

UNDERSTANDING VIDEO GAMES

THE ESSENTIAL INTRODUCTION

SECOND EDITION

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8 SERIOUS GAMES—WHEN ENTERTAINMENT IS NOT ENOUGH

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TRADITIONAL GAMES FOR SERIOUS PURPOSES/CATEGORIZING EDUCATIONAL COMPUTER GAMES/THE RATIONALE BEHIND EDUTAINMENT/THE INSTRUCTIONAL APPROACH TO EDUTAINMENT/THE MODERN APPROACH TO THE EDUCATIONAL USE OF COMPUTER GAMES/THE EDUCATIONAL EFFECTIVENESS OF VIDEO GAMES/POLITICAL GAMES AND NEWSGAMES/ADVERTAINMENT/GAMIFICATION—PLUG'N PLAY GAMES FOR REAL?/GAMES-FOR-CHANGE—REVOLUTIONARIES RISE/FINAL REMARKS

Games are really growing. It used to be mostly about entertainment, and now it's about pretty much everything else as well. The area of "serious games" has benefitted from the omnipresence of games, but has also helped influence them by showing how games can be so much more than run-of-the-mill shooters for teenage boys. During the last 20 years the game industry grew in value from €15 billion to €75 billion, and each week the people of this planet are spending something like three billion hours playing. We're playing in a number of different ways.¹ We see people doing it on their phones, on Facebook, on their TV screens, and on websites. The range of platforms, channels, and genres offered for different player types is immense, and the game industry seems to have "cracked the code" for making games a mainstream offer.

Looking back ten years, the general perception of games was quite different from that of today. Which would have been the first games to come to mind back then? It could well have been the pervasive Counter-Strike. Today the mainstream game landscape is far more varied and a casual title like *Angry Birds* is hugely famous, and not really violent in the classic, gory sense.

"Serious games" have played a large role in this transition and will probably go on to have a still larger impact on the game market. Especially since the barriers for larger penetration in schools (such as limited hardware) are slowly evaporating. As these barriers disappear, the market may grow even more rapidly. Market research companies like Gartner² and IDATE predict a huge market around the corner. IDATE, for example, predict growth from €1.5 billion in 2010 to €10.2 billion in 2015.³

Arguably, this chapter deals with one of the most nebulous and contested issues in the game world: the value of it all. We know that games serve, first and foremost, to entertain. As we contemplate the moneymaking juggernaut that is the gaming industry, it would be foolish to argue that anything is as profitable as entertainment.

The question is: what do players take away from video games? Not on a cultural level, but on an individual level, in terms of being influenced? Do players learn from video games, and if so, what do they learn? Can we manipulate players by using simple rewards and status, as gamification evangelists claim?

Is a video game capable of positively affecting the player's attitude towards Nike, as attempted by the ambitious Nike soccer game *Secret Tournament*, developed to coincide with the World Cup in 2002? In the game, you step into the shoes of world-class soccer players and have to survive a two-a-side soccer game staged in a cage.

Could players be persuaded to join a political organization that delivered its message through video games, as in the case of the game *Ethnic Cleansing*, where Jews, Mexicans, and other groups are offered as the only true enemies in an otherwise classical style of first-person shooter? However distasteful, the message is clear, and converting impressionable teenagers to a racist agenda is the goal.

Can you name the seven wonders of the ancient world? If so, perhaps you are a trivia buff, or a world traveler. Or perhaps you are among the millions of people who have played *Civilization*, leading an entire people to glory and world domination. In this classic game, the player must develop a civilization of her choice, for example, from a band of early American settlers to a modern nation spanning entire continents. Along the way, the player must absorb a wide range of historical knowledge, combining it with an understanding of geography, economics, and cultural history, to adapt and prosper.

Can the world really be made a better place by the so-called "games-for-change" movement? In *Fate of the World* you must try to develop the world in a balanced way to ensure its survival, weighting technology, climate, poverty, education, and similar variables against each other.

These examples illustrate what this chapter is about—can we get something more from games than just fun?

It is also clear that "serious games" is a diverse topic. The area presents quite a complex array of factions, all talking about the same issues in different terms. No matter the language used, they all argue that games can be used for more than entertainment, and often research is aimed at documenting positive outcomes. To further complicate matters, the topic is crowded with competing terminologies, all more or less driven by opportunists looking to build niches for themselves.

For the origins of the expression "serious games," we must look to the 1960s. The term was coined by the American academic Clark Abt in 1970, and formed the title of his influential book.⁴ Today, the label refers to a broad swathe of video games produced, marketed, or used for purposes other than pure entertainment; these include, but are not limited to, gamification, games-for-change, game-based learning, educational computer games, **edutainment**, **adverntainment**, corporate games, health games, military games, and political games (categories we will expand upon below). Serious games span a broad range, and the games in question need not be originally conceived of as "serious." In theory, any video game can be a serious game, depending on its use in practice, and the player's perception of the game experience.

The range of serious games means that very different research traditions and approaches have addressed this topic. Early examples of research interest in serious video games are: the work of psychologist Patricia Greenfield, including her 1984 book *Mind and Media*, which deals among other things with how computer games influence individual development; Thomas Malone with his work on motivation, education, and video games;⁵ and psychologists Geoffrey and Elizabeth Loftus with their 1983 book *Mind at Play*, about the cognitive learning gains from video games. Interest increased after 2000, with key academic contributions from James Paul Gee on basic learning principles of mainstream entertainment games and socio-cultural

theory⁶ by Kurt Squire on the implications of actually using mainstream entertainment games in real classrooms.⁷ In general it has been the discipline of education that has tried most rigorously to understand the educational potential of using games, for example, in the work of Angela McFarlane and colleagues,⁸ Marc Prensky,⁹ John Kirriemuir,¹⁰ and Simon Egenfeldt-Nielsen.^{11, 12}

Before turning to the educational games, which dominate the field of serious games, it is worth examining other emerging serious games areas, such as adverntainment and political games.

TRADITIONAL GAMES FOR SERIOUS PURPOSES

Although the term was coined later, the serious games "movement" was born in the late 1950s, with non-electronic, pen-and-paper, and board games. By the 1970s, educational games had exploded in popularity, and were becoming an important pedagogical tool, especially for teaching in American businesses and the military. Then as now, the games used in such settings were primarily simulations, aimed at replicating precisely a real-world event, from landing a plane to implementing city taxes, rather than the broader category of fictional games including action, adventure, and strategy, in which the replication of the real world can be less exact. One of the first educational non-electronic games, for example, was *Inter-Nation Simulation* from 1958, used in high school social studies classes to teach international relations. Here, players control one of up to seven hypothetical nations, and need to negotiate with the other nations in order to solve problems ranging from minor international crises to nuclear war. Another simulation, this time aimed at 11-year-olds, was *The Sumerian Game* from 1961, in which players learned about economic factors in Mesopotamia around 3500 BC.

Since these initial efforts, the creation and use of such non-electronic—or "traditional"—games have been relatively constant, and continue to see a stable level of use and following. They were popular with some teachers, but have never become a core feature of the educational system. Alongside this popularity, research into the educational use of traditional games is now well established, with peer-reviewed journals, well-known researchers, and substantial research topics. Over the last 50 years, researchers have addressed varied topics, from the learning outcomes of traditional games to the practical barriers to using such games. The majority of these findings are relevant to the educational use of video games. Here we present the most important implications, with brief discussions of the key topics for video games: effectiveness, motivation, debriefing, and the influence of teachers and setting.¹³

The number of studies on the effectiveness of traditional games in education is quite high, spanning more than 40 years of research, and offering some clear findings. The studies so far suggest that games are a viable alternative to traditional teaching, and provide approximately the same learning outcome—that is, a student has the same chance of learning material using a game as he does using another means of learning. Games cannot necessarily be said to be more effective than other teaching forms, although most studies have offered evidence of better retention over time and potentially better transfer.¹⁴ Students tend to subjectively rate their learning outcome higher when they use games, and to prefer gaming to other teaching methods. Thus, for good or bad, even though we cannot objectively measure an increased learning outcome, students often feel they have learned more. Indeed, the preference of students for games fits well with the increased motivation consistently found when examining the educational use of games.¹⁵

The effectiveness of traditional games relies heavily on exactly how they are used in a teaching environment. Debriefing—the process of reflection after the game has finished—is especially important. Researchers have found that students can make incorrect assumptions based on their game experiences.¹⁶ Therefore debriefing is key, as the teacher needs to take time to correct any mistakes, clarify misconceptions, and expand on the game experiences.¹⁷

The role of teachers and the setting for educational games have caused a number of problems in these studies. The school setting—with its physical limits in terms of classroom size and logistical limits in terms of available time for teaching—is not very appropriate for games. In addition, most teachers have little experience of using games, and this jeopardizes the learning experience. The teacher's theories of learning—not to mention their opinions about the value of alternative teaching strategies—may also hinder the effectiveness of games.¹⁸

As we can see, research into traditional games has addressed some of the tough questions about the proper role of games in education. This research effort shows no sign of abating, as the use of games in education has continued to grow. And today more and more of these educational games are electronic. As we turn to video games, the 30 years of research into traditional games offers interesting insights. In particular, as we will see later in this chapter, many of the ideas from traditional games research are relevant to more recent work on the educational use of computer games which challenge the dominance of edutainment.

