Video Game Spaces

Image, Play, and Structure in 3D Game Worlds

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Introduction

Interactive media and their most prominent and most diverse representatives, video games, have unsettled traditional media theory. They introduced the meta-medium computer into our living rooms, opening up a range of opportunities so unfamiliar and so diverse that we are still struggling with clear definitions. They changed the face of established media and media production and became a billion-dollar industry along the way. This industry, its fan base, and a range of noncommercial outlets constantly generate new artifacts to analyze and learn from. Games have developed from a niche market into a culturally and commercially significant media form. They may still be the new kid on the block, but they are rapidly growing up.

Games also have entered academia, where they have been investigated from a variety of perspectives. Occasionally, proponents of different approaches have engaged in a very lively debate. But we still have to explore much of the ever-expanding ground covered by the developing media. One challenge is the disproportion of a still-expanding media form and the often necessarily slower speed of generating the critical literature about it. Whereas the prophets of cyberspace were restricted to relatively few digital artifacts, often available to the selected few with access to high-tech research labs, the field of game studies today faces an overabundance of games to analyze. This body of work, in many regards, was necessary to support a wider analysis of new media.

It is incomprehensible that any single theory could do justice to a form as rich and vivid as the video game. The variety of these games calls for a diversity of analytical approaches: no one approach is sufficient, but many offer different yet interconnected perspectives. The more this analytical spectrum

grows in width and depth, the richer our picture of the video game becomes. This book tries to add its share to the spectrum. It will refer to the debates and key issues in games research but will shine a different light on them from a very specific angle—that of navigable three-dimensional virtual spaces. From this perspective, the book will revisit some models that have been examined before and suggest new ones that have yet to be debated.

3D game spaces allow players to crawl, jump, run, fly, and teleport into new worlds of unheard-of form and function. The game space we can experience, discover, and manipulate has become endless and at the same time more accessible than ever. Video game spaces stage our dreams and nightmares and they seem to get better at it every year. We will tour the landscape of video games in an effort to discover how the games work, how they are presented, how they can be read, why they are important, and how they can be improved.

Following this book's call for an interdisciplinary approach, its argument draws on many other disciplines such as literary studies, architecture, and cinema. Though comparative and interdisciplinary, it does not focus on the comparison of media as its main goal. Instead, the cross-referencing is the result of the topic. Spaces in video games can *only* be discussed through these references.

Like the 2D desktop metaphors that came before, the growing use of 3D graphics in video games shows signs of an evolutionary process. New and old game franchises adapt to the new "standard" or they struggle to survive. Whether it is Mario's step into 3D in *Super Mario 64* (Miyamoto 1996), the polygon worlds of the massively multiplayer online title *Meridian 59* (Sellers 1996), the 3D spaces in real-time strategy games such as *Ground Control* (Walfisz and Andersson 2000), or the jump from a top-down view in *Grand Theft Auto II* (Akiah, Conroy, and Hirst 1999) to the navigable 3D world of Liberty City in *Grand Theft Auto III* (Filshie et al. 2001), navigable 3D worlds have become a critical factor of game development. The market is dominated by 3D graphics in a way that suggests an overall transformation. This also affects the hardware of game systems. 3D graphics have shaped the hardware development of personal computers in the form of specialized graphic cards at least since the mid-1990s with the release of the NV1 and Voodoo 1 cards.

Often, 3D graphics have become a sine qua non in the modern commercial video game world—for better or worse. Yet the use of 3D graphics for its own sake cannot be the goal but rather a means to achieve a more complex task: the generation of fictional worlds in the player's imagination that grow from a comprehension of the 3D representations. Like written text or 2D graphics,

3D worlds have unique ways to support this imaginary work. This raises questions: How do game spaces achieve this effect? What are their key qualities? How can we improve their impact?

To answer, we have to turn to the player and the player's experience. Although this book will look at a variety of design issues and structures, its fundamental principle is to examine games in terms of the player experience. Space is an important element of this experience—and a very challenging one. The argument here is that game spaces evoke narratives because the player is making sense of them in order to engage with them. Through a comprehension of signs and interaction with them, the player generates new meaning. The elements that are implemented in the game world to assist in the comprehension will be called "evocative narrative elements," because they do not contain a story themselves but trigger important parts of the narrative process in the player. These processes can lead to the generation of a form of narrative.

Such an approach has obvious parallels to semiotics. Video game worlds depend on representation and sign systems and the audiovisual presentation is an important section in this book. But the main argument will always return to the concept of space and spatial experience. Game spaces are approached not as foregrounded spectacles based on visual cues such as perspective and parallax but as presented spaces that are assigned an architectural quality. The discussion will concentrate on their spatial structures and how players can interact with them. In the games discussed, players want to engage not with the screen but with a fictional world these images bring to mind. This indicates the references to phenomenology that guide this investigation. Experience, comprehension, and spatial practice are phenomenological key elements that reappear throughout this discussion of virtual space. But how this experience is generated in game worlds is new. As much as we can learn from these approaches, there are fundamental differences in the way experience of space happens in nondigital settings and the necessarily mediated way we encounter game worlds.

The screen remains an important layer as it is mainly through the screen that the game worlds can unfold and become accessible to today's player. Video game worlds are navigable spaces that offer a wide range of interactions, but they are also spaces told to us using certain forms of presentation. This mediation is an important factor in the narrative processes connected to game worlds. It is in these presentations that we can find filters, which are constantly at work in 3D video games. Consequently, this book is structured in three main sections: one on the reappearing question of narrative and structure in game worlds, one on presentation, and one on the functionality of game spaces.

