THE RENDERED ARENA

MODALITIES OF SPACE IN VIDEO AND COMPUTER GAMES

Axel Stockburger

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ABSTRACT

During the last 30 years computer and videogames have grown into a large entertainment industry of economic as well as cultural and social importance. As a distinctive field of academic inquiry begins to evolve in the form of Game Studies, the majority of approaches can be identified as emerging either from a background of literary theory which motivates a concentration on narrative structures or from a dedicated focus on the rules of video and computer games. However, one of the most evident properties of those games is their shared participation in a variety of spatial illusions. Although most researchers share the view that issues related to mediated space are among the most significant factors characterising the new medium, as of yet, no coherent conceptual exploration of space and spatial representation in video and computer games has been undertaken.

This thesis focuses on the novel spatial paradigms emerging from computer and video games. It aims to develop an original theoretical framework that takes the hybrid nature of the medium into account. The goal of this work is to extend the present range of methodologies directed towards the analysis of digital games. In order to reveal the roots of the spatial apparatus at work an overview of the most significant conceptions of space in western thought is given. Henri Lefebvre's reading of space as a triad of perceived, conceived and lived space is adopted. This serves to account for the multifaceted nature of the subject, enables the integration of divergent spatial conceptions as part of a coherent framework, and highlights the importance of experiential notions of spatiality. Starting from Michel Foucault's notion of the heterotopia, game-space is posited as the dynamic interplay between different spatial modalities. As constitutive elements of the dynamic spatial system mobilized by digital games the following modalities are advanced: the physical space of the player, the space emerging from the narrative, the rules, the audiovisual representation and the kinaesthetic link between player and game. These different modalities are examined in detail in the light of a selected range of exemplary games. Based on a discussion of film theory in this context an original model that serves to distinguish between different visual representational strategies is presented. A chapter is dedicated to the analysis of the crucial and often overlooked role of sound for the generation of spatial illusions. It is argued that sound has to be regarded as

the privileged element that enables the active use of representational space in three dimensions. Finally the proposed model is mobilised to explore how the work of contemporary artists relates to the spatial paradigms set forth by digital games. The critical dimension of artistic work in this context is outlined. The thesis concludes with a discussion of the impact of the prevalent modes of spatial practice in computer and video games on wider areas of everyday life.

0. INTRODUCTION

Between 1998 and 2004 I produced a series of videos in the art context that portrayed players engaged with computer games in different environments. The camera was placed in such a way that the players faces were filmed from the point of view of the monitors they were concentrating on during gameplay. In a sense it was as if the game was watching the player. The almost imperceptible movements of the players' bodies that seemed to mirror their actions in the gameworld intrigued me. Since it is not necessary for the success in a computer game to move one's entire body, I saw these movements as a kind of leftover from movements in physical space. They appeared to stem from a body memory that crossed the threshold between the physical space and the representational space of the game. In other words, the players seemed to perform movements with their bodies that were directly connected with their mental spatial experience in the game. This simple change of perspective (from watching the screen to watching the player) became the starting point for a growing interest in the curious spatial activities of the players and the kinds of spaces produced by the games. For example, in public game arcades people share the same physical space, but the spaces they are turning their attention to in the games are private. In the case of networked games this situation is turned around and people who do not share a physical space interact with each other in a space that is offered by the game. Simultaneously, every new generation of 3D game seemed to increase the level of detail of spatial simulation. These observations led me to the assumption that video and computer games generate new and different kinds of spaces and that their players perform equally novel spatial actions. Motivated by this insight I began to isolate and focus on these peculiarities in my artistic practice and embarked on the thesis you are about to read. The initial hypothesis is that the *game space* and the spatial action in such games is an original and unique phenomenon that is highly characteristic for the medium. If this were indeed true, then it would be necessary to gain a better understanding of what makes this spatiality so unique and to find out how it emerges in different games. Such knowledge of the inner workings of space in video and computer games could be beneficial in two directions:

Internally, it provides a fresh perspective for the theorists - especially from the young discipline of game studies who aim to understand and describe how games work. It might serve game designers with information about the medium that could help them to improve their creations. Furthermore, it could be of interest to players of games who want to gain a deeper insight into their activities and the medium itself.

Based on the history of art and media, and in particular the development of global mass media, we can assume that new technologies profoundly affect our spatial conceptions, perceptions and practices. Thus, it can be argued that there would also be external benefits, for such an inquiry. We can learn if and how the unique spatiality in computer and video games influences cultural production in other areas, such as for example contemporary art practice. In the following I want to provide an outline for the itinerary of this thesis and briefly convey the content of the chapters.

The first step leads to the existing literature and will deliver an overview of the approaches to space in video and computer games in the emerging field of game studies. In recent years there has been a growing academic interest regarding computer and video games, so one would assume that theorists might have shared some of the above questions and thus produced some answers. Chapter 1 reviews the literature from the discipline of game studies in order to reveal how the question of space in games is approached within the discipline. Nearly all authors agree unanimously that space and spatial representation are important characteristics of digital games and that their appearance differs from other media. Yet, so far no detailed study has been dedicated exclusively to this aspect of the new medium. Depending on their specific epistemological backgrounds, the majority of authors approach *game space* either from a narrative perspective (Murray, Ryan, Kücklich) or focus on the rules of games (Juuls, Frasca, Järvinen). This seems to mirror the fact, that the discipline of game studies has seen a somewhat artificial bifurcation between the so-called narratologists, researchers who approach games from narrative and literary theory, and the ludologists, who disagree with a reading of games as narrative devices and advance the importance of other structures, such as the rules. It can be argued that *game space* cannot be fully grasped by choosing either approach in isolation, for spatial practice in those games is a highly complex phenomenon, which spans across the rules, the narrative and the audiovisual styles of the game as well as

the actual physical location of the player. Whereas most of the research has subsumed the analysis of space in games under other dominant aspects, most prominently narrative and rules, I want to point out that it is crucial to investigate games from a truly spatial perspective. Such a perspective has to account for the hybrid and dynamic nature of the phenomenon. Space in games is the product of a human being interacting with a program and it is actively generated at the moment of play. Moreover, the actual physical space where the game is played, the narrative structures, the rules of the game and, most obviously, the audiovisual presentation, have to be considered as parts of this spatial ensemble. Based on these assumptions, this thesis sets out to develop a theoretical model that examines those aspects in detail and explains how they interact with each other.

In order to shape the contours of an epistemological foundation for such a perspective the historical evolution of different spatial concepts is briefly considered in Chapter 2. Philosophical discourse surrounding the nature of space has been a central figure in the history of western thought. If one follows the breaks and shifts that accompany this topic, it becomes evident that space has to be regarded as a socio-cultural construction, which is subjected to constant change, rather than a natural given. Spatial conceptions result from complex transactions between scientific reasoning, religious beliefs, artistic practice and technological innovations. Popular interactive media like video and computer games are among the factors that shape the spatial conceptions and cultural practices of coming generations. Artists seem to be among the first to engage critically with these slow alterations of spatial practices in everyday culture.

As I have implied above, *game space* is characterised by the coexistence of different forms of spatiality at the same time and in the same place. Thus, Foucault's notion of the *heterotopia*, which is defined as the coexistence of different *emplacements* in one location, is an accurate metaphor in this context. *Game space* is *heterotopical* because it is an ensemble of *spatial modalities,* which interact with each other dynamically. Players and producers of digital games share conceptions of space; audiovisual space is created in ways inherent to the medium; players generate specific and often individual paths through the *game space*. These circumstances lead to the question how the relationship between these different constituents of the spatial ensemble could be

conceived. Here, I turn towards Lefebvre's famous theoretical model of *perceived*, *conceived* and *lived space*. It provides the resources to comprehend space as a social phenomenon, which is simultaneously produced by what people perceive (perceptions of space), by what they think (conceptions of space) and by their spatial practice in everyday life (lived space).

Lefebvre's triadic model is mobilized as a conceptual foundation for the spatial model that is advanced in this dissertation. Accordingly, spatiality emerging from rules and narrative are identified with *conceived space*, whereas audiovisual space belongs to the category of *perceived space*, and the active engagement of the player with the game amounts to *lived space*. It is crucial to note that this reading is brought forward, because other approaches to *game space* have not tackled the entirety of existing spatial dimensions.

Chapter 3 is dedicated to the definition and discussion of these new categories and their interaction. The actual physical location (*user space*) influences the rules of a game and its audiovisual aspects. Game arcades, domestic space, mobile and location based as well as networked games are distinguished in relation to the specific qualities of *user space*. Concerning the game arcade, the dependence of types of game cabinets on the physical location and the resulting impact on different types of rules (multiplayer games) is considered. Domestic space and its influence on *game space*, as well as the recent phenomenon of location based or pervasive games and the fact that the *user space* takes over the entire *game space* in these cases is examined. Moreover, the curious multiplied user spaces appearing in Internet games and the specific situation in LAN tournaments are looked into.

The second part of Chapter 3 scrutinizes *narrative space* and its implications for other modalities. Jenkins' notion of narrative architecture as well as De Certeau's insights into the relation between place, space and narrative and specifically his distinction between the *tour* and the *map* are called upon. Spatial functions in the text-based adventure game *Zork* are analysed. The importance of the map within the narrative framework of certain types of games is pointed out and the functions of narrative frames in early abstract games are considered. In this section of the study, we also focus on the differences between games and other narrative media. Narrative

spatial action on the part of the game player can be seen as a reversal of classical mnemotechnics (Yates), the memorising of text based on locations.

Rule space, reverberates strongly with Lefebvre's notion of *conceived space*. The rules of a game govern the spatial action of players in a variety of ways and affect the use of audiovisual elements. Board games such as chess and Go are presented as initial evidence for spatial action emerging from rule based behaviour. In a similar fashion, the movement patterns of players in FPS (First Person Shooter) games are informed by *rule space*. Debates surrounding the importance of rules for simulation and the difference between games with emerging or fixed rules are addressed based on Frasca's reading of *ludus* and *paidia*. Spatial paths in MMORPGs (Massively Multiplayer Online Roleplaying Games), which are often based on resource deployment in the form of trade routes, are brought up and the role of *rule space* in puzzle type games and its links to the narrative are examined.

Subsequently *audiovisual representational space* is introduced. Here, it is important to note that the role of sound in relation to *game space* has been widely neglected in the literature so far. For this reason the subject deserves to be addressed with a level of detail that would go beyond the scope of this chapter. Thus the following Chapter 4 has been reserved for an in-depth analysis of the impact of sound on the *game space*.

A brief overview of the historical roots of computer and video games in the popular optical devices of earlier centuries, such as the camera obscura, is offered. For example, the similarities between ubiquitous game technologies such as scrolling and the classical *Myriorama* device are analysed. Core concepts of visual spatial representation are brought up in critical reference to Wolf's classification. Based on these core concepts and Crary's discussion of the camera obscura, a refined model that caters for the diverse audiovisual spatial structures in digital games is proposed. It introduces the notion of *Game-camera,* and its properties, such as different types of *Point of Perception* (PoP) (Järvinen), multiplication and movement.

All of these characteristics are evaluated in relation to their implementation in different types of games. Moreover, the connections between audiovisual space and other spatial modalities are highlighted.

Subsequently, *Kinaesthetic space* is set forth and defined as the spatial modality that dynamically connects the user's body space with the *game space*. Based on Merleau-Ponty's work, the bodily dimensions of *game space* are reflected upon and the

relevance of the interface in this context is debated. Moreover, Csikzentmihalyi's concept of flow is brought up in order to gain an insight into the unique situation of the player within the feedback system of the game.

At this point it has to be stated that although spatiality in video and computer games could be seen to inform a divergent array of fields - such as, for example, sociological accounts of games production and consumption; issues of the filmic or literary representation of gaming; as well as investigations into game culture itself - this study deliberately eschews any detailed encounter with those fields. It could be argued that a thorough analysis of these social and cultural phenomena from a spatial perspective depends on the prior existence of the conceptual categories and interpretative tools this thesis sets out to advance. In other words, before neighbouring research areas can be tackled the basic foundations for such undertakings have to be delivered. Although it is very tempting to engage in a lateral approach to issues of space in video and computer games, a narrowing deepening of the scope of the research area is imperative.

Chapter 4 is concerned with the analysis of the significant role of sound in the *game space*. Sound in games is employed to orient the player, lead him or her through the *game space*, advance the narrative, create an immersive atmosphere and simulate the effect of motion and locomotion. Based on Schafer's notion of the *sound object* and Chion's research into acousmatic functions in film, a model for the analysis of spatial sound in games is developed. The proposed model consists of a set of different types of *sound objects* and a number of so-called *spatialising functions,* which express the use of sound objects in the *game space*. In order to demonstrate its viability, this model is used to analyse the original sonic space of the game *MGSII: Sons of Liberty*, throughout the chapter.

Chapter 5 finally returns to the point of departure of this enquiry, namely artistic practice in the context of space in digital games. The discussion of key works of contemporary artists takes up the final chapter of this thesis for two reasons:

Firstly, as I have claimed above, it is an inquiry into influences of the new and original spatiality of video and computer games on other forms of cultural production. To put it differently, if it is true that *game space* affects everyday life then it

has to be possible to find evidence for this assertion in the works of contemporary artists.

Secondly, by using the spatial model that is presented in Chapter 3 as a theoretical framework to examine the works of contemporary artists, a deeper understanding of the proposed spatial model can be gained. After all it is an important characteristic of contemporary artistic work to isolate and highlight phenomena in everyday culture. Moreover, artists have a much greater interest in experimentation and in novel approaches to the medium, than the entertainment industry with its focus on the economic viability of new products. Artists test and evaluate technological or conceptual approaches to a medium much more radically and critically than the global games industry. The deeply rooted connections between games and art are discussed with reference to Schiller's idealist perspective on the aesthetic state and Gadamer's hermeneutical philosophy. The predecessors of contemporary game related artistic practice are traced back to the interactive art of the 80s and 90s of the last century and key-works from that period are introduced. I subsequently move on to examine how contemporary artworks can be understood within the framework of spatial modalities that have been advanced in Chapter 3 in order to reveal how the *game space* influences creative practice. Along with the works of international artists, Chapter 5 also showcases my personal creative practice, which, after all is the driving force and the initial instigator behind this thesis.

1. REVIEW OF THE CURRENT LITERATURE

1.1 INTRODUCTION

Although computer games have been part of everyday culture for nearly three decades, serious academic interest only awoke in the early 90s and since then has been growing steadily. Literature dedicated to computer game research can be traced to a large number of different disciplines, spanning from literary studies, psychology, sociology and computer science to education and economics. These various disciplines have diverging motivations and interests towards the study of computer games: some are more interested in their effects on players while others attempt to analyse their narrative potential or their technological background. However, the establishment of the computer game as an object of study in its own right is a very recent development that brings with it all the problems of a young discipline that is not yet sure of itself. In a paper dedicated to methodological approaches to game analysis, Aarseth catalogues the "curriculum framework" for game research proposed by the International Game Developer's Association (IGDA) as follows: "Game Criticism, Analysis & History, Games & Society, Game Systems & Game Design, Technical Skills, programming & Algorithms, Visual Design, Interactive Storytelling, Writing & Scripting, Business of Gaming, People & Process Management*" (*Aarseth 2003, 2). He asserts that each of these broad topics branches into numerous subtopics amounting to a total of 200 subfields and disciplines. Aarseth's interpretation confirms that current game research is in no way a consolidated field of study with assured methodological approaches. Instead, there is a very lively interdisciplinary discourse that is constantly fed by a large variety of academic disciplines. Indeed, Aarseth claims that it would be hard to imagine a subject or field of study that could not in some way be employed in the study of computer games. He reasons that this overwhelming potential is due to the fact that computers are simulation machines, which theoretically enables them to portray any other phenomenon, thus making it hard to exclude possible research areas. A good example for this principle is the classic simulation game *Sim City*, which has been equally interesting for researchers from the fields of urban studies (Starr, Kolson, Klein) as for pedagogical research (Carr), sociology (Collins) and media studies

(Miklaucic, Nichols). In recent years, the number of different theoretical approaches that claim authority to provide methodological approaches to the subject has risen significantly. The most relevant attempts have so far emerged from the fields of film (King, Krzywinska), literature (Murray, Ryan), and media studies (Jenkins, Grodal). The study of games is not an entirely new phenomenon, but it has never evolved into a coherent academic discipline. To avoid confusion one has to distinguish the study of games as a cultural phenomenon from the discipline of game theory (von Neumann), a branch of applied mathematics developing models to study interactions with so-called incentive structures or games. Several seminal works by individuals such as Johan Huizinga or Roger Callois are currently re-visited in the context of the new discipline of game studies.

Mäyrä notes that "[i]t is becoming increasingly complex to say what exactly we are talking about as we are discussing games. To quickly list some of the major dimensions, firstly (1) the game product with its programming code and subsequent features (the "potentials"), (2) the experiences of particular gamers (competent or not) playing this game (the "actualization"), and (3) the interpretations and discourses produced in the community that give significance to the gameplaying – these are all important, but different aspects of the phenomena" (Mäyrä 2002, 6).

He goes on to claim that "[t]he many dimensions of games as an object of research partially explain the multiplicity of approaches in contemporary game studies" (ibid.). Allthough the discipline of game studies is in a state of exponential growth, extending in various directions, two positions, namely *narratology* and *ludology* have lately dominated the discourse (Frasca). The former is mainly concerned with the narrative potential of computer games while the latter claims that games cannot be treated in the same way as traditional narrative structures and instead promotes a concentration on their inherent rules. I will discuss these different positions and the most important proponents from these fields of discourse since they represent the dominant approaches at present. But, before anything else, it is crucial for this study to discern whether there are other viable perspectives on our subject.

In a short article for the catalogue accompanying the exhibition "Game On" at London's Barbican Centre in 2002, Kurt Squire and Henry Jenkins speculate about the driving force behind the novel art form of computer games. They write, "[m]ost often, critics describe games as narrative art, as interactive cinema, or participatory

storytelling. But perhaps we should consider another starting point, viewing games as spatial art with its roots in architecture, landscape painting, sculpture, gardening or amusement-park design" (Jenkins, Squire 2002, 65). Squire and Jenkins propose to treat computer games as the "art of contested spaces" (ibid.) and give examples spanning from the early abstract game spaces to the latest attempts by game designers to incorporate configurative spatial action and online participation. At this point I do not want to discuss the relationship between art and games (see Chapter 5). Instead, the observation that computer games amount to a spatial practice has to be considered. A perspective that posits space at the core of computer games could indeed present a novel and valuable contribution to the current discourse.

Michel Foucault pointed out that while the 19th century was obsessed with the notion of history, "the present age might be the age of space instead" (Foucault 1998, 175). In his text entitled *Different Spaces*, he introduces the notion of "emplacement" (ibid. 176) in order to describe the relational aspects of the modern understanding of space. "Emplacement" is defined "by the relations of proximity between points or elements" (ibid.). The term invokes the dynamic spatial tasks of demography and in particular engineering in relation to the circulation, storage and distribution of information. Foucault writes, "[w]e live in an ensemble of relations that define emplacements that are irreducible to each other and absolutely nonsuperposable" (ibid. 178). He proposes the study of the relations that lead to particular emplacements and points out two major modes of emplacement as specifically interesting, namely utopias and heterotopias. In his view, both modes "[…] have the curious property of being connected to all the other emplacements, but in such a way that they suspend, neutralise, or reverse the set of relations that are designated, reflected, or represented by them" (ibid.). In our context, the notion of the *heterotopia* is particularly interesting, since, in his words, "[t]he heterotopia has the ability to juxtapose in a single real place several emplacements that are incompatible in themselves" (ibid. 181). Among other places, he regards the theatre, cinema and interestingly the garden as belonging to the realm of heterotopias, since they all are places, which are permeated by different forms of emplacement. He writes, "[t]he theatre brings onto the rectangle of the stage a whole succession of places that are unrelated to one another; in the same way, the cinema is a very curious rectangular hall at the back of which one sees a three-dimensional space projected onto a two-

dimensional screen; but perhaps the oldest example of these heterotopias, in the form of contradictory emplacements, is the garden" (ibid.). Cinema, theatre and even the garden have also served as metaphors for computer games.

Brenda Laurel has promoted a model of the computer in relation to theatre and the game researcher Chaim Gingold compares the "microworlds" of *Super Mario* games created by Shigeru Miyamoto with Japanese gardens. He says "[g]ardens, like games, are compact, self-sustained worlds we can immerse ourselves in" (Gingold 2003, 7), and proposes to use them as a "[…] way of thinking about the aesthetic, cognitive, and representational aspects of game space" (ibid.). Crucially, Foucault points out how *heterotopias* affect the remaining space. For him "[h]eterotopias have the role of creating a space of illusion that denounces all real space, all real emplacements within which all human life is partitioned off, as being even more illusory" (Foucault 1998, 184). Seen in this light, *game space* can be understood as a type of *heterotopia*. Games in general have the power to generate a second order of time and place that emerges from their rules. Most importantly, computer games are artefacts that juxtapose different modes of audiovisual spatial representation and present them in one place: the screen. The space of the player, the public game arcade, the console in the private living room, the spatial particularities of games on mobile devices and the Internet have to be taken into account. Numerous games display spatial narratives, such as journeys or exploration themes and text is frequently used to evoke spatial structures. Furthermore, the rules of many games lead to spatial operations, such as controlling a particular territory in a strategy game or moving as fast as possible through a racetrack. Various modes of spatial representation are gaining importance with the current surge of 3D games, and the history of games can be described as a constant evolution of spatial representational strategies. Additionally, the player connects to the game via a particular kind of bodily action, which leads to a very specific spatial practice. The sum of these different spatial dimensions or *emplacements* is responsible for the particular spatial nature of the computer game.

The discussion of these *emplacements* and their relations is crucial for the development of an adequate analytical framework for this medium. For this reason, the subject will be taken up again, in Chapter 2. Yet, before this issue can be tackled, it is necessary to turn towards literature from the field of game studies, to obtain an overview over the reading of space in that discipline. Spatial practice in video and

computer games will be the major focus in the following survey of the current state of the discourse in game studies. The task is to question whether the different theoretical positions provide a critical vocabulary to deal with our subject and to identify which spatial concepts emerge from *narratological* and *ludological* approaches. Throughout the course of this chapter, terms such as textual space and narrative action, the complex relation between simulation and representation, the importance of experiential cognitive theory for our subject, as well as models of the visual representation of space in games will be discussed.

1.2 SPACE IN GAME STUDIES

The discussion of hypertext and interactive fiction that emerged from the field of literary studies in the early 1990s can be seen as the point of origin for what has been termed *narratology* in game studies. The different models and thoughts that can be subsumed under the keyword *narratology* share an interest in treating video and computer games as textual forms and adapt existing methods of textual analysis to fit the needs of the medium. The borders between *narratology* and *ludology* are however quite blurred and the drive towards differentiation came mainly from the *ludologist* faction during their attempts to claim a share of the academic territory of game studies. Although, very recently a strong drive to transcend this artificial bifurcation of the field seems to gain ground, the grouping along these perspectives was significant for a very productive period in game studies.

From a *ludologist* point of view computer games cannot be analyzed with critical tools originating from literary theory. Instead, most *ludologists* build on the tradition of game theorists such as Huizinga, Callois and Piaget, and claim that games might be a lot of things, but in general they cannot be regarded as narratives in any traditional sense. Here, this admittedly somewhat reduced characterization of *narratology* and *ludology* has to suffice, since our focus is primarily directed towards spatial conceptions in game studies, rather than the discursive development of the field itself.

1.3 SPATIAL CONCEPTIONS AND NARRATOLOGY

Janet Murray's book *Hamlet on the Holodeck* established her as one of the strongest proponents of what has been labelled as the *narratological* strand within game studies. The subtitle *The Future of Narrative in Cyberspace* clearly promotes her interest in the narrative possibilities of the new form. She examines the potential for dramatic enactment brought about by digital technologies, drawing upon the models of Brenda Laurel, who advocated the use of theatre as a metaphor for human computer interaction. For Murray computer games are primarily a new medium for storytelling.

She states that "[d]igital environments are procedural, participatory, spatial, and encyclopaedic. The first two properties make up most of what we mean by the vaguely used word interactive; the remaining two properties help to make digital creations seem as explorable and extensive as the actual world, making up much of what we mean when we say that cyberspace is immersive" (Murray 1997, 71). The fact that she talks about environments rather than artefacts or programs adds a spatial notion, and spatiality is mentioned as an elementary property of digital media. She claims that "[t]he new digital environments are characterized by their power to represent navigable space" (ibid. 79) and goes on to state, "[l]inear media, such as books and films can portray space either by verbal description or image, but only digital environments can present space that we can move through" (ibid. 79). This observation is crucial for the understanding of video and computer games and it is precisely this spatial nature of the medium that our study is concerned with.

However, the examples she chooses to make her point are rather obfuscating because they blend different spatial metaphors without further explaining them and do not help us understand how these spaces emerge and how they are related to each other. The spatial metaphors she suggests are the user interfaces developed at Xerox PARC, namely the desktop and filing system as well as the notion of *cyberspace*, which she claims is produced by linking files on the World Wide Web. She states that "[t]he computer's spatial quality is created by the interactive process of navigation" (ibid. 80), but does not bother to explain how this process happens and instead asserts that the user instantly knows which location he/she is in, because the elements on screen change with each interaction. In particular the terms *virtual-* or *cyberspace* do not seem to be very useful in this context, since they transport very general meanings and are not clearly defined.

Murray mentions the adventure game *Zork* in order to point out the difference between digital environments and traditional texts regarding their abilities to represent space. Here, she focuses on "[h]ow this navigational creation of space lends itself to dramatic engagement" (ibid. 80). However, the idea that games might have a spatial nature in their own right is not raised at all in this account. Instead, her attention ultimately rests on the potential for drama and narration. Following the argument that digital environments represent space differently from so-called linear media such as books, it is striking that a text-based game is chosen as major example. She asserts that "[t]he computer screen is displaying a story that is also a place" (ibid.

82). Since this could be said about any text deploying metaphors to describe a place or present a topological grammar it does not seem to be unique to computer games. Indeed, if there was a difference it might have to be found somewhere else, maybe in the non-linear potential of the game, the interaction methods or the factor of time to the extent it influences the experience of the game. A text-based adventure game uses text to convey its space and is thus in many ways nearer to traditional text based ways of spatial representation than a game employing imagery and sound. Furthermore, what seems to be lacking is a more detailed analysis of how language is used to represent space in the cases she describes.

Murray's second example is Stuart Moulthrop's hypertext novel *Victory Garden*. She identifies the clicking of hypertext links with navigation through the digital environment. Obviously, we cannot exclude the clicking of a text-link from the spatial practice generated by computer games, but it is most definitely not the best example for the unique spatial potential of digital environments. Following this approach it can be stated that Murray's understanding of space generated by computers is, at the very least dominated by text and narration and does not separate the spatial practice of navigating a website from playing a computer game or using a GUI- based operating system.

She defines three elements that form the aesthetic framework of the new digital media systems: "Immersion, Agency and Transformation" (ibid. 98). Murray suggests that Immersion should be understood as the active suspension of disbelief. She notes that "[a] stirring narrative in any medium can be experienced as a virtual reality because our brains are programmed to tune into stories with an intensity that can obliterate the world around us" (ibid.). This understanding of the narrative as the driving force behind immersion is clearly rooted in literary tradition. However, in the following she points out that immersion is created by different means in different media. Whereas the form of immersion in a text that is silently read demands the reader's submission to the narrating authority, participation has the power to suspend the immersive bond and make the participant aware of the artificial nature of his or her action. The latter problem occurs in theatre, where audience participation permanently risks breaking the illusion. This fact leads to an important question: If agency and participation threaten to break the immersive stance in traditional literature and theatre, what does that mean for digital games? Here Murray settles for functions specific to digital environments, namely multi-sensory immersion that

enables the user to visit an illusory world or stage. It is interesting to note that she does not explicitly differentiate between these types of immersion, although they seem to oppose each other. Yet, there seems to be one form of immersion related to the age-old tradition of narration and another created by the immediacy of spatial practice in multi-sensory simulated worlds. Since various computer games provide both forms - text based immersion alongside participatory immersion in an audiovisual spatial simulation - it would be interesting to find out what happens when the game switches between these two forms. Although Murray does not occupy herself with this particular question, she talks about the connection between immersion and bodily involvement. The importance of this bodily spatial practice is reintroduced into the equation when she states, "[w]hen the controller is very closely tied to an object in the fictional world, such as a screen cursor that turns into a hand, the participant's actual movements become movements through a virtual space. This correspondence, when actual movement through real space brings corresponding movement in the fantasy world, is an important part of the fascination of simple joystick-controlled videogames" (ibid. 108). Here Murray presents a crucial observation: spatial practice in videogames is partly created by the relation between bodily movement and movement in the *game space*. Unfortunately, the different types of spaces she mentions are not clearly defined and she attributes a much higher value to the dramatic potential arising from this phenomenon, than to the phenomenon itself. She underlines the enormous potential of computer games as narrative devices, and claims that they have not yet matured enough as an art form capable of creating narrative masterpieces. The reader is left with the conclusion that computer games are seen as novel and interesting devices for storytelling, but for some reason they have not yet fully lived up to their task. Indeed, this conclusion would be the logical result if all our expectations were channelled towards narrative structures in games.

Marie Laure Ryan, who has extensively researched the relation between narrative and digital media, offers an interesting perspective in this context when she describes different types of plots that lend themselves to computer games. This position differs significantly from Murray's because here, the argument does not depend on the demand that computer games have to be turned into great storytelling tools in order to bring about literary art. On the contrary, Ryan is convinced that the particular nature of computers and the various forms of interaction only fit specific types of

narratives. In other words, rather than adapting games to fit existing literary expectations, novel types of narrative structures have to be developed. The narrative has to fit the storytelling device, not the other way round.

She defines different forms of user engagement or interactivity modes, which are then used to classify different genres or types of games and the narrative possibilities attributed to them. This classification model is loosely based on Aarseth's typology of user functions (Aarseth, 1997, 62-65) and consists of cross-combinations between the binary pairs of "Internal-" versus "External Interactivity" and "Exploratory" versus "Ontological Interactivity".

Ryan conceives the first pair as follows: "In the internal mode, the user projects himself as a member of a fictional world, either by identifying with an avatar, or by apprehending the virtual world from a first person perspective. In the external mode, the reader situates himself outside the virtual world" (Ryan 2001a, 7).

About the second pair of interactivity modes she writes: "In the exploratory mode, the user is free to move around the database, but this activity does not make history nor does it alter the plot; the user has no impact on the destiny of the virtual world. In the ontological mode, by contrast, the decisions of the user send the history of the virtual world on different forking paths" (ibid. 7-8). According to these definitions, it is possible to classify games according to their narrative potential, for example, by classifying the stories that fit them best. Furthermore, this conception bridges the gap between agency or interaction and the narrative options attributed to different types of games. According to this system most classical hypertext works, belong to the group of external-exploratory interactivity. She asserts that "[i]nteractivity consists in the freedom to choose routes across a textual space, but this space has nothing to do with the physical space of a narrative setting. The implicit map of the text represents a network of lexia, not the geography of a fictional world" (ibid. 8).

Textual space is understood as the result of a chosen route through the hypertext structure and thus as fundamentally different from simulated audiovisual spaces. In this sense, Ryan provides a much more adequate image of the relation between narrative and space than Murray's analysis. Ryan introduces the term "spatial narrative, whose main theme is travel and exploration" and the "narrative of place, whose focus is the in-depth exploration of a specific location, rather than travel across space" (ibid. 9) as belonging to the group of games that provide

"internal-exploratory interactivity". Here it is important to note that Ryan looks at existing games and their aesthetic and formal potential in order to propose narrative structures for them rather than the other way round. This approach sets her apart from other researchers with a *narrotological* perspective. The category, "external-ontological interactivity" includes simulation type games like *Sim City* and she notes that "[t]he mayor or the emperor are external interactors, because they do not exist in the same space and time as their subjects" (ibid. 11). Following this conception, the so-called god perspective indicates this separation in most simulation games. In those games, the player's avatar is (visually) situated outside the *game space*, which lends itself to particular types of narrative. In these cases she understands the narrative in "a looser sense of the term: these narratives do not consist of interpersonal relations, but of the sequence of transformations that effect a micro-environment" (ibid.). Finally, "internal-ontological interactivity" can be found in games of the action and adventure type. In these cases "[t]he user is cast as a character who determines his own fate by acting within the time and space of a fictional world" (ibid.). She claims that these games create a narrative, which has to be "enacted" by the user, rather than narrated to him or her. According to this approach, the pre-existing narrative in those types of games is more a function to lure the player into playing the game than a means to an end. In these cases, the narrative theme may even fade into the background once the player is sufficiently immersed in the game. Thus, the pre-existing narrative could be perceived as a device that frames the player's action. And indeed, in most action games, the player is confronted with an introductory story and subsequently left to his own devices, to play the game and to *enact* his personal narrative.

Although Ryan argues that all games are potentially narratives because the player could create a diegetic structure out of the actions he or she had to perform during the game, it becomes quite clear that games cannot be fully explained if they are treated as narratives in any traditional sense. They do however employ various narrative elements, differing between different types of games as Ryan shows. Spatial metaphors play a prominent role throughout her study and are employed to define her whole system of classification. Space and spatiality form the aesthetic metaphorical grid for this system, even though it is mobilised to explain different modes of interaction in relation to possible narratives. This seems to corroborate the fact that computer games are permeated by spatial motifs. Furthermore, the terms

external and *internal* clearly indicate a separation of location, and although their use can be traced back to different reader perspectives in literary theory, they are here explicitly used in relation to textual spatial phenomena in computer games. Thus, Ryan's work presents a viable analysis of the dynamic relation between textual narrative space and the spatial practice of interaction. Yet, it seems that when notions like "the sequence of transformations" affecting "a micro-environment" (ibid. 11) are presented as part of the narrative framework, the general understanding of narrative has to be stretched significantly. Additionally the observation that the player can look back on the performed actions he/she has performed and create a kind of narrative out of these personal experiences does not necessarily make the game a narrative device per se. In a similar fashion, various approaches from literary studies proclaim a need to widen the meaning of narrative in the light of computer games.

Lev Manovich identifies "movement through space as a means of building character" and "exploring and culturing unknown space" (Manovich 2001, 272) as central themes of video and computer games, which are reminiscent of the American frontier mythology. He points out that narrative elements in computer games are often based on travel and movement through space, and that they rely on user control, rather than on the psychological tensions between characters and movement in psychological space, which are essential in traditional literature and drama. Furthermore, he claims that travel narratives are among the oldest literary themes, and that in this respect the developments of psychological representations of inner life have to be regarded as a modernist invention. Manovich proposes the use of the terms *narrative actions* and *exploration*, instead of narration and description, in the context of computer games and asserts that "movement through the game world is one of the main narrative actions" (ibid. 247). Even though movement through *game space* might progress the player through the narrative structure of a game it is also valuable in itself, and he argues that this fact separates the traditional narratives based on movement through space from the ones that can be found in computer games. In other words, players often enjoy roaming freely through the *game space*, without following either established narratives or even the explicit rules of the game. This is indeed a very important point because it emphasizes that the spatial practice that accompanies computer games cannot be fully explained by concentrating exclusively on narrative functions. Although narrative elements are present in most computer

games, there is something else at work that can only be brought to light if other aspects that define the spatial practice, such as, for example the kinaesthetic link between body and game are similarly accounted for.

One could argue that it is always possible to go as far as Ryan, and claim that every game played is a potential narrative in the player's head, because the experience can be narrated afterwards. But that does not account for an explanation of what happens when the narrative terrain provided by the game is left for pure exploration of the game world. In other words, the fact that every experience can potentially be narrated afterwards does not mean that the source for the experience has to be intentionally structured as a narrative. Or to put it bluntly, one does not generally treat a city as a narrative device, simply because one could create a personal narrative after walking through it.

In this context it seems that traditional *narratological* models have to be transformed, and literary studies have to be informed by other fields of study in order to leave their linear approaches behind. This is in fact a familiar stance among researchers from the field of literary studies; the claim that *narratological* models have to be reconstructed and reshaped in order to make it possible to understand computer games as new narrative forms is frequently presented. It is also one of the major angles of critique for the *ludologists*, who argue that it is necessary to develop unique methods for the new medium rather than adapt existing ones. In their eyes those methods have to be generated by studying how games work first of all, instead of trying to adapt methods from other fields. Before I move on to discuss the *ludologist* spectrum of game studies, however, I will present two other distinctive positions that focus on narration.

Mary Fuller and Henry Jenkins have written a text in the form of a dialogue that reveals structures shared between Nintendo games and 16th century travel writing. They discuss the parallels between the "[e]xplorations and colonizations of space: the physical space navigated, mapped, and mastered by European voyagers in the 16th and 17th centuries and the fictional, digitally projected space traversed, mapped, and mastered by players of Nintendo video games" (Fuller, Jenkins 1995, 1). Their argument hinges on the observation that "[t]he movement in space is itself the point, topic, and the goal" in these types of games and that this "[s]hift from narrativity to geography" (ibid. 2) is a decisive factor in certain Nintendo platform games. To put

the basic idea in other words: in games, the journey is the goal and it partially replaces the narrative. According to Jenkins and Fuller, themes like exploration, colonization and the charting of white territories on the map, which were central to the travel accounts of 16th century colonialism, can also be found in certain types of videogames. This observation resonates with Manovich's interpretation of the American frontier mythology, as a core motif of the spatiality in digital media. Both positions relate spatial themes stemming from geography, historical discovery and travel with the act of playing computer games.

Jenkins and Fuller present a number of important observations, which can be treated as points of departure for more detailed enquiries. Jenkins claims the central feature of most Nintendo games to be the "constant presentation of spectacular spaces" (ibid. 5). He suggests that the narrative frame of the game, the rescue of Princess Toadstool by Mario and Luigi, does not really matter while the player is immersed in the game. Instead, what matters most is staying alive to see what spectacle awaits the player on the next screen. In these instances, the traditional narrative is merely a precursor to the explorative activity in the game. Jenkins states that "[m]oments in the narrative trajectory become places in the player's itinerary, laid out as a succession of worlds we must travel through" (ibid.) and that "these framing stories with their often arbitrary narrative goals play little role in the actual experience of the games, as plot gives way to a more flexible period of spatial exploration" (ibid. 6). Based on Michel de Certeau's analysis of narratives as spatial practice they posit the travel writings of Drake, Smith and Cortes in the same class of narratives, basically defined by an absence of plot or character, as the frame narratives in Nintendo games.

De Certeau's perspective on narrative and its inherent spatial structures is indeed a very promising point of reference for the analysis of spatial practice in computer games. In particular one has to take into account his notion of space as *practised place*. To paraphrase Certeau, the rules in the program produced by game developers is transformed into a space by the players in the same way as "[t]he street geometrically defined by urban planning is transformed into a space by walkers" (De Certeau 1984, 117). Jenkins hints at this transformational act when he says that these games allow people to enact the older narratives of exploration and colonization that can no longer be enacted in reality.

This is not only an interesting point in regard to the motivations for playing particular video games but it also reveals another important aspect of our subject. If travel narratives are indeed the product of the journey into formerly unknown places, how should it then be possible to treat computer games themselves as narratives of the same order? Does this not lead to an ontological confusion between the account of the journey and the unknown places one is traveling through? Instead, what Jenkins and Fuller appear to be revealing by this parallelization of travel narrative and game, is that although the game undoubtedly has a narrative frame, it is itself more than a narrative device; for the player it is essentially a personal act of exploration rather than the consumption of a story.

In this sense, Torben Grodal promotes a much more radical notion of *spatial enactment* in relation to narrative structures. His approach is based on narrative theory and incorporates elements from experiential cognitive theories. Here the argument unfolds a radical expansion of narrative itself. He asserts that it is necessary to understand narratives not only by their relation to mediated realizations, but also "by their relation to unmediated real life experiences and the mental structures that support such experiences" (Grodal 2003, 129). Video games are here interpreted as simulations of real-life experiences, and consequently "[c]ognitive psychology provides many advantages as a tool for describing video games compared with a semiotic approach; even if games may be provided with some symbolic signs, most of the game activity consists in seeing, hearing and doing in a simulation of real-world interaction" (ibid. 130).

This position marks the outer perimeter of *narratological* research by equating real-life experiences with (unmediated) narratives. The major question that arises from this merging of life and art is whether it is at all possible to analyse narrative structures once they are treated as completely similar to any other experience in everyday life. By equating narration with everyday life experiences, it seems that the focus becomes too blurred to generate viable results. Furthermore, once narrative is understood as an act of presence devoid of any kind of mediation it seems that the very foundation of the concept itself is eroded. In order to re-instate the concept of narration in this context, cognitive science is mobilised to postulate the existence of biologically determined story routines in the human brain. Grodal develops his model by speculating about such a biological mechanism: "The primary story-regulating brain structures are probably located in amygdala-hippocampus, the left

peri Sylvian region, the frontal cortices and their subcortical connections […]" (ibid.). If we rely on a more traditional understanding of narrative as emerging from mediation and communication we have to raise serious doubts about this attempt to shift the problems towards narrative structures in biological routines which are in any case impossible to separate from other functions such as perception and cognition.

Additionally, one does not seem to gain insights into the problem of the relation between narrative and computer games by transporting it into the black box of "story-regulating brain structures" (ibid.).

However, the recent interest of game researchers in experiential cognitive theories does promise interesting results because it enables a different perspective of the kinesthetic bond between player and game. In addition to that, post-cartesian conceptions of an embodied mind seem to be well equipped to account for the experience of playing computer games as an activity involving the whole body. In this light, Grodal's cognitive-narrative mix seems mainly to suffer from a reliance on narrative structures as a core principle, when he is actually referring to phenomena that do not necessarily belong to the narrative realm. For example, he claims that the activation of visuo-motor links provides strong immersion, even in early games such as *Pac-Man*. This is without doubt an essential element of computer games, but it seems impossible to deduct that it depends on the narrative frame in a game like *Pac-Man* if one does not adhere to his conception of an all-encompassing narrative.