It is important to understand that there are different kinds of educational computer games; although the term “edutainment” is usually used as an all-encompassing term for educational computer games and the use of computer games for education, it is important to understand that there are different kinds of educational computer games. These are examined in the next section.

CATEGORIZING EDUCATIONAL COMPUTER GAMES

The first, most obvious category is commercial educational video games, often known as “edutainment.” Edutainment focuses on teaching the player certain specific skills: algebra, spelling, problem solving, and other basic skills. Edutainment titles include *Pajama Sam*, *Castle of Dr. Brain*, and *Mathblaster*. In *Mathblaster*, the player must shoot down the right answer to an arithmetical problem to progress; with any luck, the player learns basic math along the way. Many edutainment games are consciously devised to mirror “normal” video games, in order to make them more appealing. However, the implemented gameplay and graphics are usually quite dated. Edutainment titles have a strong educational component but often do not achieve the high levels of engagement associated with commercial titles.¹⁹

The second category comprises commercial entertainment titles used fairly haphazardly for education. These rarely focus exclusively on teaching a specific topic or skill that can be clearly mapped to a curriculum. Commercial entertainment video games in this category include *SimCity* and *Civilization*, titles used by a number of schools. In the game *SimCity*, a prime example of a commercial game with educational potential, players have to plan and run a small city, developing it from a hole in the ground to a bustling metropolis. In order to do so they must understand many of the basic principles of urban planning, such as zoning, sewage, land prices, pollution, crime, and unemployment. The educational goals of commercial video games are mostly indirect rather than direct, and this can lead to a skewed focus in the learning process. However, their strength is that their motivational

effect is well documented by their success on the commercial entertainment market. When commercial games like *SimCity* get it right and are used correctly, they are an unbeatable educational experience.

The third category is research-based educational video games; these often challenge the existing formula for edutainment.²⁰ Edutainment originating from research often presents new approaches and provides strong evidence for learning outcomes. However, these titles often lack the budget and technical quality to compete with more commercial titles. They make a greater impact only if published on the commercial market with some modifications. Examples include *Oregon Trail*, *Logical Journey of the Zoombinis*, *Phoenix Quest*, and *Global Conflicts: Palestine*. In *Global Conflicts: Palestine* (produced by one of the authors of this book) you play a journalist arriving in Jerusalem. You have to write stories and in the process find sources, information, and recognize different perspectives and agendas to get the right story.

Research-based educational computer games are still few and far between, but show that there is a way to combine the strength of commercial entertainment games with education without necessarily limiting oneself to edutainment. Even though there are different forms of educational computer games, edutainment has come to dominate the area. Its very particular approach, which is both problematic and limiting, is described in the next section.

THE RATIONALE BEHIND EDUTAINMENT

According to legend, founder of Electronic Arts Trip Hawkins in 1984 coined the term “edutainment” to refer to electronic games that use entertainment in the service of education. The label was used with great success for the top-seller *Seven Cities of Gold*, a game about the Spanish colonization of Latin America in the sixteenth century.

While edutainment in general conversation refers broadly to any electronic use of entertainment for educational purposes, it appears in a variety of forms depending on the learning approach. Historically, edutainment started out in the United States in the 1970s as a very fragmented field, with different developers picking their own favorite theory from the major learning approaches (behaviorism, cognitivism, and constructivism). Early on, edutainment drew heavily on existing traditions within educational media, but this tendency became even more marked in the early 1980s. By then, edutainment basically relied on the learning principles of behaviorism, articulated first by John Watson in 1919.

Today, we still have edutainment titles similar to those from the 1970s and 1980s. The behaviorist approach is less concerned about the actual connection between the game and the learning experience; the game often simply serves as a reward for learning. So although edutainment does not have to be behaviorist it is often so today. This has increasingly led researchers into the educational use of games to look at using commercial computer games. Here they rely on the lessons learned from non-electronic games and simulations, where, for example, debriefing is critical. Indeed the limited research on educational use of commercial computer games has provided very similar results to the extensive research on traditional non-electronic games discussed earlier.²¹

So while edutainment started out as a serious attempt to create video games that could teach children various subjects, it was quickly marred. The reliance on behaviorism resulted in games that relied heavily on simple game mechanics and quite traditional learning principles, to the disappointment of researchers and many

parents.²² Today edutainment tends to focus on simple game structures which provide a limited learning experience because they feed the player information, rather than encouraging curiosity and exploration.

We must also acknowledge that edutainment, from the very start, has primarily been driven by business interests. This pedagogically mostly unambitious perspective has arguably undermined the market by producing a long string of low-quality games that simply aren't very engaging to play.²³ The edutainment category also includes a number of titles with questionable educational content, developed by opportunists seeing a chance to capitalize on parents' hopes for such games. These are often found attached to a license such as Disney, Garfield, or another favorite dish of the day, and have fielded some of the more spurious examples—games which focus on the same basic content and offer little that is new in the way of teaching math and spelling (which remain among the most popular topics).²⁴

The formula settled on by most edutainment titles in the 1980s which are still with us today can be defined by the following characteristics:

- Little intrinsic motivation Edutainment relies on extrinsic motivation—the promise of rewards—rather than intrinsic motivation, arising from the game activity *per se*. Extrinsic motivation is not related to the game but consists of arbitrary rewards, such as getting points for completing a level; intrinsic motivation, on the other hand, might be a feeling of mastery from completing a level. It is considered more pedagogically valuable because research shows that it leads to stronger learning experiences (especially Malone's research, that we will discuss a bit later). Where intrinsic motivation is in short supply for edutainment, it is evident when we look at the educational use of commercial video games. Intrinsic motivation is also quite strong in the research-based educational computer games, although with large variations.
- No integrated learning experience Usually edutainment is unable to integrate the experience of playing with the experience of learning, so the latter is subordinated to the more palpable experience of play. The player will often concentrate on playing the game rather than learning from the game. This problem is most evident in entertainment computer games used for educational purposes, where the entertainment experiences are not necessarily closely related to any accidental learning content, skills, or competences. Research-based titles again often excel in this area, as they are capable of finding unique game mechanics that work as significant learning activities.
- Drill-and-practice learning The learning principles in edutainment are inspired by drill-and-practice thinking rather than understanding. Games encourage the player to memorize the answers—for example, that two plus two equals four—but don't necessarily teach the underlying rules that make this true. Again, we will see that research-based games and entertainment computer games used in education rely on quite different learning principles. Here we find that discovery, exploration, problem solving, and experience-based learning are much more appropriate for describing the game and learning experience.
- Simple gameplay Most edutainment titles contain simple gameplay, often from classic arcade titles or a simple adventure game with a world you can move

around in. The simple gameplay can be effective, especially for younger and less avid game players. However, increasingly we need to deliver more advanced and innovative game experiences to be able to keep educational games engaging and motivating compared to the rapidly developing entertainment titles. In particular, entertainment computer games have become quite strong when it comes to developing new formats.

- No teacher presence Edutainment hardly demands anything of teachers or parents; it assumes that students can simply be put in front of a given game title, and through gameplay alone they will learn the given content or skills. This is a very problematic assertion, given recent research, for example, by Egenfeldt-Nielsen²⁵ and Squire.²⁶ In research on educational use of *Civilization III* and *Europa Universalis II* in high schools, the teacher is crucial to facilitating students' appreciation of key experiences in the game and to expanding these experiences beyond the game world.

It is a common problem in edutainment that the video game and the educational material used is completely separate. In the commercially successful edutainment title *Chefren's Pyramid* the player might read something about the pyramids, and then play a bit of backgammon. This hardly facilitates a meaningful learning experience. A way to overcome this would be for games to implicitly use educational material as part of the basic conflict (or goal) of the game, as suggested by Malone.²⁷ Or, in technical terms, the game's victory conditions would require the desired learning outcome, so the player would have to utilize the desired knowledge in order to win. For instance, gaining geographical knowledge in *Civilization* is crucial to taking full advantage of the map, and knowledge of the historical development of a certain region is beneficial in *Europa Universalis II*. Whether you get this information before, during, or after playing the game is not important. It is important that you will actually need educationally relevant knowledge, skills, or attitudes to succeed in the game, because you will then find it relevant and meaningful while playing the game, and worth "holding" onto. However, a fruitful connection between educational content and the basic game structure often remains difficult to construct. The simple structure of video games limits the amount of material one can include and this material must be integrated with the core game activities. Otherwise the player risks learning only one thing, namely how to play the game.