If this book has to be associated with a specific school or set of approaches to game research, it would be with a player-focused and experience-driven tier. This is a result of the topic at hand: the question of space. It is only logical that the reader will find chapters on identity and player positioning as well as on camera work and architectural theory. At the same time, this is a comparative survey driven by practical analyses of existent video games. Therefore, the reader will find references to numerous games and game worlds.

Ultimately, this book is an exploration of the new universe that opened up with the introduction of 3D graphics to games. This change has literally added a new dimension to video games that calls for a reorientation of games research and design and asks us to adjust our thinking about video games. Due to the interdisciplinary nature of this undertaking, the book most certainly has to miss a number of relevant sources and concepts but is intended to provide balanced arguments and detailed discussion.

1.1 Video, Game, and Space

Space has been a central issue for the study of digital media since the introduction of cyberspace (e.g., Benedikt 1991) and Multi-User Dungeons (MUDs) (e.g., Anders 1998). It has been a defining element of—at times opposing—studies in games research. Murray argues that spatiality is one of the core features of digital media (1997), Aarseth starts his discussion of Cybertexts with a look at labyrinths (1997), Ryan writes about narrative aspects of virtual spaces (2001b), and other studies of video games include often substantial chapters on space (e.g., Wolf 2002). Qvortrup edited a trilogy of books on different aspects of virtual spaces (2000, 2002; Madsen and Qvortrup 2002), and more recently von Borries, Walz, and Böttger published a large collection of short essays about spatiality in games and related issues (2007). Most of the work in this area has been discussed in numerous articles, theses, and conference papers. Jenkins's influential essays on game spaces build up from the mid-1990s (Fuller and Jenkins 1995) to a more rounded view almost a decade later (Jenkins 2005) and are only one example. This short list is by no means a full overview of the existing literature, but it shows that a study as presented in this book has to be clearly positioned to operate in relation to the other published works. This book touches on a range of established topics, introduces new interpretations of them, and suggests some new principles based on the element of game spaces. It connects various approaches to digital environments and, thus, has to clarify the field covered.

To avoid generalizations two premises will be applied. The games discussed

- have to be available on consumer hardware;
- and have to offer navigable 3D environments.

The restriction to available consumer products ties the study to a de facto analysis of existing worlds and serves as a reality check that prohibits any overly enthusiastic prophecies. It avoids the danger of promising unrealistic future wonders. Yet, where necessary, the argument in this book will refer to additional examples that are not commonly available. Video game spaces are, by and large, commercial products and thus limited by production costs and market considerations. In order to avoid a purely commercial perspective, this study also points to numerous research projects and art pieces. Notably, most of these projects do not depend on additional hardware or expensive systems, but are realized with the same technology that drives commercial video games. The author realized some of these projects himself during his work at the University of Cambridge and at the Georgia Institute of Technology. It is the philosophy of the Digital Media program at the School of Literature, Communication, and Culture at Georgia Tech to combine theory and analysis of digital media with practical experimentation. In this spirit, the book points to those kinds of experiments and combines them with discussions of commercial games.

The second restriction is that each game discussed has to feature an interactive and navigable 3D virtual world. In practice, this means that players can navigate through the world and interact with elements that are staged in it. One consequence of this definition is that these kind of worlds can offer different viewing angles to whatever events are realized in them. Clearly, this is the case for a very large selection of games but it does not cover all games. A range of titles have very limited spatial features or restrict the virtual environment to other representation forms. These titles will appear as references to clarify the differences and to provide a historic frame where necessary, but they are not at the heart of this study.

At the same time, this book will try to avoid a number of possible misconceptions. Navigable 3D worlds possess specific qualities and favor expressive techniques that differ from other formats. Perhaps we can blame the blanket term "multimedia" for an uncritical blending of different presentation formats into "virtual spaces." MUDs, 2D worlds, interactive cinema, and 3D video games are too often treated as utilizing basically the same concept of

"virtual space." That can be a misleading simplification. There are fundamental differences among a space described in a written text, a cinematic space, and an interactive navigable virtual world. They offer different forms of interactive experiences based on their specific qualities. Developing these differences will be one task ahead.

A different kind of mistake is found in some commercial approaches to virtual worlds. Here, space in video games serves too often as polygon-rich spectacle and "eye candy" that remains largely unused in the actual gameplay. It is time to revise this immature misconception and build new connections along the way for further debate.

The purpose of the two self-imposed restrictions is to keep the focus on the element of space in video games. Space—like time—is a principle at the heart of Western as well as Eastern philosophy. The study of space enters into numerous disciplines, so that we will be able to draw from disciplines as diverse as (in alphabetical order) architecture, computer science, film studies, game studies, media studies, narratology, philosophy, psychology, and many more. All of these disciplines contribute to the analysis of video game spaces but they cannot all be covered in one book. While this book can easily be accused of missing important disciplinary affinities, it will assemble relevant points to form a discussion of game spaces that can serve as basis for even more specific future work.

Such an interdisciplinary approach requires an understanding of different terminologies and a clear deployment of them in the new context. It will be one task to identify and adjust the different terminologies.