He asserts that "[l]ike cinema, the video game screen predominantly simulates perceptions of spaces and objects that are present to the senses, but they can be influenced by actions" (ibid. 139). It is quite curious in this respect that the relation between spatial experience in the physical world and the simulated spatial practice in games is not mentioned at all in this context. Instead a quasi a-priori story-routine is presented, which is thought to be continually "arranging perceptions, emotions, cognitions, and motor actions, based on innate brain modules and with or without a linguistic representation" (ibid. 152). It is definitely important to note that a purely linguistic model is incapable of exhaustively explaining computer games, but the conclusion Grodal promotes, namely to position narrative before language in the "animal brain" seems to be a step too far. For example, an obvious problem arising from this thought is the need to clarify the relation between these pre-mediated basic stories and the mediated stimulus produced by the game. Here Grodal says that, "[v]ideo games and some types of virtual reality are the supreme media for the full

simulation of our basic first-person 'story' experience because they allow 'the full experiential flow' by linking perceptions, cognitions, and emotions with first-person actions" (ibid.). If we follow the logic of this conception, we have to treat the spatial experience of playing a computer game as equal to spatial experience in everyday life. However, the simple fact that computer games present very diverse interfaces and complex but always restricting interaction systems should be enough to mobilize reservations towards Grodal's model. To put it differently, one has to learn to use a computer game interface, which goes to show that we are dealing with cultural techniques rather than a natural transition between the "real" world and so-called virtual environments. It is precisely this threshold between spatial experience in everyday life and its counterpart in computer that should be scrutinized rather than presented as obsolete.

For now, the focus will remain on the fact that Grodal prefers the term simulation over representation in the above quotation. The shift from representation to simulation appears to mark a break between more traditional media and computer games that will reappear throughout this thesis. A traditional reading of the term narrative would probably posit it in closer proximity to representation and might regard simulation as an extra-narrative phenomenon. As we will see below, this is indeed a heavily debated problem for the section of game studies that leans towards a *ludological* approach.

1.4 SPATIAL CONCEPTIONS AND LUDOLOGY

Ludology essentially positions itself as an alternative to methodologies that mainly depend on a literary or narrative background. Instead of treating computer games as narrative devices, ludologists claim that games are distinctive phenomena and that their rules have to be the focus of attention.

Gonzalo Frasca, a game researcher who maintains the www.ludology.org website, has to be mentioned here as one of the most important proponents of the *ludological* approach. He argues that although there exist similarities between traditional narratives and games, the approaches from the field of literary studies have so far generally not lived up to the subject. Frasca hints at the greater acceptance of literature in academic circles as a possible explanation for this state of affairs and concludes that it might also have lead to the fragmentation of formalist game studies in various disciplines. Instead he proposes "[t]he term ludology (from ludus, the Latin word for 'game') to refer to the yet non-existent discipline that studies game and play activities" (Frasca 1999).

In a paper entitled *Simulation versus Narrative* Frasca asserts that the most popular approaches in game studies have so far been characterised by treating computer games as extensions of drama and narrative. Yet, for him, "games are ontologically different from narrative because they are not just based on representation" (Frasca 2003, 1). Narration is here understood as one particular form of representation that has, according to Frasca, come to dominate the debates. In his view this explains why so many researchers try to come to terms with computer games using methodologies that were originally devised to account for narrative representational phenomena. As an alternative he promotes simulation as the key to understand how these games work. In his thesis he presents a methodological system entitled "simiotics" (Frasca, 1999, 22) which is based on simulation theory, semiotics and Aarseth's theory of ergodic literature. Although he acknowledges the use of simulation in analog systems, the computer is regarded as the perfect tool to deliver complex simulations. In this context computer simulation is basically defined as "the use of a computer to represent the dynamic responses of one system by the behaviour of another system modeled after it" (ibid.). The simulation process is rule-based and it is important to note that there is a certain amount of abstraction at work, because the simulated

system will only model some of the behaviour of the source system. Frasca includes analog devices into his framework when he says, "[t]he definition of simulation perfectly describes how toys represent reality. Unlike photographs, words or sounds, toys do not simply represent but they model a system" (ibid.).

Simulation is here presented as the representation of the behaviour of a system according to certain rules. If we follow this line of thought, and relate it to computer games, we have to ask ourselves which source models are being simulated. Obviously there are numerous games, which do not represent natural physical behaviour, but instead invent their own systems and behaviours. Frasca addresses this problem by stating that "[t]o claim that there is a need for a real referent in simulations is similar to say that the word unicorn is not a sign since its referent is not real" (ibid. 25). Subsequently he concludes that it is possible to apply the "[t]erm simulation to the representation of processes that mimic a system by the behaviour of another, even if the source system is not real" (ibid.).

This is the crucial point that enables or disables the use of simulation as a general model for computer games. Another aspect that makes the concept of simulation appealing in the context of computer games is that it includes an active observer/player who exercises control over aspects of the simulation process. If one takes a step further, and relates this approach to spatial representation, it becomes evident that computer games do not only represent particular spaces but they also offer simulations of movement in and through space. Given these facts it is curious that Frasca does not occupy himself at all with spatial simulation in his thesis.

Manovich promotes a reading of simulation that differs significantly from Frasca's model, although he also posits representation and simulation as oppositional modes. For him, computer generated VR systems are merely the latest step in on a long history of classic simulation. In this context simulation is seen as belonging to an alternative representational tradition that encourages the movement of the viewer, such as frescoes, panoramas, and life-sized sculptures. In short, Manovich distinguishes between traditional simulation and traditional representation by concentrating on the spatial practice of the viewer. Accordingly, the form of tableaux painting that immobilizes the viewer belongs to traditional representation, whereas a 19th century panorama that encourages the viewer to move around can be regarded as a simulation. He writes, "VR [Virtual Reality] continues the tradition of simulation. However, it introduces one important difference. Previously the simulation depicted

a fake space continuous with and extended from the normal space. For instance, a wall painting created a pseudo landscape that appeared to begin at a wall. In VR, either there is no connection between the two spaces (e.g., I am in a physical room while the virtual space is an underwater landscape) or, conversely, the two completely coincide (e.g. the Super Cockpit project). In either case, the actual physical reality is disregarded, dismissed, abandoned" (Manovich 2001, 113).

The crucial point is that Manovich conceives the user of the simulation as the central part of it when he relates to panoramas and frescoes. In this conception, the potential movement of the viewer is the key to the simulated space. This is quite interesting if one reconsiders the definition of computer simulation as a system modeling the behaviour of another system. In the case of the panorama one could argue that the behaviour that is modeled is the habitual motion of the observer: the option to walk around and choose specific viewpoints. Furthermore, as Manovich states in the above quotation, current VR simulation systems such as flight simulators are capable of completely replacing real space, but they are similarly centered on the user. Although the action of walking has been sublimated and transformed into keyboard or joystick actions, the behaviour of the user of such a system is always an integral part of it. This integration of the spatial practice of the viewer or player as a key element of the simulation is a crucial point, especially in relation to the role of simulation in *game space*.

Aki Järvinen offers a more in-depth model that accounts for the different elements at work in digital games. He elaborates on Frasca but does not follow his semiotic approach. Instead, he focuses on the formal differences between simulations from a design perspective. Games are regarded as specific forms of simulations that, in contrast to scientific simulations, exist primarily to entertain. Järvinen emphasizes the fact that simulation elements in games do not always rely on a "real" referent and he points out that computer games often reverse or transform real world causalities and behaviours. Thus, in his view, computer games should be treated as simulations without "real" source systems.

Interestingly, it seems to be precisely this lack of the "real" referent that Baudrillard is referring to when he states that "[a]bstraction today is no longer that of the map, the double, the mirror or the concept. Simulation is no longer that of a territory, a referential being or a substance. It is the generation by models of a real without origin or reality: a hyperreal" (Baudrillard 1988, 166). Baudrillard's notion of

the "hyperreal" postulates a complete transformation of the relation between the real and the imaginary in post-modern mediated life. He advances that the real and the imaginary have become inseparable, and that the "hyperreal" is generated not by its reference to the real but instead fed by the imaginary. If it is taken seriously, this notion leads directly to the ontological status of games themselves.

According to Callois, games have to be understood as activities that maintain a very special relation to the "real world". For him, the "make believe" (Callois 1961, 10) elements of play are characterised by a "[s]pecial awareness of a second reality or of a free unreality, as against real life" (ibid. 10). Thus some aspects of games seem to belong to a second order of reality, reigned over by imagination and the production of "as if" situations by their very nature. What is important here, especially in relation to Baudrillard's notion of the "hyperreal" is that the player of a game knows about the "unreal" status of the game. The fictional status has to be consciously and actively accepted as part of the rule mechanism of the game in order to play it at all. It can be stated that the very nature of games generates a second order of reality that functions according to the game's rules. This acceptance of the imaginary as part of the game provides an explanation as to why one can readily accept computer games as simulations lacking a "real" source model.

Järvinen defines simulations in the form of games as follows: "games are simulations that allow a player or players to influence the behaviour of the modelled system in the context of pre-defined rules" (Järvinen 2003, 5). One could even go further and say that games demand players to influence them. This however, does not yet answer the question how representation and simulation are related to each other in this context. Järvinen has developed a formal model that enables us to distinguish representational elements from other entities in the simulation process. It is "[b]ased on the idea that simulation operates between three nodes:

1. System: the behaviour of the referent system ('the organic whole') of simulation.
2. Representation: the sign layer that represents the system with (animated) images and sound.
3. Interface: the input schema that gives the player access to the system via representation, and henceforth access to the simulation itself" (ibid.).

These three elements are closely connected to each other and have varying degrees of proximity in different types of games. What makes this model so

appealing is that it acknowledges the necessity of representational elements within the simulation. Here we are not presented with an oppositional reading of simulation and representation, as in Frasca's and Manovich's accounts. Instead representational elements in computer games are regarded as a necessary layer that makes the simulation accessible and playable. In this sense his model enables us to treat representational elements that might be connected to other media, such as film, as part of a larger system that has a different organizational structure.

In regard to the representation of space one could then, for example, attempt to distinguish different types of simulated cameras or specific perspective modes as representational elements, which are part of a larger simulation system. To make matters more complex, representational elements can be understood as simulations of representational modes or conventions from other media systems such as film, photography or animation. Following this line of thought, the aesthetic variety of computer games can be explained as a result of their capacity to integrate discrete mechanisms of representation from different media systems into the "organic whole" of the simulation.

Järvinen claims that there are also games, which completely lack representational elements: "The tetraminoes in Tetris [1984] and the pieces in Othello [1978] do not represent anything but themselves as tokens of the game's rules" (ibid. 7). Yet, in the particular case of *Tetris* this might not be entirely true because Alexej Pajitnov, the inventor of Tetris seems to have modelled his game after the popular Russian wooden puzzle game "Pentominos". Pajitnov describes this game as follows: "It was available at toy stores in Russia. It contained shapes that would fit into a box. You would take out all the shapes, and then you spend a good hour putting them back" (De Maria, Wilson 2002, 196). Although Tetris in particular is obviously representational in the sense that it is modelled after an existing board game, there exist numerous abstract games that clearly do not have direct aesthetic real world referents. Examples include video games such as *Tempest* or *Quix*. However, Järvinen introduces another important aspect of computer games: one might find games that do not seem to represent anything, but it is impossible to find a game without rules. And here, it could be added that rules defining movements, collisions, gravity, responsiveness as well as cause and effect are certainly referring to real world parallels in some way.

The aesthetic, or representational aspects of a game are often subject to changes in fashion and style, while the underlying rules of the game stay the same. This can be seen in numerous game sequels and modifications. The game *Pacman* for example has undergone various representational changes over time, but the rules have always stayed the same. This seems to lead to the conclusion that the essence of a game is defined by its rules, while the aesthetics are variable. This emphasis on the rules generally underpins the *ludological* approach to games.

Jesper Juuls emphasizes this dominance of the game's rules over the aesthetic layer for the skilled player of a game when he says: "What interests the player is the program's rule for gameplay. In the same way that Kasparov does not think of the shapes or names of the chess pieces in a game of chess" (Juuls 1999, 36).

Juuls, who advocates a *ludologist* position, has written extensively about the relation between games and narratives. Like Frasca, he is convinced that narrative theories are not sufficient to explain computer games. Instead, he proposes a triadic model for the analysis of computer games. It is conceived as the interplay between material (text, graphics, sound), program (rules for the combination of the material) and the output (what the player receives). For him: "The interesting focus in a system like this regards the relationship between the represented and the rules for the combination of the material" (Juuls 2002, 36). Interestingly this model, which he presents in his thesis, does not take user action into account.

Juuls claims that in computer games it is possible to separate the rules from the representational elements. He emphasizes that "[t]he interesting dichotomy in a computer game is between material and program" (ibid.). He explains this separation, with the example of original games like *Breakout*, which exist in various aesthetically different incarnations while the gameplay and the rules remain consistent.

Like other researchers, Juuls is convinced that space is an important factor in computer games. He writes "[c]omputer games are almost exclusively set in a space. This space is almost exclusively in two or three dimensions. Games are usually about navigation in this space" (ibid. 46). Here it would be interesting to find out how space is related to the observed dichotomy between rules and material. Juuls describes a number of visual spatial representation systems such as different perspectives in first person and third person games. His focus is on the identification of the player with the actant (avatar) in the gameworld, and on how certain types of visual representation strengthen or lessen this identification. However, he does not

specifically talk about the influence of a game's program (the rules) on this phenomenon in relation to the material (the representational side). Yet this could be a very promising perspective, because it would show that space is indeed permeating both levels: the rules and the representational aspects of computer games. If we take the game of chess for example: we have an initial spatial arena for the game, the chessboard, but the spatial practice of the game emerges from the (actual and potential) movement of the figures which is structured by the game's rules and the momentary configurations on the board. In this case, spatial practice is clearly generated by the rules of the game, not by its representational aspects. Exactly the same holds true for numerous computer games, which are characterised by gameplay dominated by spatial practice. This spans from military simulations dealing with territorial dominance to games based on motion such as flight or driving simulations. In other words, different rules create different spatial practices in computer games. This point is so crucial because it sometimes seems as if the rich spatial representations in games were chosen for purely aesthetic reasons and not for reasons depending on the rules and the gameplay.

It is this fact that motivates Steven Poole to say that it is "[t]he choice of spatial mode, of course, which includes the choice even of whether or how far to be representational at all (*Doom* versus *Tetris*), is bound up intimately with the question of what kind of game the designers want to make" (Poole 2000, 148). It might sound banal to state the obvious connection between the type of game, defined by its rules and gameplay, and its spatial mode, but it is all too easy to overlook these relations. For this reason, the crucial relationship between the rules of the game and the representational aspects will reappear at a later stage in this thesis.

The discipline of cybernetics deals with the observation of systems containing some sort of informational feedback loop. The prefix "cyber" originates from the Greek "kyber" (to steer) and has come to great prominence in relation to computers and new media. Norbert Wiener introduced the term in connection with his approach to observing and describing the flux of processes in complex organic and electronic systems. The game researcher Espen Aarseth, who has risen to prominence with his model for the analysis of interactive literature, promotes the term "cybertext" for digital interactive texts and games. Aarseth's approach cannot be reduced to either a *narratological* or a *ludological* position. Although he bases his theory on the foundations of literary theory, it reaches into the realms of *ludology*, and

accounts for simulation and rules in games. He writes, "[t]he concept of cybertext focuses on the mechanical organisation of the text, by positing the intricacies of the medium as an integral part of the literary exchange" (Aarseth 1997, 1). Furthermore, the notion of "cybertext" emphasizes the active role of the user or steersman. The nontrivial effort required from the user to traverse a text is referred to as ergodic, "using a term appropriated from physics that derives from the greek words ergon and hodos, meaning 'work' and 'path'" (ibid.). Thus, "ergodic literature" is characterised by the nontrivial work the user has to invest. Although Aarseth initially sets out to analyse hypertext and interactive fiction, which, in his framework includes printed text, his approach has been accepted and adapted by a great number of game researchers.

Initially Aarseth examines different semiotic theories focusing on computers and comes to the conclusion that "semiotics is not beneficial as a privileged method of investigation" (ibid. 41). He argues that semiotic theories have no means of dealing with "the unique dual materiality of cybernetic sign processes" (ibid.). This dual materiality is presented as a product of the interplay between the internal processes of the program and the representational outer layer. Aarseth suggests that is not enough to concentrate on the outer layer, which is directly accessible to the user. In his view, cybertexts have to be understood as complex systems capable of generating emergent and unpredictable behaviour.

In this context he poses the fundamental question: "[w]hether a system based on an initial state and a set of generative rules should be considered a semiotic system at all" (ibid.). Here the argument hinges on the assumption that programs like John Conway's *Game of Life* cannot be described as the sign production of a human author, because they produce chaotic and unforeseeable states. He claims that these programs can also not be regarded as simulations, because they do not have an external source model that they simulate. From this perspective, Aarseth's definition of simulation is clearly narrower than Frasca's or Järvinen's. Furthermore, a program like *Game of Life* could on the one hand exist on the machine level without any semiotic output or it could be represented in myriad ways, which are arbitrary in relation to the meaning of the program. What follows from this logic, is that a model for the analysis of digital "ergodic" texts has to account for the internal machine or program processes, which are not directly accessible to the user but which are nevertheless responsible for the system's behaviour.

Aarseth presents a model for the analysis of adventure games that is based on four components that could be paraphrased as follows:

1. The database, a collection of the elements that are presented to the user.
2. The processing engines (simulation and representation). The simulation engine processes the elements from the database based on its program and the events it either receives from the user input or the system (internal events). It also controls the representation engine that presents the results of the process.
3. The interface, input and output components. Here the user input is channelled into the system and the actual visual and audio elements are channelled out.
4. The user of the system.

This rough model that can easily be adapted to fit different digital games has a number of advantages over the linear models of signification in narrative theories. Aarseth states that "[t]he model is not limited to single-user adventure games or text-based games but can also describe multi-user dungeons and graphical games such as *Doom*" (ibid. 103-104). It enables us to analyse the feedback situation generated by computer games and includes the programmed elements, which are not directly produced by either the author or the reader/user. Simulative and representational aspects are seen as integral features of digital games. An analytical model that manages to distinguish between instances such as system, simulation and representation functions enables us to concentrate on one of these functions without losing track of the overall structure. From this point of view, Aarseth has provided a convincing model for the analysis of computer games. Yet, this model does not directly refer to spatial aspects in games. In the following his take on the issue will be highlighted.

In his discussion of adventure games Aarseth emphasizes their "[s]patially oriented themes of travel and discovery" (ibid. 101) and explains the evolution of complex graphics as follows: "Images, especially moving images, are more powerful representations of spatial relations than texts, and therefore this migration from text to graphics is natural and inevitable" (ibid. 102).

Spatial representation as a vital element of computer games is the focus of Aarseth's paper entitled *Allegories of Space*. Here he claims that "[t]he defining element in computer games is spatiality" (Aarseth 2001, 154), and that "[c]omputer games are essentially concerned with spatial representation and negotiation, and therefore a classification of computer games can be based on how they represent – or perhaps, implement – space" (ibid. 154). This is a very important observation that opens up questions regarding conceptions of space and spatial representation.

For Aarseth, the widely used term "virtual space" is problematic in the context of the discussion of different types of spatial representations in games because it merely "[t]ells us that space can be simulated" (ibid. 163). As an alternative, he proposes two different concepts, Anita Leirfall's notion of "sign-space" and Henri Lefebvre's triadic concept of "spatial practice", "representations of space" and "representational spaces". In his view, Leirfall's conception of cyber-space as symbolic and sign generated collection of places enables us to define the difference between real space and objects that are computer mediated. Aarseth writes, "[c]yberspace' and other such phenomena (e.g. computer games) are constituted of signs and are therefore already dependent on our bodily experience in, and of, real space to be 'hallucinated' as space" (ibid. 162). The artificial nature of these computer-generated places makes it necessary to conceive them as "regions in space" and not as "parallels of real, three dimensional space".

Henri Lefebvre has presented the relation between artificial, abstract places and spatial practice as the relation between representations of space and representational space. Although, Aarseth concedes that it might be "dangerous to 'map' Lefebvre's theory of space onto computer games" (ibid. 163), because Lefebvre was never confronted with the phenomenon, he states that it "[m]ight be a useful perspective" (ibid. 163). He goes on to say that "[a]s spatial practice, computer games are both representations of space (a formal system of relations) and representational spaces (symbolic imagery with a primarily aesthetic purpose)" (ibid. 163). If one takes Lefebvre's theory of the production of space fully into account, this seems to be a slightly restricted reading. It deliberately excludes the major focus of his work, namely the understanding of space as a socially produced phenomenon. Furthermore, spatial practice always transcends mere signification.

Lebfevre states that "[s]pace is at once result and cause, product and producer; it is also at stake, the locus of projects and actions deployed as part of specific strategies" (Lefebvre 2000, 142). Aarseth clarifies that "[a] much longer refinement and adaption of Lefebvre's theory is needed" (ibid. 163). In the following chapter this thesis will take up Aarseth's call and attempt to explore Lefebvre's spatial theory and its viability for the analysis of spatial modes in computer games. However, for now the focus stays on Aarseth's approach, who posits "spatial representation in computer games as a reductive operation leading to a representation of space that is in itself not spatial, but symbolic and rule-based" (ibid. 163). Here it could be argued that every representational operation is by its very nature a reductive operation. It is true that spatial representation is in itself not spatial but symbolic, and thus culturally codified. If we relate this fact to Aarseth's analytical model of adventure games we are in the realm of the representation engine. The representation engine is one specific element of the larger system that also includes the player and his actions as well as the system and the simulation engine. Thus, if we want to analyse spatial practice in computer games, representational operations are only a part of the whole system that also encompasses the spatial practice of the player. The important point here is that elements of spatial representation cannot be isolated from spatial practice.

Spatial practice in computer games cannot be reduced to the representational elements alone. We will see in the following chapter that Lefebvre's work holds a lot of clues that might help us to understand spatial practice in computer games as a complex process that incorporates different instances of spatiality. Aarseth also claims that "[t]he nature of space is not revealed in this operation, and the resulting product, while fabricating a spatial representation, in fact uses the reductions as a means to achieve the object of gameplay, since the difference between spatial representation and real space is what makes gameplay by automatic rules possible. In real space, there would be no automatic rules, only social rules and physical laws" (ibid. 163).

Here we could, of course, ask what Aarseth is referring to as the "nature of space". Is he hinting at Lefebvre's notion of spatial representation as a factor that conceals the true nature of social space, or does he mean physical space. In this context it is also somewhat questionable if the notion of allegory, which alludes to a

dual structure (real space and "reduced" representational space) is helpful in order to designate the unique and novel spatial practice that only exists in computer games.

Clearly, if representations are culturally encoded abstractions, which are subjected to historical transformation, then it follows that representations of space in computer games are partly informed by preceding conventions. What then are the unique and new elements of spatial representation in these games?

Aarseth delivers a number of interesting observations and suggestions in this context. He mentions the use of teleport functions in games and adds that "[i]nstant relocation is of course a negation of real space, and as such a striking contrast to the seemingly naturalistic ideal of the games" (ibid. 164). He goes on to say that this deviance from obvious tendencies towards realism is taking place because "[t]he discontinuity of digital communication dominates even these illusions of real space" (ibid. 164). Although Aarseth does not go into further detail, the teleport functions are indeed important, because they have a role in shaping the *game space*. Their characteristics vary from genre to genre. In an action game like *Unreal* they create specific topologies the player has to be familiar with in order to be competitive. In the heat of the action in an FPS shooter the knowledge of a teleport location can save your game-life. In a platform or adventure game they provide faster access to a different location in the *game space* and help to avoid unnecessary backtracking.

Aarseth then provides a comparison between the strategy game *Myth* and the adventure game *Myst* and presents several interesting thoughts. He describes *Myst* as an indoor setting compared to *Myth's* outdoor situation. To him, both games appear to create open spaces by representational means where in reality they are following a strict topology and only allow linear forms of movement. He also points out the symmetrical nature of landscapes in both games and writes, "[b]oth games are 'unrealistic' in this respect: In real space, landscapes are usually asymmetrical (with the exception of gardens and planned cities), but they are seldom topologically constricted (at least to the degree found in Myth)" (ibid. 169). This leads him to the conclusion that "[c]omputer games, finally, are allegories of space: they pretend to portray space in ever more realistic ways, but rely on their deviation from reality in order to make the illusion playable" (ibid. 163). The major question here is if computer games do indeed set out to "portray space". If one accepts the fact that computer games can generate spectacular spatial experiences, which have no "real

world" referents, and the aforementioned teleport zones are only one example for this, it seems that they often deliberately avoid the portrayal of "natural space".

As discussed before, simulations model some of the behavior of more complex systems. If we understand space as a system instead of an object, we can describe how particular spatial configurations are modeled, while others are discarded.
A number of different factors might be relevant for the omission of some of these behaviours. For example, it could be problematic for the gameplay if the space is too vast but it could also be technologically impossible at a particular point in time to create a larger topography. Aarseth is right when he emphasizes that omission and abstractions are necessary to make games playable. This also holds true for scientific simulations: A simulation that sets out to include too many elements might not be useful or technologically possible to realize.

If we follow this thought further it leads directly to the question of realism in computer games. Aarseth's argument that the perceived growth of realism in the portrayal of spaces is in opposition to the playability of games is shared by Poole's observations. He talks about the representation of lasers in computer games and points out that they are obviously deliberately represented in ways contradicting physical laws. A real laser moves with the speed of light and would be invisible in outer space. Thus, in order to make the game playable laser behaviour has to be made unreal. Poole writes, "[g]enerally, the world-building philosophy of videogames is one in which certain aspects of reality can be modeled in a realistic fashion, while others are deliberately skewed, their effects caricatured or dampened according to the game's requirement" (Poole 2000, 61). At the same time the dynamic functions, such as gravity and friction, which are necessary for the game play are modeled in increasingly detailed ways.

The game designer Chris Crawford addresses the threshold between the real world and the game-world as dichotomy between objective and subjective reality. He writes that "[r]epresentation is a coin with two faces: an objective face and a subjective face. The two faces are not mutually exclusive, for the subjective reality springs from and feeds on objective reality. In a game, these two faces are intertwined, with emphasis on the subjective face" (Crawford 1982).

He then goes on to explain the distinction between objective and subjective representation with the difference between the representational systems of games

and simulations and their respective purposes. Simulations are produced with an evaluative or computational purpose in mind while games are created for educational or entertainment reasons. Thus, he claims that "[a]ccuracy is the sine qua non of simulations; clarity the sine qua non of games" and, subsequently, "[a] simulation bears the same relationship to a game that a technical drawing bears to a painting" (ibid.).

For Crawford, games deliberately suppress the detail that would be necessary for scientific simulations in order to be able to focus on the stylization of the game play. This position seems to identify simulation exclusively with its possible use as a scientific tool. As Järvinen has shown, it could be beneficial to consider simulation as a phenomenon that has had a history as an important tool in scientific work, but it can also be found in other contexts, where it has different tasks to fulfil. Thus, one could argue that although the purposes might be different, on the one hand the goal is scientific accuracy and on the other hand a believable enjoyable game world, the tools might be the same. Furthermore, it is hard to see how scientific simulations, as models should be able to claim total and complete objectivity. Instead, they could also be understood as subjective attempts of modelling elements of objective reality in the context of an experiment. Crawford describes these elements of objective reality as "subsets of reality" (ibid.) and claims that games represent subsets of subjective reality. However, he does not explain further how "subjective", or as he goes on to call it "emotional" reality, could be defined and understood in the context of realism. It seems that in relation to simulations we have to modify our conception of realism. This problem can only be tackled if we ask ourselves how simulations are translating the way the real world speaks to us in relation to other media such as painting, photography and film.

Stephen Boyd Davis, who has delivered an extensive discussion of the concept of realism in relation to spatial representation in different media contexts, suggests "[a]n approach based on multiple realisms" (Boyd Davis 2002, 3) and that "realisms are selected to serve particular objectives, even when the picture maker believes that some unitary notion of realism is employed" (ibid.). He defines spatial realisms in painting based on different spatial strategies, which serve in the construction of images, such as various depth cues (aerial perspective, depth perspective or linear perspective).

Subsequently, Boyd Davis posits two basic approaches to realistic representation: "PI-realism" (pictorial illusion) "which would give the illusion that a picture was not a picture but a view of a real scene" (ibid. 95) and "VE-realism" (visual experience), which is based on "representing what is known about an object (rather than a single moment and point of view)" (ibid. 85). Photorealistic painting is good example for PI-realism whereas VE-realism is present in technical drawings. He claims that PI-realism is essentially not culturally encoded since in theory the aim is to completely simulate the scene presented to the eye (which, could it be achieved, would make the representation indistinguishable from a real scene), whereas VE-realism depends on the cultural and historical context. However, the question whether an image is perceived as "realistic" or "believable" does not only depend on learnt cultural conventions, but also on the fact that these conventions have to move beyond the viewer's focus of attention. Boyd Davis writes "[t]he context is decisive and as a result an important objective of any technology for creating pictorial illusion is to suppress the observer's awareness of the context" (ibid. 69). One of the examples he gives for this phenomenon is the audience's acceptance of implausible spatial constructions in film montage. Here the conventions have been embedded over time in such a way that the audience has accepted them as plausible and coherent.

The notion of VE-realism, as the choice of a particular visual strategy, adopted to serve a specific function is quite interesting in our context. Boyd Davis emphasizes that "[m]any disparate reasons emerged why the full depth cues of natural vision might be suppressed, distorted or subverted in order to convey information more effectively" (ibid. 77). If the goal is, for example, to represent the dynamic and complex system of a city, as in *Sim City*, a first person perspective view is not useful because the amount of information that can be derived from it is too limited. VE-realism is characterized by the omission of certain information in order to strengthen the presence of other information according to the objective of the author. This could be paraphrased as the necessary omission and abstraction that lies at the heart of simulation processes and computer games.

Another important aspect is the fact that natural vision depends on movement. This has led to interesting experiments in painting, which have selectively focused on the representation of movement in a still image. To some extent media such as film or computer games are better suited for the representation of movement, but even in

film there exists no "realistic" rendition of natural vision. To illustrate this point Boyd Davis refers to camera movement: "[w]hen a hand-held camera is carried trough a scene to capture the view as of a person walking, the film-viewer is painfully aware of the wobbling of the resulting image" (ibid. 132). He concludes that "[w]hat the film then presents is not the equivalent to retinal vision but to the processed mental products of that vision after the accidentals of changing position have been eliminated: a clear case of VE-realism at the expense of PI-realism" (ibid.). The element of movement as part of a realistic representational strategy is obviously also at work in computer games. The realistic representation or rather simulation of movement is one of the major motivating factors for racing games and flight simulators.

The physical engine that simulates the behavior of a car on a racing track in situations like collisions with obstacles has a profound impact on the spatial representation of the game. Ultimately, our understanding of realism has to be reconsidered when we are dealing with simulations, since what makes them "realistic" is the coherent modeling of the behaviour of the objects in an environment. Players frequently point out the fact that what makes a racing game realistic is not necessarily the visual illusion, but the accurate simulation of the behaviour of the vehicle on different tracks and according to environmental influences (such as rain or snow).

Here, the consistency of behaviour across the *game space* is more important than the visual portrayal of real world phenomena. To paraphrase Boyd Davis, the objective of this particular realism, that we could refer to as "simulation realism" is to represent a complex and dynamic system of relationships between objects, which is defined by internal laws, rather than to simulate natural vision at a point in time or to stay true to the rules of the "real world". Although this sounds paradoxical, if the rules are consistent, a game set in a highly unnatural, fantastical environment will appear much more "realistic" than a game that tries to present a "real world" environment, but has to compromise rule coherence. A good example for this phenomenon of reduced realism through inconsistency is the fact that in a visually impressive 3D game such as *Medal of Honor*, when one is moving through a city it is only possible to enter specific buildings and not all of them. Thus "simulation-realism" depends more on the coherence with axiomatic rules in the *game space* than on the similarity between a possible source model and its representation.

Notwithstanding, there are tendencies towards visual film and photo-realism in contemporary game design. Some games are going to great lengths in order to simulate filmic use of montage and camera movement. Concerning photography or photo-realism, the aim is to increase the number of polygons as well as the resolution of shaders and textures. The increase in resolution and polygon count is tied up with the constant development of better graphic chips and faster processors. The amount of resolution or detailed information that is so important for photo-realism has its equivalent in "simulation realism" in the form of the number of objects which are affected by the game universe or the player. For example, if the movement of leaves on a tree affected by wind is simulated using a small number of polygons resulting in low visual resolution, the realistic effect will still be much higher than with high visual resolution but inadequate (looped) movement.

Boyd Davis approach does not occupy itself with the phenomenon of simulation, instead he analyses the spatial constructions of new media and computer games on the basis of a theoretical model derived from pictorial representation and film. However, he claims that "[g]enres which cannot be foreseen will come into existence and new spatial practices will be a defining characteristic of those genres" (ibid. 156). He is also convinced that "the spatial practices of pictorial interactive multimedia currently mark it out as an immature medium in which form fails to articulate meaning" (ibid.). He attributes this immaturity to the viewer's "missing acculturation to the representational devices" (ibid.). In other words, he thinks that computer games will gain maturity once their representational strategies have been further conventionalized. If one recalls Juul's argument here, namely that the skilled player of a game is more interested in the rules than in the representational aspects of the game, it could be argued that this process of "acculturation to the representational devices" is actually part of the gameplay. Furthermore, one could argue that computer games might never fully reach the kind of maturity Boyd Davis seems to have in mind because one of the motivations for their evolution is the constant development of new and spectacular interface systems and representational strategies. In other words, it is in their nature to develop highly diverse representational strategies and the player makes them transparent while playing. On the other hand, some of the sub genres of computer games such as FPS have indeed developed increasingly conventionalized modes of representation and interaction that could thus be perceived as mature.

Boyd Davis promotes the term "hybrid space" (ibid. 178) for the spatial apparatus at work in so-called god mode computer games such as *Railroad Tycoon*, a railroad simulation that presents a "map-like aerial view" (ibid.) of the landscape and tracks, as well as a two-dimensional interface that is constantly on screen. Here he notes, "[v]isually, that this is the most distinctive aspect of such games – their juxtaposition of many spatial schemes, styles of representation and forms of realism" (ibid.). The notion of hybrid space and different forms of realism is a way of dealing with the complexity of computer games. In the context of realism they seem to employ "the different languages in which the world speaks to us" in one artifact. The notion of different "spatial schemes" that are juxtaposed in a hybrid phenomenon reverberate strongly with Foucault's "heterotopia" and lead to the question how these dimensions could be distinguished from each other and how the relations between them could be conceived. For now this question has to remain open and an approach that focuses on different types of visual spatial systems in video and computer games will be discussed.

Mark J. P. Wolf has developed a useful taxonomy of different modes of visual spaces by relating them to the use of on- and off-screen space in film. He does, however, acknowledge the essential difference between the two media when he writes that "[i]n a video game, not only the representation of space, but even its implication, depend on being programmed and actively created" (Wolf 2001, 52). The novelty of game spaces is addressed as follows: "[t]he video game has no default structure for its off-screen space, that space can be shaped and structured in new ways that did not develop in film or television" (ibid.). Subsequently, navigation and interaction are presented as the distinguishing factors "[w]hile the video game's use of space relied on the precedents set in other media, such as the conventions of stage space, cinematic space, and the use of space on television and video, the video game's added elements of navigation and interaction lend an importance to diegetic space which is unlike that of other media" (ibid. 51). Although, these are crucial observations, there is no explanation how these elements actually affect the diegetic space. Wolf examines visual space, but he does not connect it to other aspects of space in games such as the spatiality emerging from the rules or the narrative. He provides taxonomy of eleven different spatial structures in video games ranging from text-based games to interactive three-dimensional environments. Although this

approach is definitely useful for the discussion of the different visual strategies that underpin the design of visual space in video and computer games, some of his categories have to be adapted to recent developments, especially in respect to multiplayer games. Moreover, there are other issues that have to be addressed, the most evident being the complete disregard for the role of sound in the generation of spatial illusion. Wolf's model will be taken up in more detail in Chapter 3 of this study, when the audiovisual aspects of *game space* are discussed.

It is crucial to avoid the trap of reducing the spatial structures at work in computer games solely to formal aspects of visual representation. Especially in the light of Aarseth's approach, it becomes quite obvious that visual representational elements are only one piece in the complex puzzle that makes up *game space*. The other elements, such as sound, rules, narrative elements, simulation structures and the player's bodily action have to be considered as well. The isolated analysis of visual elements does not only overlook other important spatial structures but also how they interact with the visual space. Indeed, if one wants to explain how *game space* emerges, all of these aspects have to be fully taken into account.

Computer games are undoubtedly, devices addressing more than the visual sense alone. Manovich writes that "[c]omputer games, motion simulators, virtual worlds, and VR, in particular, exemplify how computer-based illusionisms function differently. Rather than utilizing the single dimension of visual fidelity, they construct the reality effect on a number of dimensions, of which visual fidelity is but one" (Manovich 2001, 182). Computer games demand bodily engagement. Force feedback devices and 3D audio systems are employed to create more "realistic" simulations. To paraphrase Boyd Davis they are important *partial realisms*, which are affecting the spatial practice of computer games. Other than Boyd Davis or Wolf, who are primarily concerned with visual phenomena, Manovich points out that "[t]he history of illusionism in art and media largely revolves around the simulation of how things look, for computer simulation this is but one goal among many" (ibid.).

In order to understand the impact of the senses of vision, hearing and touch in computer games, some researchers have turned to experiential cognitive theories. Ulf Wilhelmsson, for example, deploys experiential cognitive theory as a way to explain the kinesthetic link between the body and the *game space*. For him "[v]isually controlled locomotion through direct manipulation of an interactable audiovisual environment is what computer games are all about" (Wilhelmsson 2001, 251).

He claims that "[c]ertain computer games allow the game player to establish a proprioception based on vision, audition and tactile motor action. These add up to a motor/kinesthetic link and kinesthesia, which is a sensory awareness of the positions of the limbs and body in a *game space*. In addition, when so doing we have a strong performative experience of interaction and being within a world (or rather an environment)" (ibid. 3). Wilhelmsson argues that the interaction with everyday real world environments has to be the point of departure for the analysis of the interaction with computer games. He develops a theoretical framework based on Gibson's ecological theory of perception and Lakoff and Johnson's theory of the embodied mind. The experiential cognitive approach emphasizes the major role the human body plays in shaping our conceptual systems. Everyday experience of interaction within real world environments generates the basic schemes of conception and metaphors in language. Thus, spatiality in metaphoric language as well as in visual representation is based on the use of the body and motor action. Wilhelmsson extensively discusses the notion of the point of view in cinema theories, and argues that the concept is problematic because it is, on the one hand, used to designate the visual and auditory vantage point and, on the other hand, might be understood as a narrative device to put forth a story in a certain way. Furthermore, the concept of point of view is based on the dominance of vision and therefore too narrow to be useful for a medium that addresses the entire spectrum of senses. In order to overcome this problem Wilhelmsson mobilises Gibson's concept of the point of observation, which takes into account everything a body might visually observe in an environment (that is, what the environment "affords" the observer) and, by being based on movement, presents "a possibility rather than a factual singular point*" (*ibid. 35).

Wilhelmsson then introduces the term "Point of Being" (ibid. 50), which takes into account: "[n]ot only vision but all sense modalities available to human beings" (ibid.). According to him the "Point of Being" is enacted through a representational construction he introduces as "Game Ego" (ibid. 145). He writes, "[w]hen playing computer games, we construct an abstract cognitive model of a Game Ego. The Game Ego has its basis in the tactile motor/kinesthetic link between us as game players and the controllable object within the game we are playing" (ibid.). "The Game Ego can be thought of as a container in accordance with the experientialist

theory of cognition. Our bodily container […] extends into the computer and can perform actions in the game via this tactile motor/kinesthetic link" (ibid.).

The concept of the "Game Ego" describes the complex relation between the playing subject and the controlled object (avatar) that tends to be perceived as a part of the subject. Players frequently identify so strongly with avatars or central objects in games that they frequently refer to them as "I". Here Wilhelmsson notes that "[o]ne really is the Game Ego to some respect since ones motor action is highly involved in the game play" (ibid. 146). The ultimate example for this relation between the player and the "Game Ego" would probably be the recently introduced PS2 camera controller called Eye Toy. In games using this interface device, the player's own video image literally enters the game and becomes the 'Game Ego'. Here the movement of the whole body acts within the *game space*. However, it is crucial for this concept that the 'Game Ego' is conceived as a function rather than an actual audiovisual element since it might be the case that it is not visible on screen at all. He gives the example of *Tetris* and states that even if there is no visible agency on screen that manipulates the objects, the "Game Ego" is at work since, it has to be regarded as "[t]he agency that exerts force upon the game space and that the game space exerts its force upon" (ibid. 150).

Wilhelmsson's argument hinges on the assertion that the experience of presence in the game (the feeling of being there) is primarily generated by the tactile motor/kinesthetic link between the player and the "Game Ego", and that visual representation is a secondary element. He writes, "[w]e are really there. The concrete actions taken by the game player are the foundation for the identification with the Game Ego. It does not matter whether the movement is performed in 2-dimensions or 3-dimensions, as long as it is direct. The game player imagines him- or herself as moving in the environment. The color depth, i.e. the amount of colors is also not important. Two colors are enough" (ibid. 252). This is indeed a very significant observation, because it represents an approach that is very different from the vision-centered attempts to explain spatial illusion in games.

Based on the concept of the "Game Ego", Wilhelmsson discusses the spatial apparatus of computer games in relation to that of film. The term space is here understood as designating "[t]he locations in which actions are performed" (ibid. 156). The differences between the two media are presented as follows: in a film "the

choices of what is shown are already made" (ibid. 157), whereas, "[i]n a computer game, the game space is only a possibility waiting to be explored" (ibid.).

Furthermore, he points out that whilst films usually don't include spaces which are not in some way necessary for the narrative, games often do. He claims that these "unnecessary" places make the game world more interesting and could also function as a way of telling the player how the *game space* works. Based on Lakoff and Johnson's notion of the visual field as a container, he differentiates between the screen field, the surrounding field and the field behind the "Game Ego". The screen field is defined as "[w]hat is actually seen on the screen and sounds caused by objects on the screen at any given moment" (ibid. 158) and the invisible off-screen area, the space defined by Wilhelmsson as the "surrounding field" (ibid.). The surrounding field is above, below, to the left and the right of the screen field. He states that " [t]he surrounding field may encourage motor action and stimulate moving in space to make new parts of the game space visible*"* (ibid.). Furthermore it is described as a "[d]ynamic and relative field constantly under flux" (ibid.). The field behind the "Game Ego" is "[o]pposite of the visible screen" (ibid.) and is mainly used in three dimensional first person perspective games. It is dominated by audio cues, which are important for the game play because they convey information about the location of opponents and invisible events. This classification is partially informed by Michel Chion's work on film and sound and his notion of on- and off-screen space. Wilhelmsson uses this spatial classification to elaborate on the types of action within the *game space*. Here he builds on movement within the environment that has been conceptualized by Lakoff as a "SOURCE-PATH-GOAL schema".