Consequently, the attitude among educators, researchers, and game developers towards edutainment titles is often one of deep skepticism. The game design, the learning principles, and the graphics are all criticized heavily by both children and parents.²⁸ Almost none of the current edutainment titles are built on research that verifies their educational benefits. However, the ghettoized position of edutainment games may be changing. An understanding is emerging among developers, educators, and researchers that to make successful edutainment games one may have to be inspired more directly by the commercial game industry. The minimal success of edutainment titles over the last ten years implies that children are unlikely to be attracted to discount games.²⁹ The clearest place to see the multi-faceted development is on the App Store that is one big laboratory (for better and worse) for trying to find more or less creative ways of combining learning and gaming content. The game titles that dominate the commercial sales charts are a great mix of simple games, great ideas, failed attempts, and well-polished products. A major budget is in no way a guarantee for success.

THE INSTRUCTIONAL APPROACH TO EDUTAINMENT

Despite developments in the approach to educational games and more experiments, the principles of behaviorism continue to influence edutainment heavily. However, the growing importance of cognitivism during the late 1980s, supplemented with behaviorism, has led to what we can refer to as the “instructional approach.” This approach attempts to describe how video games can most benefit the player and how to deal with various obstacles to learning. The main learning principles within the instructional approach come from the laws of exercise and effect developed within a behaviorist framework. The law of exercise says that repetition is crucial to learning something, which is surely true for learning a number of basic skills such as reading, writing, and spelling. The law of effect states that we can strengthen a response by providing a reward.³⁰ These basic principles have been expanded within the field of cognitive theory, which has articulated a number of potential obstacles to learning—limits like attention, processing speed, interfaces, and motivation.

During the 1980s, the cognitive theorist Thomas Malone elaborated on the instructional approach, and stressed that to be effective, gameplay and educational content must be integrated. Malone identifies a number of factors relevant to designing educational video games, and especially stresses the need for intrinsic motivation. In 1987, Malone and Mark Lepper³¹ wrote arguably the most influential papers in the research on educational video games. However, much of Malone’s work has not had a lasting effect on the development of edutainment. The authors list the elements needed to achieve intrinsic motivation in a game, which is one of the shortcomings of edutainment, but crucial to achieve strong educational computer games that are comparable to entertainment computer games:

- Fantasy The game activity can increase intrinsic motivation by using fantasies as a part of the game universe. All entertainment games rely heavily on building fantasies for players to explore, and educational games should be similar rather than abstract and distant—games like finding the missing letters in a word, and being given points for this. A fantasy can be internal or external to the game. In a missing letters game you can easily provide an external fantasy; for example, that you need to find the letter to free the princess. An internal fantasy is more motivating, but it also requires that the fantasy is tied more closely to the actual gameplay, and is not merely ad hoc. This is almost impossible to accomplish in an abstract game.
- Control The player gains the overall feeling of being the controlling party while playing. The sense of feeling in control is present in most entertainment games, and many fans of the best-selling *Grand Theft Auto* series describe the control and freedom as the defining element of the series. All games have a sense of control, given their interactive nature, but the degree of control can vary widely. Basically, as Raph Koster³² would say, games are about verbs not nouns, things you can do, and many educational computer games are just way more limiting than their entertainment counterparts.³³
- Challenge The activity should be at the appropriate level of difficulty for the player to be pushed to the limit of his or her capacity. Here again we see that most entertainment games do this extraordinarily well, whereas many educational

computer games have to rely on the lowest common denominator among players. They make it too easy (or sometimes too hard). Indeed, balancing a game is always a very difficult assignment.

• Curiosity The information in the game should be complex and unknown to encourage exploration and reorganization of the information. So games must always have more to show, whether literally in the exploration of a visual universe, or in the form of conversations or events in role-playing games, or in the relationships between variables and the dynamics of the underlying system in strategy games. Here entertainment games are also ahead of educational computer games as they provide more areas to explore and reconcile, whereas many educational computer games (especially edutainment) make the mistake of serving information well chewed and ordered for the player.

Over the years, the above principles served as guidelines to many researchers and some game designers. It seems, however, that although their contribution is important, their focus is too narrowly on the game structure itself. The principles leave little room for the social dynamics around the game and learning experience, which we will explore further later in this chapter. Although later revisions of Malone and Lepper’s work tried to integrate the collaboration around video games, the context of the game is arguably downplayed in this framework. The instructional approach still influences the majority of edutainment titles out there, although the principles are not applied to their fullest extent.

THE MODERN APPROACH TO THE EDUCATIONAL USE OF COMPUTER GAMES

The last decade’s criticism of edutainment has largely emerged from constructionist circles. Constructivism is particularly critical of the industry’s reliance on behaviorism and cognitive learning theory. Constructivist theorists stress different elements, such as the player’s freedom to explore the game universe and the process of constructing knowledge in a meaningful and personal way. For some constructionist thinkers, video games hold fantastic promise; they make it possible for the learners to approach a subject in an active way and construct their own representations. In an ideal game, constructivists argue, the learning experience of the students draws on different perspectives, gives rise to a variety of actions, and offers a fuller understanding of the given topic.

For these thinkers, the main focus is the actual construction process of knowledge facilitated by interaction with the game; as a consequence, constructivist-based research has focused on open-ended games, on students making their own simple games, and on so-called “microworlds.” A microworld is a simulation of a system—anything from a small universe with laws of physics to a city with basic urban planning actions—which is simplified and constructed so that a player can work with the system’s concrete objects. When players interact with objects in a video game, they are learning about the properties of these objects, their connections and applications. From a constructionist perspective, this is an optimal way to learn.³⁴

From the behaviorist perspective, the challenge of educational video games is transmitting information from the video game to the player. The context of this information is irrelevant, and the transmission of content relies on conditioning

and reinforcement (much like “drill-and-practice”). From a constructivist position, the transmission of information is not sufficient for a successful educational experience. Players must actively engage in a video game and construct their own knowledge using the artifacts of the game world.

Among the most noticeable early constructivist contributions within this field, the work by Yasmin Kafai remains central. In the mid-1990s, Kafai researched how to use the actual game design process as a new way for students to engage with a subject. Seymour Papert, often seen as the father of constructivism, inspired Kafai’s work. Kafai envisioned children not just as players of games, but as the actual designers of these games, thereby turning children into producers of knowledge and in a very concrete way letting them play with knowledge.³⁵

Today the socio-cultural approach is becoming a stronger alternative within the educational use of computer games, and is championed by James Paul Gee, David Williamson Schaffer, and Kurt Squire in particular. From a socio-cultural perspective, video games are tools for constructing viable learning experiences. Games mediate discussion, reflection, and analysis. The video game experience is facilitated by the surrounding classroom culture and the student’s identity. This approach is argued to be very useful for understanding video games that are surrounded by strong social networks, which facilitate the learning experience.³⁶ Here, the content of a video game is less significant than its way of initiating new explorations and journeys into knowledge.

Gee has given the strongest account of the approach and presents five main areas of interest concerning video games for educational purposes.³⁷ He does not see these as limited to school settings but as intrinsic qualities for learning through video games:

- **Semiotic domains** Like other activities in life, video games are a semiotic domain—a realm of signs and symbols—that one slowly learns to interpret. The player learns to make sense of and navigate through a video game, and in doing so is pointed to other interesting domains, like science and history.
- **Learning and identity** When the student is involved with the material, video games give new opportunities for learning experiences. Namely, video games are quite good at creating agency and identification: they develop the player’s sense of control and encourage the player to identify with other people. Both of these spark critical thinking and deepen the learning experience.
- **Situated meaning and learning** Video games are well suited for new forms of learning in which the player is situated in the domain and understands it from the inside. Players can interact with the game world through probing, can choose different ways to learn, and can see a topic in its larger context.
- **Telling and doing** Games can amplify the important elements in an area to facilitate easier understanding, and represent subsets of domains enabling the player to practice in a safe environment with constant feedback. Games also lend themselves well to transfer between domains, so that you can apply facts you learned about astronomy in a video game to real-life stargazing. This is due to the fact that games are virtual worlds with meaningful, concrete, and rich audiovisual learning experiences rather than abstract bits of concepts put together in a textbook.

- **Cultural models** The content in games represents ways of perceiving the world, and uses a lot of information implicit in the game universes. This content also has a bearing on other domains of life, and can be both good and bad depending on your values and norms.