1.2 Structure, Presentation, and Functionality

Lefebvre breaks down social space into *spatial practice*, which secretes a certain society from another; *representations of space*, which is "conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers" (Lefebvre 1991, 38); and *representational space*, "space as directly *lived* through its associated images and symbols, and hence the space of 'inhabitants' and 'users'" (ibid., 39). His division informs the approach of this book but the resulting structure grew more out of the ongoing analysis than from an upfront subscription to Lefebvre's theory.

3D graphics open up means of expression to the computer that add a new dimension to their representation. The use of 3D navigable space changes the textual qualities of video games and distances them in some way from other interactive pieces that present their content in a less spatially defined manner. The first part of the book, on *Structure*, will look at how 3D space can reshape

the textual qualities of video games. It first considers what the new textual qualities of these game worlds are and offers definitions of the key terms "interaction" and "narrative" as two strongholds of games research and important factors in the way players make sense of the worlds presented to them. The main focus rests on the idea of understanding space and movement therein by ways of narrative comprehension. Narrative is seen as a form of understanding of the events a player causes, triggers, and encounters inside a video game space. From this vantage point, part I reframes key principles of narratology in the context of video game spaces before discussing quests as space-driven content structures for these narrative elements. *Presentation* is understood as the expressive element of video games. It grows from the necessary interpretation of the processed rules and data into some form the player can read. Presentation in current commercial video games uses predominantly audiovisual components. Thus, the second part of the book concentrates on the roles of the moving image and sound in video game spaces. The analysis looks more specifically into cinematic elements at work in video games with a focus on the construction and guided comprehension of virtual spaces. Part II will argue that different forms of presentation create a kind of narrative filter through which player interaction is framed into specific contexts. Important factors are the focalization through the narration and the guidance of the player's reading.

Functionality refers to the interactive access and underlying rules determining what the player can do in the game space and what the space can do to adjust that. Part III looks at the elements that shape the development of the actions as they unfold in 3D worlds. Means of functionality are, for example, artificial intelligence (AI), complex rule systems, and interface design. These topics have been discussed in other works to far greater length. The aim here is to concentrate on the functionality of virtual 3D *spaces*. This leads to a focus on architectural principles and the question of a player's positioning within the space. A line is drawn from various architectural principles to their actual use in video games and the player's interaction with them. Experiential effects like immersion and presence are discussed to locate the player as active participant in the game world. We arrive at the idea of a social space, a place in video games. The argument closes with a reference back to narrative, for those social places are understood as narrative landscapes.

While part I differentiates 3D game spaces from other interactive media, parts II and III are more focused on the workings of video game spaces as such. Both are intrinsically different operational features of video games but are closely intertwined and interdependent. It will be argued that the level of presentation is a good example for the gradual development of video games

and has become part of the functionality and accessible to the player. Realizing the combination of presentation and functionality is a central goal and the underlying principle of this book. Historically, there seems to be a rift between the discussion of a game's audiovisual presentation and its functional interactive elements. But elements of spatial practice and mediation of space are always closely interconnected. Space—virtual or real—has to be encountered *and* interacted with. One has to explore the interaction and the media that present it. Any concentration on either presentation or functionality but not both would destroy the holistic principle of spatial experience. Thus, space forces us to interconnect and build new bridges between two central poles in game design and analysis.

1.3 What Space?

What is a video game space? The question has to be answered to avoid introducing a nebulous concept to the core of this argument. The difficulties in describing and limiting the term do not come as a surprise. The spatial is connected to and debated in literally every possible arena of human thinking. We cannot reduce such a holistic principle to any single frame or assume a single concept of "the space." If space is such an all-embracing and hard-to-restrain phenomenon, the task is not to reduce the term itself but to build useful frameworks to approach the topic. One has to define the frame for the specific argument at hand and clarify its context. What are these spaces?

1.3.1 Simulating Theme Parks

Video game worlds are processed. They depend on algorithms and mathematical rules. These rules and processes follow certain models, which makes all game spaces simulations. Creating these worlds from rules is a form of simulation that follows a preconceived model. But that statement does not really help us to understand video game spaces as the player experiences them.

Thanks to the freedom of the mathematical models, the resulting worlds can be anything anywhere, which makes them remarkably indifferent and somewhat meaningless to start with. There is little given context or relevance present at the origin of these worlds, neither a history nor a physical constraint is given to the space itself. That is no problem from a mathematical vantage point but it makes the resulting virtual spaces almost inaccessible for players. One has to be a trained expert to deal with them. In order to project the necessary context into the game worlds and in order to make sense of them, the player depends on a legible presentation and meaningful functionality. Players can overcome the nonspecific origins of these spaces with the help

of a designer, who makes the game worlds accessible through interactive options and shapes their mediation in specific ways. The simulation of an atom bomb explosion in the Los Alamos National Laboratory and the explosion of the "anomalous materials" in *Half-Life* (The Half-Life Team 1998) have very different aims and work very differently as simulations. The same rings true for more "realistic" sim games like Sid Meier's work or detailed driving games.

Yet, the same research labs that developed the atomic bombs famously provided the Petri dish for modern video games. The Brookhaven National Laboratory is part of the same Advanced Simulation and Computing program as, for example, the Los Alamos simulation unit. Both labs were founded to explore pressing research questions in the "hard" sciences. Nevertheless, about half a century ago, Brookhaven National Laboratory was the birthplace of the first documented video game: *Tennis for Two* (Higinbotham 1958), a prelude to *Pong*. The relationship between the armed forces and the game industry in the United States has been continuous ever since, inviting the term "military-entertainment complex" (Lenoir 2003). But tracing games only back to war simulations would be too simplistic.