Based on Grodal's prototypes of control he distinguishes between direct control and indirect control games. Action games are understood as direct control games whereas text-based narrative games and certain simulations belong to the realm of indirect control. The type of control has a direct influence on the spatial experience of the player. He writes "[w]hen a game is founded on direct control the space perceived is a personal, subjective, continuous space belonging to the Game Ego, even if the visual perspective is not that of a first person subject" (ibid. 164). In opposition to that "[t]he SOURCE-PATH-GOAL schema of a game with indirect control gives a perception of space that is discontinuous and broken up into segments*"* (ibid.). In other words, direct control games create a continuous spatial flow whereas indirect control games present the player with different places. Yet, it

seems obvious that most games have sequences of direct and indirect, or broken control. The use of cinematic scenes or loading times, for example, breaks the flow of control. Thus it is questionable whether the spatial experience is really changing in these specific cases or not. Most certainly this differs from game to game. Wilhelmsson then goes on to analyse specific games using the notion of "orientational schemes" such as "UP-DOWN", "LEFT-RIGHT" and "FRONT-BACK". These basic orientational characters are found in game characters (such as the eye movement of the ghosts in *Pacman*), but also in the arrangement of controls in arcade cabinets. He points out that "[t]he relation between what is close and far away is a relation between the game player's hands and what he may control with them. The inference of the images is in other words related to the physical medium and the game player's body" (ibid. 191).

Consequently, for him, orientational aspects can also be observed in the sounds. A pitch change from low to high is perceived as upward movement and thus cognitively schematized as a *DOWN-UP* event. Wilhelmsson's approach to computer games presents a much-needed evaluation of factors, which have often been neglected in game research, such as sound and motor action in the context of the *game space*. However, if it is logically followed through, it declares the artificiality of *game space* obsolete. This problem becomes clearer when he claims that "[p]laying a computer game is cognitively not very different from other daily activities" (ibid. 221) and concludes that in the light of this, "there really is no need to construct a dichotomy of real world, contra game play (or any media experience for that matter) in the first place" (ibid.). It might be true that the cognitive activities of playing a digital game and acting in the "real world" share numerous similarities from the point of view of cognitive theory. Yet, one risks to deliberately disregard the numerous conventions that give evidence of the artificiality of these mediated spaces. In other words, while other approaches omit the bodily implications of *game space* and put too much weight on the analysis of the symbolic level, Wilhelmsson seems to go a bit too far in the opposite direction.

Nevertheless, the introduction of experiential cognitive theory into game studies is a very valuable critical tool for questioning the dominance of vision. Wilhelmsson's work in particular provides a much-needed analysis of the relation between bodily motor-action and the experience of playing computer games. Thus, for this specific aspect of *game space* his work is very valuable. Yet, if it is attributed a higher status

than that, it ultimately seems to lead to a radical constructivism or even solipsism that makes it hard to differentiate between the object of observation and the very process of observation. In addition to that, it seems that his theory caters very well for all questions regarding the feedback loop between simulation and human player, but at the same time it doesn't account for other important spatial modalities in games, such as, for example, space created by the rules of a game.

1.5 CONCLUSION

The discussion of different approaches to spatiality in computer games has revealed that space is considered to be an essential issue by the majority of researchers. Thus, it is curious that so far there have been no attempts to address this important subject with a theoretical framework based on spatial theory. Instead, the debate about space in computer games seems to be entangled in a web of not essentially spatial epistemes, such as narration and simulation. Although these attempts are able to analyse some of the spatial aspects in specific contexts, they remain partial and incapable of generating an exhaustive analysis of the full spectrum of spatiality in computer games. Instead of choosing the experimental and potentially risky path of creating a cross disciplinary method, most researchers rely on disciplines, which are well suited to tackle other media such as literature or film but seem insufficient in the context of computer games. This leads inevitably to somewhat incomplete, singular and fragmentary results. Notions like spatial narration and narrative action are perfect examples for this phenomenon, since they only account for one of the many manifestations of space in computer games.

Here it appears sensible to return to Foucault's notion of the "heterotopia", understood as a real space providing the locus for various diverging emplacements. In the introduction to this study, I have suggested employing the notion of "heterotopia" as a metaphor for the hybrid spatiality in digital games. If we interpret Foucault's term "emplacement" as a *modality of space*, the heterotopical spaces of computer games have to be seen as complex ensembles of different *spatial modalities*. Regarding the literature that has been discussed above, it seems that different researchers have dedicated their interest exclusively to singular *spatial modalities*, like *narrative space* or *audiovisual representations of space* instead of treating *game space* as the

sum of its different spatial dimensions. Moreover, there seems to be no explanation of how these different types of spaces interact with each other.

Computer games are rich and hybrid media that rely on conventions derived from numerous other media, such as books, films or TV. Thus, one could argue that specific *spatial modalities*, which are appropriated for example from film, should be tackled with film theory. This cannot be dismissed entirely, but it does not cater for the unique characteristic of computer games, which appears to be precisely their heterotopical nature, their hybrid spatial appearance. In order to understand the specific spatial nature of computer games I propose to treat the computer game as a heterotopical phenomenon that emerges from the dynamic relations between different s*patial modalities*. The preceding chapter has already provided some hints as to how these *spatial modalities* could be discerned. The discussion has revolved around notions of *narrative space* (Murray, Ryan), space emerging from the game's rules (Frasca, Juuls, Järvinen), visual representational space (Wolf) as well as space emerging from the kinaesthetic bond between player and game (Wilhelmsson).

Furthermore, and this fact is easily overlooked, computer games always take place in a real physical environment, which is, for example, becoming increasingly important for so-called location based games on mobile devices. Based on the above discussions I propose five discrete spatial modalities:

1. Physical environment or user space
2. Textual or narrative space
3. Spatial rules of the game and the simulation or rule space
4. Audiovisual representational spatial modality
5. Kinaesthetic spatial modality or kinaesthetic space

It is important to note that this list represents a preliminary proposition of categories, which in part results from the reviewed literature. In the course of this study, these categories will be revised and developed in much more detail.

All of the above mentioned modalities contribute to the specific nature of *game space*, albeit with a varying degree of importance in different genres of games. For example, the spatial nature of a text based adventure game is clearly dominated by textual spatial modalities although with the exception of audiovisual representation,

the others are also present. Before a model of *game space*, based on a set of distinctive spatial modalities can be established, it is necessary to clarify the underlying theoretical framework for such an undertaking. Thus, in the following chapter, a brief overview of spatial conceptions is provided and on this basis a theoretical perspective that is capable of providing the ground for such a model is presented.

2. THEORETICAL CONCEPTIONS OF SPACE

2.1 INTRODUCTION

We have seen that space and spatial representation is considered to be a key aspect of computer games. It has also become evident that we are confronted with numerous fragmented concepts of space, which, more often than not, are taken for granted in their respective contexts. The enormous gravity that spatial conceptions have accumulated throughout the history of philosophy and science in the western world is generally not critically analysed in these accounts although it is often implicitly present. The term space has been used in so many different contexts and developed such an abundance of different meanings that it seems necessary to clarify its status in order to avoid confusion. The problems of the relations of space and time in regard to human perception and cognition have been among the most prominent subjects in philosophical enquiry. The scientific disciplines of mathematics, physics as well as geography have all had their share in the development of conceptual frameworks for handling the distribution of objects and events in space. The modern fields of psychology and sociology, as well as a myriad of specific disciplines, such as urban planning are indeed based on very specific spatial paradigms. Similarly, the artistic disciplines such as architecture, fine art as well as the recent developments based on digital media, contribute to a dense web of different spatial conceptions.

How can one even dare to approach this immense cosmos of conceptions and models and where should one we start with it? Which aspects are common throughout these conceptions?

According to David Harvey all "[c]oncepts of space are founded in experience. In its most elementary form this experience is entirely visual and tactile. But there is a transition from such primary experience of space to the development of intuitive spatial concepts and, ultimately to the full formalisation of such spatial concepts in terms of some geometric language" (Harvey 1973, 192).

Although the senses of hearing and indeed smell have to be added to this description of elementary spatial experience, it seems plausible that the origin of

spatial conceptions are rooted in basic perceptive experiences in the world. However, here the focus is on the following question: How is this elementary spatial experience solidified as a cultural form, that in turn transforms the way in which our basic perceptions are interpreted?

Harvey concedes that in this process of "transition, primary sensory experience, myth and image, cultural form, and scientific concepts interact" (ibid.). Hence, it is extremely difficult to separate the different layers from each other and to analyse how spatial concepts are formed. Nevertheless Harvey proposes that this process could be described as a succession of different phases. Again, the emphasis is laid on the distinction between so-called primary perceptional experience and learned or culturally determined spatial structures.

According to psychological experimental approaches, the visual perception of space is basically non-Euclidian and could be better described as a Riemannian space of constant negative curvature resulting in a hyperbolic unfolding of space. Thus, the ability to perceive space as Euclidian (geometric space based on straight lines) has to be regarded as a cultural appropriation.

Piaget and Inhelder (1956) have examined the learning processes of children and concluded that a very important element in this movement from non-Euclidian perceptional space to Euclidian space is the role of tactile and motor experience. In Harvey's words, they "suggest that children automatically progress from perception of the topological characteristics of objects (characteristics such as proximity, separation, order, enclosure, and continuity), through perceptions which encompass perspective and projective relationships, to the ultimate ability to organise all objects in space in terms of some common spatial structure, such as a Euclidian system of co-ordinates" (ibid. 193). Piaget and Inhelder propose that, although all children develop similar skills concerning topological perception, the formation of spatial representation and of imagination takes place on the symbolic level and thus forms part of culture. Thus the cultural differences between spatial conceptions are based on symbolic operations. Harvey concludes, "[a]t the representational level the emergence of spatial concepts is inextricably bound up with the structure of the culture in which such spatial concepts are developed" (ibid. 193-194).

Anthropologists have studied the specifics of culturally determined spatial frameworks. Edward T. Hall's conception of "proxemics" is relevant in this context, since it examines precisely the area between so called primary spatial perception and

culturally determined behaviour. Hall develops his model based on the observation of human cultural behavioural patterns, which are often taken for granted but very hard to explicate. The notion of "proxemics" designates the culturally codified distance-settings between people. He points out that "[i]t is this elaborate and secret code that becomes confused with what is popularly conceived as phenomenological experience" (Hall 2003, 52). He is convinced that "[p]eople from different cultures inhabit different sensory worlds. They not only structure space differently, but experience it differently, because the sensorium is differently 'programmed" (ibid.). Furthermore, he develops the idea that this spatial "programming", although culturally specific is developed pre-linguistically as well as pre-culturally, based on the specific territoriality of the various subjects. He assigns the term "infra-culture" to those behavioural patterns, which, precede and form the basis of symbolical thought as well as of culture. The important point here is that if the above holds true, we cannot assume a shared perceptional basis for spatial conceptions, which is later separated culturally on the basis of the development of mental spaces or spatial representation, because the perceptional performance is informed by environmental (territorial) factors.

Hall's suggestion is that people in a desert develop different perceptional habits (before the symbolic order enters the stage) compared to people in a mountainous environment. The impact of environmental factors on spatial conceptions clearly has to be considered. However, on this basis it is also important not to forget that modern spatial technologies have brought about "mediated" environments, which are shared by people across the globe. This opens up a question that will have to be revisited to at a later stage of this chapter: How can we understand the interplay between culturally or socially produced aspects of spatiality and those that are based on bodily perception in different environments?

Not only are there diverging spatial conceptions and representational schemes in different cultures, but there is also a constant evolution of those concepts over time. The spatial framework of a society is not entirely fixed, it is bound to change over time, and this fact has led to a rich history of diverging ideas and models from antiquity to the present day. In our context, it is also important to point out the influence of technology on fluctuation and fixation of spatial conceptions. Technologies have shaped and transformed spatial models in scientific contexts - the influence of optics in the sixteenth century is just one among many examples - as

well as in everyday life; for example, one only has to think of changing modes of travel and communication.

Before the task of generating a spatial model that is adequate for the analysis of computer games is taken up, I will attempt to deliver a brief sketch of the major questions underpinning conceptions of space in physics and philosophy from Antiquity to the present day. Computer games are undoubtedly technological devices, which have evolved from a western tradition of science and technology, and are thus strongly influenced by mathematical and physical concepts stemming from that particular tradition.

Since a detailed rendition of the history of spatial conceptions in western thought is outside the scope of this study I will only try to grasp the most basic conceptions and tendencies, while keeping their significance for our subject in mind. Although this overview has to remain sketchy and basic, it is of crucial importance for the development of the argument since it will clarify how space has been appropriated and formalised by diverse systems of thought. Classical spatial conceptions have left their traces in western culture and are still to be found in everyday spatial conceptions, including those of game designers and players.

2.2 BRIEF OVERVIEW OF CONCEPTIONS OF SPACE IN WESTERN THOUGHT

In his foreword to Jammer's famous study of the history of concepts of space in physics, Albert Einstein presents two contrasting basic spatial conceptions, one based on place and another based on space as a container. He writes, " [n]ow as to the concept of space, it seems that this was preceded by the psychologically simpler concept of place. Place is first of all a (small) portion of the earth's surface identified by a name. The thing whose 'place' is being specified is a 'material object' or body. Simple analysis shows 'place' also to be a group of material objects. Does the word 'place' have a meaning independent of this one, or can one assign such a meaning to it? If one has to give a negative answer to this question, then one is led to the view that space (or place) is a sort of order of material objects and nothing else. If the concept of space is formed and limited in this fashion, then to speak of empty space

has no meaning" (in: Jammer 1993, XV). This conception of space can thus be understood as "positional quality of the world of material objects" (ibid.). Here, every material object has a designated place or position and unoccupied space, or neutral and empty space is completely inconceivable.

Contrary to this position, "[i]t is also possible, however, to think in a different way. Into a certain box, we can place a definite number of grains of rice or of cherries, etc. It is here a question of a property of the material object 'box', which property must be considered 'real' in the same sense as the box itself. One can call this property the 'space' of the box. There may be other boxes, which in this sense have an equally large 'space'. This concept 'space' thus achieves a meaning, which is freed from any connection with a particular material object. In this way by a natural extension of 'box space' one can arrive at the concept of an independent (absolute) space, unlimited in extent, in which all material objects are contained. Then a material object not situated in space is simply inconceivable; on the other hand in the framework of this concept formation it is quite conceivable that an empty space may exist" (ibid.).

This second conception of space thus opens up the possibility to distinguish space from material objects and it enables a kinetic perspective, accounting for the movement of objects or bodies "in" space. Einstein makes it quite clear that both schematic views are essentially "free creations of the human imagination, means devised for easier comprehension of our sense experience" (ibid.). These two schemes, which can be referred to as "material space" and "container space" constitute the roots of western thought about space. Although their scientific or mathematical validity has been compromised in modern times, they are clearly present as a backdrop of spatial intuition in everyday life. The evolution of spatial concepts up to the 17th century can be interpreted as a movement of abstraction that leads from an understanding of space bound up with matter or location to the idea of space as a neutral medium and container for material entities.

Spatial conceptions in Antiquity have largely identified space with matter. Plato's philosophy, for example, treats space as material that is shaped and formed by ideal geometrical forms. Here, "[s]pace is the matter of which material objects – copies of forms – are composed: 'Its nature is to be available for [any element] to make its impression upon, and it is modified, shaped, and reshaped by the things that enter it'" (Hugget 2002, 5). Space is regarded as pure matter receiving everything that

exists. Geometrical forms are posited as the ordering principle for the world of physical entities. The most frequent metaphor for Plato's view of space as unformed matter is the block of clay waiting to be brought into form.

In contrast, Aristotle famously defines "[p]lace as the adjacent boundary of the containing body" (Jammer 1993, 18). Here, place is not the same as matter but it is dependent on material objects. Consequently, space is to be understood as the sum of all places. Since in Aristotle's view matter is finite, space as an accident of matter has to be finite too. He describes a universal, spherical and highly symmetrical space with an outer boundary and the earth at its centre. The crucial factor in Aristotle's spatial conception is that he defines the space of a body as its containing surface rather than its volume. If one compares the key metaphors of Platonic space with Aristotelian space, the former is identifying space with unformed matter that is to be shaped by ideal geometric forms, whereas the latter develops a system of place based on the boundary surfaces of objects rather than their volume. Although they were constantly scrutinised and heavily debated mostly on metaphysical grounds, Plato's and Aristotle's concurring spatial conceptions dominated western thought until the 14th century.

Two other major schools of thought have to be mentioned in the context of Greek philosophy and conceptual spaces, namely Pythagorean numerology and Euclidian geometry. The major thought that underpins Pythagorean space is the conception of the "kenon" or the "void", which served as an agent guaranteeing the separation and distinction between natural objects in space as well as the discreteness of individual numbers.

The Euclidean system of geometry, although confined largely to the two dimensions of the plane, presents a theory of the geometric readability and computability of geometrical space. Since Euclid's axioms of geometry as presented in *The Elements* has shown to hold empirical truth in everyday situations as well as mathematics it has been used until the present day and its predominance was only broken in the 19th century, when, as Jammer points out, "[w]ith the discovery of non-Euclidian geometry it became clear that there were no a priori means of deciding from the logical and mathematical side which type of geometry does in fact represent the spatial relations among physical bodies" (Jammer 1993, 146). Euclidian geometry provided the basis for important spatial concepts from Newtonian mechanics over Descartes development of the coordinate system to Einstein's theory of special

relativity. Computations of distances, triangulations and other geometric treatments of objects that are indebted to Euclid' s concepts also form part of algorithms used in contemporary 3D programs and computer games.

Medieval life was dominated by the dual structure of a space of the living and the spiritual domain - the space of the soul. This fact is exemplified by Dante Alighieri's *Divina Comedia*, which draws a precise map of the locations of the "Inferno", located inside earth, the transitional "Purgatorio" mountain on the earth's surface and finally, ascending towards the heavens - the "Paradiso". Dante presents the vertical journey of the sinner's soul from the doors of hell, via the long winding mountain of the cleansing purgatory upwards to the ethereal realm of heaven. This conception seems to be highly influenced by the Aristotelian cosmology with its spherical structure based on earth as the central core. Foucault writes that "[i]n the middle ages there was a hierarchized ensemble of places: sacred places and profane places, protected places and, on the contrary, places that were open and defenceless, urban places and country places (speaking of people's real life); for cosmological theory, there were supracelestial places as opposed to the celestial place, which contrasted in turn with the terrestrial place" (Foucault 1998, 176). Foucault goes on to say that "[i]t was this whole hierarchy, this opposition, this interconnection of places that constituted, what might be called, very roughly, medieval space – a space of localisation" (ibid.). This space of fixed localisation is challenged by the emergence of the idea of an infinite extension of space that might not even have earth at its centre.

The epistemological transformation from medieval cosmology to the idea of an infinitely extended space is one of the most important events in the western tradition of spatial conceptions. It is a shift from anthropocentric models of place to absolute space and from *material* space to *container* space. As Foucault puts it, "[a] thing's place was no longer anything but a point in its motion, just as the thing's rest was nothing more than its motion indefinitely slowed down" (Foucault 1998, 176). Thus from Galileo onwards the emphasis is moved from localisation to extension.

With Newton's "absolute space", the era of universal isotropic container space literally based on Euclidian geometry begins. Here, space is regarded as an arena for mechanical geometrical motion of bodies and objects. Newton's great accomplishment is the synthesis of the metaphysical notion of abstract space and the

empirically useful application of mechanics. Absolute space is absolute in the sense that it is regarded as independent of matter, infinitely extended and an ontologically necessary reference system for the laws of motion. "Newton introduces absolute and immutable space, of which relative space is only a measure. The final degree of accuracy, the ultimate truth, can be achieved only with reference to this absolute space" (Jammer 1993, 101).

Descartes on the other hand promoted a different understanding of space as a system of relations between bodies. Although he is convinced that "the whole universe of corporeal substance has no limits to its extension" (in: Hugget 2004, 92), this conception is different from Newton's, since first of all space is in Descartes view not independent from matter but to be identified with it (since the universe is split into either mind or matter – space being part of the latter), and secondly extension is regarded as "[a] place is picked out by its position relative to bodies which we regard as immobile" (ibid. 101). Descartes famous contribution of the coordinate system that allows to position and measure bodies in space along three axes is in use up until the present day.

From here on the discourse bifurcates along the lines of absolute space and relative space or "relationism" (which should not be confused with the theory of relativity). The famous encounter between Leibniz's spatial conceptions and Newton's thought illustrate this theoretical rift perfectly. Leibniz attacks Newton's absolute space from a "relationist" perspective. According to Jammer he posits that "[t]he relation of situation is a wholly sufficient condition for the idea of space. No absolute reality need be invoked" (Jammer 1993, 117).

The essential difference between Newton's "absolute space" and "relationist" conceptions is that the former treats space as a substance separate from matter, whereas according to the relational model, without matter there would be no "situation of objects" and thus no space. In other words, if there was no matter one could not even conceive of anything to measure space with. Here, space is rooted partly in the structure of the object given to perception as well as the apparatus of perception itself.

As is well known, Kant's transcendental idealism posits space and time as belonging to "pure intuition"; a priori elements, which precede all perceptions, since they are not dependent on the particular data of sensations but in turn themselves

pre-conditional categories for perception. Kant posits Euclidian geometry at the roots of the priori structure of space as pure intuition. His logic is based on the notion that all empirical data that the subject might receive is already preceded by space since one cannot imagine that there is no space, although one can imagine that there are no objects in space. Thus, space does not depend on existing objects in space, it is posited as a mode of perception rather than an object of perception. It follows clearly that Kant's metaphysical spatial conception is incompatible with "relationism", because it states that space is to be understood as a relation between perceivable objects. Just as Newton qualifies space as absolute thus creating a transcendental entity, Kant elevates it to a "pure intuition", an all-encompassing precondition for perception and categorization. Kant's philosophy performs a shift from space as a consequence of the existing world to a more abstract conception of space as a precondition for the perceiving subject itself.

At the end of the 19th century, Newtonian *absolute space* came to be regarded as untenable, because it could not be experimentally detected. Foucault posits his third stage of spatial conception, namely *emplacement* in close proximity to this modern shift towards relationism. He writes, "[i]n our day, emplacement is supplanting extension which itself replaced localisation. Emplacement is defined by the relations of proximity between points or elements. In formal terms these can be described as series, trees, lattices*"* (Foucault 1998, 176). Alternative geometrical concepts were developed and Euclidian geometry was subjected to closer scrutiny. Mathematicians such as Gauss, Riemann and Lobachevsky introduced mathematically correct non-Euclidian systems of geometry. The revelation that there could be concurrent consistent geometries "dealt a shattering blow to a priori concepts of physical space, to the whole philosophy of mathematics as set up by Kant, and indeed the whole traditional framework of rational scientific thought, which had been much influenced by the power and supposed uniqueness of the Euclidian system" (Harvey 1973, 199). If, modern science could develop concurrent systems of geometry that were equally "true" from the point of view of the mathematician, the crucial question is which one of these should be used in future. On the one hand, anthropological research confirmed that various cultures had developed empirical spatial conceptions, which seem to be much closer to curved non-Euclidian geometries. On the other hand, the hypothetical development of consistent n-dimensional universes by mathematicians

such as Riemann led to a split between the abstract mathematical notions of space and empirical physical notions of space in western culture. Riemann's view, that the distribution of matter determines the nature of space anticipated some of the central ideas in Einstein's theory of gravity, where indeed concentrations of mass and gravity are identified as forces shaping the space-time continuum (Jammer 1993, 161). Einstein writes that "[o]nly the genius of Riemann, solitary and uncomprehended, had already won its way by the middle of the last century to a new conception of space, in which space was deprived of its rigidity, and the possibility of its partaking in physical events was recognised" (in: Hugget 2002, 256). With Einstein's famous special theory of relativity from 1905, the conception of space is extended to a four-dimensional field, which also includes the dimension of time. Einstein's insights had an enormous impact on the scientific and cultural landscape of the 20th century and profoundly transformed the prevalent theories of space. He writes, "[w]ith the discovery of the relativity of simultaneity, space and time were merged in a single continuum in a way similar to that in which the three dimensions of space had previously been merged into a single continuum. Physical space was thus extended to a four-dimensional space which also included the dimension of time" (Hugget 1993, 257). Yet, although this theory replaced individual concepts of space and time with one single and unified concept of space-time in physics, it did not affect the experiential space and time of human perception. Therefore, Einstein's unified theory does not in any way abolish the need for alternative conceptions of space or time. It rather demonstrates the necessity to accommodate the conceptual framework to the context.

As David Harvey puts it, "[i]t is clear, also, that different concepts of space may be appropriate for different theoretical purposes. It may be realistic to regard the concept of space, therefore, as a 'multidimensional' concept in the sense that the concept has a different meaning according to cultural background, perceptual ability, and scientific purpose" (Harvey 1973, 197).

This very brief overview demonstrates quite clearly that spatial conceptions evolve and change according to their reference systems. In other words, a theory of space that has to account for a cosmology based on the existence of a singular omnipresent deity has different core features from one that sets out to explain the physical effects of the speed of light as a constant factor across different reference systems or another one that tries to grasp the peculiarities of human perception. What then, can we make of this multitude of possible approaches to the subject of space? How is it possible to discern which one could serve as a possible foundation for the development of a theoretical framework dedicated to scrutinise space in video and computer games? It seems a theory that transcends, container space as well as material space and that connects experiential space with diverging spatial concepts and the production and use of different spatial artefacts is necessary. In order to develop a truly spatial perspective for the analysis of video and computer games a very well adjusted and highly specialized theoretical framework that integrates the socio-cultural dimension of spatiality is indispensable. Thus, in the following, Espen Aarseth's insightful proposition to consider Henri Lefebvre's unitary theory of space in the context of digital games (Aarseth 2001, 163) is taken up and put to the test.

2.3 THE PRODUCTION OF SPACE AS A THEORETICAL FRAMEWORK

In the introduction to his seminal work *The Production of Space*, Henri Lefebvre poses a number of questions that reverberate with those arising from the above discussion of spatial concepts in philosophy and physics. His aim is to develop a proper science of space that takes into account seemingly disparate notions of space. Accordingly, he sets out to "discover or construct a theoretical unity between fields which are apprehended separately, just as molecular, electromagnetic and gravitational forces are in physics" and states that "[t]he fields we are concerned with are, first, the physical – nature, the Cosmos; secondly, the mental, including logical and formal abstractions; and, thirdly, the social" (Lefebvre 1974, 11). These three seemingly

separate spheres are quite clearly present in *game space*; firstly, there exists a physical space where the player is located; secondly, there is the mentally constructed space arising from narrative and rule based structures; and finally we are confronted with spaces generated by the social interaction of individuals, exemplified in multi-player online games as well as shared gaming sessions. It is precisely the connection between these different dimensions that needs to be clarified in order to understand the entirety of space in video and computer games.

Lefebvre argues that the emancipation of mathematics from philosophy and metaphysics has led to concepts of space that can only be treated as abstract and purely mental forms. Cartesian logic, with its infinite extended space, on the one hand, and the subjective space of the mind, on the other, can be understood as a point of departure for this development. For him, the gap between the mental/mathematical models of space and their relation to practice and social space seems to continuously open wider throughout the course of modernity. One of the major motivations of *The Production of Space* is the attempt to analyse and describe this relationship between logical and mental conceptions of space and the spatiality related to bodily activity and perception as well as social interaction.

Thus, the aim of Lefebvre's project is to analyse how space is produced on various levels, in the realm of codes or language, but also in practico-sensory activity and through the interactions between subjects. The ultimate goal is "[t]o expose the actual production of space by bringing the various kinds of space and the modalities of their genesis together within a single theory" (Lefebvre 1973, 16). Seemingly, discrete elements are thus understood as flexions of the wider phenomenon of space.

Since I have claimed that space in the context of computer and video games can only be fully understood if it is treated as the sum of its disparate modalities, Lefebvre's approach seems to provide an ideal framework for this undertaking. However, it also has to be taken into account that his project has an immense scope and thus it will be necessary to focus on those elements of his analysis, which are promising in relation to the present thesis. Therefore, in the following, the development of his case will be traced and those arguments that bear significance in our context will be highlighted.

The outset of Lefebvre's immense project is imprinted by a sceptical stance towards conceptions of space dominated by mathematics and logic. The identification of the divide between the mental realm of spatial conceptions and the sensory reality of space has a history of its own. For example, the sensory space of the individual is an important topic in the development of aesthetic theories in the 19th century, especially in conjunction with the rise of psychology as a science in its own right. In this context fine art provides a hotbed for critical positions towards abstract scientific conceptions of space.

In relation to architecture, August Schmarsow introduces subjective and active notions of space when he writes, "[t]he linguistic terms that we use for space, such as 'extension', 'expanse', and 'direction' suggest continuous activity on our part as we transfer our own feeling of movement directly to the static spatial form. We cannot express its relation to ourselves in any way other than by imagining that we are in motion, measuring the length, width, and depth, or by attributing to the static lines, surfaces, and volumes the movement that our eyes and our kinaesthetic sensations suggest to us, even though we survey the dimensions while standing still. The spatial construct is a human creation and cannot confront the creative or appreciative subject as if it were a cold, crystallized form. In this we see the basic difference between the art of space and the science of space […]" (Schmarsow 1893, 291).

Here, the art of architecture is posited against the strictly logical and mathematical sciences as a realm of dynamic sensory experience taking place in the psyche and body of the observer. This focus on subjective, sensory notions of space leads to a critique of the dominance of mathematical space. Conceptions of space based on lived experience are similarly important for the project of phenomenology. Lived experience is emphasised when Merleau-Ponty posits bodily space once again at the origin of spatial conceptions and asserts that "[f]ar from my body's being for me no more than a fragment of space, there would be no space for me at all if I had no body" (Merleau-Ponty 2002, 117).

This position represents a strong counter-current to Newtonian absolute space and Cartesian logic. Lefebvre acknowledges that the phenomenologist focus on bodily space and lived experience presents an option to counterbalance the one-dimensionality of logico-mathematical approaches. For him, however, the phenomenological stance of a concentration on subjective bodily space is not sufficient as a critical device, since it does not account for the social dimension of

lived space and effectively as a philosophy also belongs to the arena of spatial conceptions that arise from language. Moreover, a core element of his approach is a highly sceptical stance towards what he terms the "illusion of transparency", "[t]he presumption […] that an encrypted reality becomes readily decipherable thanks to the intervention first of speech and then of writing" (Lefebvre 1991, 28) and the "illusion of opacity", where space is misunderstood as the objectified and measurable world of things.

For him, the illusion of transparency and the fetishisation of the written and spoken word amounts to ideologically motivated assumptions. He writes, "[c]losely bound up with Western 'culture', this ideology stresses speech, and overemphasizes the written word, to the detriment of a social practice which it is indeed designed to conceal" (ibid. 28).

On the other hand, the "illusion of opacity", can be seen as one of the core-epistemes of modernism, and thus all modes of empiricism and positivism. It amounts to the belief that the world of objective "things" has a higher stake in reality than thoughts or symbols. Lefebvre's position is highly critical of all language-centered philosophy and, in particular, the critique is directed towards structuralist and semiotic approaches as well as all positions defined by oversimplified positivism and empiricism. Rooted in Marxist thought, Lefebvre emphasizes the status of space as a social product. How does this critical stance relate to the subject of this study?

If one concedes that games need to be practiced and played, not read we have to accept that there is a dimension of computer games that is experienced beyond the realm of the logos. There exist aspects of space beyond the sphere of language that can be accessed and expressed via art and play.

The ideological freight that Lefebvre refers to as "illusion of transparency" underlies western traditions of thought that perpetuate the dominance of the sense of vision over all other senses. Although critical of the dominance of the logos, Lefebvre describes space as "encoded", and accordingly, its production and decoding as subjected to historical transformation. He states that "[c]odes will be seen as part of a practical relationship, as part of an interaction between 'subjects' and their space and surroundings" (ibid.18). Here, one might pose the question how these codes relate to language. Lefebvre outlines his position as follows: "[t]he strategy of centering knowledge on discourse avoids the particularly scabrous topic of the relationship between knowledge and power. It is also incapable of supplying

reflective thought with a satisfactory answer to a theoretical question that it raises itself: do sets of non-verbal signs and symbols, whether coded or not, systematized or not, fall into the same category as verbal sets, or are they rather irreducible to them? Among non-verbal signifying sets must be included music, painting, sculpture, architecture, and certainly theatre, which in addition to a text or pretext embraces gestures, masks, costume, a stage, a mise-en-scene – in short a space. Non-verbal sets are thus characterized by a spatiality, which is in fact irreducible to the mental realm […]. To underestimate, ignore and diminish space amounts to the overestimation of texts, written matter, and writing systems, along with the readable and the visible, to the point of assigning to these a monopoly on intelligibility" (ibid. 62).

Although computer games did not exist at the time of the writing of the *Production of Space*, it does not seem too farfetched to speculate that they might have been included among the practices which include 'non-verbal signifying sets', on a par with theatre, architecture and music. In this context, it is important to recall that advocates of a *ludological* position in game studies usually reject the notion of computer games as directly "readable" narrative artefacts. Indeed, games exist to be performed or played, and are similarly characterized by a spatiality that is irreducible to the realm of the logos or what, in Lefebvre's terms, constitutes the "mental realm". Thus, aspects of this notion of spatiality, namely coded and non-verbal forms seem to be well suited to account for those aspects of *game space* that are omitted by *narratological* approaches.

One can claim that computer games constitute a spatial practice par excellence, operating through "non-verbal sets of spatial signs and symbols" and addressing bodies operating in space. Since computers are machines that operate on a symbolical level, players are continuously confronted with symbolic spatial representation. Those symbolic representational elements are, however, partially rooted in "mental" formations, similar to Euclidian space or Renaissance perspective. If one assumes that important aspects of the spatiality in computer games present themselves in a non-verbal symbolic form, it can be argued that written language alone might not be sufficient to cover the territory. It follows that in this specific context artistic practice could serve as a unique way to close missing links and to generate a unique kind of knowledge. This is why artistic practice in relation to *game space* plays an important role in Chapter 5 of this thesis. It has to be stated, however,

that these observations should not lead to the conclusion that narrative structures and language are less important than non-verbal forms for the generation of *game space*. Non-verbal sets of spatial symbols are just as much part of the hybrid spatiality in computer games as are text-based narrative spatial structures.

Lefebvre takes his argument further when he critiques the application of semiology to architecture. He is convinced that although there is always a signifying practice involved it cannot be reduced to "language or discourse, nor to the categories and concepts developed for the study of language" (ibid. 222). This is because "spatial work […] attains a complexity fundamentally different from the complexity of a text, whether prose or poetry" (ibid). A spatial work, such as a work of architecture is realised through a social practice, and "[t]he actions of a social practice are expressible but not explicable through discourse; they are precisely, acted – and not read" (ibid. 222).

It is this dimension of actual performance that is realised within and through a social practice that strikes us as a fundamental element of games in general, and thus also of digital games. In other words, just as space has to be practised and experienced beyond the logic order of language, games have to be played and it is not sufficient to study their symbolical surface without getting involved. This aspect of play that surpasses language into space is acknowledged by Lefebvre when he states that "[l]anguage possesses a practical function but it cannot harbour knowledge without masking it. The playful aspect of space escapes it, and it only emerges in play itself (by definition), in irony and humour" (ibid. 211).

This, however, does not mean that knowledge production based on language is rendered obsolete, which would invalidate Lefebvre's own work of writing. The core element of his argument emphasizes the importance of practice versus abstract and detached examination. The playful aspect of space is something that emerges naturally from the practico-sensory realm and has to be regarded as an integral part of the foundations of human development. It is this playful and non-rational space that Lefebvre posits against the rational intellectual space of Cartesian logic. He attacks the shortcomings of spatial conceptions centred on Western logos when he writes, "[a] narrow and desiccated rationality […] overlooks the core and foundation of space, the total body, brain, gestures, and so forth. It forgets that space does not consist in the projection of an intellectual representation, does not arise from the

visible-readable realm, but that it is first of all heard (listened to) and enacted (through physical gestures and movements)" (ibid. 200). This is a crucial observation, since computer and video games are clearly listened to and enacted through physical gestures and movements. However, they also mobilise the visible and the readable. This fact immediately brings about the question how these seemingly opposed areas might be related to each other. It is in particular this connection and interplay between discrete areas that Lefebvre's theory attempts to grasp and analyze.

I have already touched upon two distinct fields, the field of logical and rational conceptions of space, as defined by classical philosophy, mathematics and engineering and the field of directly experienced space that emerges from the practico-sensory realm and that is marked by what Lefebvre calls "non-verbal sets of spatiality". Lefebvre introduces two categories to account for these diverging aspects of spatiality, namely "Representations of Space" and "Representational Spaces". The first category stands for the realm of abstract and rational conceptions of space, which are tied up with philosophical thought, mathematics as well as engineering and urban planning. Here, space is first of all conceived, planned and mapped out rationally. The second, category, "Representational Spaces", designates the field of direct experience gained in the "practico-sensory" realm. It is the sphere of the non-verbal that differs from the former because it is lived and experienced rather than intellectually constructed and projected. "Spatial Practice" maintains a dialectical relationship between "Representations of Space" and "Representational Spaces" and is, in Lefebvre's words, responsible for "production and reproduction and the particular locations and spatial sets characteristic of each social formation" (ibid. 33).

In the following I will try to clarify in detail how these concepts are put to work within Lefebvre's objective and subsequently how they can be mobilised as a framework for spatiality in computer and video games.

2.3.1 THE TRIAD OF PERCEIVED, CONCEIVED, LIVED

"A triad: that is, three elements and not two. Relations with two elements boil down to oppositions, contrasts or antagonisms. They are defined by significant effects: echoes, repercussions, mirror effects" (ibid. 39). Here, Lefebvre is clearly indebted to Hegel's and Marx efforts to surmount the structural dualisms and binary oppositions,

which defined Cartesian as well as Kantian, post and neo-Kantian thought. Referring to philosophical projects based on subject–object opposition Lefebvre writes, "[t]heir dualism is entirely mental, and strips everything which makes for living activity from life, thought and society (i.e. from the physical, the mental and social, as from the lived, perceived and conceived)" (ibid. 39). Such systems of thought tend towards complete transparency and intelligibility, thus not leaving any room for the material, physical and social aspects of life. Therefore, in order to understand social space as a product of forces that manifest themselves beyond the mental sphere, it is sensible to consider the body as a starting point.

Firstly, a body in a group or society is geared towards (social) spatial practice that presupposes bodily activity, such as movement, gestures, and the use of sensory organs. This activity amounts to what Lefebvre advances as "perceived space" or "[t]he practical basis of the perception of the outside world, to put it in psychology's terms" (ibid. 40).

Secondly, representations of the body, derived from science, such as medical sciences, anatomy, physiology, form the conceived space of the body. These scientific representations of the body are obviously prone to be mixed up with ideological contents and constantly evolve over time. This field of spatial representation is posited as "conceived space".

Thirdly, bodily, or "lived space", in constant mediation between the former two, is highly influenced by social and cultural conventions and is accompanied by an "illusory" immediacy that is prefigured by symbolisms evolving from religious traditions and mythologies. Lefebvre emphasizes, that the "perceived-conceived-lived" triad should not be treated as just another abstract model. Thus, what is opened up by the notion of "lived space" should not be sacrificed by a totalitarian drive towards logical purity and transparency. This presents itself as one of the essential forces in Lefebvre's grand project. Following this line of thought artistic practice is considered an important resource for this thesis. The discussion of works of art could serve to balance the logical rigidity emerging from the theoretical approach because it is directed towards examples of experiential and lived space.

Game space has to be regarded as a cultural product and practice that is informed by spaces created through the use of verbal signs or language (narrative spaces), yet it appears equally informed by a spatial practice operating on the basis of bodily

involvement in the form of gestures (user input) as well as non-verbal sets of symbols and signs (representational spaces). All of these dimensions of space are equally present in computer games and are constantly mediating between each other.

Lefebvre demonstrates brilliantly how the triad of "perceived-conceived-lived" manifests itself in the form of historically shifting social spaces, for example by contrasting Greek and Roman spatial practice. Since this thesis engages with a specific cultural phenomenon rather than the spatial practice of a whole society at a given time, our focus will move from those details of Lefebvre's examination to the structural relations between different modalities of space. The question that interests us is how the relationship between different spatial modalities in *game space* can be addressed. Lefebvre defines the contingencies of spatial practice as follows: "The object of knowledge is, precisely the fragmented and uncertain connection between elaborated representations of space on the one hand and representational spaces (along with their underpinnings) on the other; and this 'object' implies (and explains) a subject – that subject in whom lived, perceived and conceived (known) come together within a spatial practice" (ibid. 230). It follows that if "representations of space", the results of a process, are the sole objects for the study of spatial practice, lived experience and with it the genesis of the process would be omitted. In other words, it is important to consider the processes that surround and run through cultural artefacts, namely how they come into being and how they are experienced. Thus, in order to fully comprehend *game space*, the spatial practice of creating and playing computer games has to be considered equally important as the formal aspects of spatial representation.

If one accepts the view that "[s]pace is not a thing but rather a set of relations between things (objects and products)" (ibid. 83), it follows that the initial object of study is indeed precisely the set of relations between seemingly fragmented elements, not the analysis of those elements in isolation. If one understands the production of space as a process, it seems problematic to start analysing by putting the results of the process first.

As Merrifield puts it, "[i]n Lefebvre's hands, space becomes redescribed not as a dead inert thing or object, but as organic and fluid and alive; it has a pulse, it palpitates, it flows and it collides with other spaces. And these interpenetrations –

many with different temporalities get superimposed upon one another to create a present space" (Merrifield 2000, 171). The problem here is, how to "[g]et back from the object [the present space] to the activity that produced and/or created it" (Lefebvre 1991, 113). Thus, what he aims for is to reconstitute the process of its genesis and the (historical) process of its generation. It is here that Merrifield points out the influence of Marxist thought on Lefebvre's project, when he describes it as "[a] spatialized rendering of Marx's famous analysis on the fetishisation of commodities from Volume One of Capital" (Merrifield 2000, 171). Just as commodities are perceived objectively, stripped of their inter-subjective relations and thus appear masked or as Marx terms it "fetishized", the products of the social production of space are perceived as objects bare of all social relations or processes leading to their existence. Thus, according to Merrifield, "Lefebvre's shift, accordingly, from 'things in space' to that of the actual 'production of space itself', is the same conceptual and political shift that Marx made from 'things in exchange' to 'social relations of production'" (ibid. 172). Accordingly, Lefebvre sets out to unmask the hidden social relations of the production of space in capitalist societies.