Gee’s contribution is currently one of the strongest, but is also symptomatic of the area’s broader problems: he does not engage with earlier research on traditional games, or with other findings within educational computer games research. This weakens his claims, and increases the fragmentation of the field.

Though each theory has its own problems, the field of educational use of computer games has made great strides in the last two decades, and offers a host of engaging research. Let us now turn our attention to four of the foundational issues facing the field today.

Learning Versus Playing

Recent research on the educational use of video games is concerned with a series of basic problems. Some researchers question the viability of packaging education as fun. They fear that using video games for learning sends the implicit message that learning is not necessarily hard work, and must always be fun.³⁸ However, this problem seems to spring more from these researchers’ beliefs about education, as they are not supported by any direct studies.

But a related and more crucial issue is the potentially inherent contradiction between learning and playing. Researchers increasingly suggest that a student should clearly see that a particular game is about learning a specific topic and appreciate the expected result. Without explicitly framing the experience as educational, the differing goals and rules within a play context take over. The play and learning clash is evident when the game goals work against the learning goals. This is all too often the case, as much educational use of video games relies on commercial titles, and many edutainment titles split the game and learning parts.³⁹

Another problem between playing and learning relates to students’ interest and engagement, which will vary considerably between lessons. Students see the educational experiences with games as a playful, voluntary activity, an activity that they control. Likewise, within a game the player remains in control; this is very different from the more explicit demands that traditional classroom learning makes on a student. The player feels that the control should not be tainted by outside interference, but may also criticize the lack of direct educational intervention. On one hand, that player control is a critical characteristic in video games is stressed by all researchers, but it is also a fact that many studies show the benefit of carefully guiding, supporting, scaffolding, introducing, and debriefing the player after the video game experience. This guiding is actually part of most game cultures but becomes problematic in school settings. The lack of a firm setting confuses students who are uncertain of the expectations when playing and learning. Ultimately, students are unsure whether to approach the video game as play or learning.⁴⁰

Indeed, sometimes the playful approach may ruin the educational experience. On a very basic level, relying on games means that some students will not trust the experience, while others may trust it too much. Research indicates that when students experience a contrast between their own knowledge and information presented in the game, they stick with their own knowledge.⁴¹ Other studies indicate that students sometimes have a blind belief in the game.⁴² Neither approach is

very beneficial: blind belief is a poor starting point for critical reflection and complete denial is similarly problematic.

Drill-and-practice Versus Microworlds

Today, most researchers seem to shy away from a narrow focus on the drill-and-practice games of behaviorist edutainment; but many designers still indirectly assume that parts of the game have drill-and-practice elements that can transfer facts and support development of different skills. In fact, research indicates that drill-and-practice can be useful, but works best in combination with other teaching forms.⁴³ Maria Klawe⁴⁴ stresses that video games should be used for math activities that are otherwise hard to introduce in a classroom, while specifically pointing to the limitations of drill-and-practice.

Most of the early mathematical video games focused on drill-and-practice of simple number operations and concepts. Such games are easy to develop. Moreover, playing such games is an effective and motivating method of increasing fluency for many students. However, drill-and-practice is only one of many components of mathematics learning and can be achieved via a variety of non-computer-based methods.⁴⁵

The preference for drill-and-practice is understandable: it replicates the rote repetition that is the basic method of many traditional classrooms, and thus must feel familiar to many designers; furthermore, drill-and-practice games are easy to develop compared to the design challenges facing other types of titles. Microworlds, for example, have proven significantly harder to design than classic drill-and-practice games.⁴⁶

In microworlds, the player is confronted with a virtual world which contains a condensed version of the most important variables and characteristics of a given domain. This could be a physics environment, where you explore the different mechanics and interrelationships between atoms by constructing strings of molecules. It could also be a simulation of Williamsburg in colonial times, in which you get a look at the important elements of everyday life, interactions, and routines.

Immersion Versus Transfer

In discussing the challenges of the game design process, Klawe⁴⁷ raises some of the central problems with educational video games. Most of her conclusions are backed up by an earlier study by Kamran Sedighian and Andishe Sedighian,⁴⁸ the researchers responsible for the Super Tangram component of the E-Gems series of educational titles. Klawe points out that the immersive effect of video games leads to a lack of awareness of the mathematical structures and concepts integrated in the video game. This results in a weak transfer of game experience to other contexts. Students may learn some content or skills in the game universe and apply them in the game context, but most games are not constructed in a way that makes the knowledge accessible in other contexts. In an earlier study, Klawe and Eileen Phillips found that when students wrote down math problems on paper while playing a math video game, they were more successful in transferring the video game skills to other classroom practice.⁴⁹ The engagement with paper and pencil, these researchers found, forces students to construct the knowledge actively.

The transfer of knowledge seems to represent a double bind. On one hand, many researchers assume that the learning experience must be undetectable by

children—that an educational video game should resemble a traditional video game. It should not give itself away as children will then shy away from the educational title.⁵⁰ On the other hand, it seems that if the players are not aware of the learning elements, the learning experience—and especially the student's ability to transfer the information elsewhere—will be undermined. The transfer of game skills to other contexts has to be made explicit (and here, as we'll see in the next section, the teacher can play a crucial role).

Teacher Intervention

Contemporary research consistently shows that teachers play an important role in facilitating learning with video games: teachers steer the use of a game in the right direction, and provide an effective debriefing that can catch misperceptions and important differences in students' experiences while playing. Many edutainment titles adhering to behaviorism neglect the teacher's role, and assume that no outside intervention is necessary for learning. In more recent titles designed with a constructivist approach (although few and far between), the teacher is made essential.

Many researchers argue that video games should not be thought of as explicitly educational, but as tools which provide opportunities for interested teachers. Thus, the teacher's role is imperative for creating the learning experience. This is especially true of commercial entertainment titles which find their way into educational settings—such as *The Sims* and *Civilization*—and which have not been developed with the curriculum explicitly in mind.⁵¹

In recent years the teacher's role has received more attention. Thorkild Hanghøj and Christian Brund⁵² outline four different teacher roles that approach games very differently in the classroom: instructor, playmaker, guide, and evaluator. The instructor relates to teachers' attempts to plan and communicate the overall goals of the game in relation to specific learning objectives. The playmaker is described as the teacher's ability to communicate the tasks, goals, and dynamics of a particular game from the students' perspective. The guide focuses on the teacher's facilitation or scaffolding of students in meeting specific learning objectives through playing the game. The teacher is also crucial as an evaluator who explores, understands, and responds to the students' gameplay. The teacher roles are not discrete, absolute, or normative but rather in flux. Teachers can move between them to best advantage during their teaching with games.

THE EDUCATIONAL EFFECTIVENESS OF VIDEO GAMES

The question that continues to haunt the educational use of games is whether it is really worth the trouble. The research findings regarding the effectiveness of video games for educational use are still sparse, but at least 30 studies address the issue directly.⁵³ So far, one thing seems relatively clear: just as we saw earlier with traditional games, players seem to learn the same things when using video games as they do when taught by other methods, although a student's retention may be better with the former. Also, motivation, relevance, and engagement are stronger when using computer games in education compared to traditional teaching. An example is a 2005 quasi-experimental study of *Europa Universalis II* in a high school history class. In a multiple-choice exam on European history 1500–1700, given immediately after the course ended, the students who used the video game had somewhat lower scores than the group who had learned via traditional classes and case studies.

However, when the students took a similar test five months later, the scores of the two groups were equal.⁵⁴ This study also revealed that students found the computer game to be more engaging and motivating, although not all found it to contain relevant historical information. However, the question of relevance seemed tied to specific issues in this empirical study.

One problem with the research is that most studies are content with proving that it is possible to learn from video games. Few have the opportunity and persistence to actually compare video games with traditional teaching methods. From several decades of theoretical speculation and practical research it seems obvious that we can learn something from video games, but the questions are what and how, and whether it is different from what we learn with traditional teaching methods. These questions still remain largely unanswered, although there is support for better retention and higher motivation when using games compared to more traditional teaching forms.