Unlike the data-driven scientific simulation models, which aim to deliver reliable findings, accurate training conditions, and highly elaborate answers to very specific scientific problems, games are centered on the dramatic experience. They do not provide new knowledge through the execution of their code but instead present engaging questions. The necessary dramatization leads to a different kind of product that concentrates not on the data, but on the player.

America's Army: Operations (Capps 2002) is a first-person shooter game developed for the U.S. Army and based on Epic's *Unreal* engine. It was intended as a publicity and possible recruitment tool and seems to simulate an army boot camp, training missions, and real combat situations. Its rule system might copy military concepts but the way these rules get compromised through the spectacle of the game illustrates more the tendency of the military complex to embrace the game community than vice versa. In order to raise its appeal, *America's Army* had to simplify and streamline the education of a soldier, emphasize the dramatic combat scenarios, and give up the total control over such training. It remains impossible to track the development of loyalty, duty, respect, selfless service, honor, integrity, and personal courage in a world with free chat options and the default "fire at will" setting. In addition, hacks for avoiding the game's initial and more rigidly controlled training phase were available shortly after its release as players started to utilize their new toy and tweaked it to meet their demands. As a simulation

America's Army is of value mainly for tracking social behavior of gamers, not for military training purposes.

That is why *America's Army* serves as a political platform for Joseph DeLappe in his *dead-in-iraq* project, which he calls "a fleeting, online memorial" (DeLappe 2006). In this memorial, DeLappe logs into *America's Army* game sessions as a player named "dead-in-iraq" and uses the chat function to type in the names of U.S. soldiers who have died in Iraq. The underlying rule system remains active but its use is subverted. In the case of *America's Army*, such subversion is relatively easy because its title makes the game designer's intention obvious. At the same time, the *America's Army* website also sells game-related action figures of decorated war heroes that represent a very different and less critical memorial of military operations. Political activism obviously works both ways.

But even if the game is based on more complex simulation models, the author of the game simulation still directs the simulation (Frasca 2003) and this influence cannot be free of an interpretative stand that includes ideological patterns (Bogost 2006). These differences between scientific simulations and games are not only on the level of the creator and code; they also reside on the side of the player. Players engage with video games not like scientists that operate a simulation program. They often suspend disbelief when activating a game and they usually lack an analytical distance to the data. Neither behavior is allowed in a scientific community. But what games provide is a reposition of the player into the "active" spot.

Through the loophole of virtual space we are able to reclaim the space of the action where we do not "look at" but actively visit the center of the action. When the player's game avatar Gordon Freeman pushes the "anomalous material" into the particle beam deep inside the Black Mesa Research Facility in *Half-Life* and causes a chain reaction, he remains at the heart of the disaster and has to handle it. The player has to handle it, therefore, because the player handles Gordon. We are not analyzing the events as neutral onlookers but share the space with them and have to find our way out of the exploding chamber and the resulting mayhem. The game might stage the player in the role of a research scientist, like Gordon Freeman who is introduced as a virtual MIT graduate, but involvement with the unfolding events is not a scientific research project. It is a fast-paced action adventure. When Valve included a better physics model into *Half-Life 2*, this model is neither stable enough nor intended to be a solid representation of the real world, but most notably adds to the fighting variety in the game.

If games are simulations, then they are social playgrounds based on given rule sets, but even these set of rules are bound to crack under the pressure of

the player community. Play supports behavioral studies and the bending of the rules might produce the best results for a scientific simulation. But even here it is difficult to relate the player's actions back to real-world behavior. When Blizzard added the Zul'Gurub dungeon to the virtual world of Azeroth that is the setting for *World of Warcraft* (Pardo and Adham 2004), a special fighting move of an enemy at the end of one of the new quests introduced a virtual plague to the game world. The "virus" was transmitted over virtual pets as well as non-player characters and player-avatars. It spread quickly throughout the virtual world and led to the display of some real world behavior in the player community. In many ways, the resulting player behavior in the virtual world mirrored our behavior in the real world. Players did heal each other, for example, to contain the plague. Researchers have already experimented with multiplayer game worlds to teach and investigate disease control (Neulight and Kafai 2005). Yet again, direct transfer of the *World of Warcraft* plague event to real-world behavior is impossible, for on the one hand the game is limited in scope and on the other hand it differs in key criteria of human behavior. For example, infected *World of Warcraft* players could "teleport" into the middle of large cities and infect others on purpose, making containment impossible. Whoever "died" because of the virus was instantly reborn, which rendered the plague into an exciting in-game event instead of a terrible tragedy—it also allowed for a different playing behavior. Players could retaliate for being infected and the plague could turn into a subgame in the game.

Other multiplayer worlds host growing player-driven economies that can become highly complex. A number of problems have been caused by player behavior that concentrates on an optimized economical development. For example, players started "mining" in-game resources. They concentrated their whole game efforts on gathering valuables in the game world to sell them outside the game environment for cash. Others steal property or control over player-avatars. Others again exploit in-game bugs. Real-world fiscal issues, such as inflation, are also present in multiplayer game worlds. That is why CCP Games, which runs the online world *Eve Online*, has hired an in-game economist. He observes the development of the in-game economy to analyze and steer the impact of any changes. "After we opened up an area where there was more zydrine (an in-game mineral), we saw that price dropped. We did not announce that there was more explicitly, but in a matter of days the price had adjusted" (S. Hillis 2007).