How does this unmasking or demystification of "fetishized" space that is so important in Lefebvre's work relate to this study? It is crucial to stress the fact that the particular spaces generated by computer and videogames have to be regarded as the result of a dynamic process that involves numerous distinct elements, such as the rules, the program, the player's active involvement as well as audiovisual symbolical elements. Thus, it would be quite shortsighted to concentrate on one of these particularities without taking into account the other elements in the process.

In other words, rather than studying computer games as things in space, the particular process of the production of *game space* has to be examined. On first glance, the fact that most games are finite cultural products seems to justify an approach that is focused on the visible and audible content alone. Yet, precisely because they appear as coherent entities, and the scaffolding that lead to their production has vanished, it is crucial to investigate the process beyond the technological product within the wider realm of cultural activity. And it is here that one can attempt to answer a question that has been posed at the beginning of this chapter, namely how the interdependence between the "artificial" socio-cultural aspects of spatiality and those based on the "natural" shared grounds of bodily perception could be examined. This interdependence between culture and nature seems to be exactly

what Lefebvre has in mind when he introduces the Marxist notion of production into his framework. If space is posited as a social product, influenced by perceived space (the shared perceptional basis) as much as by conceived space (the culturally specific space of logical thought and language based conceptions) it can be regarded as an implicit dialectical process that contains answers to our question, as well as the question itself.

If one takes this thought further, the products of spatial practice, whether they are games, art or architecture re-enter the process as elements, which are products of a spatial practice as much as they in turn influence that same practice. This is where this study reaches out into other areas of thought, since it can be argued that the spatial practice arising from the production and consumption of computer games in turn influences the general spatial practice of the subjects involved. To put it bluntly, an individual that has had the experience of playing a networked computer game integrates this experience into his or her general understanding of space. Thus one can claim that computer games are not only spatial socio-cultural products that give evidence of contemporary spatial conceptions but also that they influence spatial practice by introducing different and new configurations of representational spaces. This is why the analysis of the production of *game space* could reveal more about contemporary spatial practice than one might, at first, expect. Based on these assumptions, detailed evidence of the impact of spatial practice in digital games on contemporary artistic production is presented in Chapter 5.

At this point, it is necessary to return to the heuristic device mobilised by Lefebvre to examine his model for the production of space, namely his triad of "perceived, conceived, and lived space". He presents his conceptual triad as follows:

> "Spatial Practice, which embraces production and reproduction, and the particular locations and spatial sets characteristic of each social formation. Spatial practice ensures continuity and to some degree cohesion. In terms of social space, and of each member of a given society's relationship to space, this cohesion implies a guaranteed level of competence and a specific level of performance" (ibid. 33).

> "Representations of space: conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers, as of a

> certain type of artist with a scientific bent – all of whom identify what is lived and what is perceived with what is conceived" (ibid. 38).
>
> "Representational spaces: space as directly lived through its associated images and symbols, and hence the space of 'inhabitants' and 'users', but also of some artists and perhaps of those, such as a few writers and philosophers, who describe and aspire to do no more than describe. This is the dominated – and hence passively experienced – space, which the imagination seeks to change and appropriate. It overlays physical space, making symbolical use of its objects. Thus representational spaces may be said, though again with certain exceptions, to tend towards more or less coherent systems of non-verbal symbols and signs" (ibid. 83).

"Spatial practice" emerges from shared habitual action in a society based on how the members of that society "perceive" their environment and interact with it. Those perceptions are informed by the dominant "representations of space", which are advanced by a particular segment of society such as scientists, theorists and engineers. "Representations of space" is the sphere of abstract conceptions and mental models that can be highly theoretical and out of touch with everyday live.

In contrast, "Representational space" is understood as a layer of non-verbal sets of symbols that is superimposed upon physical space. It is a realm of space that is directly lived rather than negotiated by conscious logic. "Representational space" is a first hand experience rather than an abstract conception. The "spatial practice" of a society is the result of a complex interaction between "representations of space" and "representational spaces". How do "spatial practice", "representations of space" and "representational spaces" relate to computer and video games in detail?

In Lefebvre's view, "[t]he spatial practice of a society secretes that society's space; it propounds it, in a dialectical interaction; it produces it slowly and surely as it masters and appropriates it" (Lefebvre 1991, 38). He characterises spatial practice in neo-capitalist society as follows: "[i]t embodies a close association, within perceived space, between daily reality (daily routine) and urban reality (the routes and networks which link up the places set aside for work, 'private' life and leisure (ibid)". Seen in this light, the spatial practice emerging from computer games reveals a lot about the conditions of post-modern societies. For instance, one can witness a continuous

blurring of the boundaries between leisure and work. Not only do play and work take place at the same physical location and on the same device, the individual's PC, mobile phone or PDA. Moreover, networked games bring about a spatial practice that facilitates global participation and have led to the inception of novel economic systems. With the enormous growth in the trade of virtual objects in MMORPG's such *as Everquest*, *Ultima Online* or *World of Warcraft* that has been thoroughly researched by Edward Castranova (2001), forms of play increasingly take on the characteristics of paid work. Another aspect of this erosion of the border between cultures of play and work has been examined in detail in relation to the modes of production in game companies (Kline et al. 2003). Increasingly the production of digital games is presented as a kind of game of its own, a playful and creative activity that can be enjoyed without thinking too much about overtime and extreme "working hours", because it is "fun". Simultaneously, concepts and practices in the vicinity of "user generated content" point in a similar direction.

Computer and video games have to be regarded as products of neo-capitalist economic structures and the spatial practice associated with them accordingly, to paraphrase Lefebvre, "secretes that society's space". In other words, the myriad forms of territorial domination, spatial contest and individual struggle that appear in those artefacts are clearly related to the underlying drives of post-modern culture. Moreover, one could argue that contemporary "spatial practice" in Western societies is increasingly permeated by various forms of "representational spaces "due to the enormous increase of digital devices operating with spatial sets of non-verbal symbols. After all, the GUI's of operation systems in daily use by millions of people all deploy non-verbal spatial metaphors. In this context, there is no better example for "representational space", than the kind of space that is directly lived through its associated images and symbols, generated by the audiovisual spatial illusion of video and computer games.

Yet, at the same time, other aspects of computer games are clearly dominated by "representations of space", that is specific conceptions of space, which can be highly abstract and clearly based on language and the logos. A spatial narrative or a set of rules that defines spatial action in a game belongs to this dimension. The game designer who programs the movement of objects in a game according to mathematical rules and algorithms within a coordinate system generates specific "representations of space". The player continuously switches between these

dimensions while playing the game. On the one hand the player experiences the space directly through non-verbal sets of signs and on the other hand consciously generates an abstract mental map of the space and devises strategies to play. Thus "spatial practice" in video and computer games has to be regarded as a result of the highly dynamic mediation between "representations of space" and "representational space". How does this dynamic mediation unfold itself?

Lefebvre writes, "[t]o take in theatrical space, with its interplay between fictitious and real counterparts and its interaction between gazes and mirages in which actor, audience, 'characters', text, and author all come together but never become one. By means of such theatrical interplay bodies are able to pass from a 'real', immediately experienced space (the pit, the stage) to a perceived space – a third space which is no longer scenic or public. At once fictitious and real, this third space is classical theatre space" (ibid.). Here we are dealing with theatre, a cultural form that has already served Brenda Laurel (Laurel, 1991) as the central metaphor, for her examination of enactment and active performance in human computer interaction.

Lefebvre points out that "[t]heatrical space certainly implies a representation of space – scenic space – corresponding to a particular conception of space (that of the classical drama, say – or the Elizabethan, or the Italian). The representational space, mediated yet directly experienced, which infuses the work and the moment, is established as such through the dramatic action itself" (ibid. 188).

This is a crucial point in relation to *game space* and it can be paraphrased as follows: the spatial practice surrounding computer games is on the one hand defined by spatial modalities that belong to the field of "representations of space", such as particular rules defining spatial performance, verbal conventions of spatial narrative, conceptions guiding the construction of audiovisual spatial representations (various modes of perspective) and on the other hand established by directly "lived" experience and active construction of "representational spaces". In other words, there are elements, which act as foundations, as basic spatial conceptions, for the fluid and action-based directly experienced (played) space of the moment, resulting in a coherent "spatial practice".

In the following I want to address the importance of Lefebvre's notion of "lived space" from a slightly different perspective by briefly introducing one of the most prominent commentators of Lefebvre's work. Edward Soja presents his re-reading of

the spatial triad in the form of what he terms the "trialectics" of "First-, Second- and Thirdspace". He provides a post-modern reading of Lefebvre's project. "Firstspace" is identified as the directly perceived "material side" of space and "Firstspace" epistemes are described as "[f]ocusing their primary attention on the 'analytical decipherment' of what Lefebvre calls spatial practice or perceived space, a material and materialized 'physical' spatiality that is directly comprehended in empirically measurable configurations" (Soja 1996, 74). Thus "Firstspace" is also the area of the aforementioned, illusion of opacity, the tendency to "[p]rivilege objectivity and materiality […]" (ibid. 75). Subsequently, "Secondspace" epistemes are advanced as guided by "[t]heir explanatory concentration on conceived rather than perceived space and their implicit assumption that spatial knowledge is primarily produced through discursively devised representations of space, through the spatial workings of the mind" (ibid. 78-79). This is the space of the "illusion of transparency", the tendency to treat every kind of knowledge about reality as a result of reflective thought, thus granting the reign to the res cogito. The element that differs most from Lefebvre's original text in Soja's interpretation is his version of "lived space" or "Thirdspace". He basically defines "Thirdspace" epistemologies as "[a]rising from the sympathetic deconstruction and heuristic reconstruction of the Firstspace-Secondspace duality [...]'(ibid. 81). For Soja, "Thirdspace" is the necessary other for the duality of real and imagined space and he introduces Borge's "Aleph" as a metaphor for it. In his rendition "Thirdspace" seems to become the post-modern container of difference, otherness and novel approaches. Thus he leaves the definition for "Thirdspace" as open as possible, to be filled with all concepts and strategies leading to new possibilities and places. Here, "lived space" becomes a very far-reaching placeholder for everything that cannot be defined either by "First-" or "Secondspace" approaches. Soja's reading brings Lefebvre down to earth when he identifies perceived space (Firstspace) with the real, and conceived space (Secondspace) with the imaginary, leading to lived space (Thirdspace) as a field of both, imagined and real. The hybrid mix between real and imagined spaces that is provided by computer and video games reverberates strongly with this conception of "Thirdspace".

This insight is crucial because it defies the idea of computer games as merely "virtual" and purely imaginary spaces. It is precisely the interaction between real and imagined spatiality that makes this medium so compelling and unique. The spatial

practice emerging from computer games has to be regarded as a hybrid between physical and imagined spaces.

At this point it is necessary to recall the different *spatial modalities* that have been proposed at the end of the preceding chapter, namely *user space*, *narrative space*, *rule space*, *audiovisual representational space* and *kinaesthetic space,* and to position them within the framework of Lefebvre's spatial model.

Firstly, *user space* is the physical location of the "spatial practice" emerging from the gameplay. It has a social dimension, since it is the location of players who meet and interact with each other. Accordingly, within Lefebvre's triad it can be identified with "perceived space". Secondly, the modalities of *narrative space* and *rule space* are language based abstract dimensions and thus belong to the realm of "conceived space". Thirdly, the modality of *kinaesthetic space* is closely linked with Lefebvre's notion of "lived space", since it designates the bodily link between player and game, which is established through the interface in conjunction with the non-verbal sets of spatial symbols produced by the *audiovisual representational modality of space.*

What makes Lefebvre's theory so significant for the development of a novel perspective on *game space* is his precise analysis of different types of space and the notion of the dynamic interplay between them, resulting in the notion of "spatial practice". Accordingly, all of the above categories have to be regarded as interlinked modalities in a dynamic process that results in the "spatial practice" of computer game play. To illustrate, the "spatial practice" emerging from playing a space shooter could be sketched as follows: it is taking place in a specific *user space* (a public game arcade where the player is watched by others) and it involves representations of space such as *narrative space* (transporting valuable cargo that has to be brought to the next space station in order to advance the narrative) and *rule space* (avoiding the asteroids and shots from opposing space ships, but moving over power-up icons) as well as the *audiovisual representational* aspects (the pixels representing an advancing or retreating asteroid, the sound made by advancing shots) and finally the *kinaesthetic modality* (the link between the player's body, via the joystick to the avatar/space-ship) that makes the game a directly lived, visceral experience. As this sketch demonstrates, on the one hand, it would be impossible to deny the connections between those spatial modalities; on the other hand they all have individual and distinctive characteristics that have to be accounted for.

In the next chapter a detailed discussion of the characteristics of the proposed modalities of space will be delivered and their interplay in the light of different types of video and computer games will be examined.

3. MODALITIES OF SPACE IN VIDEO AND COMPUTER GAMES

3.1 INTRODUCTION

The following chapter sets out to develop a model of the interplay between the modalities defining the spatial practice of video and computer game play.

Before the details are approached, the scope and benefits of such a model have to be addressed. It has been claimed throughout this thesis that it is necessary to develop a new perspective on digital games which focuses on their unique spatiality. Accordingly, the specific qualities that make this spatiality "unique" have to be laid bare. The characteristics that define the distinctive spatial modalities have to be presented and analysed in detail. At the same time it is imperative not to lose the whole picture while concentrating on those details. The model that will be advanced has to enable us to answer the question how these different elements work together as part of a dynamic system. It has to show how the different modalities affect each other and how this process leads to the distinctive spatiality of a game. Accordingly it is necessary to address a problem that follows us throughout this chapter. It has been established earlier that different spatial modalities can be discerned and that their interplay forms the spatial body of a game. To give an example, I have claimed that the kind of space created by a narrative structure is different from the kind of space generated by rules or the one created by audiovisual representation, yet all of them work together to form a coherent whole.

The problem arising from this claim can be stated as follows: If all of these modalities are necessary for a computer game to be perceived as a coherent entity, how can one focus on them as isolated moments?

To put it differently, if the narrative frame of a game is based on travel, one can assume that this fact leads to rules, which define movement through an environment (including areas that can or cannot be accessed) and furthermore to an adequate audiovisual representation of that movement. Does it make sense in such a case to

isolate the *narrative space* from the *rule space* or the *audiovisual representational space* and the *kinaesthetic space* based on the interaction model?

This question can only be answered by hinting back at the obvious differences between spatial modalities and by pointing out the numerous fine links between these different flexions as part of a larger system. Furthermore, there are examples, which reveal that in some games, particular spatial modalities have a stronger impact on the whole heterogeneous *game space* than others. It seems obvious that the impact of the modality we have termed *narrative space* is of greater importance in purely text-based games than, for example, driving or racing games. There are numerous games whose spatial mode is dominated by specific spatial rules as opposed to narrative or audiovisual representation such as, for example, puzzle games. Furthermore, it has to be considered that different modalities might come to the fore at different times during gameplay in a single game. For example, the *narrative* spatial modality might define the *game space* throughout the opening levels of a game only to give way to *rule space* coming to the fore in a level characterised by puzzle elements. The number of games where the dominance of spatial modalities fluctuates throughout the game far exceeds those where a clear dominance of one particular modality can be observed. At times a particular spatial modality will come to the fore, while another one might be less important for the generation of the *game space* at that moment in time, only to switch positions at a later stage in the game.

A second question that has to be addressed here is whether one of the mentioned spatial modalities is generally more influential than others. Is there a general hierarchy of spatial modalities in the sense that, for example, the narrative base of a game always paves the way for a particular audiovisual representation or interaction model.

Again, this cannot be stated categorically and is easy to refute by pointing towards the implementations of specific games across different platforms. A game that has the same core narrative might be ported from the *Playstation* console to a mobile device resulting in a completely different spatial apparatus, such as from 3D to 2D representation. Thus the core narrative remains unchanged but rules, audiovisual setup and the resulting gameplay are transformed significantly, thereby changing the relationship between narrative modalities and specific interaction models or audiovisual spatial representations. The order in which the different spatial modalities will be discussed should therefore not be misunderstood as a hierarchical

sequence. The reader has to be prepared to connect and cross-reference the different modalities with each other.

In addition to these facts we have to acknowledge that the historical development of digital games, which can be read as a history of constant technological innovation, has lead to shifts concerning the impact of spatial modalities. In the early days, when the capacity for audiovisual and graphical representation was extremely limited, a lot of games were entirely text-based. At present, however, there is a strong drive towards 3D games.

Just as Lefebvre's lived space results from the intertwined workings of perceived and conceived space, the heterotopical *game space* emerges from the interplay between different spatial modalities while the game is actively played. This activity does not take place in a vacuum but in a physical space that is affected by a host of environmental influences. In the following, the perceived physical space taken up by the players of the game and the gaming device that has been introduced as *user space* will be examined.

3.2 USER SPACE

The famous game scholar Roger Callois points out that "[t]here is a place for play: as needs dictate, the space for hopscotch, the board for checkers or chess, the stadium, the racetrack, the list, the ring, the stage, the arena, etc. Nothing that takes place outside this ideal frontier is relevant" (Callois 1961, 6). Games take place in a clearly demarcated location over a defined period of time.

In the case of computer games this defined place reaches beyond the visual space of the video monitor or computer screen; elements such as the physical qualities of the gaming device as well as the social space surrounding the game are part of the *game space*. Raiford Guins reminds us how videogames managed to permeate an abundance of different places when he writes, "[s]ince the Pong prototype debuted in Andy Capp's tavern in 1972 and Space Invaders overtook Tokyo pachinko parlours in 1978, video games have intruded upon the thresholds of quotidian public places like launderettes, grocery and liquor stores, on television screens in the home, on cinema screens in the form of themed films, films that look like games, as well as video games in the lobby, on computer monitors in the workplace and in the home, on the internet, on one's wrist, in one's palm, on one's phone, in the air and on the road" (Guins 2004, 198). He argues that a phenomenon like the video game can only be studied as a socio-cultural phenomenon if questions regarding "who plays and where, as well as what is on the screen" (ibid. 199) are taken into account.

While playing a video or computer game, the player, as well as the device the game is played on are located in a material, physical space that can be referred to as *user space*. The spatial modality of the *user space* has a very special position in the conglomeration of other modalities. Its range of influence on other modalities varies between different types of games. In certain cases the *user space* is deliberately put beyond the player's sensory reach in order to enhance the immersion in the *audiovisual representational* environment. For example, a player using a helmet-based virtual reality system experiences a very high degree of sensory separation from the surrounding *user space*. Here the perceived space is secondary to the game-space and in extreme cases it is completely removed from the player's sensory reach. For a lot

of games, the perceived physical space amounts to a source of unwanted distraction that threatens to disturb the immersion. In parallel to the way the cinema viewer's attention is directed towards the film and not the physical space of the auditorium, the game player's attention is directed towards the audiovisual offerings of the game rather than the surroundings. There are, however, games where the *user space* has a significant impact on the gameplay. The most obvious example for this situation is the so-called location-based game where the perceived space literally becomes the playing field.

However, in all of these cases the *user space* exerts an influence on the other spatial modalities of a game. Where a game is meant to be played can affect the gameplay (rules), the audiovisual representational elements as well as the narrative. In this context four broad categories can be established: arcade games, home games, mobile devices and networked games. The historical transformation of the *user space* could be described as a transition from the public realm (arcade games) over to the private home (PC and console games) via mobile devices (Gameboy and mobile phones) towards a different kind of public sphere (online games). A general distinction can be made between static *user spaces*, found in the case of arcade games and home games and potentially mobile *user spaces* present in mobile and location based games (played on networked mobile devices). In the following, different types of *user* spaces will be discerned and their influence on the other spatial modalities will be analysed. Firstly, public arcade games are addressed; secondly, home and mobile games are considered and finally the specific phenomenon of location-based games is discussed.

3.2.1 THE GAME ARCADE

Video games seemed to fit perfectly in the mould of public entertainment spaces such as the highly frequented pinball parlours of the early 1970s. Public videogame arcades had their heyday between 1976 and 1982. Stephen Kent cites a Play Meter Magazine study from 1982, which states that "America was covered with arcades. […] there were approximately 24000 full arcades and 400000 street locations. In all, according to the 1982 study, there were more than 1.5 million arcade machines in operation in the States" (Kent 2000, 123).

Although the game arcade as a space for videogames has lost the dominant position it had in 1982, it has not completely vanished and game arcades are still found around the world. Arcade video games have historical roots in mechanical gaming devices known as "novelty games" in amusement arcades. As Kent points out, "[b]y the 1940's, a few companies had already invented mechanical baseball games. Other games simulated horse racing, hunting, and Western gunfights. Over the years, the field has grown to include hockey, soccer (known by many as football), flying, and even building construction. One of the most popular themes was the shooting arcade" (ibid. 8). The first electronic games were thus replacing mechanical devices in dedicated game arcades and amusement areas. Another predecessor of the business model of coin-operated machines can be seen in the music jukebox that made its way into bars, restaurants and clubs around the 1950's.

Kline, Dyer-Witheford and De Peuter point out that "[i]t should be no surprise that videogames first became available to the public in arcades, malls, and bars whose noisy traditions of public gaming date back to the seaside entertainments, amusement parks, peep-shows, coin-op phonograph boots, and fair grounds of the previous century. These were sites for dynamic and sexualised active entertainment: gambling, shooting, betting, racing and contests of might and skill" (Kline, Dyer-Witheford, De Peuter 2003, 91). They assert that the game's first appearance in "primarily male venues" (ibid.) can be seen as early evidence for the much discussed and statistically apparent gender imbalance in digital gameplay. This is a very important point because it seems to suggest a direct relationship between the gender specific types of gameplay and the public spaces of game arcades. The game arcades of the mid-

seventies had the status of "[s]ocially suspect, sites of young male delinquency and corruption, and the domestic video game industry would soon decide whether to capitalize on that aura so as to sell to boys, or repudiate it to reassure the parents" (ibid.). *User space* is clearly subjected to dynamics of gender relations, and ethnographic observations of video game arcades suggest that they are indeed predominantly male venues (Griffiths 1993, 223-237).

Other research into the gendering of the spaces where video and computer games are played suggests that the amount of female players changes within different environments, and grows significantly from the public arcade or LAN tournaments, over domestic spaces to internet play (Bryce, Rutter 2003, 3-22). For example, the ESA (Entertainment Software Association) report from 2003 suggests that 40% of online players are female (ESA Report 2003) while figures from a 2004 consumer survey in US households state that 62% of computer and video game players are male while only 38% are female (ESA Report 2004). Since a more detailed image of the important issue of gender in relation to video and computer games is beyond the scope of this thesis, it will have to suffice here to keep in mind that the proposed category of *user space* can be regarded as a privileged arena for further investigations into this matter.

Figure 1: Computer Space Advertising (1972), Nolan Bushnell.

In 1972, Nolan Bushnell, the founder of Atari took on the game *Space War* and produced the first arcade video game called *Computer Space* based on its principles. A lot of thought went into designing the physical manifestation of the gaming device. "Bushnell put special emphasis on creating an elaborate futuristic cabinet to hold his game. In his mind, the cabinet would be the huckster convincing people that they wanted to play" (Kent 2000, 27).

The shape and form of the game cabinet extends the general spatial metaphor of the game into the *user space*; in the case of *Computer Space* the cabinet was designed to resemble a control terminal in a space ship. It famously found its way as a backdrop into the science fiction film *Soylent Green* (1973). Although *Computer Space* initially was an economic failure it paved the way for the immense success of arcade games that were to follow.

Mark J.P. Wolf states that "[t]here are several different forms of arcade games, each allowing for a different type of interaction: stand alone consoles, cocktail consoles, sit-inside games, and virtual reality style games" (Wolf 2001, 24). The physical manifestation of the game cabinet, and the material interface of the game have repercussions in other spatial modalities. For example, the shape and form of the control devices and the cabinet are often directly dependent on the *kinaesthetic spatial modality* and they are also directly linked to the type of visual spatial representation in the game. This can be observed with games such as *Sea Wolf*, where the cabinet featured a large periscope in front of the screen that players would use to shoot torpedoes at ships and submarines.

Figure 2: Seawolf Cabinet, Midway.

Again, the physical manifestation of the periscope is designed to enhance the spatial metaphor of the game – the player is located inside a submarine. Other examples include the game *Battlezone* that "had a distinctive periscope-like viewer" (Kent 2000, 121) that "[e]nhanced the feeling of being inside a tank" (ibid.) and *Paperboy*, based on

boy delivering newspapers on a bicycle, featuring a distinctive bike handle interface. Players can immediately relate to the metaphorical shapes of cockpits, periscopes and tanks while there is also a direct link to the type of interface and therefore the *kinaesthetic spatial modality*. Apart from the metaphorical shape of cabinets, which grounds the player in the overall spatial metaphor of the game, the type of gameplay is also linked to the *audiovisual representational space* of the game.

Figure 3: Battlezone cabinet with periscope, Atari. Figure 4: Paperboy cabinet, Atari.

A good example for this link is the cocktail type cabinet which often houses games with an "[…] overhead view of a playing field (for example a football game viewed from above) so that neither player has an upside down view" (Wolf 2001, 24).

Here the particularity of the *user space*, such as a restaurant or bar has led to a form of device, the cocktail cabinet, which in turn has an impact on the visual representational space (such as the use of overhead view or top down view). Other examples are so called sit-in devices, often housing flying, racing or driving games, where the cabinet is shaped in the form of the cockpit of a vehicle and the representational space in the majority of these games is defined by first person perspective. As Wolf observes, "[t]he games range from merely having a seat in front of the screen to enclosing the player in a box or even moving the seated player around during the game" (ibid.).


Figure 5: cocktail cabinet. Figure 6: Night Driver cockpit cabinet, Atari.

However, at the same time it is necessary to mention that certain consoles enabled the player to choose from a number of different games and in some cases arcade owners would put the "wrong" game into a cabinet. The need to change the whole cabinet each time a new game was launched became economically unsound as soon as the novelty aspect of video games had vanished; generic conventions for cabinets and interfaces developed over time and the very original and specific cabinets of the early years became increasingly scarce.

Game devices that are produced in order to be placed in the public space of the game arcade, often feature specific physical elements directed towards enhancing the experience of immersion, either regarding the control devices or the shape and form of the cabinet. Obviously, those devices can also be used at home, providing that the player has sufficient private space and money. In the context of arcade games it is, however, crucial to keep in mind that those game devices were developed for the specific purpose of the public game arcade. Since coin-operated arcade games are geared towards maximising revenue, the games are designed as short intervals between coin insertion. The majority of coin-operated arcade games are so-called stand-alone consoles, which afford the player to stand in front of the device. The introduction of the storable highscore created an interesting spatiotemporal linkage between single players, since it connected the efforts and traces of actions of all the players on a gaming device in one particular location. The high score also enables an additional layer of competition, a meta-game, which adds an incentive to play and essentially leads to higher revenues for the arcade owner.

Public game arcades are social spaces, where players meet, exchange information about games and watch each other play. The typical arcade situation presents itself as one player playing a game and a number of surrounding people watching and occasionally commenting upon the action. Furthermore, there exist

numerous multi-player devices. Newman points out the importance of social interactions emerging from such situations and refers to a study by Saxe based on player interviews in game arcades (Newman, 2004). Saxe notes that "[o]n many occasions, at a particularly popular arcade game such as *Virtua Fighter* and *Mortal Kombat*, participants (players, spectators) from diverse racial and age backgrounds are all gathered together, sometimes in very cramped quarters, around the same video screen. On this level, the screen play provides an anonymous opportunity for shared play space among individuals who might not normally participate in joint events" (Saxe 1994, 8). This notion of a shared social space contradicts the conception of computer game play as a solitary activity. Newman goes on to state that "[p]layers not only reported significant social networks oriented around and emerging from gaming, but also that these networks were supportive and non-confrontational. For example, players indicated the ways in which they learned from others, and helped others to learn, by sharing information or strategy and technique through talk and observing of the play of others" (Newman 2004, 149). Obviously, social spaces tied up with computer game playing are not exclusive to the public arcade, but can be found in conjunction with different *user spaces* and games.

In the arcade, however, the option to watch a game being played enhanced the competition between players and it drew players to game consoles they hadn't played before. This fact was deemed so important that the Atari producer Ed Rotberg writes about the special periscope viewer in his game *Battlezone*: "[t]o this day I don't like it [the viewer]. I was concerned with coin drop. It isolated players and gave them a feeling of immersion, but it blocked other people's view of the game" (in: Kent 2000, 121). Here, we have an interesting example of a device designed to blend out the surrounding visual *user space*, which on the one hand created a stronger immersion, but on the other disabled the show effect that is so important in public arcade games. In order to enable this show and share effect, game cabinets were often designed specifically to enable bystanders to follow the game. Cocktail cabinets housing games such as *Galaxian* or *Phoenix* enabled bystanders to watch the game conveniently, by grouping around the table.

Since coin-operated arcade games are built in order to generate maximum revenue over time, they do not usually employ complex narrative spaces. Although a lot of games are based on simple narratives such as travel, exploration and rescue, which will be discussed in more detail in the discussion of *narrative space*, the

importance of complex spatial narratives increases significantly with home devices, since the player spends a lot more time with them. The majority of arcade games are based on fast paced-action, whereas games featuring more complex narrative structure as well as purely text-based games are much more likely to be played at home.

3.2.2 DOMESTIC SPACE

In 1958 the engineer William A. Higginbotham developed a tennis simulation game based on an analogue computer with a control box facilitating a button and a knob allowing players to control a paddle to bounce a ball off. This game became the blueprint for the immensely successful *Pong* as well as numerous tele-games following similar principles.

Figure 7: Magnavox Odyssey, game: Teletennis.

Ralph H. Baer, who had seen the device, started the process of transforming it into a commercially viable product in 1967. Finally, in 1972 the Magnavox Odyssey based on Baer's patent appeared, which could be plugged into a normal TV-set and played simple games often based on metaphors from different sports. This grandfather of video game consoles transformed the potential use of television. Kline et al. state that "[b]y linking console to television, Baer had connected digital gaming with the most pervasive mass media technology of the era, enabling the convergence of twentieth century's two most important communications media – television (and the popular entertainment industry that had developed around it) and computers (with their

ability to design more complex interaction with technology)" (Kline, Dyer-Witheford, De Peuter 2003, 92-93). The authors argue that the single most important step towards the wider popularization of video games has to be seen in this linkage between the established medium of TV and the video game, which was in its infancy at that period in time. Following this argument, the TV has to be regarded as the opening that allowed computer games to enter the homes and develop a growing stronghold there. The Magnavox Odyssey and similar tele-gaming consoles only featured a very limited number of games, and most importantly, the games were hardwired in the apparatus. The scenery changed when the most successful company in the arcade business, Atari, saw a market opportunity in the creation of home versions of arcade games and introduced the VCS (Video Computer System) in 1977. VCS games were sold as cartridges and the system could be hooked up to any television set at home. With the Atari VCS, the development of computer and videogames to be played at home became a commonplace phenomenon. Since then, a great number of different game consoles have been developed and the PC has become a device for games.

With the appearance of home consoles, the private homes of individual players became the privileged *user space* for video and computer games. Today the home market, which includes devices such as the Sony Playstation 1 and 2, Microsoft's X-Box, Nintendo's Gamecube as well as PC's, dominates all other forms. For example, the state of the industry report for arcade operators reveals that the annual revenue in the US market shrunk from $1,7 billion in 2000 to $1.5 billion in 2003 (Playmeter Magazine SOTI Report). Simultaneously, statistics related to the annual overall sales of video and computer games in the US suggest a significant growth from $ 5.5 billion in 2000 to $ 7.0 billion in 2003 (ESA Report 2003). A Mintel report analysing the in-home entertainment market in the UK asserts that "[s]ince the launch of Playstation, the games industry has become the fastest growing segment of the in-home entertainment industry and it is now preparing to take on the PC and the television" (Mintel Report 2000). Game console revenues in the UK have gone up from £122m in 1995 to £300m in 2000 (Mintel Report 2000). A forecast for game console revenues in 2004 estimates a figure of £580m (Mintel Report 2004). The figures suggest that computer games have become a booming sector of the home entertainment business. Increasingly, the *user space* has to be identified with domestic living- and bedrooms.

It is practically impossible to exhaustively cover the vast territory of specific qualities of the *user space* in home games, since there are countless individual settings that would have to be taken into account. These are, on the one hand, technological (various different devices, TV systems and audio setups as well as controllers) and, on the other hand, the spatial qualities of the actual rooms (living room, bedroom, office). Furthermore, nearly all types of games, including those originally developed for the arcade, are potentially convertible for home consumption.

There are, however, some general tendencies that are specific to home-based gaming and are shaped by the private nature of the domestic *user space*. How then, does this shift from public to private user spaces relate to other spatial modalities in games?

First of all, nearly all game-consoles (including very early devices) have multiplayer options accommodating up to eight players. Since the living room is a social meeting place of family and friends, it seems quite obvious that multiplayer options are a crucial feature of console games. In contrast, PC multiplayer games are not commonly played on a single PC in a shared *user space* but rather involve multiple machines in networked environments. Because networked games present a very interesting case in terms of *user space* they will be discussed as a separate phenomenon below.

Multiplayer games on consoles are usually played on one TV set. On average between two and four people either play simultaneously or turn-based focusing on one screen. However, dedicated multiplayer options are not necessary for a game to be played by a group of people. Newman points out that "[…] even ostensibly single-player games are frequently played by more than one person. There are a number of ways this might be seen to happen. For example, players may play in turns – perhaps taking responsibility for one level or one life each before swapping over, or perhaps comparing completion times, number of items collected and so on" (Newman 2004, 152). In addition to this practice of taking turns, that can be referred to as "relay play" (ibid.), people often play single player games in teams made up of the game-player and active advisors. In these cases, specific roles within the team, such as "map reading/making co-pilot", "puzzle solver" and "lookout" are assigned

(ibid.) Whenever team play in the above sense can be observed, *user space* becomes the locus of a cooperative social practice rather than competition.

In typical multiplayer games, the *audiovisual representational space* is often divided on screen. The screen real estate is split in half or into four fields, leading to a separate view for each of the partaking players. Examples for split screen games are racing games such as *Wipeout XL* as well as numerous first person shooters such as *Halo: Combat Evolved.*

Figure 8: Halo: Combat Evolved, Bungie, X-Box, 2 player split screen.
Figure 9: Halo: Combat Evolved, Bungie, X-Box, 4 player split screen.

Shared screens in competitive multiplayer games can lead to problems of privacy concerning the opponent's game state. Since health and weapon status are accessible for both players, this information can have an impact on gameplay tactics and strategy. In this respect, Newman mentions that Sega developed a specific device, the so-called Dreamcast VMU (Visual Memory Unit), which can be connected to each player's controller, thereby keeping vital information private (Newman 2004. 151). Other good examples for the separation of information displays are multi-player games for handheld consoles (Sony PSP, Nintendo GB and GBA), where each player already has his own private screen. These issues are a good example for the impact of the *user space* on the *audiovisual representational modality*.

Another important aspect concerning home games derives from the timeframe of the played game. The overwhelming majority of games developed for home use enable the player to save game-states, meaning that they can stop and restart a game according to their own needs. This option, that would be counter-productive in a coin-operated arcade game, makes it possible to develop longer, more elaborate games, with a more complex narrative as well as larger in-game spaces. The ability to

pause a game if the player is interrupted or diverted (for example by a phone call) has to be regarded as a crucial feature for games in the domestic arena. Thus one can state that the development of games for the home *user space* has an influence on the quality of the *narrative spatial modality*. Players generally spend more time with a particular game at home, which leads to the development of more complex narrative structures and elaborate worlds. Handheld gaming devices enable the player to take the game on the road. Thus, the *user space* becomes potentially mobile. The earliest devices were designed to play one particular game, often derived from popular arcade hits. A large number of small handheld devices was developed and sold and with the introduction of Nintendo's Gameboy cartridges and the possibility of playing different games on one device became increasingly popular. Handheld game consoles are generally not as powerful in terms of graphics and processor power, as their stationary siblings or PC's. This has led to a large number of ported games, which often use simpler graphics and in a lot of cases also simplified gameplay. The developers of mobile devices are, however, developing increasingly powerful systems, and contemporary mobile consoles such as the Game Boy Advance are already capable of displaying millions of colours and rendering complex 3D structures. In recent years, mobile phone developers have started to introduce games, which were initially reduced to simple remakes of arcade classics such as *Breakout* and *Pong*. Nokia presented the N-Gage device, a cartridge based game console with mobile phone capabilities, in 2003. Game developers and publishers continuously widen the array of potential *user spaces*, in order to enable gameplay "everywhere" and "anytime". Mobile devices are also employed for location-based gaming, which is one of the most interesting phenomena in relation to the *user space* because they potentially transform entire cities into playable spaces.

So far the *user space* of arcade and home games, as well as mobile devices has been considered. In the following, specific cases that give evidence for the impact of the *user space* on other spatial modalities are presented. Location-based games for example, directly incorporate the physical environment of the player into the *game space*. Moreover, networked games create a very specific type of *user space* that has to be addressed in this context.

3.2.3 MOBILE AND LOCATION BASED GAMES

"Location based" or "pervasive" computer games depend on positioning systems such as GPS, wireless network services such as WIFI as well as small mobile computers (PDA's or mobile phones). They are often developed in conjunction with companies providing the necessary infrastructure, such as mobile phone and telecommunication companies and usually take place in urban environments, which are sufficiently covered by either WIFI or mobile phone services. In location-based games, the *user space* dominates the entire *game space*. Players are equipped with mobile computing devices and their position within a physical environment is a crucial element of the gameplay. Obviously, the entire *user space* of such games, which are networked by definition, is made up of individual *user space*s that might be in different geographical locations.

In a paper from 2001, Nicklas, Pfisterer and Mitschang distinguish between three different categories of location-based games: Firstly, mobile games, where game events only happen when players meet so that there is no need for position tracking; Secondly, location-aware games, where game events depend on the geographical position of the player independent of the detailed environmental context; and thirdly, spatially-aware games, where real world surroundings such as buildings, road and landmarks are available for use in the game (Nicklas, Pfisterer, Mitschang 2001, 2). Following this categorisation one can state that the influence of the *user space* on other modalities grows in importance from mobile games over location aware games to spatially aware games.

The game *Mogi,* developed by the French company Newt Games in 2003, for example, is based on collecting items like flowers or fruit and hunting creatures, which are hidden in the city of Tokyo. It belongs to the category of spatially-aware games since it tracks player location and the game events depend on particular environment locations. *Mogi* is available to users of the KDDI mobile phone service in Tokyo as well as online users who access a larger map through their web-browsers. The players can access a map of the city on their mobile phones while they are on the move to see whether items or creatures are nearby. In order to pick up items the

player has to be physically present at specific locations. Players form teams and share and maintain collections of *Mogi* items

Figure 10: Mogi, NewtGames, web map.

Figure 11: Mogi, phone interface.

Different teams trade items with each other and individual players can meet and chat based on physical proximity. The developers have positioned certain creatures or objects around particular parts of the city. A specific type of creature for example will only emerge in parks or green areas. A player who hunts such a creature therefore has to physically move to the designated location in the city.

This is a perfect example for a game whose spatial modalities are clearly dominated by the *user-space*. In this case the game provides a data-layer that is projected over the urban environment. All other spatial modalities, such as the *narrative space* (creatures living in the physical environment), the *audiovisual representational space* (a map view of the city that includes objects and creatures as well as other players), the *rule space* (collect objects by walking to a place) are clearly based on and derived from the role of the *user space*. Games like *Mogi* exemplify the hybridisation of symbolic space and real space, leading to a spatial practice that resonates with Soja's notion of Thirdspace, understood as a conglomeration of real and imaginary space.

According to *Mogi* players, the game enables a new perspective on the city itself. Paul Baron, a player currently living in Tokyo gives the following account of the game: "[w]hat makes the game so exciting to me? It uses the GPS in my phone, and that's so cool. It maps a virtual data layer onto Japan and brings a fresh new way to look at my map of Tokyo. I get a chance to discover parts of the city that I ignored, a motivation to check out that parallel street I never took. It has a community dimension to it, I chat with other players, I also know how far I am from them and finding out some are less than a few hundred meters to me is really exciting. Over

the past month, I bumped into a player who turned out to be the creator of the game; I had to race to pick up a flag that had been put on the map at equal distance between me and another player to encourage us to meet" (Baron 2003).

Mogi also connects players on the street with players accessing the website where a larger and more detailed map of objects and creatures is available. Within a group of players, the streetplayer nearest to an object of desire might for example get a phone call from his group members and be told to pick it up. In a recent WIRED article, Mathieu Castelli, the creator of *Mogi* hints at yet another element: "[s]ome of our players live outside Tokyo, in distant neighbourhoods, and they always want to do what the people in Tokyo do. So when you give them a chance to feel what daily life is in Tokyo through the movements of team-mates moving on the Tokyo map, they enjoy themselves" (Terdiman 2004).

The fashion in which the game directs the individual's navigation through the city resonates with elements of the Situationist practice of *dérive*, the psycho-geographical flow directing individual paths within urban environments. The game leads players to places in the city that they might never have encountered thereby enabling unexpected and unique encounters with the urban surroundings. This function of *Mogi* seems to be very closely connected to Guy Debord's understanding of the *dérive* and in more detail the notion of the "possible rendezvous" where "behavioural disorientation" is brought about by an invitation to the subject to go to a certain location at a specified time. Debord writes, "[o]ne of the basic situationist practices is the dérive [literally: "drifting"], a technique of rapid passage through varied ambiances. Dérives involve playful-constructive behavior and awareness of psychogeographical effects, and are thus quite different from the classic notions of journey or stroll" (Debord 1956, 50-56). Another interesting similarity between the spatial practice mobilised by Mogi and the practice of *dérive*, is the Situationist idea that a social arrangement of several small groups of people undertaking the *dérive* simultaneously is favoured. Although it has to be said that the *dérive* in the Situationist sense, does not have the same teleogical structure as *Mogi* (its clearly stated goal of gathering special creatures) the effects, namely to approach a city from an entirely new perspective are similar. The players have to react to unexpected and seemingly random events and the moment of surprise becomes a significant factor of the gameplay experience.