Some small-scale qualitative studies have failed to find educational effects of video games, and question the general merits of their educational use. These researchers point out that the content in video games is understood and mediated in the game context in ways that are not appropriate for education. The risk is present, for example, in Civilization, where a player may understand the building of the Hanging Gardens of Babylon, one of the seven wonders of the ancient world, as nothing more than providing a reward of one extra happy face. This is hardly an adequate description of their historical and cultural significance. Others have also found mixed evidence for the effectiveness of video games.⁵⁵

The most inclusive meta-study on the effectiveness of game-based learning relates to computer-based simulation games. Traci Sitzmann and Katherine Ely's 2010 study offers quite strong support for game-based learning, but also stresses that simulation games are far from a magic pill for everything. Interestingly, the study focuses on games for adults rather than children: it is based on 55 studies of work-place learning, with 6,476 adult respondents. They find that self-efficacy increases by 20 percent—so when learning from games the learner acts with greater confidence in their own knowledge. This can be a double-edged sword, as acting with incorrect knowledge will potentially lead to harmful consequences. However, being unsure of your own capability in a situation requiring your knowledge may also be very problematic: for example, people may hold back from giving first aid because they feel uncertain of their own ability. This meta-study also shows that both declarative knowledge (up 11 percent) and procedural knowledge (up 14 percent) increase when using simulation games, compared to an array of other teaching methods. So learners are better at both presenting the knowledge acquired and using it to perform certain tasks. Finally, the study finds that retention increases by 9 percent and transfer by 5 percent. Overall, it shows that you learn more from game-based learning. You will remember it better, and be better able to transfer it to a real-life situation.⁵⁶

Sitzmann and Ely also find a number of key accelerators for getting the most out of game-based learning. First of all the games do necessarily need to be entertaining, and have a stronger impact when learners have free access to them. They also find that game-based learning is most effective when combined with other forms of instruction. Finally, they find that game-based learning that requires an active approach, as opposed to passive, is more effective. So, when games require the learner to make decisions and infer rules from the game system, the learning effect from simulation games increases, compared to other instructional methods.

A fundamental problem in our assessment of games is that defining "educational effectiveness" is incredibly difficult. Measuring the learning outcome of a given activity is never easy, but the interactive nature of video games makes such quantification even harder. We also need to acknowledge that different kinds of computer games focus on different forms of knowledge, which are not easy to measure. Some of these knowledge forms will go largely unnoticed if we rely on, for example, simple multiple choice tests. Computer games are dynamic systems and each player will have a different experience. For instance, in the ambitious educational strategy game *Making History: The Calm and the Storm* by Muzzy Lane, one student may not acquire information about the Japanese occupation of Manchuria in 1931, whereas another player will. This makes it very hard to compare learning outcomes between students and classes, and also causes teachers concern. What is one to measure, and will students learn the right things? To some degree this problem stems from a narrow focus on education as knowledge acquisition. Let's see what happens when we widen our view to include the "softer"—but no less valuable—cognitive skills.

Cognitive Learning Outcomes

Some researchers have argued that we should not look for a direct relationship between game playing and the assimilation of specific knowledge; instead, they have suggested that video games could improve general cognitive skills. Over the last 20 years, hand-eye coordination, spatial ability, and problem solving have received some attention.

Starting in the early 1980s, researchers attempted to connect hand-eye coordination and game play⁵⁷ but with disappointing results. A limited number of studies all found that there do not seem to be any differences between non-players and players with respect to hand-eye coordination, although anecdotal evidence remained popular in and outside research circles.⁵⁸

The area of spatial ability is more thoroughly researched, and positive effects of game play have been found both on a long-term basis⁵⁹ and for short-term improvement.⁶⁰ After playing video games, subjects were able to perceive more quickly the construction of objects in 2D or 3D space. A major controversy in research on educational video games revolved around the question of whether one can transfer skills learned in video games to other areas. Although spatial skills show some indications of transfer there are severe methodological problems. A frequent source of error in the studies on spatial ability is measurement methods. The test of spatial skills is conducted on a computer screen, the native platform for video games. Hence, the test is administered in an environment favoring the video game players. The favorable results for the video games group may therefore be a consequence of familiarity with the test platform rather than improved spatial ability.

The third and final cognitive area—problem solving in relation to computer games—has received the most research attention over the past 30 years. Problem solving is often linked to adventure games, a game genre popular among teachers, journalists, parents, players, and researchers alike.⁶¹

Most of these studies have methodological problems of their own—particularly as regards the testing methods used to measure problem solving—but the conclusions of the most ambitious studies are consistent: problem-solving skills can be improved by playing one game and then transferred to another video game. They also found that general problem-solving skills are a predictor of performance in

video games, which implies that video games may potentially be used to test a subject's existing problem-solving skills.⁶² However, the studies did not find that real problem solving will be improved by playing computer games.

The results of this research to date are mixed, but lend some support to the belief that video games influence cognitive skills (although, we should note, often not significantly more than other activities such as creating a small puzzle). However, all of these studies are hindered by the difficulty of documenting the transfer of skills obtained in a video game to other areas of life. Still, we believe that edutainment would benefit from broadening its definition of effectiveness in education. If we focus not just on the acquisition of specific facts, but consider the many skills required to play games, then perhaps we can more adequately understand the variety of benefits that might come from playing games.

POLITICAL GAMES AND NEWSGAMES

Beyond the more directly educational games, there is a variety of smaller sub-domains that we will cover in this last part of the chapter. They all have somewhat limited research behind them, but can to a large extent draw on the findings from the broader area of educational games. The first area is the use of games for current affairs, often referred to as newsgames or political games.

Political games overlap with the category usually referred to as newsgaming. At www.newsgaming.com, for instance, game designers try to illustrate current issues in public debate—such as airport security—through video games. Most controversial is Kuma Reality Games, which “builds re-creations of real-world events using advanced gaming tools.”⁶³ Here, players are able to play recent newsworthy events on their computers, for example, the invasion of Iraq or fighting in Afghanistan, while receiving news analyses and video material. The games are built as classical first-person shooters. A more subtle and serious attempt at developing episodic games about current news is the collaboration between Persuasive Games and the *New York Times*. The popularity of this broad category of political games implies that at least some gamers do not mind a heavy-handed message as long as it is delivered with something they can play. Some of the better-known examples of games in this area are *Playing the News* and *Cutthroat Capitalism*, both of which achieved some success.

Newsgames have had a long life, but so far have not really achieved a major breakthrough. One of the main drivers behind newsgames is that the news media in general is struggling to keep its audience. The younger generation in particular is leaving the classic news media behind, and games seem to be the place they are going. However, games are not often made overnight, meaning that the time-lag between a news item and a newsgame can be problematic. This often leads newsgames to be focused on feature items (such as crisis in Iraq) or recurring events (general elections, for example), or to be based on simple game templates (like quiz show formats). Research into the area has been limited but Ian Bogost has been spearheading the field from an academic point of view, alongside more hands-on work by Gonzalo Frasca.⁶⁴ Increasingly, it is suggested that for newsgames to thrive they need to be integrated with the news organizations rather than an externally inserted “plugin” that journalists do not have a close relationship to. One can say that journalists almost need to become game designers and game developers in their own right.⁶⁵

More politically loaded games have not made a breakthrough, either, but also have a long history. Some significant early attempts at constructing video games

with a political agenda were Nuclear War, Balance of Power, Hidden Agenda, and the neo-Nazi game Purging Germany. All of these games tried to set a political agenda, and could in some sense be called educational; however, their goals were quite specific. Some served more as comic strips or propaganda leaflets than real games. They wanted to present a particular message, and this message had strong political under-tones. In NuclearWar, for example, the inevitable destructive consequences of nuclear war were caricatured in “Spitting Image” style, a cartoonist’s caricature of current world leaders. The subversive use of video games has always been present within game culture, but became less of a factor as the industry matured commercially during the 1990s.

However, political games have made a comeback in gaming subculture since the terrorist attacks of September 11, 2001. Most of these games have paralleled the fight on terrorism, and serve as part of an ideological crusade against Osama Bin Laden in particular. The sub-genre is still emerging and research is quite limited, although news articles have hailed political games as “the next big thing,” especially in connection with the 2004 US presidential election.⁶⁶ Some well-known recent examples of using video games for political agitation are: September 12th, Ethnic Cleansing, the Michael Jackson Baby game, Kaboom Kabul, and The Howard Dean Game for Iowa.

September 12th serves as a good example of this recent crop. In this simple, single-screen game, the player overlooks a village filled with both terrorists and civilians. The player’s only option is to fire missiles to kill the terrorists or do nothing; the firing of the missile will inevitably result in civilian casualties. The deaths of innocent victims will draw mourners, who will also be drawn towards terrorism; the player watches as almost the entire village population become terrorists. The player cannot win the game, and does not get any points. All he can do is observe, and become more frustrated in his powerlessness. Circulated on the web in 2003 by Gonzalo Frasca, developer of the game and game researcher, September 12th is barely a game, but its criticism of the war on terror is clear.

One of the most discussed examples of political games is Special Force. Developed in 2003 by Hezbollah, the Lebanon-based political party, social institution, and/or terrorist group, depending on your source and outlook on the world, the player is placed in the middle of the resistance against Israel in southern Lebanon. The goal—hinted at by the game website’s claim that the game includes “all that an anxious persons dreams of in order to participate in facing the Zionist enemy”⁶⁷—is to influence public opinion against the Israeli occupation.