All of these activities can have real financial impact as the virtual riches often translate into goods that can be sold for real money. Through their hard-cash value, these events have impact on the complex network of real

economics. In November 2006, Ailin Graef, a prominent figure in *Second Life*, who earns real money in virtual real estate deals and other in-game businesses, announced that she had acquired more than $1 million through her online activities (anshechung.com 2006). The result of such activity is a gradual merging of two complex systems: the rule-driven and social networks of the game world and economic systems of the real world. It is here that the value of games as simulations becomes relevant, precisely because these worlds expand beyond their rule-driven origins—because they break their original simulation frame.

On the level of presentation and engagement, the simulation remains a technology that often gets hacked, tweaked, and compromised by players. A scientific simulation has to limit error margins and aim for certain neutrality with the highest possible data density to provide valuable outcomes. In contrast, games present their world in the most appealing way to attract players, insofar as they are simulations that dream of Hollywood, the Cirque du Soleil, TV commercials, the Taj Mahal, or Las Vegas. 3D graphics fuel that dream with a more and more elaborate form of presentation. While players in *Tennis for Two* looked on the playing ground, modern 3D worlds take us into the event space and onto the stage.

The *Back to the Future* ride was a main attraction of the Universal Studios entertainment park in Los Angeles in the mid-1990s. The LA ride had only opened in 1993 and combined flight simulation techniques and OMNIMAX cinema projection in an elaborate audiovisual and haptic spectacle. Instead of entering the airplane cockpit, visitors stepped into an oversized time-traveling DeLorean to race through different time periods in a great spectacle directed by Douglas Trumball and driven by Industrial Light and Magic's effects. I had to wait about half an hour in a queue before I could even enter the building that housed the main attraction. To sweeten the bitter pill of waiting, the designers had multiple monitors and various movie-related paraphernalia installed along the queue. The closer the visitor came to the main attraction, the more one was surrounded by the fictional universe created in the *Back to the Future* movies. I found myself slowly fading into the *Back to the Future* universe that gradually replaced the "reality" of the theme park. When I finally reached the last waiting line that separated the visitors into smaller groups—each of them about to enter the pneumatic technical wonders of the ride itself—I was already inside the *Back to the Future* world, thanks to the surrounding artifacts and the expectations of the upcoming ride. Promising rumbling, muffled music, and the screams of visitors who were just experiencing the excitement on the other side of the doors, combined to produce an

overwhelming soundscape that was all part of the attraction. At that point, the ground started to shake. Alarm bells added to the overall excitement. Flashing lights went off on various corners. The doors sprang open and guides in uniforms hurried us along short hallways. We were about to experience the latest thrill ride on the planet—not quite.

We went right through the building and out on the other side. Only there, blinking at the bright sunlight, along with other confused visitors, did I slowly realize a minor earthquake had struck the park. What I had experienced as part of the attraction was, in fact, nature's disruption of it. The fictional disaster ride had become the very real scene of danger (albeit minor) and reality had played its tricks on the virtual. It had reclaimed its space.

Like game spaces, theme park attractions create an expertly directed sense of place and context in a fictional universe within the shortest possible time. The *Back to the Future* attraction did not consist solely of the main ride's few minutes' duration but also of the experience of waiting, the gradual drift into the unreal world of the attraction. Theme parks have been recognized by the game community as important references (Carson 2000) and discussed by a number of researchers (Darley 2000; Manovich 2001; Ndalianis 2004). But there are fundamental differences between the two space types. The fictional space of a video game is an imagined space that lacks the physical and nature-dependent quality of theme parks. My earthquake experience could not have happened in the game version of the ride as presented in the GameCube video game *Universal Studios Theme Park Adventure* (Okuhara 2001). The game version of the *Back to the Future* attraction consists of a racing game featuring a chase—as does the theme park version—but the game uses it merely as an occasion to provide a whole range of other effects closer to an interactive racing game, far removed from the physicality of the original attraction. If a real quake would occur in the play space that houses the GameCube and my real body, no virtual ushers would hush me along polygonal hallways into virtual safety. The play space in the real Universal Studios and that in the video game differ widely in the way they connect the material world and the fictional one.

Another difference between rides and games grows out of these very real security issues for life and safety: theme park rides restrict exploration and interaction in order to control the balance of sensations. While players of 3D video games can explore vast virtual landscapes and learn how to master movement in 3D, theme park rides are by and large linear experiences with no or little interactive access. The player controls the hands and arms of the game character and "reaches" into the game world. In contrast, visitors to theme

park rides have little chance of interference with the optimized sensual spectacle they are "riding." In the *Space Mountain* attraction in Disneyland Paris, visitors literally ride the bullet with no means of interaction whatsoever. The *Space Mountain* attraction offers an action-packed version of Jules Verne's *Voyage dans la Lune* that explicitly asks the visitors to "keep your arms and hands inside the vehicle all time." It is part of the concept that control in the peak moments of the attraction is not in the hands of the to-be-overwhelmed visitor but in those of the designer and engineer.

Theme park attractions that offer some form of meaningful interaction, like DisneyQuest's *Pirates of the Caribbean: Battle for Buccaneer Gold* (Fitzgerald and Garlington 2001), turn more toward augmented reality (AR) games. Schell and Shochet argue that these mixed forms are neither games nor rides, but a new medium. They draw a line between theme park attraction and interactive virtual reality (VR) pieces (Schell and Shochet 2001). *Battle for Buccaneer Gold* is, in fact, an interactive piece modeled after the classic—and far more linear—Disneyland attraction, *Pirates of the Caribbean*. It is not a copy of the attraction but a more game-like in its own right installation. Like the film version, *Pirates of the Caribbean: The Curse of the Black Pearl* (Verbinski 2003), which was inspired by the same attraction, the VR installation is a different media format.