The game *Botfighters* by the Stockholm based company It's Alive Games has been widely acclaimed as one of the first location-based or pervasive games. It is based on proximity, thus it could be categorised as a location-aware game. Players locate each other in an urban environment and try to "shoot" each other. Mobile phone based positioning data is used to determine whether players hit or miss each other.


Figure 12, Figure 13: Botfighters 2, It's Alive Games, phone interface.

The website provides a highscore, weapon and armour upgrades as well as real-time position maps of current players. In the first instalment of the game most of the interactions, including the position checking of other players and the shooting itself were facilitated by SMS messages. The current version, *Botfighters 2,* features a more sophisticated java based graphic interface.

Similar to *Mogi*, the *user space* is here synonymous with the temporary physical location of the player. On the promotional webpage the game creators claim that, "[t]he real world is the game arena. This is a truly pervasive game that blends with your everyday life. Using location technology, the player's movement is mirrored in the game. Your own neighbourhood could turn out to be hostile territory, and weapons and power-ups can be found on the streets" (Botfighters 2005). The fact that a botfight can take place in pretty much every location of the designated area (in this case a mobile phone community) and also at any point in time has lead to the notion of the "pervasive" game. A game can potentially be played on the way to work, anywhere in the city, during a meeting and so on. This is a very interesting development since it seems to transcend the traditional definition of the game as contained within a specified location and timeframe.

Location-based games present novel perspectives towards negotiating the complex spatial structures of urban environments. They present a variety of solutions for the dissemination of dynamic location specific information. The spatial practice

of games like *Mogi* or *Botfighters* is unique because representations of space, such as the maps used for orientational and navigational purposes, are very tightly interwoven with representational symbolical spaces resulting from the game's rules. For example, in *Mogi* distinctive breeding areas of certain characters that are defined by the rules attract players to these specific locations. The player is simultaneously navigating the physical environment and the superimposed imaginary one, which mainly consists of non-verbal sets of signs. This curious interpenetration of different kinds of spaces reverberates strongly with Foucault's notion of the heterotopia. It is precisely this kind of hybrid spatiality, oscillating between the physical environment and the overlaid sphere of symbols in flux that has to be regarded as a novel and unique phenomenon. Although other location services such as GPS-based car navigation systems share a lot of these characteristics, what makes these games so interesting, particularly from an artistic perspective, are the contingencies of the interplay between urban reality and the fictional space of the game. In addition to that location-based games are excellent vehicles for social interaction in the public arena and they give rise to social networks such as dedicated user groups and fan bases.

3.2.4 INTERNET AND NETWORKED GAMES

In the case of multiplayer online games the *user space* has to be regarded as the sum of individual, usually static, *user spaces*. Thus, for example, the *user space* of a popular networked FPS involving ten different players incorporates ten different individual physical and geographical locations. At first it seems that this heterogeneous form of *user space* does not directly influence the gameplay. Whether a networked game is played by players in different geographical locations via the Internet or in the same place via LAN does not seem to make a difference regarding other spatial modalities of the game. Yet, networked games display very intricate and complex spatial structures, whether they are Multiplayer Online RPGs (Role Playing Games) or more action based variants such as Muliplayer Online FPS. Players, who are physically located in separate sections of the entirety of the *user space*, interact with each other in a singular shared *audiovisual representational space* that renders individual perspectives or portions of visual space for each player.

A major difference can be made here between continuous world type games such as *Everquest*, where the game-world evolves whether the player is logged in or not and where the player can permanently influence the environment, and the FPS or RTS (real-time strategy) games, which are usually limited to a specific interval of presence.

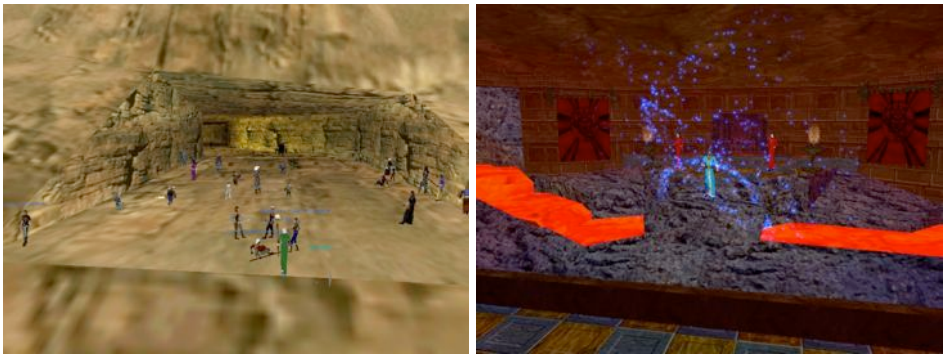


Figure 14: Everquest, Sony, East Commonlands.
Figure 15: Everquest, Sony, The Temple Of Solusek.

In the case of games like *Everquest*, the *user space* can be enormous and large numbers of players are online simultaneously, yet they all share a single representational *game space* that allows them to leave permanent changes such as buildings and artefacts behind. Abstract maps are important features of the audiovisual space in such games and they will be discussed in more detail later.

LAN (Local Area Network) parties, where large numbers of players meet in a shared physical location, often huge tents, convention or sport centres, and bring their personal PC's in order to play networked games against each other are a very interesting exception to the usual spatial structure of networked multiplayer games. Here, the individual locations that segment the *user space* in such games are re-united in a shared physical environment. Two major reasons can be brought up for the recent surge in LAN parties: Firstly, the fact that all machines are within one LAN guarantees equal connection speeds for all players (speeds often vary for individuals during internet play) and secondly, the social aspect, where people meet to compare their skills and exchange information, has to be noted. A very interesting detail that can be observed at LAN tournaments is that players quite often separate their sensory spaces further from each other by using headphones. The specific

importance of sound for spatial representation, especially in the case of FPS games, will be analysed in chapter 4.

Figure 16: LAN party, Fragapalooza (2003), Edmonton, Canada.

The situation of the player in a LAN tournament is quite unique, since every player tries to shut out "irrelevant" sensory information from the surrounding *user space* in order to be able to concentrate fully on the shared audiovisual representation. Here, the highest degree of immersion is achieved by completely blending out the *user space*. Ironically, images of LAN tournaments resemble the IT sections of large companies, where each worker is located next to the other, separated only by the thin wall of a cubicle. If the spatial practice of a society indeed "secretes that society's space" as Lefebvre (1991, 38) puts it, LAN tournaments and their mirroring of the spatial organisation in contemporary office environments seems to illustrate this process perfectly. Although a large number of individuals share the same physical environment, the spatial practice they are engaged in is entirely oriented towards and enacted in the symbolical representational space of the game.

3.3 NARRATIVE SPACE

Chapter 1 of this thesis highlighted the relationship between game studies and narrative structures in computer games and established that there exists a wealth of different approaches and research interests in that context. However, since this thesis aims to develop a spatial perspective, the focus will be directed towards those narrative elements that play an important role in the generation of the *game space*. In the following, these elements will be referred to as part of the modality of *narrative space*. In order to demarcate this category more clearly, the question which narrative elements and strategies are responsible for the particular spatiality of the medium has to be answered. Following Lefebvre, the narrative spatial modality belongs to the realm of representations of space, or conceived space. However, this is only true for those aspects of narrativity that are directly related to text and textual representation. It becomes problematic if narrative is understood as resulting from gameplay, which clearly complicates the issue.

One of the most interesting positions in this context is presented by Henry Jenkins, who aims at a middle ground between the two poles represented by *narratology* and *ludology*. He argues that game designers create worlds rather than stories and thus should be seen "less as storytellers and more as narrative architects" (Jenkins 2002, 3) and points out that game design documents usually deal with the level-design rather than the plots or character motivation. Jenkins is convinced that "the core narratives behind many games center around a struggle to explore, map and master contested spaces" (ibid. 5).

A large number of computer games that are based on film franchises clearly adapt and maintain narrative structures from the film. Thus the question is how these narrative elements are employed in games. Here, Jenkins presents us with a very interesting perspective, when he observes that most games tap genres such as "fantasy, adventure, science fiction, horror, war – which are most invested in world-making and spatial storytelling" (ibid. p5). Numerous computer games extract spaces from film-based narratives in order to create environments where stories have to be enacted by the player. This process of synthesizing a particular environment out of a larger narrative theme is also at work in the creation of theme parks such as Disney World. Jenkins refers to this practice as environmental storytelling and claims that it

"creates the preconditions for an immersive narrative experience in at least four ways: spatial stories can evoke pre-existing narrative associations; they can provide a staging ground where narrative events are enacted; they may embed narrative information within their mise-en-scene; or they provide resources for emergent narratives" (ibid.5). Jenkins describes this first mode of *spatial stories* as being based on the locale, the general atmosphere of a space in relation to a background narrative. A good example is the practice of extracting locations from films or books, such as for example the different significant locations of action from *Lord of the Rings*, which are transferred to the games.

Jenkins introduces another formal aspect of spatial stories, the *micro narrative*, which is based on memorable localised events. Here, one can think of objects or places that change their state or shape during the gameplay. Those elements can be part of a narrative chain that can be accessed in a linear or nonlinear fashion. For example, the game *Half-Life* makes extensive use of such micro-narrative, in the form of obstacles that have to be overcome, such as blocked doors that can only be opened after the electricity has been repaired.

Embedded narratives are narrative structures that use the entire *game space* to tell a story. The story is told while the player is moving through different locations and unlocks parts of the foregone events. The game *Max Payne* is a very good example for such an embedded story since the player learns new details about his avatar's history and reconstructs the plot while moving from place to place. The narrative is literally inscribed in objects and rooms within the *game space*. Jenkins writes that in such cases "[t]he game world becomes a kind of information space, a memory palace" (ibid. 10). This mode of *spatial story* represents a curious reversal of the age-old tradition of mnemotechnics, which enabled people to memorise texts by walking through architectural structures and mentally connecting for example parts of a speech with specific location in order to memorise them. Frances Yates gives the content of one of the most important works on this art of memory, the *Ad Herennium* as follows: "The artificial memory is established from places and images [Constat igitur artificiosa memoria ex locis et imaginibus], the stock definition to be forever repeated down the ages. A locus is a place easily grasped by the memory, such as a house, an intercolumnar space, a corner, an arch, or the like. Images are forms, marks, or simulacra [formae, notae, simulacrae] of what we wish to remember. […]. If we wish to remember much material we must equip ourselves with a large number

of place. It is essential that the places should form a series and must be remembered in their order, so that we can start from any locus in the series and move either backwards or forwards from it" (Yates 2001, 22). The classical art of memory was based on artificially constructed relations between place and memory and it was developed further throughout the Renaissance before it vanished into obscurity with the advance of scientific methods of knowledge organisation in the 17th century. However, it is curious how computer games seem to reverse the sequence of classical memory generation by their presentation of narrative elements and images connected to specific loci in imaginary environments. The story is told through a series of places that, if it is implemented in order to facilitate nonlinear access, can be navigated through in variable order.

As a last mode of spatial story, Henry Jenkins presents the idea *of emergent narratives*, which are "game spaces that are designed to be rich with narrative potential, enabling the story-constructing activity of players" (Jenkins 2002, 10). Games like *The Sims*, where the player constructs a simulated world that can then generate narrative elements of its own are given as an example for emergent narratives.

The concept of the *spatial story* that clearly resonates with the work of Michel de Certeau enables a broader understanding of narrative, which is not reduced to classic literary forms, but includes themeparks as well as digital environments. Story and space seem to be highly dependent on each other in computer games. There are source narratives or themes that evoke particular game spaces as well as elements within the *game space*, which are used in numerous ways to tell stories. This strong interdependence between narrative and *game space* is characteristic of the modality of *narrative space*. What then is the importance of *narrative space* for video and computer games?

On the one hand, as the *ludologists* have argued, there are games, which do not feature obvious narrative features, such as puzzle games like *Tetris*. Although it can be argued that even puzzle games sometimes have short frame narratives that generate some kind of context for the action these stories can often be easily disconnected from the gameplay and are thus highly interchangeable.

On the other hand, there exist games, which are entirely based on text. Those are mainly part of the adventure genre, and have developed out of classic RPGs like the *Dungeons & Dragons* tabletop game. In purely text-based games, such as *Adventure*

or *Zork,* the narrative modality clearly dominates all other modalities, since there exists no audiovisual representation apart from the text itself and no strong kinaesthetic involvement is necessary to play them. The presentation of the game world, the navigation through it, as well as all possible actions are handled via text on screen. Text-based adventure games have been well researched, partially because they presented a field of interest for hypertext scholars and *narratologists*. Espen Aarseth for example has delivered a compelling analysis of the game *Deadline* (Aarseth 1997, 115). He uses text-based games as examples for his model of ergodic literature, focusing on aspects of the program, non-linearity and reader involvement. Adventure games are often based on exploration and discovery and those spatial themes are the core element of the narrative. However, between the two poles of puzzle games and text-based games there exists a vast grey area of different narrative strategies and functions that are essential for the generation of spatial structures in games. In order to gain a better understanding of these issues it is necessary to delve deeper into the relation between narrative and space.

Michel de Certeau has clearly demonstrated how narrative structures are permeated by a spatial backbone. He is convinced that "[e]very story is a travel story – a spatial practice" (de Certeau 1984, 115). He concentrates on the relation between narrative and spatializing actions and states that everyday language as well as literary narrative is permeated by spatial indications. Furthermore, he clarifies the relationship between narrative and action when he points out that "[t]hese narrated adventures, simultaneously producing geographies of actions and drifting into commonplaces of an order, do not merely constitute a 'supplement' to pedestrian enunciations and rhetorics [sic.]. They are not satisfied with displacing the latter and transposing them into the field of language. In reality, they organize walks. They make the journey, before or during the time the feet perform it" (ibid. 116). This remark is crucial for our understanding of *narrative space* in computer games because it clarifies how the spatial narrative channels and organizes spatial practice, the spatializing actions which are performed while playing the game. De Certeau can be paraphrased as follows: narrative elements in computer games make the journey before or during the time the player performs it.

In this context, the narrative function that provides a thematic setting which precedes the played game (before the journey) will be referred to as *frame narrative*.

The second function, the *spatial narrative*, emerges while the game is played, performed and actualised (during the journey). I will first address the *frame narrative* and then consider how the *spatial narrative* presents itself.

In relation to the role of stories in everyday practice and based on Georges Dumezil's work, De Certeau points out that "[t]he story's first function is to authorize, or more exactly, to found" (ibid. 123). And in the following, "[i]t "provides space" for the actions that will be undertaken; it 'creates a field' which serves as their 'base' and their 'theatre'" (ibid. 124). This creation of a field of action is precisely the primary function of the frame narrative. It creates a potential arena for the actions of the players, even if the *game space* is to a much higher degree defined by audiovisual representational aspects. Frame narratives are presented to the player through a range of different media other than the games themselves: from the packaging that usually has a short narrative summary on the back of the box, over previews in game magazines, websites to trailers and marketing material. The frame narrative for the third instalment of the famous *Doom* series FPS on the official website is given as follows: "A massive demonic invasion has overwhelmed the Union Aerospace Corporation's (UAC) Mars Research Facility leaving only chaos and horror in its wake. As one of only a few survivors, you fight your way to hell and back, in an epic clash against pure evil"(Doom 3 2005). These two sentences, which do not differ greatly from the narrative introduction to the previous *Doom* games, are sufficient to generate the field of potential action. The place, a research facility based on Mars, as well as the type of action, fighting against demonic invaders, are introduced by this clearly skeletal narrative frame. *Frame narratives* are the extra-diegetic back-stories of games. They are presented on the packaging of cartridges, on websites and in introduction sequences. Wolf points out that "[b]y placing the video game's action within a detailed narrative context, the game's diegetic world is given a greater illusion of depth and the player, as the story's main character, is given motivation so that there is more at stake than if the game's action were merely some random, meaningless exercise" (Wolf 2001, 101). This form of narrative context was crucial for early video games, where the audiovisual representation and the possible modes of interaction were not as capable of transporting narrative elements as they are at present. In some cases the player's imagination is stressed enormously. The game *Breakout,* for example, combines a puzzle type game with a background

narrative that is based on the idea of breaking out of an interstellar prison. Interstellar space and anything related to it is never visually hinted at in the game itself. Essentially the player has to control a bouncing ball with a paddle and the example demonstrates quite clearly that the narrative in some of the early videogames represents an element that seems to be easily interchangeable. In the following I will consider how the *frame narrative* is related to *the spatial narrative* - how the initial setting relates to the dynamic narrative action in he game.

De Certeau distinguishes between place (lieu) understood as "[t]he order (of whatever kind) in accord with which elements are distributed in relationships of coexistence" (ibid. 117) and space (éspace) which "[e]xists when one takes into consideration vectors of direction, velocities, and time variables" (ibid. 117). Place is understood as implying an indication of fixed relations, whereas space is something dynamic, it "[o]ccurs as the effect produced by the operations that orient it, situate it, temporalize it, and make it function in a polyvalent unity of conflictual programs or contractual proximities" (ibid.). Space is here something that emerges from spatializing actions, which can be guided or framed by an order. De Certeau states that "[s]pace is a practised place" (ibid.) and points out that stories are constantly transforming places into spaces as well as the other way round. The *frame narrative* can be seen as an instance that generates a kind of place, because it introduces an order that will then be transformed into the *game space* by the spatial operations of the player. There is a continuous transformation from the dynamic and ambiguous space, which emerges from player-action to instances of place and thus the narrative order. This process can be understood as the generation of mental maps of the *game space* on behalf of the player. As I have mentioned before, the digital environments generated by computer games are capable of reversing the process of mnemosynthesis, from walking in a building to memorising a text. Here, the player's spatial practice leads from space to an order of places or literally a kind of map (whether mental or actual as part of the audiovisual representation of the game) that is constantly updated during gameplay.

If stories (and games) are constantly shifting between space and place, what facilitates this oscillation between opening and closing? In other words, which functions, symbols or forms can be observed during those transformations?

De Certeau approaches this question by introducing a number of different modes, such as the map and the tour as well as functions of delimitation and the marking of boundaries. He presents the work of Linde and Labov, who analysed the descriptions New York residents gave of their apartments and distinguished between "map" and "tour" type descriptions. A map type description describes places in relation to each other, in the form of 'the kitchen is next to the bedroom'. Descriptions which lead to a place as part of a path that has to be followed, such as "[y]ou have to walk up one floor and then move to the left" (ibid. 119), are descriptions of the "tour" type. Interestingly, only a very small percentage of the New York corpus of stories was of the map type.

De Certeau writes that "[d]escription oscillates between the terms of an alternative: either seeing (the knowledge of an order of places) or going (spatializing actions). Either it presents a tableau ('there are…'), or it organizes movements ('you enter, you go across, you turn…')" (ibid. 119). These two different ways of narrating space amount to two poles of experience. Whereas one is more concerned with subjective spatial operations, the other one tends towards abstraction and totalisation. In reference to Lefebvre's model, the tour type of descriptions tends towards lived space or subjective experience of space, and the map type points towards abstraction and representations of space. These two atomic modes of spatial operations represent the core structures of *narrative space* in video and computer games. To give an example, in a textual adventure game the player performs spatial operations of the tour type in order to establish map type situations and then orients him/herself within the map to return to the tour. This process can also be regarded as a permanent shifting between action, opening, movement and reflection, orientation and planning.

Infocom's game *Zork* presents the player with map type descriptions and the player navigates through this narrative map by typing spatial operatives. Since there is no audio-visual perspective or viewpoint, the player is addressed in the grammatical form of a second person point of view. The following is a short transcription of the opening passage of the game:

"West of House

You are standing in an open field west of a white house, with a boarded front door.

There is a small mailbox here.

>go west
Forest
This is a forest, with trees in all directions. To the east, there appears to be sunlight.
>go east
Forest Path
This is a path winding through a dimly lit forest. The path heads north-south here. One particularly large tree with some low branches stands at the edge of the path.
>go north
Clearing
You are in a clearing, with a forest surrounding you on all sides. A path leads south.
On the ground is a pile of leaves."

The game describes the current location of the player (West of House, Forest, Forest Path, Clearing), what the player "sees", including items or aspects of the environment of potential interest as well as options for further movement. The tour results from the player's input, his/her spatializing actions. Moreover, just as the potential spaces to be explored are presented by the game, there exist boundaries and limits, which demarcate the textual spatial representation and guide the player through the maze.

De Certeau writes "[b]y considering the role of stories in delimitation, one can see that the primary function is to authorize the establishment, displacement or transcendence of limits, and as a consequence, to set in opposition, within the closed field of discourse, two movements that intersect (setting and transgressing limits) in such a way as to make the story a sort of "crossword" decoding stencil (a dynamic partitioning of space) whose essential narrative figures seem to be the frontier and the bridge" (de Certeau 1988, 123). The textual space of *Zork* is clearly demarcated by barriers or borders. Some of these blocked off and demarcated paths can only be passed at specific points in the game, or if the player is in possession of the right object (machete, key, rope). The game constantly presents openings and closings, thereby allowing the player to dynamically partition the *game space*, which, in turn becomes an important aspect of the gameplay. In the following I have compiled some of these border elements from *Zork*:

">go south
Forest
This is a dimly lit forest, with large trees all around. […]
>go south
Storm-tossed trees block your way. […]
>go north
The forest becomes impenetrable to the north. […]
>go west
You would need a machete to go further west. […]
>go east
Forest
The forest thins out, revealing impassable mountains. […]
>go east
The mountains are impassable. […]
Living Room
You are in the living room. There is a doorway to the east, a wooden door with strange gothic lettering to the west, which appears to be nailed shut, a trophy case, and a large oriental rug in the center of the room. Above the trophy case hangs an elvish sword of great antiquity. A battery-powered brass lantern is on the trophy case.
>open door
The door cannot be opened."

What de Certeau notes about stories, namely that "[l]imits are drawn by the points at which the progressive appropriations (the acquisition of predicates in the course of the story) and the successive displacements (internal or external movements) of the acting subjects meet. Both appropriation and displacement depend on a dynamic distribution of possible goods and functions in order to constitute an increasingly complex network of differentiations, a combinative system of spaces" (De Certeau 1988, 126) holds true for text-based computer games.

If one rephrases the above, the distribution of objects (machete, key, rope) and possible functions (cut jungle, open door, climb up) brings about the combinative system of spatial change that is acted upon by the player within the programmed structure. Ambiguous border symbols, such as doors or other obstacles, which

present either a barrier or a point of passage, are the key elements in this process.

In text-based adventure games *narrative space* has a very central position in relation to other spatial modalities. Audiovisual representation is reduced to text and the choice of font and colour. Moreover, the rules that create the space can clearly be extrapolated from the narrative framework and the kinaesthetic options are also highly limited. Yet, the functions I have borrowed from de Certeau in order to describe the workings of *narrative space*, such as tour and map structures as well as the demarcation functions are not limited to text-based games.

If one returns to de Certeau who describes the historical transformation from maps based on itineraries to the scientific abstractions of geographically "correct" maps which have erased all traces of tour describers, one can pose the question whether the medium of computer games shows a reversal of this trend in the form of spectacular entertainment. Numerous computer games are based on narrative structures that re-introduce the tour into the map. As Jenkins has shown, while the geographical status of earth has been crystallised and closed, not leaving many white spots on maps, computer games present themes of active exploration and discovery that have vanished from everyday life. *Narrative space* thus often mobilises themes based on discovery and exploration that lead to a gameplay, characterised by the uncovering and exploring of visual maps. In the game *WarCraft III,* for example, the player starts out with a map view from a top-down perspective, where the territory that has not been uncovered yet remains blacked out.

Figure 17: Warcraft III, Blizzard (2002), Screenshot.

In this case the player is literally playing to excavate the full view of the map, albeit in order to be able to see the buildings and forces of the opponent. Here, a basic narrative theme based on exploration of unknown territory leads to a specific audiovisual representation and a set of rules that define the space further. The interplay between *narrative space, audiovisual representation* and *rule space* results in a coherent whole. How can we describe the relationship between rules and narrative?

On the one hand, the basic rules that are necessary to play the game are either introduced by the *frame narrative* or conveyed by the *spatial narrative* during gameplay. On the other hand, the rules that define schemes of action as well as an overall goal for the game have an impact on the kind of narrative experience in the game. In this sense, the rules and the narrative of digital games are intertwined with each other. Wolf seems to hint at this when he says that "[g]oals and obstacles, choices and their consequences, and the means and ends with which the player is provided; these become the tools that shape narrative experience, and the real narrative becomes the player's own passage through the narrative maze of branching storylines and events" (Wolf 2001, 109).

Although, at this point, I have barely scratched the surface of the complex matter of narrative in video and computer games, the most basic functions in relation to *game space* have been outlined. The *frame narrative* and the *spatial narrative* with its oscillation between opening and closing and the importance of spatially ambiguous border elements were examined. Since, in this thesis, my main concern is to enable a differentiation between unique forms of spatiality and not to develop an entirely new framework for the analysis of narrative space in isolation, this basic discussion has to be sufficient. In the following I will take a closer look at the functions and characteristics of a game's rules in relation to other modalities of space.

3.4 RULE SPACE

In the first chapter of this study I have addressed the increasing scholarly interest in the functions of rules in computer games. A number of authors (Frasca, Friedman) favour simulation as a reference model over narrative when it comes to computer games. Interestingly, with the exception of Newman, who dedicates a short chapter in his recent book to the relation between gameplay and space, the question of how a

game's rules impact on space is not often addressed in the literature. Quite clearly, games emerge from rules by definition. If one understands the rules of the game as those structures, which govern the player's actions, it follows that they must have an influence on the *game space* as well. In the following I will refer to the spatial modality emerging from the rules of the game as *rule space*. With every new game that is developed, the rules defining spatial action have to be conceived, planned and balanced carefully. Just as a town planner creates rules for the movement of people or vehicles by planning environments, the game designer conceives rules that define the optional movement through the *game space*. How do these rules affect the *game space* and how do they interact with other spatial modalities?

The power of rules as a mechanism that determines spatial patterns in games is not limited to video and computer games. One only has to think of games such as hopscotch, which are played across the globe. Board games like the ancient Chinese strategy game Go are another good example for the issue at hand. According to the basic rules - which are slightly alternated in different cultural settings and traditions - at their turn, two players place black or white stones at intersections of the game board (goban) usually made up of a grid of 19 horizontal and 19 vertical lines. The rules state that the players have to try to surround and capture their opponent's stones. The goal of the game is to capture the majority of stones and ultimately to strategically dominate the entire space of the board. Based on this simple set of rules the game develops an enormously complex pattern of shifting spatial domination. If a player manages to completely surround a number of stones belonging to the opponent, he has also captured the entire territory defined by the outer stones limits. Just as the other great example, chess, is capable of revealing; there is an exponential growth of possible moves and therefore an extremely high variability of spatial constellations.

Figure 18: Go Board

What makes this kind of space so interesting is that although it is transformed on the basis of a representational reference (black and white stones on a board), the sheer number of potential spaces goes far beyond the visible. During the game, the players are constantly evaluating and testing potential spatial configurations on the board. In other words, most of the mentally projected spatial constellations might never be actualized on the board but they are still a crucial part of the *game space*.

In an interview with Celia Pearce, Will Wright, the designer who created *Sim City* and *The Sims* said, "[w]hat really impresses me about Go isn't so much the abstraction as the emergence. The fact that it's one of the most amazing examples of emergent behavior I've ever seen. And it's so clear and simple and you can just see before your very eyes that these simple little rules give rise to this incredible strategy" (in: Pearce 2001, 4). This emerging complexity results from the two concurring mental models of presently dominated territory in the *game space* that the players maintain and transform according to a simple set of rules. Not only does a player construct a mental model of the current situation on the board, he/she also tries to anticipate the moves of the opponent and thereby creates a mental map of the opposing force on the board. It is this cognitive mapping - and more precisely the misapprehension of the opponent's cognitive map of the territory - that unleashes the enormous complexity of the game based on simple rules.

In chess we have a situation where the strategic territorial domination is played out via figures that are assigned different types of movement by the rules of the game. If the rules of movement for one of the chess pieces were changed, it would affect the entire spatial apparatus of the game. This is what happened in the 14th

century, when the empowerment of the Grand Wezir or the queen (that was formerly the weakest figure because it could only move one field) completely transformed the game in exactly this manner.

In this sense the rules of a game are capable of changing or creating spaces, which are independent from representational aspects. Whether the chess pieces that are allowed to move one field ahead and then one diagonally are represented as a bishop or as an elephant does not have any bearing on the spatial structures emerging from the game. Although there might be a historical symbolic connection between the representation and the powers attributed to the figures, the visual representation can be enormously diverse without affecting the gameplay.

However, if this matter is related back to video and computer games one is confronted with a much more complex situation. Of course there are a number of explicit rules, but if one adheres to the notion of simulation in the context of computer games it becomes evident that the rules of the simulation itself have to be taken into account. In other words, the rules that have an impact on the *game space* are not only those that govern player action explicitly but also those that define how objects will act or react as part of the program architecture.

Claus Pias, who has delivered a detailed and extensive history of the development of strategy games leading to digital games, presents an excellent example for a basic form of *rule space* in his discussion of cellular automata. He explains how John von Neumann's cellular automata are based on simple rules that allowed the connection of thousands of distinct components with each other, without having to describe a rule for each detailed element (Pias 2002, 257-259). A simple cellular automaton is based on a grid, where each cell in a field is simply gathering information from the next neighbour in the grid and defining its own function accordingly. Conway's *Game of Life* for example is essentially a set of simple rules set in a grid space: a cell is "born" if it has three "living" neighbours and it "dies" if it has less than two "living" neighbours. In conjunction with a recursive function, this inherently spatial algorithm generates complex behaviour. Pias shows how these algorithms based on neighbourhood in a spatial grid were also used in early military strategy board games and are still in use in numerous grid based computer strategy games

Rules of simulation which are inherently spatial also have an impact on player behaviour in the game. For example, if collision with an object in the *game space* leads to the destruction of the avatar, this might not be part of the expressed rules of the

game, but it will lead the player to avoid collisions, thereby resulting in a specific pattern of movement.

Thus it is necessary to distinguish between explicit rules, which are clearly stated, and inherent rules that are part of the simulation mechanism of the game and have to be uncovered by the player via exploration and testing. In the above case (death by collision), the inherent rules of the simulation (defining the characteristics of objects) are responsible for spatial decisions taken by the player (avoid such objects) and thus have an influence on the general spatial practice of the game. On the one hand, there are explicit rules for the player in human readable form and, on the other hand, the tacit rules of the program in the form of algorithms.

Greg Costikyan, an experienced game designer puts it this way, "[i]n a board game, players are responsible for operating the game as well as playing it, if you will; when a calculation must be made or an algorithm applied, they must do so, referring to the rules if necessary. In an electronic game, the "rules" are incorporated in the software; a player gains understanding of them through experience, by playing the game, and may well remain in ignorance of their specific details, instead gaining a 'gut', intuitive understanding of their operation" (Costikyan 2002, 19). Furthermore, Costikyan points out that although the rules in a game shape the player's behaviour, in a good game they do not completely determine it. It is this element of freedom that allows the player to experiment and to adapt different strategies and approaches to a specific situation; "it allows players to take many possible paths through the 'game space" (ibid. 20).

The uncovering of a game world's internal rules is essential to playing the game itself. Aarseth stresses this fact when he writes that in adventure type games the "game user cannot rely on imagination (and previous experience) alone but must deduce the non-fictive laws of the simulated world by trial and error in order to complete the game" (Aarseth 1997, 50). Friedman goes even further when he says that "[l]earning and winning […] a computer game is a process of demystification: one succeeds by discovering how the software is put together. The player molds his/her strategy through trial-and-error experimentation to see "what works" which actions are rewarded and which are punished" (Friedman 1999, 7). There exist two overlapping domains, the explicit or tacit rules that influence the behaviour of the game world and the playful activity of experimentation that constantly scans and tests the reactions presented by the game in order to deduce the laws of the game world.

On the one hand, there is the law and, on the other, the playful activity coming to terms with it.

In his famous classification scheme for games, Roger Callois introduces two terms, which clearly resonate with the two elements discussed here, namely *paidia* and *ludus* (Callois 1961, 27). Essentially they define two poles within the realm of play, *ludus* stands for rule bound play "allied to the taste for gratuitous difficulty" and *paidia* designates the "primary power of improvisation and joy", the move towards freedom in play (ibid.). Callois writes that "[i]n a general way, ludus relates to the primitive desire to find diversion and amusement in arbitrary, perpetually recurrent obstacles" (ibid. 33). Although Callois does not explicitly refer to rules in the context of *ludus*, his characterisation seems to imply that *ludus* type activities have defined goals (the overcoming of obstacles, the completion of the puzzle) as well as certain rules (defining the actions leading to those goals).

Paidia stands for turbulence and the expulsion of surplus energy, thus it is forever pitched against the *ludus* structure. Gonzalo Frasca, for example, uses the *ludus-paidia* dichotomy in order to separate games with clear goals from those who leave the definition of goals open to the player. Accordingly, he defines a game like *SimCity* as a "paidia game" (Frasca 2003, 231), because the simulation leaves the definition of game goals to the player. However, although some games might leave more freedom to the player, it seems slightly problematic to define classes of *ludus* or *paidia* games too strictly, because any player can reintroduce elements of *ludus* into his/her style of play. In addition to that, *Sim City* does not seem to be the best example for a game introducing turbulence, chaotic behaviour and "immediate disordered agitation" (Callois 1961, 28). Therefore it seems to make more sense to acknowledge that elements of *ludus* and *paidia* are present in computer games to varying degrees.

In this particular context, I am most interested in the impact of ludus and paidia elements on the spatial practice. Here it can be stated that *ludus* designates the clearly indicated optimal path to the object of desire, whether it is an opponent, a checkpoint or the finishing area of a level, whereas *paidia* stands for the exploration of the gameworld and the testing of movement options and skills which are not exclusively directed towards explicit goals in the game. In certain types of games, there are sequences dominated by free exploration which tend more towards *paidia*

and others which are clearly *ludus*, directed towards points, highscores or the completion of levels.

The open structure of a game like *Grand Theft Auto III* illustrates this point perfectly. In the game the player can either choose to freely explore the city, by (stolen) car or on foot, to find hidden areas or roads and bridges that can be used for elaborate stunts, or he/she may choose to follow a stricter narrative based on missions with different goals. In this case there exists a broad spectrum of spatial action, from *paidia*, simply enjoying the movement of the car through unknown parts of the city to *ludus* and goal-oriented navigation. It has to be clarified however, that even in a *paidia* situation of free movement, there are unspoken rules that define the behaviour of objects in the game world such as car damage levels or the behaviour patterns of the city's inhabitants. The fact that excessive levels of car damage lead to the explosion of the vehicle has a strong impact on the player's choice of movement through the *game space*. The player has to watch the speed of his/her car, and has to avoid hitting obstacles like other moving cars, persons or parts of the architecture. The factors that guide player movement in *paidia* situations are therefore often based on avoidance of damaging collisions, and the tacit rules/algorithms of the game. If the player chooses to enter a more *ludic* situation by choosing to play one of the offered missions (such as driving a person from one part of the city to another part of the city within a given timeframe), the mission goals clearly orient the player's movement within the *game space*. In this case the task is to choose the fastest route to the target. *Grand Theft Auto III* implements more *paidia* type play options by opening up the entire *game space* for exploration. In numerous other games the player is confronted with a more closed environment and much stronger *ludic* gameplay.

In most of the space shooters that followed in the wake of *Space Invaders,* for example, the player's movement through and within the *game space* is directed by the rules defining collision with certain objects as positive (energy, life, weapon upgrades) or negative (enemies, laser fire, bombs). The movement-pattern of alien ships in *Space Invaders* as well as the shots fired are responsible for the movement of the player's ship. This principle has been elaborated to include architectural elements and large moving objects in side scrolling shooters such as *R-Type*. Here, the movement of the player's ship through the *game space* is entirely dictated by the patterned waves of enemy fire, bombs and vehicles, as well as openings in transforming architectural structures. Quite often, the place on screen where the player can move within the

complex firework of different threatening objects is only a few pixels wide. In order to master the game the player has to learn the movement patterns of ships and projectiles, so that he/she can move to the right space on screen before a new alien attack wave. Simultaneously, the player has to steer his/her spaceship over power ups and weapon upgrades whenever they can be reached without sacrificing a life.

Here the route taken through the *game space* emerges from avoiding certain objects and choosing to move over others and hence by the rules that lay down movement patterns of "positive" or "negative" objects. In the case of *R-Type* these patterns result from quite static algorithms. In other words the enemies will always move in a similar fashion across the screen which enables the player to memorise their patterns. All of the rules defining those movements are the tacit rules of the simulation. The explicit rules are presented to the player visually before the game starts: they include the identification of enemy ships with different amounts of points, explanations of navigation controls and button combinations, as well as listings of the visual representations of in-game objects and their functions. Thus, the explicit rules (such as: you have to avoid or seek these objects) working together with the tacit rules of the game (the algorithms that bring about the movement patterns of objects) can be regarded as two sides of one coin. Both types of rules in conjunction have a strong influence on the spatial practice of the game.

In MMORPG's, the rules affect the spatial operations of players in various different ways which are much more complex than the pattern algorithms present in shooters like *R-Type*. Player movement through the online universe depends on elements such as the initial spatial deployment in the environment, various missions, the emergence of trade routes as well as the location of resources and importantly, the actions of players. For example, the deployment of necessary resources will lead players to certain regions in the *game space*. A second layer of spatializing action is added if one considers the emergence of trade routes in game spaces. Based on resource accumulation but not completely determined by them, particular regions in a game will be known for trading specific goods which in turn attract players interested in those goods. Since the developers of MMORPGs such as *Everquest* or *Ultima Online* are constantly monitoring and readjusting the game, they do have an active influence on the balance of the spatial deployment of goods and resources.

In relation to the spatial structure of FPS shooters, Newman points out that "[t]he constrictive nature of Doom's spaces is essential to create the tension of the action – the player is literally forced down certain routes into combat. Too high a degree of freedom of movement will simply allow the player to evade confrontation. It is important to note that, while videogames can be defined as a form by the emphasis they place on spatial exploration, navigation and mastery, the player's exploratory and navigational freedom is often severely limited in order that particular kinds of gameplay can be enacted" (Newman 2004, 122). He seems to confirm that *rule space* directly affects *audiovisual representational space* when he states "[…] spatial representation is subordinate to gameplay" (ibid.).

Evidence of this effect of *rule space* is also present if one considers the influence of different types of gameplay on the game-space in *Quake III Arena*. As the title suggests, the multiplayer element in *Quake III Arena* was more important to the developers than the single player missions in its predecessors (*Doom*, *Quake*, *Quake II*). The game does not even present the player with a coherent single player narrative; training stages with so called bots (autonomous programs that define the behaviour of computer generated opponents) are only the preparation stage for the real purpose of the game – different types of multiplayer games, namely the so called DM (Death Match - where every player tries to kill every other player and points are collected during a specified period of time), Team Death Match (Team DM - where two groups of players play against each other) as well as CTF (Capture The Flag - where two teams are trying to steal the flag of the opposing team while defending their own). In other words the game really is nothing more than an arena, a playing field where different types of games are acted out. The different rules of DM and CTF lead to completely different spatial behaviour in the same *game space*: While the player movement in DM is basically freely floating apart from occasional concentration at spawn points of powerful weapons (such as the rocket launcher), CTF leads to a more organised conquest of the opposite team's lair of a group of players while the other group usually stay in their own base in order to defend the flag against the enemy. Interestingly, different rules also lead to the development of special maps for CTF games. They are designed to meet the needs of the gameplay by presenting small and defendable team bases with enough open ground for battle in-between. Furthermore, id software decided to create the expansion pack *Quake III*

Team Arena (2000) after the launch of *Quake III Arena* because they were facing competition by other games such as *Unreal Tournament*, which offered a larger number of different team-play options. *Team Arena* featured a larger number of purpose built maps for different types of gameplay and introduced new gameplay modes such as Single as well as Overload and Harvester. In Single CTF the flag appears (spawns) at a neutral point on the map and the teams have to capture it and bring it back to their bases in order to score points. This game mode changes the spatial actions of players. Overload is also played by two teams against each other and both teams have so called obelisks in their home bases, which need a certain amount of hits before they are destroyed. The goal is now to destroy the enemy team's obelisk while protecting your own. In terms of spatial operations here, quite obviously most of the movement will be directed towards these objects or the respective home bases. In the case of CTF this is not so much the case since the major goal is to stay alive as long as possible while carrying the enemy flag. In Harvester mode players have to collect a larger number of objects and return them to the home base.

In general one can state that the evolution of the rules in Online FPS from simple Death Match type games (*Doom*) to more complex team or group based games such as *Unreal Tournament* and its numerous sub-games reveals precisely how the rules affect firstly the spatial behaviour of the players and secondly the design of special maps for these games. This is what makes the transitory stage, where multiplayer games were played in single player maps so interesting. Here the transformation between different spatial strategies and uses of the *game space* can be observed quite clearly.

Another interesting example for the impact of *rule space* on other spatial modalities shows itself in fighting games. In this context Newman remarks "[a]s such, in a fighting game, it is important that the players fight. Allowing them to move away from opponents not only facilitates evasion but also makes it difficult to engage in combat even when intended as the task of 'lining up' players in three-dimensional space so they can hit each other is problematic [...]. Removing these considerations from the player, and limiting freedom of movement to 'back', 'forward' and 'jump' along an invisible axis joining the two fighters, frees them to concentrate on the game and engage within its rules" (Newman 2004, 123).

Here, the deliberate restriction of potential movement in the *game space* is an essential feature of the game that influences the *audiovisual representational* space.

Rule space also defines puzzle situations in computer games. There are an enormous variety of puzzle elements, from more abstract games such as *Tetris*, or *Puzzle Bobble* to games like *Tomb Raider*. Although there is an abundance of variations, a large number of them share spatial characteristics.