These examples fit the informal definition of political games presented by Karlsson, who writes that a political game:

wants to communicate a specific message or perception of the world. Play becomes secondary. This does not mean that the gameplay necessarily lacks in any way. *America’s Army* is hugely popular because of excellent gameplay, but play is still instrumental as regards to the US Army’s overriding goal.⁶⁸

The game Karlsson refers to is one of the most successful efforts at political gaming, although some will deny its political connotations. Available free on its own homepage, it is explicitly offered as a promotional tool to “inspire” young men and women to join the US Army. However, its popularity has been a huge surprise for many, and some speculate, partly in jest, that without the game the United States would not have been able to continue the war in Iraq due to the lack of recruits.

America's Army in this way spills into another subdomain, namely advertainment, which is meant to promote a specific product, whether it be the US Army, Nike apparel, or Doyle bananas.

ADVERTAINMENT

Advertainment is a fusion of advertising and entertainment, and refers to video games used for marketing purposes. Advertainment has grown considerably since its origins in the mid-1990s, led by increasing interest from major companies around the world. Such growth has been facilitated by an abundance of new software, including Shockwave, Flash, and Director, that requires much less technical knowledge than earlier gaming tools, which were mostly built in-house by game companies, with limited documentation. In addition, the World Wide Web now means that anyone with a web page can "publish" a game, thus circumventing the traditional channels for reaching the game audience. Global brands in particular have been eager to produce advertainment titles, to attract traffic to their websites, and increase brand awareness: a small sampling of recent games includes *The Beast*, developed for the Steven Spielberg movie *AI*; *Nokia Game*, a recurring game series for Nokia; *Nike Goood* for Nike; and *Stolichnaya*, produced for the vodka company of the same name.

Companies like these especially appreciate the active participation required to play these games; while playing, we are relentlessly exposed to the companies' products, which are incorporated into the gameplay in more or less creative ways. While playing an advertainment title, in other words, we are literally helping to build the company's brand in our own and others' consciousness.⁶⁹ Gardner stresses the difference between "integral" games and "giveaway" games,⁷⁰ referring to a classic problem in using video games for serious purposes. Some serious games will not really integrate the message they want to get across with the gameplay. These are called giveaways, whereas integral games combine the message in the gameplay. Integral games are usually more difficult and expensive to develop, but also result in a stronger impression and user experience. This issue recurs in the current gamification discussions later in this chapter.

There is limited research into advertainment, but it is considered one of the best means of drawing visitors to websites. And by making these interactive commercials fun for the consumer, these games facilitate exposure to the brand that can last a lot longer than a typical commercial. The global companies with leading online presences—such as Lego, Nike, Disney, and Coca-Cola—continue to harness the potential of video games because they seem to work. Companies often keep the results to themselves, but Toyota's *Adrenalin* racing game from 2000 was found to increase brand awareness considerably among consumers. According to the company's own brand recognition survey, Toyota went from a number six ranking among major car brands to number two a mere three months after game launch.⁷¹ Fully fledged video games are also increasingly considered a medium for mainstream advertising. And not just to reach reclusive adolescent boys—increasingly they are used as a mainstream advertising tool.

As video games reach a broader audience, product placement becomes a more appealing option for a wider variety of global brands. Product placement differs significantly from traditional advertainment games, as product placements can in principle be implemented in any computer game, and not necessarily in a specifically developed game. Though product placement began in racing and other sports

games, as well as games that featured virtual worlds, today we encounter product placement in virtually any genre. We see product placement even in the abstract *Super Monkey Ball*, a game which bears no resemblance to the world we live in. The player picks up bananas labeled with the Dole brand name. The launch of *Super Monkey Ball* became part of a cross promotion with Dole to introduce a "luxury banana" in Japan.

Although a game may seem to feature product placement, that need not, of course, be the case. To increase realism, many video games try to model the game environment as closely as possible on the real world, leading to incidental product placement. Still, the last five years have seen an increasing amount of actual product placement, with companies paying game publishers rather than the other way around. Product placement has also matured in recent years, with companies specializing in product placement and offering what they refer to as "dynamic implementation" of a product, inserted and continuously updated across a number of titles which all have online access.⁷²

Most advertainment is simply an extended version of product placement. However, sometimes it does try to actually use video games to create a different advertising experience. One example is a home design game for high schools, created by the organization for interior architects. The intention behind this game was to bring new, talented people into the business by letting students experience what it is like to work as an interior architect. This provides a truly different user experience from other commercials, bringing users into the actual product, and letting them become part of it. The same is the case in the area of political games, where organizations attempt to bring users closer to their agenda, and participate in universes reflecting their worldview.

Advertainment never really achieved the same mainstream appeal and hype as edutainment. Neither the classic advertainment to attract users nor the more subtle in-game advertising is a hit. However, advertainment may be having a renaissance, with the introduction of the term "gamification" in 2010. This is a highly controversial development, and a battle is raging over the validity, relevance, and substance of gamification's claims.

GAMIFICATION—PLUG'N'PLAY GAMES FOR REAL?

The idea of using games for more than entertainment has always been about bringing content, attitudes, or skills into a gaming context to improve the related learning experience. However, in recent years the idea of gamification has taken off—turning things upside down. In gamification you bring the game into the content you are trying to enrich, rather than the other way around. Gamification has gained a huge following, with more or less powerful anecdotal evidence testifying to its effect. There has so far been little research into the area, but thought leaders are eagerly citing evidence from related fields such as sociology, cybernetics, behavioral economics, and game theory to provide backing for their claims.⁷³ However, in essence gamification is about using game principles, like rewards, level up, and flow, to engage users and influence their behavior, knowledge, attitudes, or skills. Indeed, the ideas gathered under the heading of gamification do have a previous history in the games arena—for example, back in the 1980s research tried to derive powerful heuristics for creating enjoyable interfaces from games.⁷⁴

Overall, gamification seems to be much more commercial in its approach, compared to serious games in general, and it is more about the underlying

mechanics that games apply than actually making games *per se*. Gamification is about using game mechanics to enhance existing structures, sites, services, products, or experiences, and it very much ends up sounding more like marketing than anything else, although it certainly doesn't have to be like that.⁷⁵ The more flexible approach to using game mechanics has really given gamification traction with major corporations. Gamification companies like BunchBall and Bagdeville offer a turnkey solution for getting started quickly and embedding game mechanics in your organization, product, or service.

The key argument behind gamification is that by quantifying, tracking, and rewarding behaviors towards a specific goal we are able to induce people to act in ways they normally would not. This underlying approach obviously stirs great controversy, since it incorporates quite a mechanistic view of human nature. As with any discussion ultimately based on ontological assumptions, there really isn't a right or wrong answer—although of course you may through research in specific cases find more or less backing for a given approach in a given context.

Although gamification is still new, there are already a number of famous examples which suggest that there may be some substance to the idea. Some of the more famous examples come from the “Fun Theory” project,⁷⁶ sponsored by Volkswagen. The basic idea was to make people do things they otherwise didn't want to by making the activities fun. Three examples from the project provide a concrete way of illustrating the academic discussion around gamification.

- **The speed limit** In this project, a speed lottery was set up, so that when people drove past a speeding control point at the speed limit or slower, they would be entered in a lottery draw. They would compete for the money earned from those people speeding. After three days of the experiment the average speed had fallen 2.2 percent. On the surface, this looks like a classic, quite simple example of gamification, in which you earn points for a behavior directed towards a specific goal. By making it fun to keep the speed limit you can change people's driving. However, there is nothing really meaningful or enjoyable about participating in the lottery competition—it's basically just a very simple game mechanic, in which you try to score points to achieve the goal of winning the lottery. This demonstrates gamification in a very pure and simple form, but does not really demonstrate that fun can achieve behavior change—rather it's simply a points system and prize reward.
- **The can recycling** In another project, people were rewarded with points for throwing cans and bottles down recycling slides, and given clear, colorful feedback. This led to massively more people using the project's recycling automat than a nearby conventional recycling point. This game set-up is slightly more complex, since it includes a points system, but still it is fairly simple. There is no real fun activity involved, and no element of skill or mastery—rather, it's about accumulating as many points as possible. And there are no game mechanics beyond the award of points—interestingly, the use of a timer or high-score device might have made the game even more effective.
- **The fun piano** In this project, an interactive piano was set up on the stairs next to an escalator to see whether people would take the stairs instead of using the escalator. Indeed, 66 percent more people took the stairs during the experiment. This example was not driven by classic gamification principles, since it was

about an enjoyable and creative experience rather than goals, points, or achievements. However, one could speculate about what would happen if you put a high-score at the top of the stairs and escalator, to see who can get to the top fastest—would people still go for the fun piano or would they race up the escalator?

