intended outcomes: "There was no thinking involved, just walking from the water hole to the site and back again." Poor game play diluted the intended educational effect of the game: "The awkward mechanics and repetitive unrewarding nature of the tasks were so distracting that I forgot that they were even trying to make a point about the severe conditions in Darfur." Overall,

this game is not considered as attractive for play, even though other parts of the game, such as visual presentation, are of good quality and style.

## **Discussion and Conclusion**

We looked at the entertainment value of seven serious games by rating and reviewing them on a scale of enjoyability based upon the entertainment experience of entertainment games (see Figure 4.1). The enjoyability of two out of seven games was assessed above average (*America's Army—Operations*, and *Objection*), one was average (*Re-Mission*), two below average (*Electrocardiogram*, and *Londoner*), and two much below average (*Hate Comes Home*, and *Darfur is Dying*). This distribution suggests that our sample covered a wide range of serious games in terms of their entertainment value.

Our first goal was to explore whether serious games could hold the promise of containing as much pleasure as entertainment games. Our findings reveal that serious games can be reasonably enjoyable compared to their entertainment counterparts. Five out of seven games ranged between 30 and 70 assessment points and could therefore be placed roughly around average in the enjoyability calibration. For scholars as well as practitioners, this heartening finding suggests that the blend of entertainment and education in digital games is possible in reality. Serious games, although not primarily designed for entertainment purposes, can still fulfill our entertainment desires to some degree.

Our second goal was to explore whether the enjoyability of serious games would result from the same inhibiting and facilitating factors as in

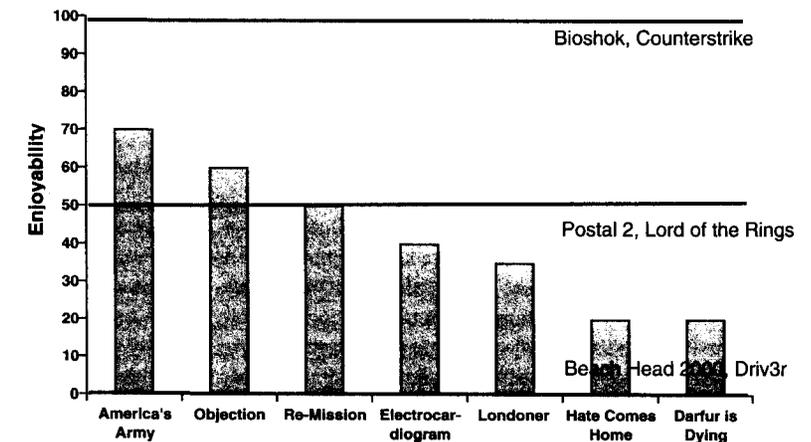


Figure 4.1 Enjoyability ratings of serious games (columns) with scale anchored by entertainment games (solid lines).

entertainment games. In evaluating the detailed reflections on game enjoyability of our sample, we did in fact find similar patterns discussed by Wang, Shen, and Ritterfeld (this volume, chapter 3). Our data suggest that in order for a serious game to be acceptable or playable, it has to meet certain thresholds in terms of technological capacity, aesthetic presentation, and game design elements. For example, it has to have a stable system with effective and intuitive control (when our player could not move the character around easily, it creates great frustration in *Darfur is Dying*, but when it worked smoothly, it offered tremendous pleasure in *America's Army—Operations*). A game must also have decent graphics and sound effects to attract the player (two games sampled here, *Electrocardiogram* and *Londoner* did not even have sound, which further inhibited their enjoyability). In addition, a game has to have some basic structure and formal game elements in place. It certainly diminishes the pleasure of play if the player is given limited options, as in *Hate Comes Home*, must take on repetitive actions, like in *Re-Mission* or *Darfur is Dying*, or when the actions do not result in logical consequences, like in *Londoner*, *Hate Comes Home*, and *Darfur is Dying*.

We have also recognized that a number of *super fun* factors contribute to a high level of enjoyment, even when the topic or content is serious (as opposed to pure entertainment). These super fun factors are namely: narrative-related elements such as character and dialogues (as in *Objection*), humor (also in *Objection*), and social interaction (as in *America's Army—Operations*). Of course, these games with super fun factors are often characterized by a more sophisticated and high-quality presentation and a game play structure with complexity and diversity.

For the serious games examined in this study, we found that most passed the threshold of technological capacity, aesthetic presentation, and game design. A few of the games were less enjoyable due to technological glitches. Most of the other games fell into a second category: they were playable, at rather average fun level, but not highly enjoyable. These games were generally stable technologically, but might have some problems with control or being less sophisticated aesthetically, which inhibited their enjoyability. In order to reach the third stage—to be a highly enjoyable game that is often deliberately selected and played over a longer period—a game must utilize both narrativity and social interaction to promote player emotional engagement and elevate the level of pleasure in game play (also see Wang, Shen, & Ritterfeld, this volume, chapter 3; Wang & Singhal, this volume, chapter 17).