Puzzle-type games such as the *pelmanism* or pair memory game, where players have to remember the locations of corresponding image cards laid out face down on a table can be seen as predecessors for similar location based memory puzzles in computer games. Other puzzles are based on the notion of the potential placement of distinctively shaped objects in order to recreate a shattered image. The famous *Tetris* game clearly emerges from traditional Russian wood puzzles. Spatial action in *Tetris* is not based on finding objects or navigating routes through a *game space*, but, as Newman puts it "[…] the player is charged with the duty of protecting their space by rotating and translating the descending geometric shapes that seek to overrun it" (Newman 2004, 108). The game *Puzzle Bobble* (1994) is based on a very similar principle. A small dragon operates a balloon gun shooting balloons of different colours at spots on top of the screen where enough balloons of the same colour have emerged in order to free up the space that threatens to grow and smash the player. Essentially the gameplay in both games revolves around the concept of defending an open unfilled space against the chaos of not properly aligned or sorted objects. In *Puzzle Bobble* the ordering principle is based on colours and numbers whereas in *Tetris* the shape of falling objects dominates everything.

Other types of puzzles require locating objects such as keys in order to open doors, or transforming parts of the architecture by pressing buttons in the right sequence. When Lara Croft has to flick the right switches in the proper sequence in a cave in *Tomb Raider*, the *game space* and the way it is experienced is governed by the modality of *rule space*. All of the puzzle-operations in such cases are rooted in space: for example, the location of objects, accurate orientation within the *game space* and sometimes even the complete transformation of spatial representational elements in the game (such as the movement of large stones blocking the way via levers). Some games require the player to develop quite detailed mental maps of the *game space* in order to solve a spatial puzzle. The rules that define the sequence of buttons to be pressed in different locations or the combinations of objects that have to be found

and placed at other locations in the *game space* are quite clearly organising the navigation and action in the *game space*.

I have now mentioned various examples for the manifestations of *rule space*. Firstly, the intricate patterns of movement in early shooters, which are generated by avoiding certain objects while seeking others or in other words simple rules of positive and negative collision. Secondly, the trade routes emerging in MMPORGs which are largely directed by resource deployment in the *game space* were brought up. Thirdly, the sub-games that have developed out of traditional FPS games by imposing different rules on an existing *game space*. The navigational constraints in fighting games have been brought up and the spatial aspects of puzzles in games have been pointed out. Moreover, puzzles in games are a very important element controlling a player's spatial actions, whether in terms of movement or performative transformation of the game architecture, according to rules. In the following, I will concentrate on the influence of the *rule space* on other spatial modalities.

For example, *rule space* is linked to the narrative spatial modality in different ways. Quite often narrative structures are employed to convey the explicit rules of a game to the players. The idea is to blend the rules of the gameworld with the narrative universe of the game. The in-game narrative is one possible way of conveying the rules that are necessary for the gameplay. It seems that if we return to text-based adventure games, the (spatial) rules for the gameplay are definitely laid out during the game as part of the narrative structure. The rules defining where the player can go and which places are off-limits or, in other words, the boundaries of the game world are carried by the narrative based on the in game location. If the program tells the player that a door is closed because the key is missing or that he has to use something to overcome an obstacle in his way, it clarifies the explicit rules for a particular in game situation and maybe even a possible solution for a problem (a goal such as finding a key or a specific object).

Concerning the relation between *rule space* and audiovisual representation we have already mentioned an observation that has served as a major argument for the *ludologists* in their debate with *narratologists*, the reincarnation of one particular game, defined by distinctive rules, in various visually and technologically different manifestations. The transition between *Super Mario Bros. 1* in 2D and the 3D version *Super Mario 64* could be presented as one of countless examples. This observation

seems to lead to the assumption that the rules of a game do not have a direct impact on the audiovisual representational elements of games. While this might be true in the case of certain types of games, which are indeed transferable from one visual style to another, we still have to take into account that particular types of rules and gameplay result in very distinctive forms of audiovisual representation. Strategy games, for example, do not accidentally employ the so-called God Mode perspective. The rules demand that the player can instantly oversee and evaluate the contested territory. The sheer amount of information necessary for the gameplay is simply impossible to convey via first person perspective. To give an example, *Warcraft III* presented a feature that would let the player zoom in from a distant God Mode Perspective to a much narrower quasi-3rd person perspective. This feature might be aesthetically pleasing, but serious players avoid using it because it renders the game much harder to play due to the fact that one loses the overview over the complex action.

In summary, *rule space* affects the *game space* and other modalities profoundly in different ways. It shapes the spatial action of players by defining the basic spatial structure of the *game space* and providing the rules that govern the status of objects (to be evaded, to be sought after), tasks (collect, destroy) and goals (go there, get away from here).

3.5 AUDIOVISUAL REPRESENTATIONAL SPACE

Visual representational dimensions are frequently seen as the dominant factors in the unique and distinctive spatial nature of video and computer games. The complex visual illusionism of contemporary digital games seems to exert such a strong influence on the imagination that other aspects of space are frequently neglected. Although this thesis sets out to challenge this seemingly obvious dominance of the visual spectacle, the impact of what Lefebvre has termed the "perceived space" on the *game space* as a whole cannot be denied. I have argued that the heterotopical spaces generated by computer games have to be regarded as a dynamic interplay between an ensemble of spatial modalities; the audiovisual representational modality is but one of them. Although audiovisual representational aspects are without

question very prominent, any attempt at an adequate account of the *game space* is futile if they are seen in isolation.

With the exception of specialist games for handicapped players (for example sound games for blind people) the vast majority of games are audiovisual phenomena, and therefore, the sound can by no means be regarded as a side effect. Yet, the dominance of visual aspects seems to have had such an overpowering impact on the scholarly interest in the subject that sound and hearing in relation to space, have widely been ignored. Due to this state of affairs I have decided to dedicate an entire chapter to the important issue of sound in relation to space. In this sense the present account of audiovisual representational elements has to be read in close conjunction with the discussion set forth in Chapter 4.

The history of the development of spatial representation in video and computer games is inextricably bound up with their technological evolution. Wolf writes "[t]he video game began with perhaps the harshest restrictions encountered by any nascent visual medium in regard to graphic representation. So limited were the graphic capabilities of early games, that the medium was forced to remain relatively abstract for over a decade. Gradually as technology improved, designers strove for more representational graphics in game imagery, and today they still continue to pursue ever more detailed representations approximating the physical world" (Wolf 2003, 47). Clearly the same is true of sound and its underlying technology as we will see in more detail in Chapter 4.

Without doubt, the technology had to undergo enormous changes from the early abstract manifestations such as *Spacewar* and *Pong* to the current exuberant visuals in contemporary games like *Half-Life 2*. Games are a major force of technological innovation for the PC industry, motivating players to constantly upgrade their hardware. Kline, Dyer-Witheford and De Peuter note that "[i]nteractive gaming drives the overall trajectory of the computer industry, because the high demands for processing speed, graphics display, and networking capacity made by the hardcore gaming culture set the technical standards that later trickle down into the more mundane requirements of the business sector" (Kline Dyer-Witheford and De Peuter 2003, 173).

If one retraces the evolution of computers one could argue that there exists a deeply rooted co-dependency between the development of games and computer hard

and software. To give an example, the device that has come to be regarded as one of the first commercially viable personal computers, the Apple II, might not have had simple audio and colour capabilities if it weren't for the fact that Steve Wozniak employed it to port the game *Breakout* to the platform in 1977. Wozniak talks about the development of the Apple II as follows: "I decided that I had many of the parts available to have a Breakout game on this computer, in software. Arcade games had just barely started appearing with microprocessors. In the case of the Apple II, I was the designer and I'd written the Basic. So I took a bold step, not knowing if it was even possible, to consider programming Breakout in Basic. I had to add at least one paddle. I decided to use a timer chip. The microprocessor could count how rapidly a capacitor charged and determine where your hand controller was turned to. But by now timers could be obtained 4 on a single chip. So I built in 4 paddles for virtually no extra parts. I added a speaker, with 1 bit of sound. Just enough for beeps and clicks in the game of Breakout. I added commands in my Basic to draw colors on the screen. Then I sat down one evening and started writing Breakout in Basic" (in: Goldberg 2002).

In this sense, *Breakout* triggered the introduction of sound and colour displays in personal computers and the seeds for the complex audiovisual GUIs and interaction devices in today's operating systems were initially developed out of a playful spirit and the appreciation for games. This is such an important point because these historical facts are easy to overlook if one considers the branching between machines for business and office use and those developed for pure entertainment purposes.

Most of the underlying core concepts of visual spatial representation were in fact developed quite early on. For example, the game *Night Driver* managed to convey a first person perspective by changing the sizes of objects approaching the player on the z-axis as early as 1976 and therefore has to be regarded as a conceptual precedent for contemporary FPS games. The most important evolutionary difference concerns the amount of visual information or "richness" that is deployed by the game as well as the potential for navigation. In this context, the quest for "realism" can be read as a movement towards increasing visual detail. In the following a brief overview over historical precedents of audiovisual representational strategies in video and computer games is given.

3.5.1 HISTORICAL ROOTS

Computer and videogames as spectacular, technological devices can be regarded as descendents of a long history and tradition of illusionist technologies. Significantly, illusion and ludere (Latin for: to play) share the same etymological roots.

The relations between contemporary digital entertainment and historical optical illusional entertainment devices were traced accurately by Andrew Darley, who points out that "[t]he new digital forms signal a kind of reawakening or renaissance; a return to and continuation of preoccupations, practices, forms and experiences that were part of an earlier phase of popular entertainment"(Darley 2000, 37). However, Darley concentrates mainly on the links between historical illusion technologies and film and does not engage with the specific relation between such illusion devices and computer and video games in detail.

Devices such as the Phenakistokope, Zootrope as well as the Stereoscope, which were developed at the beginning of the 18th century, are widely regarded as the technological ancestors of film and photography. However, Jonathan Crary has criticised the tendency within film studies to "position them as the initial forms in an evolutionary technological development leading to the emergence of a single dominant form at the end of the century" (Crary 1992, 110), since such an approach often "ignores the conceptual and historical singularities of each device" (ibid.). It is indeed problematic to subscribe to a simplistic notion of teleological evolution leading to the idea that the early devices only had to be perfected in order to reach the non plus ultra in verisimilitude represented by film. Yet one can observe a very specific kinship between the mass entertainment devices of the 17th century, used at annual fairs, folk gatherings and markets and the 20th century forms of entertainment taking place in public game arcades. Such similarities exist in the public form of display and use of such devices and the economic formula of "pay per use". Furthermore, there are areas of proximity between the spatial concepts underlying devices such as the Panorama, the Myriorama, the Diorama or the Peep Shows and the concepts of spatial illusion in early digital games.

If one considers the example of the Peep Show Box, which first emerged in experimental form during the Renaissance and reached a high point as a popular entertainment device at the end of the 17th century, this point will become quite clear.

The Peep Show in its initial form is a wooden box that presents the viewer, who has visual access to the scene trough two eyeholes, with a perspectival view. The spatial depth of this view emerges from splitting the whole of an image into different parts of visual information and applying the resulting elements onto different layers (sometimes translucent, sometimes cut out) in the background, middleground and foreground. The redistribution of visual information from a flat image plane onto a number of spatially separated ones creates the illusion of spatial depth. In other manifestations, the Peep Show was used to recreate miniature theatrical stages or scenes; this variation is referred to as the "perspective theatre".

A large number of early computer games utilize similar strategies to create the illusion of spatial depth, by employing two or three different layers of visual background information, and seemingly "cut out" figures (made up of sprites) as focus of the action in the foreground. The interesting point here is that the Peep Show as a visual device, seems to be much nearer to the spectacular visual machines of early video game cabinets, than, for example the Renaissance painting that employs similar perspectival laws governing the layout of the visual information. One could argue at this point that other illusionist spatial setups, such as the theatre stage, and later the depth orientation and layering of visual information in film follow similar principles. The special kinship between computer games and Peep-show devices, however, becomes clearer if one considers that the user of such devices becomes part of an individual illusion-machine that literally incorporates the viewer.

Crary writes, "like the phenakistoscope, or the zootrope, the diorama was a machine of wheels in motion, one in which the observer was a component" (ibid. 113). In specific cases, the user could have a direct physical impact on the visual information. For example, a specific form of Peep Show, the paper diorama, consisted of a printed or painted scene that was folded up and could be expanded like an accordion. In this case the hand movement of the user has a direct influence on the spatial qualities generated by the illusion device. Another striking example is the so called Myriorama (literally the "many thousands view"), where the visual information is once again rendered discrete in the form of numerous little image segments, which are then re-arranged vertically. With a Myriorama it is possible to assemble infinite landscapes, because the different images are constructed in order to allow for a matching connection between each single image. Interestingly, the level designs for numerous 2D games are created in a similar fashion; they have a

myrioramatic structure. The single images that serve as backgrounds for different levels feature visual topological connections (openings or paths) that can be recombined with each other in iterated sequences. By creating images for level backgrounds that can be variably interconnected game designers have knowingly or unknowingly adapted the spatial principles laid out by the Myriorama.

These are the spaces Wolf refers to as "adjacent spaces displayed one at a time" (Wolf 2001, 59). Interestingly, rather than relating them to the historical precedent for these types of games, the Myriorama, he likens them to film when he writes "[i]n the cinema, joining of contiguous spaces through cutting signalled the arrival of editing. Likewise in video games like the arcade game Berzerk (1980), or Adventure (1978) and Superman (1979), both for Atari 2600, adjacent spaces or rooms are displayed as a series of nonoverlapping static screens which cut directly one to the next without scrolling, not only following the precedent set by film but also relying on it to allow the player to make sense of the geography of the game. As the player's on-screen character moves off-screen in one direction, the screen changes instantly and the character reenters on the opposite side of the screen; the direction of screen movement is conserved, and the screens are seen as being immediately adjacent to one another, an assumption that relies on one's knowledge of continuity editing in film" (ibid.).

The comparison between film and video games is a continuously recurring theme in literature dedicated to games (Krzywinska, King 2002). Clearly, cinematic conventions have affected video games and there are numerous cross-branded film game packages on the market. Yet video and computer games also employ conventions from TV, cartoons and animation as well as photography. As has been pointed out above, it is part of their nature to simulate styles and conventions from various media systems. Therefore it is questionable whether film should be regarded as the dominant medium in this respect and, in addition, one has to ask how far film theory can account for game specific phenomena. It can be argued that the relation between historical illusion devices such as the ones we have mentioned above and interactive games might in certain cases prove to be closer than the one between film and games.

A third example that sheds light on the kinship between digital game spaces and historical illusion techniques is the use of stereoscopic images, which were one of the most important ways of consuming photographic images in the 18th century. The

Stereoscope, that was a direct result of research into subjective vision and physiology by Charles Wheatstone and Sir David Brewster around 1830, was a device that generated spatial illusion by showing two slightly different pictures, viewed separately by the right and the left eye, thereby utilising the peculiarities of human binocular vision and its relation to spatial depth.

Today there are numerous stereoscopic goggles and devices that render different frames for the left and the right eye. Again they have to be seen in close conjunction with historical visual illusion machines that were directed towards single viewers. In Chapter 1, the Panorama and the viewer's ability to move through a physical space while taking up different vantage points within the *trompe l'oeil* scenario was briefly discussed. In the case of the Stereoscope this situation is turned on its head. The viewer is immobilised, and the concept was developed to recreate the sensation of solid objects near to the viewer. "The stereoscope […] provided a form in which "vividness" of effect increased with the apparent proximity of the object to the viewer, and the impression of three-dimensional solidity became greater as the optic axes of each diverged. Thus the desired effect of the stereoscope was not simply likeness, but immediate, apparent tangibility" (Crary 1992, 123-124). It is this strategy of artificially reproducing the illusion of a near, tangible object by purely visual means, that has seen a renaissance with the emergence of stereoscopic goggles for 3D. Although there have been numerous attempts at stereoscopic vision effects in film, employing different technologies, the concept never had a breakthrough in this medium and it has to be seen whether it will have a greater impact within the field of digital games.

After pointing out some of the shared conceptual approaches to visual space between illusion devices of the 17th and 18th centuries and computer games I want to reemphasize a point that is crucial for the following discussion. It is of specific importance because the notion of illusion was introduced in close conjunction with technology earlier, which might lead to the idea that the problem here is based on purely optical phenomena.

Crary emphasizes that the visual devices emerging in the 18th century cannot be separated from the creation of a new understanding of the observer itself; that is an understanding intertwined with social, scientific, historical and economical structures. A lot of the devices mentioned earlier were direct results of shifts in the scientific

understanding of the status of the observer and the philosophical discourse surrounding notions of representation and perception. Crary marks a rupture between the observer of the 17th century, the time of Descartes and the camera obscura, and the "modern" optical devices of the 18th century that discarded the camera obscura as a model of human perception and turned towards the physiological and biological determinants of vision and perception inside the observing subject. The notion of the observer changes over time and it is subject to numerous forces that cannot be reduced to aesthetical models or technological innovation. In Crary's words "[w]hat begins in the 1820s and 1830s is a repositioning of the observer, outside of the fixed relations of the interior/exterior presupposed by the camera obscura and into an undemarcated terrain on which the distinction between internal sensation and external sign is irrevocably blurred" (ibid. 24). In the 19th century, the physiological processes come to the foreground and visual spatiality is increasingly understood as the interplay between numerous complex systems, biological and chemical processes as well as brain functions. Accordingly, the nature of conceived space, in Lefebvre's sense is subject to radical transformations between the 17th and the 19th century.

Returning to my argument, I want to point out the importance of complex mental processes for visual spatialisation. Gregory tackles this important point in his work on the relation between perception and illusion when he describes perceptions as "predictive hypotheses, based on knowledge stored from the past" (Gregory 1998, 1). It seems that visual spatial representation is based on the viewer's mental models and, accordingly, to a mixture between cultural codes that are clearly subject to historical transformation as well as subjective experience within the physical world. The viewer's mental spatial models are based on information that has been gathered over a long period of time, which partially consists of hands on-data based on physical bodily interaction as well as experience of the behaviour of objects in the world. In this sense, the notion of simulation (mentally modelling space) has to be integrated into the framework of visual spatial representation. Visual spatial representation in a game also comes into being, because moving entities display believable spatial behaviour. To put it differently, an abstract game like *Asteroids* creates a believable spatial setting not only because it employs culturally codified visual spaces (for example foreground - background or scale relations) but also because the behaviour of objects (for example gravity) is part of a deeply rooted

mental hypothesis about world and space resulting from subjective experience in the physical world. This problem has to be addressed here, because it would be short-sighted to reduce visual spatial representation to a set of optical phenomena or exclusively visual representational strategies (such as the different forms of perspective) since this would not allow for an explanation of how early and very abstract games created believable spatial settings without adhering to optical laws, such as perspective. It seems to be a fruitless undertaking to keep these different forms entirely separate from each other since they obviously work together in bringing about the sense of being in a space. Questions regarding the connection between the knowledge about spatial behaviour of objects in the world and visual spatial representation are so important because they display the fault lines in theories that attempt to reduce spatial representation to a side effect of visual perception. It is precisely this relation that lies at the heart of the specific spatial capacity of video and computer games. The *game space* is explored by testing the visual representational environment through interaction with the visual symbols representing the *game space*. This is why it leads in the wrong direction to explain the visual representational aspects of such games by referring solely to visual spatial representational strategies from painting or drawing.

The visual content in a so-called 2D game might look overtly similar to a drawn or painted space, but the crucial difference is that the visual hypothesis can actively be tested within the present *game space* by moving the avatar, or actively changing the visual perspective. If one looks at a popular strategy of creating visual spatial representations in 2D games, such as the use of different layers from foreground to background in conjunction with parallax motion, the example does rely on historical visual precursors (theatre) but the sensation of spatial presence depends on interaction. In such a case, the visual representational spatial modality maintains a constant feedback loop with the kinaesthetic modality that will be addressed in detail later. The close relationship between potential avatar movement and the audiovisual representational modality of space has to be considered as a structure that shapes possible classifications of game-spaces. Optional avatar movement (scrolling vertically, horizontally or along the z-axis) can be used as a way of distinguishing different modes of visual representational space. This train of thought leads directly into a very difficult territory: the distinction between 2D and 3D in this context. If one considers that all of the visual information in video and computer games results

from sprites or pixels moving on a two-dimensional surface it is impossible to distinguish between 2D and 3D games based solely on visual information. If one excludes the issue of potential avatar movement completely it does not make sense to deploy categories of dimension. From the perspective of (technological) image production it is however possible to talk about 2D and 3D games, based on whether or not all objects on screen are modelled in three dimensions in the computer's memory. This is why, for example, Wolf introduces the notion of "true 3D" games for those games that render all objects in three-dimensional space (Wolf 2001, 71). However, if there are "true" 3D games it follows that games that avoid full three-dimensional computation objects in the game world are therefore false 3D games, even if they also manage to represent three-dimensional environments. Therefore, based on the visual evidence alone, this distinction only makes sense from the perspective of the game designer. It seems that three different trajectories of dimension can be discerned in this context: Firstly, there is the purely visual level that is not sufficient for the distinction; secondly there is the issue of potential movement in the *game space*, and thirdly the technological perspective. This has to be kept in mind in order to avoid confusion.

3.5.2 CORE CONCEPTS

Wolf's classification of representational game spaces has already been introduced in Chapter 1 as a viable approach to the subject in question. The major point of critique concerning his approach is based on the fact that he reduces space in games to visual representational aspects while completely ignoring sound. In the following I will attempt to demonstrate how the different categories within his classification system are connected to other spatial modalities, and therefore to reveal that they are part of a much more complex mechanism. He states that "[t]echnical as well as aesthetic factors influence the design and use of space in the video game, and the individual game's worldview also determines how the game's diegetic world is constructed and represented on screen, and what it means" (Wolf 2001, 51). The first two influences on *game space*, namely technical and aesthetic factors, can be rendered in the form of either a techno-historical overview or a classification of aesthetic styles as proposed by Järvinen (2002). The third factor, the "individual game's worldview" is the problematic instance in this case. It is precisely one of the missing links that I

want to tackle here. The "individual game's worldview" can be described as the result of the interplay between narrative spatial modality, *rule space* and audiovisual spatial modality. The visual representational aspects forming part of the spatial character of a game depend on the qualities of *rule space* and *narrative space*. In other words if the *narrative space* generates a particular perspective, and the *rule space* organises a particular type of action, the visual representational space will be structured accordingly.

Wolf mainly uses film space as his reference model and structures his presentation of spatial elements along the lines of the binary pairs of on- and off-screen. Curiously, sound, which seems to be one of the central functions concerning on- and off-screen situations, is not mentioned at all. Chapter 4 addresses this omission and presents a discussion of on and off-screen situations that considers the impact of sound. Wolf defines eleven "elementary spatial structures", which are introduced according to their historical evolution (Wolf 2001, 53 – 69).

1. text based
2. 1 screen contained
3. 1 screen contained (wraparound)
4. scrolling (1 axis)
5. scrolling (2 axes)
6. adjacent spaces displayed one at a time
7. layers of independently moving planes
8. z-axis movement
9. multiple, nonadjacent spaces, displayed simultaneously
10. interactive 3d environment
11. represented or mapped spaces

In the following these "elementary spaces" will be referred to as *S1* to *S11*.
In the majority of cases employing *S1*, the visual space is congruent with what I have referred to as narrative modality. This is however not true for cases where ASCII characters take on purely graphical representational functions and are not read as text. Wolf points out that those types of games can be seen as a bridge between text adventures and graphical games. *S2* and *S3* both refer to games, which are contained in one screen, such as *Pong* or *Asteroids*. They differ because objects that leave the screen vanish in the case of *S2* but reappear in *S3*, thereby creating a "wraparound"

space. What makes this difference so interesting from our perspective is that the *rule space*s of *S1* and *S2* differ significantly and thus motivate different types of visual representation.

Let us briefly consider the examples of *Pong* (*S2*) and *Asteroids* (*S3*) and their different *rule space*s. *Pong* was one of the early successful games precisely because the rules defining the spatial action were extremely condensed. The instruction "avoid missing balls" deploys enough knowledge to be able to play the game. Now clearly, if one can miss a ball by not being at the location that blocks the ball's movement outside of the visual frame, it follows that there has to be an outside space that is off the playing field where the ball vanishes when the player misses out. A wraparound screen that leads to the ball reappearing on the other side of the screen would formally lead the game's instruction ad absurdum. The rules of the game define that the ball has to be kept inside the visible frame and a ball that moves outside of it results in points. *Asteroid's rule space* is different because, here, the player has to either destroy asteroids with his ship's gun, or avoid to be hit by them (the opposite of *Pong*). The asteroids, as well as the player's ship, will re-enter the *game space* on the opposite side of the screen if they move off-screen. This fact, in combination with simulated gravity and acceleration is a crucial factor in the game. There is also a very close proximity between the rules of the simulation (gravity, acceleration) and the spatial modality mobilised by *rule space* in this case.

The point I want to clarify here is that the visual space of a game can neither be seen as a purely aesthetic device that can be separated from the rules of the game, nor does it exist to generate spatial illusion for aesthetic pleasure alone. Instead visual space has to be regarded as part of the ensemble of spatial modalities. The difference between *S2* and *S3* is therefore not primarily aesthetic or visual but systemic on an operational level. This is one of the major problems arising from the constant comparison between film space and *game space*. To put it very bluntly, film space on the screen clearly amounts to visual representational space, whereas *game space* can only be understood as a space where the tip of the iceberg is made up of visual representational elements and the major bulk of it is tied to the player's potential action. Wolf does address this when he says that "[u]nlike the film viewer, who is led (visually) through the film's diegetic world by the film's characters, the video game player has a stake in the navigation of space, as knowledge of the video game's space is often crucial to a good performance" (Wolf 2001, 53). Yet, he does not seem to

fully realize the importance of this difference, by solely positing knowledge of the *game space* as prerequisite for good performance in the game. My argument is that there is much more at stake here: Although there is some shared territory, there exists a deeply rooted ontological difference between space in film and games. As I have mentioned in Chapter 1, Wilhelmsson even goes as far as to classify game spaces based on the distinction between types of action within the *game space* leaving visual representational aspects aside. Although, I will return to this idea with the discussion of kinaesthetic space, it has to be pointed out that this approach also lacks completeness because it disregards obvious shared visual concepts between films and games.

In the following, some of the elements responsible for the common ground between film and computer games, such as the camera metaphor, will be discussed. Clearly the camera in computer games is a concept and not a machine that records images of the physical world. If the computer is a device that models and simulates other devices, one can treat the camera in this instance as a simulation of the film camera that is used as an agent to show fractions of the *game space*. Within Wolf's system the film-camera metaphor seems to be present in nearly all types of video and computer games apart from *S1*. He likens *S2* type spaces to early films of Méliès and Lumiere (ibid. 56), where the camera is static for the duration of the action, and when he talks about scrolling games: "[C]inematically, the revealing of off-screen space by 'scrolling' or reframing the image is accomplished by tracking shots and crane shots (or by panning and tilting, if one ignores the changes of perspective in each)" (ibid. 57-58). Yet, he does not extrapolate the camera as a concept and interestingly the camera metaphor is not used when split-screen situations are discussed as is the case with *S9*, and it is also omitted from what he calls mapped or represented spaces (*S11*). These two cases - split screens and mapped spaces - seem slightly problematic in Wolf's taxonomy. It is, for example, hard to explain the qualitative difference between a split screen in a racing game for two players, and the use of two different views on the *game space* in single player games without referring to something that transcends the visual frame. I have, for example hinted at the relation between *user space* and solutions such as split screen structures. Furthermore Wolf seems to exclude all single player games that offer multiple simultaneous views of the *game space*, like for example *Metal Gear Solid 2*, where the player frequently uses surveillance monitors and visual devices that deliver additional visual information

about the *game space*. An example like this, where the additional view results from a simulated camera/monitor within the *game space* seems to be very near to what Wolf calls "represented" spaces or maps (*S11*) in games. It seems problematic to posit a second order of representation in the case of maps in games, since they simply offer a different kind of view of the *game space*, albeit a reduced and abstract one. Games like *Sim City*, where the map is literally played on, make it even harder to introduce mapped spaces as a distinctive elementary space.

Here I would like to propose a slightly different view on split screen situations and maps in games by understanding them as specific views of the *game space* and I want to posit the notion of *game-camera* as the metaphorical function that enables such views. In other words, a split screen in a two-player game comes about because characteristics of *user space* lead to the presence of multiple *game-cameras*, and maps can be seen as part of the *game-camera*. In the following an original model of the camera metaphor, that accounts for issues such as the Point of Perception, user control, as well as split screen situations and what Wolf calls "represented" spaces or maps, will be presented.

3.5.3 THE GAME-CAMERA MODEL

In order to acknowledge the complex set of contingencies tied up with all spatial models and metaphors based on the camera it is necessary to take a step back in history. The camera obscura or dark chamber is essentially a visual spatial phenomenon of great importance throughout the history of philosophy and science as a model for human vision itself and the relation between the observer and the universe. It also was an important device for the production and reproduction of images and the central thought-model for the consideration of visual representation. In reference to the impact of the camera obscura during the seventeenth and eighteenth centuries, Crary writes "[f]or two centuries it stood as a model, in both rationalist and empiricist thought, of how observation leads to truthful inferences about the world; at the same time the physical incarnation of that model was a widely used means of observing the visible world, an instrument of popular entertainment, of scientific enquiry, and of artistic practice" (Crary 1992, 29). He delivers a detailed analysis of the reasons for the transformation of concepts of truthful representation that go hand in hand with the advent of modernity and describes the shift of focus

from a belief in the direct analogy between world and observer towards a growing interest in issues of perception and the physical and biological functions of the observer leading up to the breakthrough of physiological research in the 18th century. The advancing knowledge about the human visual system based on research into the functions of nerves for sensory experience generated doubt in the concept of truthful representation. The fact that the observer's body seemed to be capable of producing sensations, independent of external stimuli lead to a general disconnection between sensation and signification. Nevertheless, notions of truthful visual representation (for example in connection with film and photography) still form part of common sense understanding of the world. This might also explain the impression digital image technologies have made in the public arena in relation to issues of authenticity, falsification, image manipulation and so on.

One of the essential aspects of the *game-camera* is that it generates visual worlds rather than presenting a mechanism that either projects images from the physical world or captures them with the help of chemical reactions. Thus, it seems, the *game-camera* as part of an electronic or digital image generation device is so far removed from the initial meaning of camera that the term itself is problematic. How then is the *game-camera* camera metaphor related to traditional conceptions of camera?

It is possible to think of the *game-camera* as an inverted camera obscura. In order to understand this inverted relation it is sensible to compare the two metaphorical devices. The camera obscura is generally described as a room with a small opening, permitting light to permeate from the outside, thus projecting an image from the outside physical world onto the back wall of the room. The observer is in the dark chamber and sees images from the outside world. Now, let us imagine a typical computer game situation: A person is sitting in a dark room in front of a TV that creates an image through the use of photons shot at a matrix, and plays a game with a game console. In this case, the world, which is entirely generated by the game device itself, is presented to the viewer who can alter it by using an interface device. The visual machinery of the *game-camera* does not transport an image from outside to inside but the other way round. It is, however, still the conceptual entity that frames and "delivers" the discrete visual elements of the simulated world witnessed by the observer/player.

In the light of this parallel view of two very different conceptions of camera it is sensible to return to another device, namely the "[…] magic lantern that developed alongside the camera obscura and had the capacity to appropriate the setup of the latter and subvert its operation by infusing its interior with reflected and projected images using artificial light" (Crary 1992, 33). This illegitimate twin of the camera obscura seems to resonate strongly with the metaphor of the *game-camera*. Thus the concept of the *game camera* points towards the camera obscura when it comes to issues such as representation and framing but also towards the magic lantern with regards to aspects of simulation.

By positing the camera metaphor at the centre of the *visual representational modality of space*, it is possible to reach out to different forms of media, from photography to film over to contemporary 3D graphics. Furthermore, the concept can serve as a tool for the analysis of different types of user control within the *game space*. The *game-camera*, is capable of modelling the effects of other kinds of camera-types, by simulating their characteristics and visual qualities, from photo camera (still image) over film camera (the use of various filmic conventions) to video camera, TV camera (as can be seen in numerous sports games) or CCTV camera. Thus the *game-camera* metaphor seems quite promising as a means of analysing different instances of visual representation. How does this concept relate to so-called virtual cameras in 3D games and software packages?

The virtual camera is a conceptual entity that has existed since fully rendered 3D spaces became a technological possibility around the middle of the 90ies. Today it is an essential tool in every 3D design package. In contrast the *game-camera* is not reduced to fully rendered 3D games. It has to be seen as a set of functions responsible for displaying particular portions of the *game space*. Although, in the specific case of early abstract games, we cannot speak of a portion, since the *game-camera* in this case is equivalent to the entirety of visual aspects present in the *game space*.

Another crucial point is the double representation/simulation in relation to the *game-camera*. From the historical camera obscura, through photography and film cameras, the visual representation of elements from the physical world was an inherent principle. However, Crary has shown that the notion of visual truth as a core element of representation was shattered with the advent of the photo camera, because the idea of the observer itself underwent a significant transformation. In the

case of the *game-camera* the notion of visual truth is entirely displaced by questions regarding coherent style and behaviour within the simulated game universe. In the following, the characteristics and variable properties of the *game-camera* that ensure this coherency are addressed.

3.5.4 THE PROPERTIES OF THE GAME-CAMERA

The *game-camera* has a number of distinctive properties that affect the visual representation of a game as well its interaction model. The properties that can be discerned are the following:

1. PoP (Point of Perception, 1st person, 3rd person, isometric, synoptic).
2. Multiplication (single or multiple instances).
3. Map function.
4. Movement (still or moving, type of movement, user or program control).

Combinations of these different qualities are employed to simulate conventions from other media systems, such as film or TV. Specifically in relation to sound in games, it makes sense to make use of the concept of Point of Perception (PoP) as introduced by Aki Järvinen (2002) rather than Point of View. He describes PoP as follows, "[p]oint of perception is the position from which the player perceives, i.e. both sees and hears, what goes on in the *game space*. It can be compared to the dominating view discussed in theories of narratives and narration, but it is not quite the same thing, because of the highly interactive and non-narrative nature of most games" (Järvinen 2002, 116). In his proposition for a model of audiovisual styles in games, Järvinen also presents the term *dimension* (op cit. 115) in relation to the PoP, which basically defines whether a game can be referred to as 2D or 3D. He presents the different versions of *Grand Theft Auto* as an example for shifts in dimensionality, in this case from 2D top down PoP to fully rendered 3D. Yet he doesn't account for the fact that *GTA III* actually incorporates 4 different PoP's, from 1st person view, through 3rd person view, to a side trailing camera and the top down PoP known from *GTA I* and *GTA II*. One can state that the properties of the *game-camera* in *GTA III* are

definable as four user-controlled optional PoP's within a fully rendered 3D environment.

Järvinen points out that the 3rd dimension in *GTA III* is more than a purely aesthetical decision, since it actually changes the gameplay. This argument resonates with the understanding that modalities such as *rule space* and *kinaesthetic space* have a direct influence on the visual representation. He writes, "[i]f the game's rules demand that the environment is made into a two-dimensional or isometric grid that governs the means of moving (like in many board games, or turn based strategy games), then two dimensions or an isometric perspective might well be the appropriate solution regarding dimensionality" (ibid. 116).

The concept of PoP should neither be directly conflated with the technological distinction between 2D and 3D games (whether all objects are modelled in 3D or not), nor with the potential movement in the *game space*. To give an example, the game *GTA I* represents a 3D space using a top down PoP, but movement is only possible in two directions. In the following I will discuss the different forms of PoP's, the way they are present in games either as singular form or switching from one to another, (a form we can refer to as fluid PoP).

3.5.3.1) FIRST PERSON POINT OF PERCEPTION

First person perspective in literary and narrative theory is usually understood as a function resulting from a story being told from the viewpoint of the narrator figure inside the diegetic universe of the story. This viewpoint often leads to very subjective, relative and sometimes fragmentary accounts of the action. In a computer game, the 1st person PoP functions in a different manner, since the player is always actively involved in the unfolding of potentially branching sequences of actions. In most cases, the narrative framework addresses the player personally and puts him/her at the place of the potential narrator. The *frame narrative* addresses the player in ways such as, you are a fighter pilot, mayor, agent, gangster, general, architect, zoo director, astronaut, space-marine and so on. The player then has to fill that role and deal with the problems that are presented by the game. In other words, the narrative positioning is the same for FPS games (1st person PoP) as it is for the different types of 3rd person PoP games. Thus, one cannot make out a direct causal link between the

addressing function of the narrative spatial modality and the audiovisual perspective. What then, is the relation between narrative perspective and the choice of Pop?

Laurie Taylor, (Taylor 2002, 34) who has analysed different perspective modes in digital games, argues that 1st person perspective in games, although seemingly more natural and intuitive, actually reduces the amount of information about the spatial game context in comparison to other modes. She writes" [t]he player's understanding of context in first-person point-of-view games commonly is based on the idea that the player plays as the player-character by seeing through the player-character's eyes, which seems to many in the game design field as more intuitive and natural because the player appears to act and perceive the gaming space in the way that the characters act and perceive the game. But, this ignores the fact that the player has no context within the game space (that is, intra-diegetically) because the player has a very limited access to the representation of positionality and spatial relations within the game space" (Taylor 2002, 26).

Following this observation it can be stated, that just as the narrative strategy of 1st person narration is fragmentary and gives a reduced subjective account of the story world, a 1st person PoP (such as in *Doom*) delivers much less information about the positional and spatial relations within the *game space* than a 3rd person PoP (such as *Warcraft III*). On the other end of the scale, we could position the omniscient narrator, in parallel to the player of a so-called god-view game, where the player has a much larger amount of visual information within view. In other words the relation between narrative spatial modality and visual representational modality concerning perspective is defined by increasing amounts of accessible information from 1st person PoP, over 3rd Person PoP to so-called god view games. The need for different degrees of accessible visual information results from the rules set forth in the *rule space*. However, although first person PoP's present less visual spatial information than other modes, they can be used in very specific ways to deliver more subjective information about the avatar's state by changing certain qualities of the *game-camera*. For example in the game *Deus Ex* the *game-camera* will start to shake and become wobbly if the player is either drunk or affected by some form of poison. This change also affects options of movement. In the same vein, the game *Max Payne* changes *game-camera* qualities in an experimental fashion, when the avatar is in a dream like

state and the angle of view of the camera changes significantly, so that spaces appear much larger than they do throughout the rest of the game.

Although games with a 1st person PoP camera became very prominent with the advent of the FPS, such as *Castle Wolfenstein 3D*, the earliest game to employ this type of PoP was Atari's driving game *Night Driver* from 1976. The illusion of three-dimensional depth was created by a number of differently sized white graphic blocks that marked the roadside. A larger white block at the bottom of the screen symbolized the bonnet of the car. Interestingly, the function of the bonnet representation can be traced into contemporary driving and FPS games that usually have employ some sort of representation of vehicle parts (bonnet, windscreen) or extremities (hands with weapons) which symbolically bridge the gap between *game space* and player. In this sense *Night Driver* can be treated as prototypical for numerous games that were to follow, although the later versions of 1st person PoP games started to introduce numerous technological advancements and continuously increased the visual resolution of textures.

The first 1st person 3D game that allowed the player a higher degree of movement within the *game space* (*Night Driver* essentially was a flat representation of Z-axis movement) was Atari's *Battlezone*, albeit using Vector graphics.

Here, Wolf argues that "[t]he first-person perspective increased the importance of off-screen space because it positioned the player within the space, subjectively, as opposed to the third-person objective view in earlier games" (Wolf 2001, 66).

This is a crucial observation, because it is indeed true that the player's direct control over which part of the *game space* he wants to visualise at a particular moment in time becomes an intrinsic element of the game play in these types of games. Again it has to be stated that sound plays a very significant role in this respect. As will be shown in the Chapter 4, spatial audio cues often make up for the limited amount of visual information in 1st person PoP games.

In reference to Taylor's argument, I want to re-emphasize the notion that 1st person PoP is a quality of the game-camera that significantly narrows down the amount of visual information the player receives from the *game space*. The *rule space* of a game defines which types of information a player needs to receive in order to play the game successfully. For example, if an important part of the game's rules is built around jumping from platform to platform, while avoiding falling "down" in between them, a first person PoP might not be the adequate solution, since it does

not deliver enough visual information about the spatial context of the avatar. In other words, in a 1st person PoP game, you cannot properly judge visually whether you are still on a platform or not, where your avatar is positioned in relation to significant objects in the *game space*. If the *game-camera* shows either a part or the whole of a player's avatar, such topological judgements are much easier to make. Objects approaching from within the surrounding *game space* can be seen early enough for the player to react. The game *Alien versus Predator 2* is quite an interesting example in this context, because the three different species the player can choose to play (Alien, Predator, Space Marine) are separated by different qualities of first person PoP game-camera. Each being has different game-camera options. If you play the predator, you can choose to view the *game space* in a simulated "infrared" or "heatview" and use zoom functions. However, the species that is most interesting in relation to what has been discussed above is the alien. The game designers have chosen to give the alien *game-camera* an extreme wide angle, which makes orientation in the *game space* quite difficult at first, but also enables a form of peripheral vision that is very different from conventional first person PoP games. The simulated fisheye properties allow the player to see a lot more of the *game space*, such as enemies approaching from behind and above. It takes some time to get used to this simulation of peripheral vision since the added visual information confuses the player's orientation. Paradoxically, although the player can see a lot more of the *game space*, the game is much harder to play with this visual mode which might be a reason for the scarcity of games with extreme wide angle 1st person PoP. This seems to hint at a much older problem of perspective in painting, namely how to "naturally" depict an interior without loosing too much visual information.

Lawrence Wright explains this as follows "[f]rom within the room, even an overall angle of view of 90 degrees will allow only half of the total wall surfaces to be shown, and the perspective will not look convincing unless the drawing is very large or the spectator is uncomfortably close" (Wright 1983, 48).

Accordingly, the only way to depict the whole of the room if the PoP is inside it is to choose an extreme wide angle, which leads directly to a depiction of curved space. A historical example can be found in Jan van Eyck's famous portrait, *The Bethrothal of the Arnolfini*, in the round mirror at the back wall that shows the whole room in curvilinear fashion. Interestingly, the idea that curved space in perspective representation leads to a somewhat incorrect depiction has been addressed as a

phenomenon that is connected to modern scientific perspective. Panofsky writes that "if even today only a very few of us have perceived these curvatures, that too is surely in part due to our habituation – further reinforced by looking at photographs – to linear perspectival construction: a construction that is itself comprehensible only for a quite specific, indeed specifically modern, sense of space or if you will, sense of the world" (Panofsky 1997, 34). Here seems to be another hint at a familiar problem. Although human visual perception seems to be much nearer to a curvilinear Riemannian space, as has been argued by Piaget and Inhelder, cultural influence facilitates a shift to Euclidian and rectilinear concepts. Again, one is reminded of Lefebvre's notion of the impact of conceived space on perceived and lived space, and it could be speculated that the visual spatial representation in first person PoP games is to a certain extent still embedded in a "sense of the world" that owes much to scientific linear perspective. In summary it can be stated that a large majority of first person PoP games, gives the player a somewhat limited access to visual information about the *game space* within a single frame which makes it necessary to constantly move the view (frame) in order to orient and position oneself within the *game space*.