Finally, theme park attractions often use elaborate interfaces (Pausch et al. 1996; Mine 2003) that differ significantly from consumer-level video games and their interaction design. While any attraction in a theme park is situated in the middle of a corporate entertainment complex and visitors stream from one waiting line to the next, most of the video games discussed here run on home entertainment systems. That means they are played at home, in a familiar environment and with a very different interface predisposition. A theme park ride game such as *Sim Theme Park* (Harris, Leinfellner, and Nuttall 2000) includes a remediation of the ride experience, but mainly as a test of the player's building skills. It ends up being a reward, much like a cutscene. Although this quotes the sensual spectacle of a real rollercoaster, it does so in the second instance through the eye of a virtual camera. In other titles such as the original *RollerCoaster Tycoon* (Sawyer 1999), the managing of the park is the sole core of the gameplay and we see again the game-based version of a simulation.

In order to discuss video game spaces, we need a method that allows us to distinguish between the various spaces: one precise enough to spawn the discussion and allow for clear differentiation between game spaces and other spaces; but also one that is scaleable enough to support more detailed critique of a game world.

1.3.2 Five Planes

Theorists have offered a range of approaches for analyzing video games. Each of these approaches defines a different set of layers or planes for understanding how games function (Konzack 2002; Montfort 2006). Any such a layering has to be selective, because game studies are free to explore any game-related aspect and no model can provide all possible approaches upfront. The selection here was made with a view toward the experience of space. If "cyberspace is a representation of human beings' space experience" (Qvortrup 2002, 23) and we continue such a phenomenological approach, then the system has to be able to answer to how we perceive the space, how we are positioned in relation to it, and the way we practice with this space. In order to address these issues, the model suggested here distinguishes between five main conceptual planes for the analysis of game spaces:

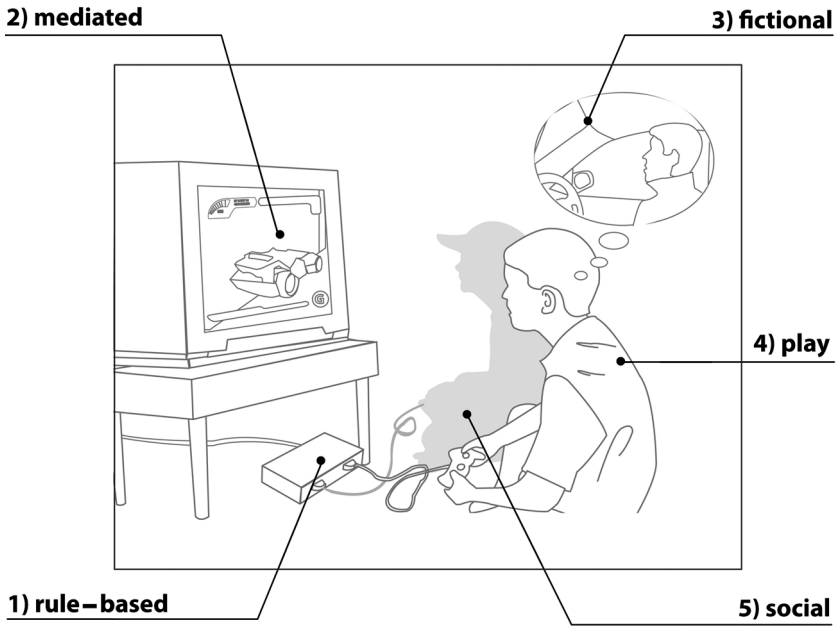

Figure 1.1 Five analytical planes

These planes are

1. *rule-based space* as defined by the mathematical rules that set, for example, physics, sounds, AI, and game-level architecture;

2. *mediated space* as defined by the presentation, which is the space of the image plane and the use of this image including the cinematic form of presentation;
3. *fictional space* that lives in the imagination, in other words, the space "imagined" by players from their comprehension of the available images;
4. *play space*, meaning space of the play, which includes the player and the video game hardware; and
5. *social space* defined by interaction with others, meaning the game space of other players affected (e.g., in a multiplayer title).

All five are conceptual planes that have their own qualities and define themselves through different elements. Yet in order to provide a fluent gaming experience, they all have to work in combination.

The *rule-based space* is defined by the code, the data, and hardware restrictions. It is the world of the functional restrictions that often mirror architectural structuring of video game spaces. This world is the basis for the *mediated space*, which consists of all the output the system can provide in order to present the rule-based game universe to the player. In the case of commercial video games this layer consists mainly of audiovisual and tactile output that provides a form of presentation. The player is confronted with this presentation and imagines a world from the provided information—the *fictional space*. Based on the fictional world players decide on actions to affect the game space. As long as players continue this engagement, they form a designated space in the physical world that includes the player and the gaming system—the *play space*. Finally, actions in the virtual world can affect the spaces of other players on the layer of *social space*. The planes offer an analytical framework and a perspective to approach the question of game spaces. At the same time, they are scaleable. Each plane could be broken down into more subsections for a finer granularity of analysis.