None of these examples really tell us whether the effect will wear off when the novelty factor disappears. Are the changes in behavior merely a consequence of people's curiosity about new things? Another example that may give us better anecdotal evidence is the “fly in the pissoir.” Basically, people are not really very focused when they are using a urinal. However, one manufacturer added a fly at the optimal point, and the consequence is that people turn it into a “pissing contest”—who can hit the fly? The “pissing contest” has proven to be an extremely enduring phenomenon, even if we are only using a very simple game principle to nudge people in the right direction.

Looking more closely at the approaches to game design in these examples, there are at least two: “idealist” and “instrumentalist.” The instrumentalist approach has been by far the most influential, since it delivers what people want. It delivers the “how” of behavioral change through gaming, without worrying too much about the “why.” The idealist approach, on the other hand, stresses that the gamified activity should not only show how to get people to do things, but also provide a deeper, more meaningful activity that answers the question, why do it? We shouldn't just log into Foursquare to get points, level up, and achieve status, we should do it for a deeper purpose, such as socializing with friends and creating new relationships. The instrumentalist argument is, yes, we can create a deeper experience, but really it's not so important as long as we achieve the goals we set out to accomplish. However, both sides agree that it's usually harder to get both the why and the how right. The idealist will argue that the instrumentalist approach is shortsighted, and people will realize that they are trying to do something that lacks meaning. The truth is probably somewhere in between. You may get a stronger and more sustainable gamification experience if you combine the why with the how, but you can to a large extent settle for using only the instrumental approach for quick gains. Also, one may consider whether it is possible always to turn everything into a meaningful activity with a higher purpose or motivation.

Several discussions have piggybacked on this fundamental debate, relating to the relation between extrinsic and intrinsic motivation, as well as inner and outer control. Several studies suggest the external/extrinsic can undermine the internal/intrinsic. After significant controversy over the years at conferences and in blogs, more than one commentator has lost perspective. However, Jesper Juul has tried to sum it up, describing three main threads in gamification criticism:⁷⁷

1. Extrinsic rewards demotivate in the long term. If you play football to win matches and forget about love of the game, you will become demotivated. This argument ignores the fact that, for a lot of activities (especially those gamified), there may not really be any love to lose. However, there is indeed a valid concern when we use gamification principles, for example, for motivating learning (such as the grading system). Students may forget that they are not learning to get good grades but because it's interesting, important, and opens new doors. There is also bigger question with regard to whether reliance on extrinsic motivation in one knowledge domain will spill over into other areas. Will you, for

example, also stop loving playing the piano if you are all about winning the football match?

- 2 Some suggest that gamification comes close to repression, and that it encourages shallow understanding of an activity, potentially leading to a "seduction of the masses." This is really an empty line of reasoning—it may very well be true, but no more so than for most other strategies for influencing people, and for media consumption in general. This line of reasoning seems to be more a question of passion and outrage than informed reasoning. Especially since the success of Farmville, Epic Win, WeightWatchers, and Foursquare, to name a few, gamification hits can be hugely successful—labeling these as seduction of the masses may not be completely inaccurate, but on the other hand it may also be somewhat of a stretch to see them as much more than the next phase of entertainment, following the reality wave.
- 3 Finally, Juul suggests that player optimization and performance measurement, which have worked inside games, may not work outside games. Implementation needs to be careful, but this criticism seems rather general, and is made without giving concrete examples.

These three criticisms attack gamification somewhat differently, but the first two are more ethical than anything, while Juul's final point is rather vague. The ethical criticisms seem better founded, although still difficult to generalize from. The suggestion that gamification may not work seems just as doubtful as some of the claims made for it by its proponents. It's safe to say that the market is still being defined.

If we look more closely at design in gamification, there are marked differences between the instrumental and the idealist approaches. The instrumental approach has basically been focused on how, through experience and points, you can create a status that gives you power, access, and stuff; this formula involves a number of key principles inherited from the game world. The idea is that any activity you engage with gives you points. Effectively, points serve as an indicator for your experience level and progression. No matter what you do you will feel a sense of progression (however superficial this may be, it often works). As you gain experience this will give you privileges that can take different forms. They can be about the basic need for feeling included (access), the feeling of empowerment by influencing surroundings (power), or the need to acquire desirable goods (stuff). The basic idea is that these principles can be applied across the board. The content is of less importance, as you always quantify something and hence turn it into a game—most people with kids will recognize this strategy. Reluctance to get dressed in the morning, for example, can be overcome in an instant if it's turned into a competition to see who can get their clothes on first.⁷⁸

The idealist argues that we need something more than just points, badges, and leader boards. According to Deterding, we need to focus on creating meaning, mastery, and autonomy in the game experience. You can create meaning in a number of ways—through, for example, being part of a community or setting up meaningful goals. However, the activity has to be relevant on some level. The second requirement is that you actually have to learn something and feel the fulfillment of achieving mastery in a new domain. Without mastery, scoring points or pinning on badges will seem empty. You need to make the game about interesting choices, balancing options, and challenge—it should not be trivial. Rules are crucial here because they set the

constraints that make things more difficult, and goals communicate clearly when you are successful at a new level of mastery. Finally, it is stressed that autonomy is key to creating the engagement characteristic of games, and that framing is crucial. You will engage in quite "numbing" activities for a greater purpose, if you find it meaningful and you choose to do it. However, if you feel something is forced upon you—no matter how good the game—it will lose a lot of its attraction.⁷⁹

GAMES-FOR-CHANGE—REVOLUTIONARIES RISE

Although gamification has attracted quite a lot of attention, Jane McGonigal, with her book *Reality is Broken*, has probably been just as influential in arguing that one of our favorite pastimes can serve as backdrop for serious collaboration, thinking, and reflection. Although McGonigal has much in common with the idealists working within the broader gamification approach, she comes to the subject from a different angle. The goal is still, however, to use games technology and game mechanics to change people's behavior. Her vision is that the impact of games can reach a level such that it warrants a Nobel Prize—quite an ambition.⁸⁰

The games-for-change movement is, however, much broader than the work by McGonigal, as evidenced by games like *PeaceMaker*, about creating peace between Israeli and Palestinian, *Stop Disasters* on how to stop flooding, *Escape from Woomera*, about detention camps in Australia, *ThirdWorld Farmer*, about the daily hardships of farmers in Africa, and *Darfur is Dying*, based on the unfolding humanitarian catastrophe in Darfur. The Games-for-Change festival spearheads the efforts, and over the years there have been eight such festivals. The specific area is not that well researched, but McGonigal attempts to rally support for a collective quest to change the world through games. Her focus is on games based around epic challenges, collaboration to solve problems, and a role for everyone that we should be able to leverage to solve real problems. She very much extends so-called "alternate reality games" (ARGs), which weave together fiction and reality to engage people in solving real-life problems in an epic setting. However, the approach in games-for-change basically covers the entire spectrum of game types presented in this book, and as such can be treated as a subgroup of educational games.

In 2012 Constance Steinkuehler launched a project with the White House in Washington where games are used to facilitate solving public challenges, like saving fuel in the Navy, or similar.

FINAL REMARKS

There are positive research results on the benefits of educational use of computer games, but it still seems that the real breakthrough, where the majority of teachers, organizations, and corporations use computer games for educational purposes, is some years away. Unfortunately many publishers, developers, and companies within the area are stuck with an edutainment formula that provides much low-hanging fruit, but which also has many limitations. This is far from implying that these games do not work—rather it indicates that there is room for much improvement and a larger scope, as evidenced by the work of Jane McGonigal.

The barriers blocking the educational use of video games seem to be numerous. Research on edutainment has provided little clear direction on where the field should head. Taken as a whole, the results of studies suggest that students can acquire knowledge from a video game, but that this acquisition may be only slightly

more effective than a teacher's presentation, or reading a textbook. Further, it is evident that edutainment was for a number of years at a dead-end, following an unchanged formula. However, we are now benefitting from new impulses, not only from commercial computer games but from games-for-change and gamification, which are pushing the area in new directions.

We must also acknowledge that contemporary education may simply be a poor fit for video games. The foundations of primary and secondary education today—lesson plans and strictly divided subjects—hardly facilitate the use of video games. To this we can add the clash between game expectations and school expectations on the part of both students and teachers. Many teachers are curious about games, but with their strong pop culture connotations it is also easy to doubt their educational benefit—few teachers will accept that killing monsters can be educational, and in the eyes of many non-gamers, killing monsters is what most games are all about. This attitude may be most apparent in schools, but it is certainly also found outside schools, when promoting educational use of games to corporations. The knee-jerk rejection of games that are more than entertainment is probably becoming less prevalent, but it is still common.