3.5.3.2) THIRD PERSON POINT OF PERCEPTION

A fact that is often neglected in this context is that nearly all adventure games before Sierra introduced *King's Quest* in 1983 for the IBM PC, were 1st person PoP games. Roberta Williams, the programmer, remembers "[u]p to then the adventure games had been first-person perspective. I had the idea to do something different, so I said, 'I want to create a world with a little guy running around and you control him.' But if you had a little guy running around, you had to give a sense of dimensionality in the picture. He has to go behind things like trees and rocks and stuff" (Wilson, De Maria 2002, 138).

The fact that the player would continuously see the avatar on screen in 3rd person PoP games lead to a heightened interest the design of characters from this point onwards, leading to famous characters from Mario to Lara Croft. Since the development of more complex characters in games also strengthens the narrative possibilities, games with stronger narrative structures often employ third person

PoPs. Furthermore, if the player can see the avatar constantly, changes of its status in the game, such as health or damage can be conveyed directly without the need for an additional symbolic display. In general, a 3rd person PoP game-camera leads to a much higher degree of contextual spatial information in comparison to 1st person PoP's. This is specifically important in games whose *rule space* generates maze structures or obstacle courses. Platform games, such as *Super Mario Bros.* or *Super Metroid,* that involve running and jumping through an obstacle course are thus traditionally 3rd person PoP games. Again, this is due to the fact that the player has to be able to continuously evaluate positional structures in the *game space* in relation to his avatar's potential movement. However, as much as a third person PoP might help the player in a situation where a gap has to be jumped over, it might also make other actions, such as targeting and shooting an enemy, harder to accomplish, especially if movement in three dimensions is possible. This is the reason why a number of third person PoP games allow the player to change to a first person PoP when targeting or shooting objects. *Metal Gear Solid II* (*MGSII)* is a good example for the use of both qualities of *game-camera* in a single game. Here the general mode of PoP is third person throughout the game, but whenever weapons, cameras or binoculars are used, the *game-camera* switches to a first person PoP in order to enable more accurate visual targeting. The fact that the "tanker mission" in *MGSII* is actually based on the goal of sneaking into a secret facility in order to make photos of a secret weapon system using a digital camera confirms that numerous media systems are simulated in contemporary games. In this particular case the simulation of photography is an essential part the *rule space*, since the player has to sneak to different places in the room housing the weapon in order to get shots from different viewpoints. If the image is taken from the wrong place, or does not show the essential features, the player has to navigate and try other perspectives and framings. Here the camera metaphor has quite literally been integrated into the game as a way of directing the player's attention and navigation through the *game space*.

Other games that use both types of PoP create an inverted situation, in comparison to the above example. Numerous FPS games employ cut-scenes (sometimes pre-rendered, sometimes in realtime) that allow camera movement away from the first person PoP prevalent during gameplay to third person PoP, which show more of the scene and can be likened to establishment shots in films. However, in this case, the camera movement is in most cases pre-programmed or rendered and

thus cannot be influenced directly by the player. One can generally state that an increasing number of contemporary games employ fluid PoPs. Additionally, the camera is often moved in accordance with narrative structures in the game. This direct link between *narrative space* and *game-camera* movement can be found in games like *Medal of Honor*. Although the normal mode is first person PoP, the game-camera moves away from the player to introduce new tasks or fields of action. Quite often, such camera movement is indeed influenced by film conventions and it is often used to familiarise the player with a new scenario or a particular topological goal. An important issue in such cases is the amount of control the player has during game-camera movement and we will discuss this issue separately below.

If one considers fighting games like *Soul Blade*, it is possible to gain further evidence for the influence of rule-space on the choice of PoP, since the rules of the game imply that the player has to be able to visually contextualise the fighting moves of his avatar in relation to the opponent. In other words, since the rules of the game might state that a hit at a particular part of the body is more or less damaging to the player's health, the player has to be able to see where the attacking move is intended to be placed and to take evasive action if possible. In this case a 1st person PoP would not allow the player to gain visual feedback of his own avatar's actions. One could argue that these types of fighting games have a lot in common with traditional puppet theatre, where different puppeteers steer the movement of puppets, however the player takes on the perspective of the audience rather than the puppeteer. Contemporary fighting games like the *Tekken* series or the *Dead or Alive* series display complex *game-camera* movement routines, that enable different viewpoints according to avatar locations and attack or defence moves. The way the camera hovers above the players and circles them seems to mimic conventions found in live TV coverage of boxing and martial arts.

3.5.3.3) SYNOPTIC POINT OF PERCEPTION

I would like to introduce the term synoptic (the Greek "synopsis" stands for "general view") PoP in relation to games that allow visual access to all the information from above. The synoptic view is also commonly called "God View" and this convention

results from one of the first games employing such a PoP, namely Peter Molyneux's *Populous*, where the player took the role of a god looking down on his people. Interestingly, a second strain of synoptic PoP games emerged in the same year with Maxis publishing their first version of Will Wright's *Sim City*. Molyneux explains his inspiration for *Populous* as follows: "[I] can remember going up in one of those scenic lifts and looking down at all the little people below going about their lives, and it made me think about using little people, to convey this feeling of power" (De Maria, Wilson 2002, 266). In synoptic PoP games, the player usually has an optional overview over the whole *game space*.

However, in a lot of cases, the player is given the option to zoom in, to get a more detailed view of a partial section of the *game space*, which is often crucial for the gameplay. The simulation of the zoom function can be an important element of the game's conceptual underpinning, as for example in the game *Black & White*, where the player is a god that can either manipulate the world from high above or interact with his creatures on a the ground level. Thus, the change of zoom level is equivalent to a switch between playing as a detached god who manipulates nature without caring for the repercussions these actions might have on living creatures, or a caring god who deals with singular creatures, for example by helping or healing them. The avatar for the god in *Black & White* is a large hand that is used in various ways to interact with the gameworld. Accordingly, the spatial modalities of *narrative space* (you are a god who has to decide how to affect his universe), *rule space* (you can either interact with a larger portion of the environment or with detailed entities – on a micro or macro level) and the *visual representational space* (the choice of synoptic PoP with zoom function) inform each other and constitute the heterotopical spatial structure of the game.

A crucial question arising from the use of different PoP's in digital games is concerned with how the player identifies with the avatar on screen. If the first person PoP seems to generate a "natural" extension of the physical player into the game, and the third person PoP presents a visible character that the player supposedly identifies with, how does this relate to the specific situation in synoptic PoP games, where there is no visible avatar?

Friedman is convinced that in synoptic games the player effectively identifies with the sum of game processes on the map rather than a representational device such as an avatar. He writes "[w]hat does it mean to identify with an entire city?

Perhaps attempting to map 'roles' onto the player's on-screen identification misses the point. When a player 'zones' a land area, she or he is less identifying less with a role than with a process. And the reason that the decision, and the continuous series of decisions the gamer makes, can be made so quickly and intuitively, is that you have internalized the logic of the program, so that you're always able to anticipate the results of your actions. 'Losing yourself' in a computer game means, in a sense, identifying with the simulation itself" (Friedman 1993, 9).

Friedman proposes that the player identifies with large parts of the simulation in synoptic PoP games. Most importantly, this identification does not take place on the visual level alone and action/reaction patterns within the constant feedback situation of the game are crucial in this respect. It is precisely at this point that the kinaesthetic spatial modality comes into play. However, before this important subject will be discussed, it is necessary to concentrate on the role of the map in the context of synoptic PoP games.

Strategy games such as *Age of Empires* are specific forms of synoptic PoP games. The *game space* literally is a map seen from above, and the synoptic view is necessary to enable the player to anticipate troop movements and to use the terrain for strategic operations. The historical evolution of the chess game over numerous board-based military simulation games towards contemporary strategy computer games has been analysed in detail by Claus Pias (2000, 203–223). One of the examples he presents is a board war game developed by the Prussian Georg Heinrich von Reisswitz in 1811, which was loosely based on the territorial paradigm of chess but introduced numerous new rules in accordance with the warfare at the time and used a real map in the scale of 1:80000. Board-based war games and "simulations" became more and more important as devices to model and learn strategies that could be employed in the reality of war.

In this sense contemporary strategy computer games with a synoptic game-camera owe a lot to their historic predecessors - numerous board based war games that were played on tables with the players watching from above. It can be stated that the use of top down synoptic PoP is generally employed in those types of games whose *rule space* has evolved out of historical board strategy games. The element of simulating or modelling factors from real world environments that had entered the war games in the beginning of the 18th century seems to be mirrored in a number of simulation games that favour a synoptic perspective. Although a game like *Sim City* is

not at all based on motifs of warfare, it employs the perspective from above in the form of a three quarters isometric PoP. This type of PoP had already been employed by *Populous* but is also consequently used in the entire *Sim* series of games – from *Sim Ant*, over *Sim City* to the latest installment, *The Sims*. *The Sims*, a game that seems to be partially based on the dollhouse metaphor, can be seen as sort of zoom into the simulated cities that were presented by its predecessor *Sim City*. With few exceptions, synoptic PoP games are played on the map itself. If the map is synonymous with the *game space* in numerous synoptic Pop games, how do all the other maps in games relate to the *game-camera* model?

3.5.3.4) THE MAP FUNCTION

The term map itself is slightly problematic in the context of computer games because it is on the one hand, used by game designers to designate the architectural elements of a game level; on the other hand there exist very reduced maps which are designed to help the player with navigation in spatially complex games. Here, the map is understood as a visual element that is a specific property of the *game-camera*.

The importance of the maps ranges from being synonymous with the *game space* itself (*Sim games*), over abstract indicators of progress to navigational and orientational help functions. *Tom Clancy's Rainbow Six* for example, which is thematically based on elite police and counter terrorism forces raiding various types of buildings, includes a preparation section before each new level is started that enables the player to plan each individual movement of the police he/she directs with the help of abstract maps of the *game space*. Planning routes through the *game space* and setting waypoints on the map is therefore an intrinsic element of gameplay, not a subordinate orientational help function. In such a case, the *game-camera* presents a three-dimensional abstract map of the *game space*. However, in the same game the player can use an even more abstract map that will indicate the positions of his team members while he is playing the level. Thus, the map is used in a planning phase to develop the strategic approach to a building raid and during the action phase in order to quickly locate and orient members of the police team.

The kinds of maps that provide the player with a dynamic reference to his/her position in the *game space* and are thus continuously updated, have to be regarded as part of the *game-camera* because it was defined as a function that presents a portion of

the *game space* visually. Here, maps cannot be understood as representations of a representations as Wolf seems to understand them, but on the same order as and belonging to the *game-camera*. The various forms of radar simulations, which indicate the advance of enemies or important actions within the *game space* in a very iconic and reduced form, can be seen in the same light. Again, even those representational devices which are not navigable spaces themselves, have to be understood as being part of *game-camera*, because they are necessary elements within the visual representational apparatus that generates the spatial simulation in exchange with the other modalities of space. This fact is important here because it exemplifies that the *game-camera* can manifest itself in various forms and styles beyond fully rendered three-dimensional representation. The view from above in the classic game *Frogger* is just as much a form of game-camera as the intricate 3D game-camera in *Doom 3*. If there are simultaneous separate visual representations of the *game space* it is possible to speak of multiple *game-cameras*, each having their own qualities.

3.5.3.5) MULTIPLE GAME-CAMERAS

The most common form of *game-camera* multiplication is the split screen setup. In various racing games, two or more players each have their own *game-camera*, which is separated on screen. The two-player mode in the racing game *Wipeout* for example splits the screen horizontally; the game-camera of player one is placed on the upper half of the screen and player two is given the lower half. In these split screen situations, the *user space* affects the visual spatial representation quite directly. The number of players playing one game simultaneously defines the number of *game-cameras* in such a situation. However, the screen real estate is limited and in home games one usually doesn't find more than four simultaneous *game-cameras* in split screen setting. Thus if a larger amount of people play a game simultaneously, other technological means become necessary. The most common solution to this problem is networking; usually with one server and several clients, where each client generates an individual game-camera. In a popular FPS game like *Quake III Arena* there exists one shared *game space* or level at a given time and each player has a different individual audiovisual representation of this space in the form of an individual *game-camera* with a first person PoP. The visual representational apparatus of such a

multiplayer game has to be understood as the sum of different individual *game-cameras*. In popular MMORPGs the number of individual *game-cameras* can be in the thousands, one for each player taking part in the game.

However, multiple instances of *game-camera* are not entirely confined to multiplayer games. There are a number of single player games that make use of multiple cameras. The simultaneous use of multiple *game-cameras* has become more widespread with the advent of live rendered 3D games. In *MGSII*, the player often has access to images from security video cameras that show a portion of the *game space* visually accessible with the dominant game-camera. These additional *game-cameras* are important for the gameplay because they show the movement of guards and opponents and help the player to coordinate his actions in the game. Additional *game-cameras* are either built into the existing architecture in the form of monitors or visual displays or they are present in the form of a picture in picture or split screen setup. Generally, the use of additional *game-cameras* in single player games allows a more complex visual representation of the *game space* and it can also be used in a way that reminds us of similar use in film, to show simultaneous events or actions and thus gain importance for narrative functions. A picture in picture *game-camera* might show the player what a particular action in one part of the *game space* has affected at a distant location or it might show an event to be anticipated by the player. The picture in picture solution is important in those situations because, the additional game-camera does not entirely take over the screen, and will thus not affect the immersive link between the player and his active game-camera.

Games simulating TV conventions, such as most sport games, also deploy multiple *game-cameras*. Just as in TV sport broadcasts, one camera might be on close up following for instance a ball while another one might show the whole playing field and occasionally the reaction of the public. In various racing games, the player has an option to watch the replay of his actions, in form of a programmed edit of footage from different game-cameras. The footage is not stored in the form of a movie file, but based on the position data of the player and other objects gathered during the active play session, and then shown from various different game-cameras with different PoP's. In some cases, the player can further influence the replay by actively switching between *game-cameras*, which can go as far as a veritable authoring function that allows the storage of the directed replay.

3.5.3.8) MOVEMENT

Movement in the game is either movement of objects in the *game space* or movement of the *game-camera* itself. In most video and computer and games from the 1980s, the *game-camera* was static and movement was thus generated either by the objects on screen or layers in the background. Some of the early incarnations of platform games, which were technologically not capable of rendering 3D environments, created the illusion of movement by fixing the position of the avatar, and moving visual planes in the background at different speeds.

Wolf describes game spaces that emerge from such technologies as "[l]ayers of independently moving planes" (*S7*) (Wolf 2001, 57-58). This strategy to create the illusion of movement has its historical predecessors in theatre, where backgrounds that could be unrolled were frequently used in this sense. It is also a common function in cell-animation and has been perfected by Japanese animators who manage to simulate extreme acceleration and deceleration simply by moving patterned backgrounds at different speeds. Parallax motion, or motion of layered planes in different directions at different speeds is an important form of creating the illusion of movement through space in so-called scroller games. Wolf writes "[t]he use of layers of planes creates a three-dimensional effect without being truly three-dimensional; each layer is still a flat two-dimensional plane" (ibid. 63). In all of these cases it can be stated that the *game-camera* is still and objects or layers move independently of it.

The movement of the *game-camera* itself has become a crucial element of the game apparatus with the advent of fully rendered 3D environments. Functions like tilting, panning, zooming and tracking, which are all used in film, have become commonplace in contemporary 3D *game-cameras*. The control of those functions as well as the movement of the *game-camera* itself depends on the interplay between program and player. Since the PoP and the visual information it presents has to be directed towards the relevant spaces of action, the programming often provides algorithms that will move and direct the game-camera in addition to the player's input. The types of trailing game-cameras that hover behind and slightly above the character in 3rd person PoP games like *Tomb Raider,* for example, move behind the player in order to deliver the optimal perspective for a particular type of action. This

amounts to one of the most important differences between camera movement conventions in films and games.

Bob Rehak writes "[t]he FPS borrows certain aspects of cinematic storytelling, most explicitly the tracking POV shot, but makes little use, at least while players are controlling the avatar, of editing or montage in a traditional sense. Rarely, for example, do conventional video games rely extensively on shot-reverse-shot constructions, which counterpose two images – a viewed object, person, or scene and a corresponding image of a viewing subject – to create for spectators the illusion of a contiguous space which they inhabit as an invisible presence" (Rehak 2003, 119).

Although, shot-reverse-shot structures can be seen during cut-scenes, they do not seem to be as important in games as in films. Again, this could be due to the fact that the contiguous space in a game depends much more on the kinaesthetic feedback than visual logic. Often, the most spectacular views might be entirely incompatible with the visual needs governed by the *rule space* of a game. If a player is presented with a shot that, although it might be very dynamic and interesting, does not include the opponents he is fighting against in a particular situation it only leads to frustration.

This problem has been brought up in connection to the game *Resident Evil*, which employs a number of fixed cameras in rooms based on cinematic principles, which resulted in situations where the player simply could not see the enemies he was dealing with. The functions that define the movement of the *game-camera* in conjunction with player actions thus have to be balanced against the form of gameplay and the resulting needs of audio-visual information. In this sense, player actions can be seen as one of the most important reason for the omission of numerous conventions, which are important in the realm of film. Rehak asserts that the "[i]ndividual control over the camera's behaviour – its ability to tilt, pan, track, even climb ladders and descend staircases at the behest of the player- literalizes the conceit of an embodied diegetic participant that cinema, because of its material technologies, can only imply" (ibid.). In other words, specifically in first person PoP games, the introduction of camera perspectives that cut away from the dominant perspective in the form of shot-reverse-shot is often avoided because it disturbs the strong bond between player agency and a specific PoP. However, the real problem here is not so much the shift of perspective per se, which is in fact employed in various games, but rather the question if the player hase some kind of control over it

or not. There are numerous situations where the program takes over all *game-camera* movement functions. This form of temporary switching from user control to program control often happens during cut-scenes and it disrupts the feedback link between player and game-camera and avatar.

In the ensuing subchapter the focus will be directed towards this "embodied link" that expresses itself as a result of player interaction and direct camera control in FPS games, but can take on numerous different forms in other types of games.

3.6 KINAESTHETIC SPACE

If the visual representational modality of space reverberates strongly with Lefebvre's perceived space, the kinaesthetic modality points towards his notion of lived space. Thus, just as lived space emerges from conceived and perceived space in Lefebvre's model, *kinaesthetic space* as it is understood here, is entirely dependent on all the other modalities we have described before.

Kinaesthesia is usually defined as the sense of where one's limbs are, whether still or in motion. How does this sense that is clearly based on bodily experience relate to our subject? After all, computer and video games are frequently criticised as being adverse to bodily exercise and the newspapers are full of articles that relate the rise of computer-based entertainment to the surge in adolescent obesity in the western world. In the public sphere, video and computer games are often regarded as purely cerebral activities that do not involve the full body. On another front, that has been central for the development of the themes of cyberspace and virtual reality and is thus located in the vicinity of computer and video games the body is also regarded as highly problematic.

Newman writes "[c]entral to cyberpunk/cyborg discourse is the often explicit contempt that is shown for the body" and in the following "[c]onsidering the body an unreliable mediator of experience, cyberpunk discourse sees technology, as a means of sidestepping this 'faulty component'" (Newman 2004, 140). Here, the body is regarded as a site that has to be left behind in order to reach a freedom from the constraints it imposes. In addition to that, it is considered the weak point in the cybernetic double of man and machine. A very detailed analysis of the topic of the critical state of the human body in post-modern science-fiction was presented by

Scott Bukatman (1993). He writes "[t]he superimposition of technology on the human is dramatized in all its effects throughout science fiction: this is its function. The computer alone is narrated as a prosthetic extension, as an addictive substance, as a space to enter, as a technological intrusion into human genetic structures, and finally as a replacement for the human in a posthuman world (the computer is juxtaposed to the human; it is superimposed upon the human, and it ultimately supersedes the human)" (Bukatman 1993, 259). Concluding her analysis of early 90ies cyberspace discourse, Margaret Wertheim argues that "[w]here early Christians conceived of Heaven as a realm in which their 'souls' would be freed from the frailties and failings of the flesh, so today's champions of cyberspace hail their realm as a place where we will be freed from limitations and embarrassments of physical embodiment – what cybernetic pioneer Marvin Minsky called: 'the bloody mess of organic matter'" (Wertheim 1999, 17). However, it will be argued in the following, that 'the bloody mess of organic matter' has to be regarded as the origin of our existence in space and is thus also a crucial factor for the spatial experience of video and computer games.

Merleau-Ponty's emphasizes this role of the body when he says "[i]n so far as I have a body through which I can act in the world, space and time are not, for me, a collection of adjacent points nor are they a limitless number of relations synthesized by my consciousness, and into which it draws my body. I am not in space and time, nor do I conceive space and time; I belong to them, my body combines with them and includes them" (Merleau-Ponty 2002, 162). In addition to this grounding in spatiotemporal relations, he also puts forward that there exists a space of the body independent of conscious thought or representational structures. "My body has its world, or understands its world, without having to make use of my 'symbolic' or 'objectifying function'" (ibid.). *Kinaesthetic space* designates precisely this spatial sense of the body, the space that is lived, rather than conceived. Merleau-Ponty delivers striking evidence when he describes the problems of patients suffering from apraxic disturbances, who are incapable of imitating another person's movements if they are not oriented in exactly the same way as the other person. In these cases the unconscious awareness of the localisation of different parts of the body at different times is disturbed, and the patients can only imitate movement by employing symbolic functions. In such cases the patient's body image is dysfunctional.

By way of this disturbance one is made aware of the fact that spatial acts such as the imitation of movements do not take place in representative space emerging from acts of thought. This initial form of motility presupposes human spatial perception and it returns in a myriad of different spatial practices, from sports over music to the playing of games. Merleau-Ponty asserts the importance of this basic spatial structure when he writes "[e]ven if subsequently, thought and the perception of space are freed from motility and spatial being, for us to be able to conceive space, it is in the first place necessary that we should have been thrust into it by our body, and that it should have provided us with the first model of those transpositions, equivalents and identifications which make space into an objective system and allow our experience to be one of objects, opening out on an 'itself'" (Merleau-Ponty 2002, 164).

However, the crucial point concerning the *kinaesthetic* modality of space, is the fact that such basic motility is essentially an automatic process although it will at times be influenced by perceptions, conscious decisions and symbolic operations. Merleau-Ponty presents the term "habit" for spatial operations that incorporate objects and tools into the spatial body image. He gives examples, like the blind man's stick, which ceases to be a perceived object, but becomes part of the motoric body image as something to perceive with. Another interesting example is the habit of driving a car, where the driver does not have to compare the width of a narrow opening consciously with the dimensions of his car, just as somebody going through a doorway does not consciously have to check the width of the door against that of his body. In order to incorporate tools and objects into the unconscious body space, phases of conscious training are necessary.

Most games feature training levels, where the player accommodates to the interface and its functions. If, as Merleau-Ponty states, "[h]abit expresses our power of dilating our being-in-the-world, or changing our existence by appropriating fresh instruments" (ibid. 166), then we have to consider that the habitual spatiality one might acquire through playing a computer game amounts to such a change of existence. How do these spatial habits emerge in video and computer games?

Merleau-Ponty presents an observation that leads to the core of this issue when he notes "[w]hen I sit at my typewriter, a motor space opens up beneath my hands, in which I am about to 'play' what I have read. The reading of the word is a modulation of visible space, the performance of the movement is a modulation of manual space, and the whole question is how certain physiognomy of 'visual'

patterns can evoke a certain type of motor response, how each 'visual' structure eventually provides itself with its mobile essence without there being any need to spell the word or specify the movement in detail in order to translate one into the other" (ibid.167).

Clearly, in the context of this study, the keys on the typewriter can be seen as any kind of game interface, from joysticks over mice to the very elaborate interfaces in contemporary game arcades. The kinaesthetic modality of space is the site of the interface. Interfaces facilitate "the motor space that opens up beneath our hands", and the "modulation of visible space", or the visual representational modality of space, is an important element in this process.

Within Merleau-Ponty's typewriter analogy, "[…] the subject who learns to type literally incorporates the key-bank space into his bodily space" (ibid.). In exactly the same way, a game player incorporates the interface-space into his bodily space and, for example, avatar movement is gradually integrated into the player's body image. Thus it seems entirely wrong to proclaim any kind of vanishing of the body in relation to computer and video games. The opposite seems to be happening: the game's spatial apparatus is incorporated into the player's body space. For this translation to be successful, it cannot operate on a conscious or logical level, but on the basic level of spatial habit or intuitive body space. Such basic interaction habits in the game could be understood along the lines of Piaget's "sensorimotor schemes" (Piaget, Inhelder, 1969, 4), which are defined as organised series of motor acts formed in the process of reiterating action in the same or similar circumstances. Furthermore, "sensorimotor schemes" are made up of motor acts, which are performed under sensory guidance, such as visual, audible or tactile information. However, they are thought to operate on a very basic level that precedes language and symbolic activity. Maatanen points out a very interesting aspect of the sensorimotor scheme in relation to spatial organisation when he writes "[t]he child's conception of permanent object is based on the ability to manipulate material objects. Visual coordination takes place on the ground of the already formed sensorimotor scheme of grasping. The child sees the object from different perspectives, but does not learn to associate these different images together as images of one and the same object, until the sensori-motor scheme of grasping (manipulating objects) has formed, until it has learned to take hold of the objects." (Maatanen 1993, 55). Following Piaget's conception of the sensorimotor scheme, it

seems to become clearer that basic motor action is a condition of human spatialisation, and that tactile information as well as movement are crucial factors concerning the organisation and development of a spatial being in the world.

Contemporary neurological has re-evaluated the involvement of the entire body in brain activities as a basic condition. Pathological cases of people who loose limbs and simultaneously all memories of events, which were experienced on the basis of their use are revealing in this context (Sacks, 1998). Not only do these examples demonstrate how problematic the Cartesian binary model has become, but they also seem to rein in different tendencies of constructivism. Experiments with sensory deprivation chambers have demonstrated that after a period of time logical thought breaks down and various hallucinations emerge. In the light of these experiments one might also read Deleuze and Guattari's dictum of the "Body without Organs" differently: "[y]ou never reach the Body without Organs, you can't reach it, you are forever trying to attain it, it is a limit" (Deleuze, Guattari 1987, 151).

It is crucial to point out that video and computer games reach out to the body in more ways than other media devices. If computer and video games are considered as media devices that enable spatial navigation based on sensorimotor schemes it follows that they are capable of incorporating very basic structures of human spatial experience. Thus they are in much closer proximity to what Lefebvre terms lived space, than other media systems like film or photography, which do not offer direct motor involvement. In this sense, in computer and video games, space is lived through symbolic representation and based on conceived spatial structures (the rules of the game).

Newman seems to allude to this state of play when he writes "[…] videogames engender a degree of interaction with the gameworld that goes far beyond the abstracted 'use' of a system or vicarious identification with and manipulation of an iconic character or world. As a consequence of the perfect tuning, appropriateness, and feel of the interactive interface, the player arguably becomes enmeshed within the feedback loop of the gameworld" (Newman 2004, 142). This description points towards some of the key functions that are characteristic of *kinaesthetic space*. Firstly, the interface and the player's accommodation to it are key factors for the embodied experience of the game. Secondly, time-structures such as repetition are important for the feedback loop between player and game and the constant repetition that emerges from training and replaying parts of the game. The looped form of the game

player feedback is structured rhythmically. I will first discuss the interface devices and then move on to highlight the importance of rhythmic structures in games.

On the level of the interface one can distinguish between indirect control and direct control over the avatar or *game-camera*. Whereas the first is likely to create a weaker kinaesthetic link, in the second case the *kinaesthetic space* comes to the foreground. Wilhelmsson has presented a precise differentiation between direct and indirect control over what he calls the "Game-Ego"(avatar). He writes "[i]ndirect control of a character means that the game player's motor action is not immediately transferred into an action by the controllable character within the *game space* (i.e. the Game Ego). This type of interface is most common in narrative adventure and mystery games and is found in games like *Secret of Monkey Island*, *Sam & Max Hit the Road* (Lucas Arts 1993), *Day of the Tentacle*, *Full Throttle*, *Phantasmagoria*, *The Daedalus Encounter* etc." (Wilhelmsson 2001, 161). In the following he points out, "[t]hese games have similarities with the constructions of space seen in movies i.e. sequences edited together" (ibid. 165). They enable the player to start such sequences, and then perceive them without direct interaction.

Direct control over the avatar is at work in most action, shooter, racing, driving and flying games. Here the player's motor action is directly translated into avatar action, which leads to a strong kinaesthetic bond between player and game. To avoid confusion it is important to note that, although in some cases the control over the avatar might be synonymous with the control of the game-camera (in FPS games for example), this does not hold true for 3rd person PoP games. Certain games, most notably simulation and strategy games present mixed forms between direct and indirect control.

If one addresses the numerous different types of interfaces for games, one is immediately brought back to the first category of this spatial model, the *user space*. It can be stated that, the material side of the interface is located in *user space* while the effects that come to light during its use have to be regarded as part of the *kinaesthetic modality* of space. The shapes, forms and functions of interface devices influence the embodied spatial experience of a game to a high degree. A very striking example for the interrelation between *user-space* and the *kinaesthetic space* can be seen in Sony's Eyetoy interface. It is essentially a USB camera that is plugged into the Playstation 2 and functions as an interface device to games by creating a closed circuit video loop akin to CCTV-systems, where the player interacts with the game with his/her entire

body. Body movement is mirrored on screen and overlaid visually with zones that have to be activated or deactivated by moving one's limbs. The strong kinaesthetic sensation generated by all Eyetoy games results from immediate and direct body-control over game events.

However, in most cases, the game-interface is designed exclusively for hands or feet. Generally, the functions and layout of an interface device are structured in such a way that they can be learned without too much effort since problems with mastering game interfaces are among the most important reasons that keep people from playing a game. Quite often the term "playability" is used to designate issues of interaction with the game. Playability, reaches into the realm of the *kinaesthetic space*, insofar as it is commonly used to judge the quality of the link between interface and movement or action system in a game. The design and implementation of interfaces and interaction models are crucial for a game's success. Computer games can get away with mediocre graphics, but if the interface or interaction model is badly designed or implemented the game will most definitely fail to be successful. This problem becomes quite visible in the case of games that are ported from one system to another, for example, from PC to console. Since the console has a limited number of interface elements in comparison to the PC's keyboard, some games cannot easily be moved from one platform to the other without sacrificing playability.

A number of different game genres and devices have developed certain interface standards. For example, the Playstation introduced controllers with a fixed button layout. Various different PC FPS games use similar keyboard layouts for the different types of action buttons. Additionally, nearly every contemporary PC game enables the user to change the button designation. These standards and options enable the instant playing of new games without having to accommodate to new interfaces. If there are new in-game features or functions the player can concentrate on incorporating these without having to worry about already habitual issues such as navigation. These standards have become so important that a game company that changes for example the jump button for a Playstation game would be confronted by angry gamers and be received critically by the gaming press. A good example for a recent flop, allegedly due to the game's unorthodox control system is Rareware's *Grabbed by the Ghoulies* that was developed for the X-Box.

A different strategy enabling a shorter accommodation phase is to provide intuitive interfaces based on tools experienced in the physical world. For example, the interface device for Sega's *Bass Fishing,* which became immensely popular in Japan, is a fishing rod. The game is played by moving the fishing rod towards the screen and whenever a fish bites it has too be pulled away from the screen. Interface devices such as steering wheels for driving games follow a similar logic. The operational structures are quite easily incorporated because they are analogous to real world actions. A last example, the rhythmic dancing game *Dance Dance Revolution*, where the player has to step on different floor pads mirroring the movements of dancers within the rhythm given by the game, is also able to build on previous bodily experiences. Interface devices that facilitate tactile feedback, such as the shock controller of the Sony Playstation, or so-called rumble packs also have to be regarded as part of the *kinaesthetic modality of space*. A very interesting example for the creative use of tactile feedback is the game *MGSII*, where the controller starts to mimic the rhythm of increasing heartbeat in situations of heightened alertness. Here, the interface becomes an intricate biofeedback device that generates a deeper coupling between player and machine through simulating a body rhythm.

Most importantly, although it depends on mastering the interface, the kinaesthetic modality of space moves to the foreground in a reciprocal relation to the vanishing of the interface from conscious perception. Just as the 'veteran' typist is not consciously aware of the keyboard, the game player will at some point overcome conscious awareness of the interface and incorporate it into his body or 'finger-space' like a musician who plays an instrument very well.

It is crucial to keep in mind that the kinaesthetic modality only exists in conjunction with active gameplay; it is present while a player is interacting with the game and fades into the background during non-interactive sequences in games, such as start and loading, cut-scenes and inter-level sequences. Newman clarifies the importance of such "non-interactive" moments in games and points out that during the playing of most computer and video games there are, surprisingly, numerous breaks and gaps that define the time structure of the medium. Non-interactive cut-scenes that are indebted to filmic conventions are frequently used as narrative vehicles. Thus one could state that during such cut-scenes games share characteristics with film and the *kinaesthetic modality* that comes into play during interaction is among the most

significant factors separating the two media from each other. The constant movement between interaction and non-interaction introduces a very specific order of time that is characteristic for video and computer games. A specific form of rhythm establishes itself through the oscillation between interaction and non-interaction.

Claus Pias writes about the prototypical game *Pong*: "[t]he 'pong'-sound of the collision detection appears as a reward for the right answer in a responsible game, and its rhythmic recurrence enables the functioning of this ball game and makes the coupling between human and game in a shared system tact [sic.] audible" (Pias 2000, 133). He then goes on to speculate whether this rhythmic accommodation could be one of the explanations for the feeling of "losing oneself" in the game. I will return to the question regarding loss of the perception of time and space in games at a later stage and present a slightly more complex answer. However, rhythm is most definitely one element of the solution to this puzzle. Apart from numerous successful so-called rhythm games, like *Dance Dance Revolution* or *Parappa the Rapper,* rhythm is an important factor in all computer and video games.

In his final published work, Lefebvre sought to synthesize his earlier efforts concerning the nature of space with structures of time in the form of a project dedicated to the analysis of rhythms. He envisages the discipline *Rhythmanalysis,* that would generate "[..] a new field of knowledge (savoir): the analysis of rhythms; with practical consequences" (Lefebvre 2004, 3). Lefebvre posits the body at the heart of this discipline, when he writes "[t]he theory of rhythms is founded on the experience and knowledge (connaissance) of the body; the concepts derive from this consciousness and this knowledge; simultaneously banal and full of surprises – of the unknown and the misunderstood" (ibid. 67). But the concept of rhythm is moved from the "polyrhythmia" of the body to envelop our entire sensual world when he states that "[e]verywhere where there is interaction between a place, a time and an expenditure of energy, there is a rhythm. Therefore:

a) repetition (of movements, gestures, action, situations, differences)

b) interferences of linear processes and cyclical processes;

c) birth, growth, peak, the decline and the end" (Lefebvre 2004, 15).

All of the elements Lefebvre deems inherent to rhythm are prominent factors in computer and video games.

Firstly, repetitive structures are ubiquitous; from the most basic level, the repetition of basic animation cycles, textures, movements, over the iterative nature of computer programming, the constant repetition of actions during game play (pressing a button), the repetition of parts of the game during gameplay to the repetition of spaces and places that are revisited in a game.

Secondly, interferences between the linear process of a teleological *narrative space* (find this object, kill this end monster) and the cyclical processes that lead to its finalisation are a core function in video and computer games. However, apart from this reading of the opposition between linear and cyclical structures, they can be seen in a much more fundamental relationship. Lefebvre writes" [t]ime and space, the cyclical and the linear, exert a reciprocal action; they measure themselves against one another; each one makes itself and is made measuring-measure; everything is cyclical repetition through linear repetitions" (ibid. 8). This reciprocal relationship is geared towards a dialectic process, whereby the synthesis unfurls itself as mediated and mediator: rhythm.

Thirdly, cycles of birth and death of the avatar are common phenomena in most video and computer games. The accommodation to the rhythm of the game is one of the defining moments of the kinaesthetic modality of space.

Furthermore the training of a computer game with the goal of accommodation to what it demands is itself a rhythmical process of constant repetition. It resonates with Lefebvre's notion of "dressage" - "[h]umans break themselves in like animals. They learn to hold themselves. Dressage can go a long way: as far as breathing, movements, sex. It bases itself on repetition" (ibid. 40). "Dressage" usually presents itself as the triple structure of activity, repose and reward, a form that anybody who has ever played a computer game knows very well. The question resulting from this reading is basically, what is the player trained for? Or to put it differently, is the reward enjoyable enough to sustain the training or are there other elements that have not been discussed yet?

"Dressage" as a conscious process of learning seems to entail a particular exteriority to the rhythm of the game, because one has to observe in order to react. Lefebvre captures this problem very accurately when he describes the problems of the rhythm analyst as follows: "[i]n order to analyse a rhythm, one must get outside of it. Externality is necessary; and yet in order to grasp rhythm one must have been grasped by it, have given or abandoned oneself 'inwardly' to the time that is

rhythmed" (ibid. 88). Apart from the fact that this observation seems to highlight the problems of any scientific approach to a sensual medium, it might also help us to gain an understanding of the kind of joy that results from playing computer games. Being grasped by a rhythm, and giving oneself over to it, seems to be one aspect of the enjoyment closely tied up with *kinaesthetic space*.

Mihaly Csikzentmihalyi introduced the concept of *flow* (Csikzentmihalyi 1992, 71) to explain how joy or happiness could emerge from activities that entail a loss of time and space perception. This concept might present a starting point for a better understanding of the curious phenomenon of losing oneself in a computer game. The term flow was coined in conjunction with psychological research into happiness. I will in the following present a notion of *flow* that is partially influenced by Turner's reading in the context of performance and theatre (Turner, 182, 55 – 58). MacAloon and Csikzentmihalyi write "[f]low denotes a holistic sensation present when we act with total involvement" and it is "a state in which action follows action according to an internal logic which seems to need no conscious intervention from our part … we experience it as a unified flowing from one moment to the next, in which we feel in control of our actions, and in which there is little distinction between past, present and future" (Turner 1982, 56). Csikzentmihalyi presents six distinctive qualities he deems important for the "flow experience" and I will briefly introduce each single one and discuss their relevance in the context of our specific subject.

1. The experience of merging action and awareness

While a player may be aware of what he is doing, he cannot be aware that he is. In other words, self-consciousness can break the flow experience because it leads to a loss of the rhythm that is necessary for the flow event. We could paraphrase with Lefebvre: during a flow experience the player has to be inside the rhythm generated emerging from gameplay and once he becomes exterior to it the flow is lost. The merging of action and awareness means that the dualism between these states is folded into one. The player accommodates to the rhythm emerging from the feedback loop between player and program.

2. The centering of attention on a limited stimulus field

The aforementioned state of merging action and awareness comes into being because the player's attention is fully focused on a limited stimulus field presented by the audiovisual or haptic (in the case of shock controllers or rumble packs) information delivered by the game. This fact could also prove to be responsible for the phenomenon of a shifting perception of time, since the player is focused on the now to such an extent, that past and future do not matter to him anymore. All the information that is irrelevant to the present game action at hand, such as anything happening in the *user space*, people entering or leaving the room is excluded. The player intensifies his focus on the present demands of the game and blends out everything that is not directly connected to it. Awareness and attention is limited and intensified too a high degree. In a game, the rules perform the function of defining the stimulus field as well as generating motivation in the form of competition or points. Any information or perception which is outside of the field defined by the rules is identified as disturbing noise and is dismissed as such. The rules also put forward what kind of task is demanded and how the player's concentration will be rewarded. However, while playing, the player is not focused on the rules but on the necessary actions he has to perform in the game. During the flow state the rules move to the background. For Csikzentmihalyi another crucial factor is the "will to participate" and if we follow Huizinga's definition of games, one has to voluntarily opt to play a game. If one observes the players of computer games that demand fast action and highly skilled behaviour, the enormous concentration and focus on the game becomes quite obvious.

3. The loss of Ego

The state of Flow generates a kind of temporary autism. The player is immersed in the flow experience and accepts the rules of the game as the rules of his universe. As Turner puts it "[t]he 'self' which is normally the 'broker' between one person's actions and another's simply becomes irrelevant – the actor is immersed in the 'flow', he accepts the rules as binding which are also binding on other actors – no self is needed to 'bargain' about what should or should not be done.[…] Self-forgetfulness here does not mean loss of self-awareness. Kinaesthetic and mental awareness is indeed heightened, not reduced – but its full effect is broken, as we have seen; the special sense of self - intrinsic to it, is lost" (Turner 1982, 57). To lose oneself in a game could also mean to transfer all the activities of the player's ego to what

Wilhelmsson calls the Game Ego, or the avatar. In this sense the player is completely immersed and present in the game through his/her actions in the *game space* and temporarily looses his/her self-awareness in relation to the rest of the world.

4. Control of actions and environment

The skills of the player have to be matched to the demands of the game. This is also why the demands of mastering the interface have to be overcome if a flow experience is to take place. In the realm of music we could speak of a certain degree of virtuosity that has to be reached before flow is possible. According to Csikzentmihalyi this form of control over the situation leads to a "positive self-concept". The player can cope with the demands of the game and fully control his or her actions within the *game space*. Worry and fear that might be connected to demanding tasks move to the background and the player is delighted about his sense of command over the program. If the demands of a game are too complex or a game is too hard, flow is not possible and the experience will be frustrating. This might be one of the reasons why most games present the player with different levels of difficulty, so that a novice player can enjoy the game just as much as a professional one.

5. Non-contradictory demands for action and unambiguous feedback

Computer and video games create such non-contradictory demands for action and they provide immediate feedback in the form of auditory or visual information. Action games generate instant audiovisual feedback that is simultaneous to the gameplay. Furthermore, performance is assessed in the form of high-scores or competition results. Numerous games provide in-game statistics that tell the player immediately how he/she is performing. Again, the explicit rules of the game make the judgement of performance easier than in everyday situations of life.