Others have suggested different but related categories for the understanding of space. Traces of those approaches remain in this game-space model. For example, Lefebvre distinguishes between "spatial practice" (closest to the rule-based space), "represented space" (closest to the mediated space), and representational space (which can be read as a combination of fictional, play, and social spaces toward an existential whole) (Lefebvre 2001). Others have chosen to focus on specific planes. Cinematic space has been discussed, for example, by Heath (1976) and Branigan (1992), whose findings mainly apply to the mediated space. Huinzinga suggested the concept of the "magic circle" that separates the world of the player from the not-playing surrounding world. Game studies have adopted some of these philosophies (e.g., L. N. Taylor

2002 for a reference to Lefebvre; Wolf 2002 for cinematic space; Salen and Zimmerman 2003 for Huinzinga) and started to investigate possible relationships between separate planes (e.g., Juul 2005 for the relationship between rule-based and fictional space). Konzack (2002) and Montfort (2006) offer relating planes with a different focus and call for an analysis that interconnects them. Following such a layering, the argument here will try to make connections among all five of these spaces. None of these layers alone is enough to support a rich game world. That is why the argument will concentrate not on a separation between these layers but on their interconnections and overlaps to understand how they work in combination.

The two main forces that connect all layers are the two basic streams of presentation, which leads to comprehension and motivation, and functionality, which allows for interactive access and active game worlds. Functionality and presentation are the two forces that constantly interlink the different planes to bring game spaces to life. Instead of focusing on any single plane, we will look at the forces that interconnect them all. Ultimately, the division into five principal spaces for video games provides an orientation map from which the argument can embark. It also helps to concentrate on the given topic of game space.

1.3.3 Cyberspace and Text Spaces

One debate that provides insight in video game space concerns cyberspace. Discussing cyberspace within any scope is difficult. The term was derived from fiction and never totally shed the element of the fictitious. Although there are conceptual parallels, today's internet does not work or look like the original vision of cyberspace as William Gibson introduced it in 1984, yet the term seems to work as a reference to the web and numerous other digital formats. From the vantage point of space and spatial experience, the conflation of Gibson's cyberspace with the internet is questionable. Data space and navigable 3D space do not have to be the same; in fact, they rarely are. Data can be presented and processed in many different ways: as 2D webpages, mathematical models, descriptive text, or soundscapes, for example. It was only logical that the idea of a singular all-embracing cyberspace had to break down into smaller and more specific segments once virtual worlds became available en masse in video games. Once more specialized studies emerged, the idea of a singular information space gave way to countless smaller spaces. Today there is not one form of cyberspace.

When Dodge and Kitchin introduce their work on the mapping of cyberspace, they point out that "at present, cyberspace does not consist of one homogenous space; it is a myriad of rapidly expanding cyberspaces, each

providing a different form of digital interaction and communication" (2001, 1). Consequently, they include maps of continuous 3D worlds such as *AlphaWorlds* as well as nodal networks of internet connections and website structures. Since then things have become even messier with user-generated worlds from *Counter-Strike* levels to *Second Life* and *Spore*.

However, the discussion of cyberspace offers a gateway for a lot of relevant work on virtual spaces that can serve as key references for video game spaces. Many of these arguments remain valuable but need a readjustment to the specifics of 3D video game worlds.

Benedikt's seminal *Cyberspace, First Steps* (1991) contributes a range of perspectives to the new phenomenon. A whole body of work on cyberspace in the 1990s started the discussion of important issues: spiritual and theological (e.g., Heim 1993, 1998; Wertheim 2000), architectural (e.g., Novak 1996b; D. A. Campbell 1996), political (like Barlow's "A Declaration of Independence of Cyberspace," 1996), social (e.g., Rheingold 1991, 1993), cultural (e.g., Anders 1998), theatrical (e.g., Schrum 1999), and the questions of text, reader, and author that overlapped with some discussions in hypertext (e.g., Bolter 2001; Bolter and Grusin 1996). Most of these approaches will reappear and inform the discussion.

From the earliest days of video games, the medium was driven by graphic representation tied to rule-based processing. Titles such as *Spacewar!* (Graetz and Russell 1961) or *Tennis for Two*—arguably among the first video games in the sense that they could not have been realized outside the computer—featured graphics that became classics for later clones. Their representational form and interactive design did not derive from the literary textuality in a literal sense, but rather from spatial realization. In *Spacewar*, two player-controlled spaceships try to destroy each other with torpedoes, while avoiding collision with a central star that slowly pulls them into its gravity field. The gameplay grows from very basic rules that are implemented in very limited code (9 K), but it remains rich and variable for the player because these rules are realized in a virtual space that seems to open nearly endless permutations. For example, experienced players often used the gravity of the central star in their opening maneuver. They let themselves be pulled toward the star while shooting at the other spaceship. When performed by both players, the maneuver generated a shape not unlike the CBS logo—and thus was termed the "CBS opening" (Graetz 1981).

Unlike other opening moves, for example in chess or in the initial stages of a MUD, *Spacewar* simulates physical forces and an in-world timeframe that shape the game universe. Other nondigital formats, like pen and paper role-playing games, can try to simulate spatial behavior and map it onto their rule

systems, but it is difficult to match the precision of the computer in the way it handles spatial representation and functionality. Exact measurement and orientation can be difficult variables in pen and paper games that need significant simplification, for example in the form of simplified locations on the board. As a consequence, a lot of early video games emphasized their specific advantage in the use of space. For example, the first mass-produced commercial arcade game *Computer Space* (Bushnell and Dabney 1971) brought the simulation of the spaceflight to the foreground.