Some researchers have argued that we should be careful about investing large sums of money in expensive educational video games before we have evidence that they are worth the investment.⁸¹ On the other hand, it is very hard to gain the necessary experience to develop effective titles without experimental use and research. Though to date it is still difficult to prove conclusively that serious games are worth the investment, it would be premature to dismiss the potential of educational video games, especially with promising meta-studies beginning to provide stronger evidence. It seems that the real breakthrough in educational games may come from more unlikely places, as suggested by the developments in the fields of gamification and games-for-change.

DISCUSSION QUESTIONS

- How do "serious games" such as edutainment titles compare to "regular" video games?
- What challenges do you see in using games for purposes other than entertainment?
- What potential is there for using games for purposes other than entertainment?
- Do advertising, games-for-change, gamification, and political games present game developers with ethical and moral dilemmas?

NOTES

¹ McGonigal, 2011.

² Gartner, 2011.

³ IDATE, 2010.

⁴ Abt, 1970.

⁵ Malone, 1980; Malone and Lapper, 1987a, 1987b.

⁶ Gee, 2003.

⁷ Squire, 2004a.

⁸ McFarlane et al., 2002.

⁹ Prensky, 2001.

¹⁰ Kirriemuir, 2002.

¹¹ Egenfeldt-Nielsen, 2005.

¹² The diverse backgrounds of these researchers may have had the unfortunate result that earlier research on the topic, published in a variety of journals, has not always been acknowledged.

¹³ Greenblat and Duke, 1981.

¹⁴ Egenfeldt-Nielsen, 2006

¹⁵ Clegg, 1991; Randel et al., 1992; Van Sickle, 1986; Wentworth and Lewis, 1973.

¹⁶ Egenfeldt-Nielsen, 2006.

¹⁷ Lederman and Fumitoshi, 1995.

¹⁸ Saegesser, 1981.

¹⁹ Facer et al., 2003; Leyland, 1996.

²⁰ See e.g. Hancock and Osterweil, 1996; Malone and Lepper, 1987a.

²¹ The most significant research on commercial computer games used in education has been carried out by Squire, 2004a and Egenfeldt-Nielsen, 2005.

²² Buckingham and Scanlon, 2002; Leyland, 1996.

²³ Buckingham and Scanlon, 2002; Egenfeldt-Nielsen, 2005.

²⁴ Buckingham and Scanlon, 2002; Egenfeldt-Nielsen, 2005.

²⁵ 2005.

²⁶ 2004a.

²⁷ 1980.

²⁸ Buckingham and Scanlon, 2002.

²⁹ Buckingham and Scanlon, 2002.

³⁰ Good and Brophy, 1990.

³¹ 1987a, 1987b...

³² 2004.

³³ To a large extent this is a consequence of the fact that the feeling of control and freedom is by far the most expensive aspect of a game to develop.

³⁴ Rieber, 1996.

³⁵ Kafai, 1996.

³⁶ Gee, 2003; Jessen, 2001; Linderoth, 2002; Shaffer, 2006; Squire, 2004b.

³⁷ Gee, 2003.

³⁸ Healy, 1999; Kafai, 2001; Okan, 2003.

³⁹ Egenfeldt-Nielsen, 2005; Grundy, 1991; Healy, 1999; Magnussen and Misfeldt, 2004.

⁴⁰ Egenfeldt-Nielsen, 2005; Jillian et al., 1999; Leutner, 1993; Squire, 2004a.

⁴¹ Egenfeldt-Nielsen, 2005.

⁴² Grundy, 1991.

⁴³ Cotton, 1991; Loftus and Loftus, 1983.

⁴⁴ 1998.

⁴⁵ Klawe, 1998, p. 9.

⁴⁶ Kafai, 1995, 2001; Papert, 1998.

⁴⁷ 1998.

⁴⁸ 1996.

⁴⁹ Klawe and Phillips, 1995.

⁵⁰ Brody, 1993.

⁵¹ Cavallari et al., 1992; Egenfeldt-Nielsen, 2005; Grundy, 1991; Klawe, 1998; Squire, 2004a.

⁵² 2011.

⁵³ See Egenfeldt-Nielsen, 2007 for an overview.

⁵⁴ Egenfeldt-Nielsen, 2005.

⁵⁵ McFarlane et al., 2002; Squire, 2004a.

⁵⁶ Sitzmann and Ely, 2010.

- ⁵⁷ Egenfeldt-Nielsen, 2003.
- ⁵⁸ Funk and Buchman, 1995; Gagnon, 1985; Gibb et al., 1983; Griffith et al., 1983.
- ⁵⁹ Gagnon, 1985; Green and Bavelier, 2003; Greenfield et al., 1996; Lowery and Knirk, 1983.
- ⁶⁰ Dorval and Pepin, 1986; Gagnon, 1985; Green and Bavelier, 2003; Lowery and Knirk, 1983; Okagaki and French, 1996; Subrahmanyam and Greenfield, 1996.
- ⁶¹ Gee, 2003; Greenfield, 1984; Herring, 1984; Whitebread, 1997; Grundy, 1991; Jillian et al., 1999; Ko, 2002.
- ⁶² Ko, 2002.
- ⁶³ From Kuma Reality Games website <http://www.kumawar.com/> (accessed 17 Feb. 2012).
- ⁶⁴ Bogost et al., 2010; Delwiche, 2007; Frasca, 2007.
- ⁶⁵ <http://www.ludology.org/>
- ⁶⁶ Erard, 2004.
- ⁶⁷ See Whine, 2007, p. 83.
- ⁶⁸ Karlsson, 2004, p. 4.
- ⁶⁹ Gardner, 2001; Lindstrøm, 2003; Rodgers, 2004; Tønner, 2000.
- ⁷⁰ Gardner, 2001.
- ⁷¹ Youn et al., 2003.
- ⁷² Book, 2003; Emery, 2002; Lienert, 2004; Wong, 2004.
- ⁷³ Reeves and Read, 2009; Dignan, 2011; Zichermann and Cunningham, 2011.
- ⁷⁴ Deterding et al., 2011.
- ⁷⁵ Raymer, 2011.
- ⁷⁶ <http://thefuntheory.com/>
- ⁷⁷ Juul, 2011.
- ⁷⁸ Zichermann, 2010; Zichermann and Cunningham, 2011.
- ⁷⁹ Deterding, 2011.
- ⁸⁰ McGonigal, 2011.
- ⁸¹ Grundy, 1991; Jillian et al., 1999.

9 VIDEO GAMES AND RISKS

TWO RESEARCH PERSPECTIVES/THE ACTIVE MEDIA PERSPECTIVE/THE ACTIVE USER PERSPECTIVE/OTHER QUESTIONS/FINAL REMARKS

This chapter explores the risks involved with playing video games—or, in popular parlance, the (alleged) harmful effects of video game play. This is an issue that everyone in the industry—and just as many people who have nothing to do with video games—seems to have an opinion about. For angry parents and determined teenagers, for dismissive developers and anxious educators, and seemingly for everyone in between, video games seem to contain an element of danger. Over the years, the question of harm has received massive attention in both public debate and research circles. Although the interest may not be as great as in the last millennium, the area has still regularly received attention, especially from the general media which often looks for causal links between shootings and playing video games.

Was the Columbine high school shooting of 1999 aided by the killers' fondness for violent video games? In 2011 did the Norwegian killer Breivik plan and carry out his crimes with the help of computer games? Can violent video games make you more aggressive? Questions like these never seem far from the public agenda, and researchers of various stripes have for the last few decades tried to answer them.

We discuss this Pandora's box by contrasting two competing research perspectives: the "Active User" perspective and the "Active Media" perspective. The discussion will make clear that the link between violent games and player aggression has received most attention, but that beneath this issue lie even more basic disagreements about how we experience and perceive video games.

As we have seen throughout this book, academic research has been conducted on many elements of video games; however, the study of dangers in connection with games remains a key research avenue, as it continues to receive massive media attention and is still an arena for great controversy. As mentioned, research within this area has primarily been centered on the question of whether video games lead to increased aggression in players. This concern has been driven by regular bursts of public concern in relation to violent video games, most noticeable on the release of *Death Race* in 1976, *Mortal Kombat* in 1994, *Grand Theft Auto 3* in 2001, and *Medal of Honor* in 2010.

Until the late 1990s, the majority of funded game research involved a risk perspective. This century, it has become somewhat of an orphan in games research, as more than a few researchers have flatly refused to take part in studies of risk. These researchers, as we'll discuss further, typically feel that video games as a medium are treated unfairly—that the discussion of games and aggression is essentially an attempt to turn games into a scapegoat for more complex societal problems; they also fear that the link to aggression is a precursor to censorship not