As already noted above, some serious games proven to be effective in achieving educational goals may not be assessed as most enjoyable (cf. Graesser, Chipman, Leeming, & Biedenbach, this volume, chapter 6; Wong et al., 2007). The same pattern holds true for *Re-Mission*, where test results demonstrate that it has significant power to change adolescents' knowledge, attitudes, and even self-care behaviors related to cancer, but which only received average enjoyment ratings from our player. Our study, however, examined the enjoyability of

serious games according to an enjoyability scale based on entertainment games. In other words, we found that although serious games are not yet as much fun as the top entertainment games, they can still be reasonably enjoyable. Other studies, specifically those comparing serious games with other forms of instruction, may report other findings about enjoyability levels because they adopt a different frame of reference.

The above conclusions, however, are merely a preliminary exploration of the link between serious games and enjoyability. As mentioned earlier, we only analyzed 7 serious games that are by no means representative of the more than 600 or more serious games currently on the market (Ratan & Ritterfeld, this volume, chapter 2), considering, for example, that the sample did not include games that charge a premium to play. Such games might have a larger investment figure and better production quality which could influence enjoyability. However, the enjoyability of games is not always a direct result of the budgetary investment in game development. *Re-Mission* was produced by a group of leading game developers with a budget similar to those for entertainment games (HopeLab, 2006), but it did not score very high in terms of enjoyability. The game boasts nice auditory and visual presentation, but monotonous game play. Thus, we cannot establish a clear connection between development budget and enjoyability. Budgetary investment seems crucial to enhance and raise enjoyability, but is not sufficient to ascertain high enjoyability.

On the other side, poor production effort is most likely inhibiting game enjoyability. Serious games such as *Hate Comes Home* and *Londoner* had a relatively low budget, as well as low enjoyability ratings, and were found to have inadequate technological capacity, less sophisticated presentation, and inferior game design. Current serious games development is usually supported by non- or small-profit agencies with limited resources available compared to high-end entertainment games development. Therefore, the crucial question for serious games is not whether this genre would be as enjoyable as successful entertainment games if the resources were invested, but what specific aspect(s) of serious games contributes most to the overall enjoyability and hence deserves the most attention and resources at the development phase.

This research suggests a relationship between several key aspects of serious games and enjoyability. First, technical elements such as smooth running and ease of use of the user interface are the backbone for an enjoyable game play experience. They ensure that the player is not distracted or frustrated because of technological glitches. Second, aesthetic presentation, visual and sound effects in particular, is not a sufficient condition for enjoyability. Several games examined in our study have good quality visuals but low enjoyability, such as *Re-Mission*. On the other hand, games like *Objection* manage to engage the player with very limited and even simplistic sound and visual effects. Since aesthetically appealing presentation may be very expensive to produce, it is worth reconsidering prioritizing sound and visual effects when game development resources are limited. Third, the game must have the basic game structure and

formal elements of challenge and reward to be enjoyable. Some games with lower enjoyability scores suffer from a disconnection between the available actions and their respective consequences, which were not logical or meaningful to the player. Lastly, we found that humor in narrative and dialogues, diversity of tasks, and the ability to connect and play with other players over the Internet could contribute greatly to enjoyability. Serious games ventures should exploit these super fun factors to increase their enjoyability.

At this point we would like to draw the attention to the greater context of digital gaming in which serious games are a subset. As stated above, the mere labeling of some games as educational or serious may elicit negative reactance in a player. Utilizing games in an educational, occupational, military, or health setting could therefore be a double-edged sword. On the one hand, labeling these games as serious may elicit negative reactions if presented in a leisure context. On the other hand, serious games may simply represent an innovative way to teach and, thus, be highly appreciated by their players. If academic, education, health, or occupation related games do not compete with leisure activities, but with serious communication of less enjoyable format, they are most likely to fulfill their potential. In a gaming context, players may enjoy interacting with content that they are supposed to process anyway; however, whether they would deliberately choose this content over leisure activities is still unknown and could be explored by future research.

Given the patterns we've identified between entertainment and serious games, we believe that the supposed great potential and tremendous promise in serious gaming, as described in the beginning of this chapter, is well founded. In comparing examples of lower to high enjoyability, we identified similar causes for limited fun in both serious and entertainment games. The enjoyability aspects of digital games are very similar for both genres. Consequently, the dichotomous approach of establishing these genres as distinct must be challenged (cf. Jenkins et al., this volume, chapter 26; Gee, this volume, chapter 5), although whether the players of both genres follow the same motivational patterns remains unknown. Thus, in answering the question raised in the title of this chapter we conclude: Yes, serious games and seriously fun games can be one and the same.

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