Once the game world expanded into 3D, the precision of the represented space became the basis of many more game formats. Collisions, spatial relations of bodies to each other, audiovisual representations of the environment, interaction with objects in the world and with the world itself—all necessarily highlight the spatial qualities of the game. How, then, do these qualities differ from other digital formats such as hypertext?

One way to approach video games is to look for the defining units of meaning within them. Looking for textual units mainly in text-driven games, Aarseth distinguishes between *scriptons* as "strings [of signs] as they appear to readers" and *textons* as "strings as they exist in the text" (1997, 62). "A scripton, then, is an unbroken sequence of one of more textons as they are projected by the text" (Aarseth 1994, 60). While Aarseth's scriptons are the signs de facto delivered to the user, he distinguishes them from the Barthesian *lexia*. Barthes defines lexia as "brief, contiguous fragments . . . units of reading" (1974, 13) that refer more to Aarseth's textons. In reference to this division, hypertext theorists divide hypertextual works into lexias—the individual data segment available at a certain node—and interconnecting links (e.g., Landow 1992). The overall structure of both can result in a possible rhizome of interconnected data. The hypertext piece *afternoon, a story* (Joyce 1987), for example, consists of 539 lexia and 950 links that form a complex network of interconnections. Interactive fiction, a relative to hypertext, can generate the text and thus might be less restrictive but still depends on descriptive textual segments (see, e.g., Montfort 2003). These can be arranged in various ways to form networks of lexia with different levels of complexity (Ryan 2001b). Yet none of these levels reaches the diverse range of a 3D space.

Breaking down a 3D game space in comparable units is nearly impossible. The options offered in a 3D navigable interactive game world include countless opportunities, possible positions, and directions. They cannot be separated into a definite number of textons. Rules and definitions might apply to each element, but the combination and dynamics between objects and worlds make such a breakdown impossible. Any movement in any direction at any point and any specific interaction at that point change the world's

condition. Fighting games like the *Tekken*, *Virtua Fighter*, or *Dead or Alive* series depend on such an optimized combination of spatial control and specific fight moves. Any small change in a pattern might be the difference between glorious victory and miserable failure and will trigger a different move of the opponent. The interactive options as such are limited: spatial navigation, blocking, and attacking moves. Their realization is unique due to their use inside the game world and their dependency on the other character's actions. Instead of single nodes, game spaces put the emphasis on the forces between innumerable states and describe them in minute detail. Elements such as speed and direction are implemented in high detail and realized with great effect in the game world.

For the space creation in film, Chatman distinguishes between the "literal" story space in cinema, "that is, objects, dimensions and relations are analogous, at least two-dimensionally, to those in the real world" (1978, 96–97) and the "abstract" space in verbal narrative "requiring a reconstruction in the mind" (ibid.). In this regard, games are at least as "literal" as film. Virtual set design, lighting, visualization, and spatial sound design have become important ingredients in the development and experience of virtual worlds. In the context of video games, these options have changed the process of writing or reading a text into a process of designing or exploring a space. The creator becomes a "spacemaker" (Walser cited from Rheingold 1991, 286) or "narrative architect" (Jenkins 2004, 129) and the player an explorer and conqueror of space. In order to identify game spaces' specific features, the theorist as well as the practitioner must look at their spatiality that distinguishes them from literary pieces such as MUDs, which use spatial metaphors for orientation but consist of literary representation that offer different functionality and presentation.

Written texts have a spatial quality but their description of space differs significantly from the games discussed here. Moving through 3D audiovisual video game spaces is intrinsically different from interacting with a hypertext that uses conditional links to let the user create a path or reading through the available node elements. When clicking on a hypertext link, the user cannot predict the direction she will take. In fact, it is part of the pleasure of reading (navigating) a hypertext such as Joyce's *Twilight: A Symphony* (1996) to succumb to his expertise in the writing of each node and his careful arrangement of available text elements. Clicking on any hyperlink generates a unique reading path through the piece, but the reader's sense of control is limited because one cannot predict what the next move might be or where the link might lead.

Video game spaces are far more descriptive and graphically defined and have developed to a stage where they contain numerous spatial references and details. In fact, they can overwhelm us with these references. They can be so detailed that they trap us in their perfection and their presentation can become too flawless, too clean. They reach the uncanny valley where the distance between nature and virtual world become reemphasized by the gradual progress toward photorealistic rendering. The first demo I saw running on the PlayStation 2 presented a virtual forest that spread into sheer infinity—too pixel-perfect to look alive.

Ultimately, 3D game spaces remain part of the computer as media, and the basic textual machine that is responsible for the generation of the game text applies to them. Game spaces and other interactive media formats rely on the player to provide input and a system of rules that processes and reacts to this input. But game spaces differ from other interactive media formats in their textual units, the way they are generated by designers, and the way they are experienced by players.

Video game spaces share qualities with simulations, theme park rides, cyberspace, and hypertext worlds. In fact, they can be seen as simulators or a subsection of digital space, depending on the preferences of the analyst. But they offer different assemblies of the five defining spatial planes. These differences might be gradual—as seen in the game characteristics of the *Pirates of the Caribbean: Battle for Buccaneer Gold*—but traceable. The field of video game spaces as they are discussed here is defined by the two limitations previously outlined: only games that are available on consumer hardware, only games that offer navigable 3D environments. We will look at this field with the model of the five planes as our analytical framework interconnected by presentation and functionality. The book will proceed with a discussion of these spaces' qualities and operational forces.