6. Flow is autotelic

The last quality, Csikzentmihalyi deems important for the flow experience, is that it is autotelic. In other words it has an end in itself and "seems to need no goals or rewards outside of itself". In this sense the game is just a means to an end not the end in itself. Flow might be reached in a game of chess just as much as in a high

speed driving game. The result, a state of happiness brought about by the flow experience is just the same.

The concept of flow can be beneficial to understand why particular computer games are so enjoyable and how the kinaesthetic link between player and game leads to a temporary state of happiness. Essentially flow can be seen as a type of strong immersion leading to a presence in the *game space* that is not created by the narrative modality of the game but by the kinaesthetic one. Following this logic, two different types of immersion can be made out. Both are present in games, sometimes even at the same time; namely *narrative immersion* and *kinaesthetic immersion*. Furthermore it can be stated that it is precisely the second kind that has to be seen as a new and distinctive element in the medium of computer and video games, whereas *narrative immersion* is a function that is strongly linked to traditional media systems, such as literature and film. Yet, as has been mentioned throughout this chapter, there might be numerous situations in games where what we have termed the *narrative modality* comes to the foreground and others where the *kinaesthetic modality* is superimposed upon the others.

3.7 CONCLUSION

The preceding chapter has served to develop a novel and original model that can be employed to examine and define spatiality in video and computer games. To recapitulate, the reading of such games as *heterotopical* in Foucault's sense has been advanced, based on the fact that they are capable of displaying highly divergent spatial qualities at the same place and time. The enquiry has been positioned within the framework of Lefebvre's triadic model of space, in order to account for the fact that space in video and computer games is simultaneously conceived, because it is generated according to mathematical principles and following cultural codes, perceived through a highly spectacular audiovisual machinery and most importantly also lived, through an embodied relation with the *game space*.

Based on this insight, five different spatial modalities have been put forward, namely *user space*, *narrative space*, *rule space*, *audiovisual representational space* and *kinaesthetic space*. The distinction between these elements has been established by tracing the

different qualities of space present in the medium in the light of a variety of games. It is crucial for the viability of this model to acknowledge the highly fluid and dynamic interplay between and the strong connections among these different instances. Moreover, it has to be avoided to treat these categories as if they were cast in iron. Rather they have to be seen as something that is constantly alive and subject to variation across different genres of games but also within games. A particular game might start out with a *frame narrative* that introduces the player to the *game space* at which point all the other modalities are still in the background. When the player starts to act, the *kinaesthetic modality* can come to the foreground only to give way to a the narrative modality coming to the foreground during cut-scenes and breaks. Simultaneously all the emanations of the audiovisual modality are in a dynamic interrelation with the *spatial narrative* (entities in the game are visually part of the story world) and the *rule space* (since the behaviour of those entities as well as the spatial action by the player is prescribed by them). The action takes place in the *user space* that can also influence other modalities, as has been shown above. This whole fluid process shows itself as rhythmically structured dynamic interplay between player and program.

I will now focus a subject that is of great importance because it has a very strong impact on the creation and perception of space in video and computer games. The functions of sound in the *game space* will be analysed in the next chapter. In relation to the model that has just been presented, the following Chapter 4 has to be read in close conjunction with *audiovisual representational space*.

4. THE GAME SPACE FROM AN AUDITIVE PERSPECTIVE

4.1 INTRODUCTION

The earliest information about the external world an unborn baby can gather is commonly understood to be provided by the sense of hearing. Until the infant is capable of using the visual sense, the auditory realm along with the sense of touch supplies all the necessary environmental clues. During this time of human development, hearing is the sense dominating spatial orientation. This early reign of hearing is later superimposed by the directional nature and the richness of information offered by the visual sense. Throughout most everyday tasks all senses inform each other and work together, producing coherent spatial perceptions. Marshall McLuhan and Edmund Carpenter write about the particularities of auditory experience "[t]he universe is the potential map of auditory space. We are not Argus-eyed but we are Argus-eared. We hear instantly anything from any direction and at any distance within very wide limits. Whereas the eyes are bounded, directed, and limited to considerably less than half the visible world at any given moment, the ears are all-encompassing, constantly alert to any sound originating in their boundless sphere" (Carpenter, McLuhan 1960, 69).

Hearing does establish a very direct connection to the surrounding environment. However, western history has a long tradition of describing space primarily in visual and pictorial terms, often neglecting the importance of the auditory realm. In his account of the specific perception of space found in Aivilik Eskimo culture, Edmund Carpenter reveals that they favour hearing as a source of spatial information and describes the different nature of the resulting spatial awareness. "Auditory space has no favoured focus. It's a sphere without fixed boundaries, space made by the thing itself, not space containing the thing. It is not pictorial space, boxed-in, but dynamic, always in flux, creating its own dimensions moment by moment. It has no fixed boundaries; it is indifferent to background" (in: Schafer 1977, 157).

This auditory space, that has no fixed boundaries and is constantly in flux, reverberates strongly with Lefebvre's notion of lived space, as a kind of space that is "directly" experienced. The sound theoretician R. Murray Schafer considers Aivilik culture as an example for the reversal of visual dominance developed in the European Renaissance. He points out that within the Eskimo culture acoustic space influences and supersedes visual space.

Although the representational spaces of western traditional arts may have been dominated by the visual coding of space, the recent development of audiovisual media has re-introduced the sense of hearing into the equation. As has been argued, video and computer games are media systems that feature very particular means of representing space. With the exception of a number of text-based games, the overwhelming majority have to be regarded as audiovisual kinaesthetic artefacts and the relationship between sound and image lies at the centre of the gaming experience. The importance of the aural realm, especially in relation to what has been introduced and discussed as the modality of *kinaesthetic space,* cannot be overlooked. Sound in games enables the extension of spatial representation beyond the visual sphere and synchronises the kinaesthetic link between player and game through instant feedback. For Brenda Laurel, "[t]ight linkage between visual, kinaesthetic, and auditory modalities is the key to the sense of immersion that is created by many computer games, simulations and virtual-reality systems" (Laurel 1991, 161).

Although most researchers acknowledge the importance of the auditory for the medium of computer games, no consequent account of the nature of this "linkage" between the different sensual modalities in relation to the spatial nature of game experience has been presented so far. For example, a recent methodological model by Lars Konzack (2002, 89) that is presented as a framework for the complete analysis of numerous aspects of computer games does not mention sound. He has used his model to analyse the fighting game *Soul Calibur*, and developed seven layers of analysis: hardware, program code, functionality, game play, meaning, referentiality and socio culture. Elements of the visual aesthetics are understood as part of game play, meaning and referentiality. However, sound is not considered at all. To give just one example, the various effect sounds connected to the different weapons in a game like *Soul Calibur* are important elements of the gameplay as they generate feedback about the player's performance while reaching out to the genre of martial art films and their distinctive sound design. This is just one of many examples for the

marginalisation of sound in the current literature. Whenever sound does turn up on the agenda, it is very often in relation to film and music. Steven Poole (2000, 80) for example argues that a superficial similarity between films and video games exists because they communicate to eyes and ears of the audience and both share methods of sound production. Although, there are indeed similarities between the sound practice in film and computer games, which enables the use of film theory in this context, it is crucial to approach sound in games as a separate and unique phenomenon.

This state of affairs leads to a number of questions: How can the impact of sound on the emergence of representational spaces in video and computer games be described? Which types of sounds are present and what is their specific role in relation to the image? Are they merely an addition to the visual aspects of the game, or do they have the capability of actively transforming the spatial information? What is the relationship of auditory elements to the spatial modalities that have been discussed in the last chapter? Which theories and approaches might be beneficial in this context?

One of the most influential researchers dealing with the relationship between sound and image in the context of film is the French theorist Michel Chion. He has termed the relationship between sound and vision the "audio-visual contract", and the relevance of his findings in relation to the subject at hand will be discussed. Other theories, dealing with the spatial nature of sound, namely from acoustic theory and electroacoustic music might be appropriate to turn to for answers. But before this investigation can move any further, the technological basis of gaming; the hardware that actually produces the sounds has to be addressed briefly.

The evolution of the concepts and technologies behind the production of sound for video and computer games shows a somewhat slower pace in comparison to the development of their visual counterparts. The interest in the ongoing development of the graphic and visual possibilities of games seems to have overshadowed the audio side. The largest part of the memory and processing power available from early computer systems was dedicated to the graphic representations on screen and only a very small amount was reserved for the production of sound.

Various in-depth accounts of the history of computer game technology can be found on the Internet. Joerg Weske's history of sound technology (Weske 2000) is

among the most complete ones. However, this is not the place for a detailed history of the particular chip designs and capacities of game consoles and computer systems.

Considering the impact of technological changes on the actual content of the game sound it is possible to define three major stages: the era of the programmed sound chip, the use of digitized sound with the advent of larger storage media like the CD-ROM and the recent advances in real-time digital signal processing (DSP) and real-time 3D sound systems. It can be stated that the development of audio hardware has had an enormous impact on the soundscapes of different games. Throughout the period of programmable hardware chips, video and computer were the proprietors of new and alien electronic sounds that also influenced the popular music of the time. In this early phase sound designers had to be programmers who generated sounds in highly restricted environments. When the use of recorded sounds became a technological possibility the creation of sounds for computer games took a turn and became increasingly similar to other fields of media. At the same time, however, the game soundscapes diversified and grew richer. Voice-actors and studio recording sessions were introduced and game sounds began to lose the air of novelty and quirkiness that had accompanied the early games. With stereo and 3D sound the options for spatial sound design exploded and sound became gradually more important for the narrative aspects in games. The latest technological shift, namely the introduction of digital signal processing in real-time offered a host of new possibilities for dynamic sound that could be interlinked with significant moments during gameplay.

4.2 DISTINCTION BETWEEN USER AND GAME SPACE

Since the perspective in this chapter is directed towards aural space, it is sensible to define the categories that will be used in the following. Firstly, in reference to the terminology laid out in Chapter 3 one can define the *user space* as the physical room occupied by the user, whether at home or in the gaming arcade. Secondly, the origin of the sum of sounds emerging from the game will be referred to as the *game space*. The major reason for this distinction is the fact that the *user space* is subject to a number of significant variations resulting in completely different experiences whereas the sounds originating from the game remain relatively stable. The size and the

nature of the room, the sounds coming from the environment, as well as the specific hardware used, influence the player's experience.

In contrast to that, the *game space* is usually a very consistent set of elements that does not vary from player to player, since the majority of games are still packaged as products on storage devices such as cartridges, CDs or DVD-ROMs. In other words the distribution of the same data to a large number of players is ensured. Thus, although individual players might experience different types of sounds when playing the same game, they potentially have access to the same sounds. The exception to this rule would be the growing number of so called game mods and patches, add-ons and changes for existing games that alter original games.

4.2.1 THE USER SPACE

Somebody playing the game *Tomb Raider* on a Playstation device, in a small room on a small TV with mono sound output will have an entirely different spatial experience than somebody else playing the same game on a state of the art PC with a surround sound card and appropriate speakers in a large living room. The factors influencing the characteristics of the *user space* are, on the one hand, the qualities of the audio hardware, such as the type of chip, the use of mono or stereo sound, headphones or speakers and, on the other hand, the room acoustics as well as all the non-game sounds present in the environment. If one considers the effects of spatial acoustics it is important to note that games designed for different user-environments often have different over-all sound properties. For example, the user space of a coin-operated game, for example a shopping mall, usually has a lot more interfering sounds than the average living room. Accordingly, the sound design for games in public spaces has developed specific qualities. Most importantly, there has to be a recognisable branding of the sound to make it distinguishable among all the other audible games in the same space. In other words there exists a kind of sound branding that enables the player to recognise a specific game immediately among many others. Furthermore, the sound has to support the instant gratification the game should provide when it is fed with coins. In an arcade the user generally doesn't spend the same amount of time with a game than at home. Thus, games produced for home use generally have a lot more options of slowly building up dynamic and complex sound environments.

Detailed research into the specific nature of the *user space* would lead to the analysis of different room-sound situations and deal with acoustic problems in relation to the specific hardware. Qualitative listening could enable a form of research that accounts for the unique auditory structures present in this medium. Although it is important to keep in mind that, for example, a game that is produced for a stereo device will only produce the right results with stereo hardware, here is not the place for further investigation in this direction. The focus of this chapter is directed towards the sound coming from the *game space* and details of sound hardware and room acoustics will deliberately be disregarded here.

4.2.2 THE GAME SPACE

The collection of visual and sound elements organised as culturally coded representations of space organised and presented by the game constitutes the *game space*. All the sounds originating from the game during gameplay, as well as the sound of the credits before and after the game and all the sounds related to the interface are understood to belong to the *game space*.

4.3 THE SOUND OBJECT

Although there exist numerous software packages on the market that provide for the programming needs of game development, most game developers write their own custom built programming environments for each new game. The structure defining the relations between all the elements in a game is referred to as game-architecture. Within the game-architecture, separate elements, such as pre-recorded sound files and textures are regarded as objects, and organised in classes.

The software that enables the interaction between these objects is called the game engine. A game engine is first of all a set of different software libraries, each of which perform specific functions necessary to create the interactive environment of the game. There is, for example, the 3D graphic engine, necessary for interactive animation, the sound engine, responsible for sound synthesis, effects and spatialising functions and other specific libraries like AI (Artificial Intelligence) engines and physics engines used to simulate physical systems are part of the game engine. The architecture consists of the objects within classes on the one hand and the libraries

defining how they are implemented on the other hand. Pre-recorded sound is, seen from the point of view of the software architecture, similar to graphic files. Both are part of the conglomeration of different "objects" in the game architecture. Thus, it makes sense to speak of "sound objects" which are used in the game according to a program. The non-linear use of sound objects from a database, deployed according to an algorithm, marks a conceptual difference between the use of sound in computer games and traditional musical notation, which relies on fixed linear structures. All sound objects are part of a wider network of elements whose interrelations are determined by the game engine. In the case of real-time DSP, qualities such as pitch, volume, reverberation or other effects, are regulated by a program that is in turn dependent on user-input. Every sound object can potentially enter a temporal and spatial relation with every other sound or graphic object. In this sense, it is possible to define different types of sound objects whose deployment in the game are regulated by a set of functions.

The notion of the sound object resonates with meaning from the field of music theory and its use in the game context has to be clarified. The French theoretician and musician Pierre Schaeffer introduced the term sound object (objet sonore) in his influential work *Traité Des Objets Musicaux*. He writes "[w]hen we listen to sound objects whose instrumental sources are hidden, we are led to forget the latter and to get interested in the objects themselves. Here, the dissociation between seeing and hearing is favoring a specific way of hearing: the hearing of sound forms, without any other purpose than to get a better understanding, and, finally to be able to describe and analyse the content of our perceptions" (Schaeffer 1966, 93).

According to Schaeffer sound objects are all the sounds that are not merely transportation devices for something else, signifying either their source such as a musical instrument, or a specific meaning such as intelligible language. Sound objects are sounds that ought to be observed for the sake of their sonic qualities alone. According to Schaeffer, the dominant form of listening to sounds is of an indexical nature. We try to identify the sources of sounds and have complex systems for deriving meaning from them. Schaeffer advanced the method of "reduced listening" a way of listening that would avoid the habit of searching for the semantic properties of sounds and instead lead to their specific properties and perceptual characteristics. Reduced listening was put forward in order to free the sounds from being secondary to their origin. Schaeffer set out to develop a language that describes sounds

exclusively according to their innate properties as opposed to the qualities of the objects or actions producing them. Seen in this light, a lot of in-game sounds cannot be subsumed under Schaeffer's conception of the sound object, the most obvious being speech. In addition to that, sounds directly connected to their source objects (for example, a visible vehicle that creates a specific sound) would also fall outside of this system. Furthermore, it is quite obvious that a mode of reduced listening will not be achieved during the playing of an audiovisual game, simply because one is drawn to construct relations between the visual and auditory information. It is, however, possible to describe sound qualities that are inherently spatial, independent of an indexical connection to their source.

Ulf Wilhelmsson has shown that sounds have innate orientational qualities, conveying schemes such as up-down or approaching-leaving, via the change of their pitch. He claims that sounds have spatial qualities without being indexically linked to their material source and describes how changes in loudness and pitch can generate the illusion of movement. Sound objects could be analysed according to these inherent qualities as Wilhelmsson has demonstrated. Yet, this chapter intends to focus on the use of sound objects in the game environment and there is no room to describe the inherent qualities of the sounds themselves in detail here.

The use of the term "sound object" is proposed here, because it designates the paradigmatic nature of the sound elements in the *game space*. From a programmer's point of view, all sounds are treated as classes of objects belonging to the sum of elements that make up the game. Most importantly, there is no "natural" relationship between a visual object and a sound, simply because all of these elements are brought together by an "artificial" program. This is not an entirely new phenomenon, since quite clearly in the case of film the relationship between the visual and the audible is also artificially established during the post-production phase. Still it could be argued that in the case of digital games there is an even higher degree of artificiality, since so many of the objects in play are part of imaginary universes.

The use of sound objects in the game, the functions they are subjected to and the relations between them, shape their roles in the generation of *game space*. Before focusing on the effects of the interaction between sound and visual elements and the functions they are subjected to, it is sensible to concentrate on the sound objects

themselves. It is possible to distinguish between different types of sound objects according to their role in the spatial apparatus of the game.

In the following, the game *Metal Gear Solid 2: Sons of Liberty (MGSII)* is used as a major example, due to the fact that, although it is part of a wider genre of action and stealth games, *MGSII* employs sound in very diverse and innovative ways. From a visual standpoint, *MGSII* primarily presents a 3rd person PoP *game-camera* that is switched to a 1st person PoP in specific situations. The narrative is based on tactical espionage and infiltration. The game was developed and published by Konami in 2001 and directed by Hideo Kojima.

4.4 TYPES OF SOUND OBJECTS IN THE GAME SPACE

The following typology of sound objects is based on the identification of the inherent qualities of different types of sounds and their role within the spatial framework of games. It is an attempt to grasp and map out the diverse functions served by auditory elements in video and computer games.

4.4.1 SPEECH SOUND OBJECTS

In most cases speech sound objects are part of the narrative system of a game and thus connected to *narrative space*. Speech is a perfect vehicle for the narrative of a game and can help to make in-game characters more believable and authentic. There are, however, exceptional cases where speech sound objects are used as mere sound that does not deliver intelligible information, such as murmuring or fantasy alien quasi languages. Speech is either recorded and spoken by voice-actors or synthesized by the sound chip, often resulting in the kind of synthetic voices widely associated with computers or robots. In accordance with the functions of the modality of *narrative space*, in contemporary games, speech sound objects are quite often used to explain the rules of the game, to introduce missions, or to lead players through the game.

In MGSII speech sound objects are used in various ways. All the important characters in the game, such as Solid Snake, Raiden, Vamp, Rose, Otacon are linked

to speech sound objects derived from voice-over acting. Interestingly, speech sound objects in *MGSII* are always accompanied by written text in the style of film subtitles. They are indeed the core transport elements of the game's narrative and most options and objectives are explained via speech. The game employs a radio/video communication device that contacts the main character on a regular basis and enables the player to reach other characters in order to receive directives or help. Even the save interface is an element of this communication device. Each time the user saves a gamestate he is drawn into a conversation with a person. This trick cleverly incorporates the save dialogue into the diegetic system of the game. Speech sound objects are also constantly employed for the description and mapping of locations in the game environment. Their sound qualities often simulate other media systems and their specific aural qualities, such as telephone, radio or TV. In *MGSII* this is present in the radio communication, which is accompanied by hissing and crackling noises. The communication device is also used to emphasize the spatial separation between the user and game characters. It enables the construction of complex spatial relations between speakers, who are located in separate regions of the game environment. There are two very different ways in which speech sound objects influence the spatial practice in *MGSII*.

On the one hand, the spatial information is transported by the text in the form of language. Whenever a character in *MGSII* gives directions - where to move, which object or place to look for - it influences the player's movement in the game environment.

On the other hand, speech sound objects can move through the game environment, which conveys spatial information. This is especially strong in a 3D sound environment, such as Dolby Surround. The movement of sound objects in the game environment can be understood as a spatial function, and will be discussed in detail later on.

4.4.2 EFFECT SOUND OBJECTS

Effect sound objects are sounds that the player cognitively links to visual objects or significant events in the *game space*. They are, in other words, perceived as being produced by or attributed to visual objects or events within the *game space*. Visual

objects are, in this context, all the visual objects presented by the *game-camera*, whether moving or static, directly interactable or not. Examples range from sounds connected to opponents, shots, explosions and consumable objects, over doors, and transportation devices. In this context, events are all the changes in the gamestate (the spatiotemporal relations of all game objects) perceived by the user, whether they are relevant for the active gameplay or not. Sometimes effect sound objects are connected to direct user action (for example gunshots) sometimes they are connected to visible events brought about by the program (a helicopter passing by over head) and in other cases they mark events on their own without a visible equivalent (such as explosions that can't be seen). The realm of the effect sound objects is generally constituted by all the sounds which are at the forefront of the users attention with the exception of intelligible speech. Effect sound objects signal changes in the game state and can provide feedback about changes of conditions in the game, such as the points gained, the health status, birth (spawning) or death events.

Importantly, they do not have to refer to a game object that is visually represented. The sound one hears in synchronisation to the movement of the avatar, "motoric" sounds such as footsteps or motor sounds are good examples for this. In spatial terms effect sound objects have the ability of situating objects in the game environment. Just as speech sound objects, they can also be moved through the game environment, which is in most cases created by panning in a stereo situation from left to right, as well as modulating loudness in order to generate the illusion of objects approaching or leaving.

In the case of *MGSII* there are large number of effect sound objects. They could be classified as being linked to the avatar, the game characters, objects, and events. The following list intends to give some examples, but is not intended to be exhaustive.

Effect sound objects linked to the avatar.

Firstly, there are all external body related sounds generated by the avatar's movement, such as footsteps, sounds produced by fighting or martial arts moves (a swishing type of sound cutting through the air), the sound of the avatar swimming, the sound of knocking on walls (intended to confuse guards), cries of pain when the player is hurt. Secondly, there exist the internal body sounds such as heartbeat, which is used in an intriguing way to strengthen identification with the avatar in connection

with the vibration of the controller when the player is hiding in cupboards. There is also a breathing sound when the avatar smokes a cigarette.

Effect sounds of usable objects carried by the avatar.
This includes all of the weapon sounds, such as a variety of guns, grenades, a sword but also objects like binoculars and different types of sensors, objects that can be thrown as well as clothes.

Effect sound objects linked to in-game characters.
Movement sounds such as footsteps, weapon sounds, a particular sound for surprise, snoring sounds, yawning sounds.

Effect sound objects linked to other entities in the game environment.
This category includes sounds such as the opening and closing of doors, hatches, cupboards as well as elevators and other transport devices, servo sounds of cameras, flying drones, helicopters, planes, ships, birds.

Effect sound objects linked to events in the game environment:
These are sounds produced while the avatar consumes objects such as power up objects, ammunition objects, weapons and tools. Sounds produced by bombs before they explode (ticking) as well as the explosion itself.

4.4.3 ZONE SOUND OBJECTS

I propose the term zone sound objects for those sounds, which are connected to larger areas or locations in the *game space*. Zones can be understood as those areas in the *game space* that contain a finite number of visual and sound objects. A zone might be a level in a given game, or part of a larger set of zones constituting a whole level. Zones are separated by qualitative changes of larger conglomerates of interlinked visual, kinaesthetic or auditory qualities. In other words, a specific area in a game that shares a particular design, lighting as well as sound can be regarded as a zone. In this respect zone sound objects are used to define areas within the *game space* aurally. They can have an indexical or non-indexical connection with the number of visual objects

or events present in the zone. In the machine room of a ship for example you might hear a mixture of machine sounds, maybe hints of sounds produced by the rolling sea. In other cases there might not be a direct link between the audible sound and the visible environment such as sounds that could be described as a low frequency humming that might generate a specific emotional response. Zone sound objects share a lot of qualities with the type of sound Michel Chion has introduced as "ambient-" or "territory" sound when he suggests to "call ambient sound sound that envelops a scene and inhabits its space, without raising the question of the identification or visual embodiment of its source: birds singing, churchbells ringing. We might also call them Territory sounds, because they serve to identify a particular locale through their pervasive and continuous presence" (Chion 1994, 75).

I propose the term "zone sound object" here rather than "territory sound", because the generation of a kind of ambience is also an important characteristic of the game music or score. As opposed to effect sound objects, zone sound objects do not present a direct feedback to events or actions. Rather, they should be regarded as elements belonging to the staging of a location in the game. *MGSII* contains a number of different zone sound objects. There are for example two main outside zones: an oilrig and a ship. On the platforms of the oil rig the zone sound is generated by waves, wind and the sounds of seabirds. The outside zone sound on the ship is mainly characterised by the sound of raindrops that is particularly immersive. The inside zone sound objects are usually dominated by ambient mechanical sounds, such as the humming of an air conditioning system and in one particular case a conveyor belt. A very good example for a zone sound object is the sound in the underwater level, a flooded part of the oil rig (Shell 2 Core) that has a very particularly muffled sound quality which perfectly reproduces the immersive aural experience of being under water.

4.4.4 SCORE SOUND OBJECTS

Game music has a huge emotional impact on the player and it generally enhances the feeling of immersion. Following this logic, there should not be gaps within the musical score of a game because every break will threaten the immersive bond with the player. Game music is often used to mask transitive situations of waiting for interaction options and to veil load times or other idle situations. Game scores can

be dynamically related to the game events, or, similar to film music, as a linear progression of music. The in-between cut scenes in contemporary games, which are commonly used to develop the narration, are in most cases pre-produced and not dependent on user action.

The racing game *Wipeout XL* for example uses popular dance music by artists such as Future Sound of London, Chemical Brothers and Prodigy in an attempt to reach out to a specific audience. If the music is specifically composed for the game (and not simply licensed from a record company as in the above example) it is usually conceptually separated into modules and transitions between them. One of the main problems a game music composer faces is the variability of the temporal structure of games. Depending on his abilities and the gameplay a player might spend a very long time playing a particular sequence or complete it very quickly. The music has to stay interesting enough even if it is present for a very long time. One approach of dealing with this situation is to program a modulation of the instrumentation for a particular theme, another one is to have a variety of different appropriate themes that can be shuffled or randomly accessed. The transitions between these themes or modules have to be seamless. There are a number of different formal strategies for the production of game music. Very similar to film music, there might be a number of themes for the different characters accompanying them through the game. Dynamic changes in the gameplay are often anticipated by changes in the score. When danger lurks around the corner one might be alerted by a change of dynamics or volume. The aspect that is most interesting for our analysis is the location based approach.

Here, the composer creates different themes for the different locations in the game. In *Tomb Raider 2,* for example, there is a musical pastiche of different traditional local musical styles according to the different countries Lara Croft is visiting. Italian style music will be heard in Venice while Tibet is accordingly represented musically with the help of Asian flavouring. A more complex strategy involving location based game music is the possibility of modulating the location tunes if a specific event, such as a discovery or revelation in the game has "transformed" the emotional associations with a space. Atmospheric games like *Silent Hill* make extensive use of this technique. Generally it can be said that a large number of conventions from film music seem to be equally at work in contemporary video and computer games. The major difference that remains is the necessity of a modular and dynamic approach in the case of games. Specific spatial qualities in

game music are mainly realised through the use of location markers, themes that are always connected with specific places in the *game space*. The score of *MGSII* was produced by the Hollywood composer Harry Gregson Williams. It was his first game score and in an interview on the making-of-DVD (Konami 2002), he says that it was challenging for him to produce music without having any direct visual reference for it. Instead he chose to write themes linked to different actions or states in the game, such as sneaking, alert, action, ambient as well as general feelings, like being watched, watching, tension and so on. Additionally, he produced individual themes for the main game characters, which is a strategy that echoes traditional film soundtracks. He then delivered these elements as 1-minute clips, which were built into the game by Konami's sound department. Overall the music is synthesizer based and built around several different drum patterns related to the different states of alert in the gameplay. This strategy of creating different themes for different states of alert is a very good example for the adaptive approach taken by game music composers.

4.4.5 INTERFACE SOUND OBJECTS

Interface sound objects share most of the qualities of effect sound objects with the exception that they describe the "outer borders" of the game. Interface sound objects are all the sounds connected with saving or loading gamestates, navigating through the memory and changing settings. They are all sounds that can be heard outside actual gameplay. This is crucial because, it can rightly be argued that the interface extends beyond the load, save or option menus. In this context, however, the term is used to designate all the sounds that are neither part of a game's diegetic structure, nor of the game score. The use of sound in interfaces offers possibilities of enhancing navigation and user feedback in the development of multi media applications. These sound objects help the user to indicate a location within a metaphorical interface structure and deliver feedback about actions. Interface designers even coined the term of the earmark, the sound equivalent of the icon, for these functions. At present researchers (Maaso) are discussing the potential of adding sound options to information media systems, a process referred to as "sonification". In the case of *MGSII*, all the sounds one hears when changing the different game settings, such as the controller functions, image and sound settings, on-screen representation of objects carried by the user can be understood as interface sound

objects. Here the sounds are short bleeps, which can be heard whenever a setting is changed.

Now that I have proposed four different types of sound objects the next step is to analyse the internal relationships between these sound objects and the functions that govern their deployment within the *game space*. Again, this analysis is first and foremost focused on functions that are valuable for spatial representation. Accordingly, these functions will be referred to as spatializing functions.

4.5 SPATIALISING FUNCTIONS IN THE GAME SPACE

Spatializing functions in the *game space* are responsible for the relations between sound objects and visual objects. As introduced above there are numerous parallels between characteristics of film and games, such as, for example, the short pre-rendered sequences (cinematics) that can be found in most contemporary computer games. At the same time the major difference between these media systems has to be kept in mind. Digital games have to be regarded as dynamic systems, which can offer non-linear structures, whereas traditional film represents a finite collection of audiovisual material that is arranged in a fixed spatiotemporal layout. Thus, if one turns towards film theory it remains to be seen which approaches retain their relevance in the light of the dynamic nature of digital games.

John Belton and Elisabeth Weis state "[…] one of the major shortcomings of the present literature on sound has been the lack of a single, succinct explanation of the mechanics of sound that was comprehensive but addressed aestheticians rather than technicians" (Belton, Weis 1985, 10). It is interesting that it took such a long time for an audiovisual medium like film to be considered from an auditive perspective. Nevertheless, since Belton and Weis' anthology appeared, an area that had been widely neglected before seemed to gain importance. Is it, nearly twenty years later, possible to find a unified theory of the mechanics of sound in film?

It seems that this task still remains to be addressed properly, although there have been numerous important contributions. A lot of interest in the field has been directed towards the early years of cinema and the transition from silent film to the "talkies", as well as the analysis of recording technologies. In this study, however, the focus is directed towards the impact of sound on spatial representation. The French

theoretician and musician Michel Chion has presented relevant work in this context. He has set out to research the internal workings of visual and auditive elements in film and television and describes the relationship between sound and image, the "audiovisual contract" in cinema as one of "added value", meaning that a sound has the potential to transform the meaning of an image in the viewer's perception. This phenomenon is especially at work in situations of "synchresis" (a term introduced by Chion combining synchronism and synthesis) "[…] the spontaneous and irresistible weld produced between a particular auditory phenomenon and visual phenomenon when they occur at the same time" (Chion 1994, 63). It can be stated that situations of *synchresis* are present in film and games. One just has to think of the example of an explosion, the combination of a temporally structured visual event and the sound that adds the texture and material quality to it. It could even be argued that in the case of games there exist situations of permanent synchretic relations, if visual objects are permanently connected to specific effect sound objects. The phenomenon of *synchresis* is just one in a number of particularities that have been discussed by Chion in a very convincing way and that seem to be equally applicable to films and computer games. *Synchresis*, the temporal conjunction between image and sound that affects the nature of both forms is a function that defines the relationship between them. In the following I will propose a set of functions, which, similar to the notion of *synchresis*, define the dynamic interrelation of sound objects and visual objects in the game.

4.5.1 THE ACOUSMATIC FUNCTION

The "acousmatic" is a Pythagorean term reintroduced in 1955 by Jérôme Peignot that designates the separation between sounds and their origin or source. Historically, the term "acousmatic" refers to the situation of disciples listening to the words of a priest hidden behind a curtain. However, the term has come to stand for a genre of music which evolved out of Musique Concrète and is founded upon this specific listening situation. The notion of the acousmatic was important for Pierre Schaeffer in his discussion of the sound object and Michel Chion adapted it in order to describe specific relations of sound and image in film. The radio, for example, can be regarded as a purely acousmatic media system because the listener never sees the source of the sounds. Conversely, film can potentially visualise the source of a

sound: "[i]n a film an acousmatic situation can develop along two different scenarios: either a sound is visualized first, and subsequently acousmatized, or it is acousmatic to start with, and it is visualized only afterward" (Chion 1994, 72).

The importance of the acousmatic situation for spatial representation can only be fully grasped if one considers the nature of human sound localisation. One usually tries to identify the source of a particular sound. In a perceptual sense sound completely surrounds us and, even if there is spatialising at work through phase difference between our ears, hearing is not directed in the same way as seeing. The natural everyday action of accurately locating a sound originating from a place that is not part of the visual field, would be to move one's head in the general direction and to attempt to visually locate its source. Film uses framing and the possibility of sound editing to generate different spatial situations which are subsequently stabilised during the editing process and result in the pre-defined interplay between acousmatic and non-acousmatic situations. The description of sound being either off- or on-screen is used by a large number of scholars to describe these acousmatic situations in film. It has been argued that it is not really the sound that is on or off screen, because the sound can either be heard or not.

For example Christian Metz states that "[w]e tend to forget that a sound in itself is never 'off': either it is audible or it doesn't exist" and in the following "[t]he situation is clear: the language used by technicians and studios, without realizing it, conceptualizes sound in a way that makes sense only for the image" (Metz 1985, 157-158). This is an important point since it problematises the dominance of the visual in theoretical approaches to film. Yet, in the context of computer games, this thought leads to the realisation of a further difference between the two media systems. Whereas a visual object that moves outside the frame in a film literally ceases to exist (and sound might take over to simulate its position) this is not necessarily the case in a computer game, where all visual objects can still be part of the simulation system, whether they are shown by the game camera or not. In other words, an opponent that is shooting at the player's avatar can do so whether visible or not. Accordingly, the bond between sound and visual objects in video and computer games seems to be of a different nature.

As discussed in the previous chapter, the game camera is responsible for the presentation of the visual aspects of a game. In the majority of computer games the player has a direct influence on what the game camera renders visible. The

visualisation of objects can even be a crucial part of the gameplay itself. In order to underline this dynamic potential I propose to refer to sound objects that are related to visual objects presented by the game camera as visualized sound objects rather than on-screen sounds. Whenever the opposite is happening and the sound can be heard while the visual object is not shown by the game camera (but might still be present in the game space), it will be called acousmatised rather than off-screen. In 3D games, the portion of the game space that is visually rendered usually represents a small percentage of the overall game space. It is precisely this large invisible area that can be accessed via sound. Contemporary 3D games, and especially first person perspective games, allow the user to actively visualize or acousmatise sound objects that are connected to visual objects. While playing the game, the player continuously makes conscious decisions whether the visual counterpart of a sound object is worth seeing. In other words, when I am playing an FPS game such as *Quake*, I constantly have to scan the aural field for effect sound objects that I have learned to identify with opponents, and if I hear such a sound I will usually move the game-camera in the direction of the sound to visualize the sound and to locate its source. The kinaesthetic control over the acousmatisation and visualisation of sound objects in the *game space* is one of the crucial factors that characterise the unique experience of playing a FPS computer game. To emphasize this point, sound and more specifically the dynamic acousmatic function are integral elements for the constitution of the modality of *kinaesthetic space* and without it the greatest part of the game space, that which is not visualised, would be inaccessible.

Whenever one wished to identify the source of a strange sound – in, say, a horror film – one had to acknowledge that the timing of this identification was up to the film's author and their control of suspense. A game like *Silent Hill*, which plays with a lot of conventions derived from horror films, allows the players to perform the visualisation and acousmatisation of sound objects in their own time. Even if one only focuses on the specific acousmatic situation alone, the functional differences between films and computer games immediately come to the fore. Although watching a film is most definitely an active process, the decision to visually locate the source of a sound is not at the viewer's discretion. In the case of film, the relations between sound and image are usually defined after the filming has taken place. In the post-production process of adding the sound to the image, each connection has to be defined for each frame, and the final outcome of the process is a product

constituted by the fixed bond between elements. In a computer game, while there also exists a set of fixed relations between sound objects and visual objects, the temporal process of visualization and acousmatisation is much more flexible and open to variation. This state of affairs makes it necessary to regard acousmatic functions in a computer game as dynamic functions. There is a constant flux between user-controlled acousmatisation and visualisation on the one hand, and the scripted behaviour designed by game developers to prepare situations of suspense. For example, the acousmatic function also emerges whenever a game developer deliberately places visual objects that are connected to effect sound objects outside of the immediate visual reach of the player's game camera. Designers can play with this function by revealing or hiding the visual source object of a specific sound. Again this technique is frequently used in games in the horror genre, like the *Resident Evil* and *Silent Hill* series. There are numerous examples in *Silent Hill*, where the player hears odd sounds like heavy breathing or scratching from enclosed rooms or cupboards and it is up to him/her to visualise this sound object or leave it in its acousmatic state.

User-controlled dynamic acousmatic functions are among the most important spatialising functions in 3D games because they allow the designers to open up an aural space of events that reaches far beyond what is rendered visible by the game camera. This doesn't mean that 2D games avoid using acousmatic functions. But, whereas the potential space in 2D games extends beyond the game camera on a plane to the right and left as well as up and down (depending on the type of game), in 3D games it can also extend "behind" the game camera thereby creating a much more complex environment for acousmatic functions.

Sound can be employed very effectively to bring this invisible space into being and realise representational spaces that extend far beyond the limited visual space. In this way the player can be steered through vast and complex virtual architectures with the help of sound. The player can be attracted towards and repelled from specific locations in a wider environment. The sound objects used in these situations are in most of the cases either speech sound objects or effect sound objects. In the case of the game *Splinter Cell*, for example, the voice of a commanding officer regularly presents new objectives and informs the player about changes in the mission or in-game narrative. Although its "owner" is briefly introduced visually in the beginning, throughout the rest of the game the voice appears via simulated radio

communication and thus remains in the acousmatic realm. In this specific case a lot of the observations made by Chion in relation to the use of acousmatic voices in cinema seem to hold true. Here, the acousmatic voice gains an air of omniscience and control. In other words, the acousmatic voice is perceived as an agency "in the know" that exerts a kind of power over the player by giving directions and orders. A very good example for the permanent oscillation between acousmatic and visualized effect sound objects is the game *Star Wars: Rogue Leader*. In the tradition of flight simulation games, it uses acousmatic functions extensively within the gameplay. A surround sound system based on the Dolby 5.1 standard enables the simulation of movement of sound objects through 3D space. Although the player has access to an abstract visual map that displays all the enemy ships during a fight in space, aural cues are extremely beneficial in order to locate enemy ship positions. Since the game camera only renders a very narrow portion of the entire *game space*, the aural information is essential for successful gameplay. Visual objects such as enemy fighters continuously perform 360-degree turns to move behind the player's game camera in order to attack without being seen. An important part of the gameplay is constituted by attempts to locate and visualise the opponent in order to target and shoot. Thus audio cues are both important in orienting oneself in the boundless visual representation of outer space and necessary for locating the enemy. In this example, the interface sound objects are clearly related to visual representations of user navigation and are therefore visualized. In fact it is important for their function to be remembered in connection with a visual feedback situation. When you click the save button you expect to hear feedback sound. Other types of sound objects, such as the zone sound objects, remain acousmatised in *Star Wars: Rogue Leader,* since they are not introduced on the visual level. The same is true for the score, which also remains acousmatic. The score is acousmatic in all of the games that have been brought up so far in this chapter. The convention in film of introducing the visual source of music (for example, a radio or a record player) is rare in gaming.

There is, however, an interesting exception which plays with the visualisation and acousmatisation of game music and its source. The game *GTA III* features numerous radio stations playing different genres of music, from reggae and drum n' bass to classical music, hip hop and talk radio. These radio stations are accessible from within the majority of cars and therefore connected to visual objects. Interestingly, different types of cars, which are related to different groups of people

in the game, are initially tuned to their respective radio stations. In other words, if one steals a car belonging to the mafia, a classical music channel will play Italian operas, whereas a "yardie car" usually has its radio tuned to reggae. In addition, the player can switch radio channels while driving a car. This experimental use of acousmatisation and visualisation is, however, not the norm and in most cases visual objects like radios used in games are connected to short loops of music or static and therefore have no connection with the game music, but have to be regarded as effect sound objects.

Dynamic acousmatic functions are also very important in stealth intrusion games like *MGSII* where the gameplay consists to a large extent of hiding from opponents. In order to remain undetected the player has to stay hidden, which means that most of the time he/she cannot see the opponents. In such situations the player can nevertheless hear effect sound objects indicating the approach of guards, in the form of footsteps or speech sound objects (conversations among the guards). Whenever the player has alerted these guards, the gamestate changes, indicated by an alarm sound and the disappearance of the small map that usually locates opponents in the game environment. In these situations the player has no way of locating the enemy other than listening for footsteps. A specifically interesting acousmatic situation emerges when the avatar hides in a cupboard. It is possible to get a very limited amount of visual information through small slits in the cupboard door, but one will only see the enemy when he is directly in front of the cupboard. In these situations the acousmatic state shifts and the effect sound object of enemy footsteps is visualized. These functions are crucial for actively locating or situating objects in the game environment and are thus very important features of the game's spatial apparatus. In conclusion it can be stated that the dynamic acousmatic function defines the aural extension of the representational space beyond the visual portion displayed by the game camera.

4.5.2 THE INDEXICAL FUNCTION

Indexical spatialising functions signify important places or events in the *game space* and transport information that can be important for the gameplay. Sound objects,

which provide information about an event that is significant for the gameplay or a special place that is to be reached or evaded by the player, are regulated by indexical functions. Here, the indexical aspect, the "readable" information is more important for the spatial understanding than any other function. This is what separates sound objects that are regulated by indexical functions from others, which might add to the atmosphere or believability of the environment, but do not carry decipherable information that is necessary for playing the game. The ability to decode the meaning of such a sound is either part of the rules learned in the game or relies on an everyday knowledge of objects or situations in conjunction with the sounds they produce.

A perfect example for this function is the defusing of time bombs placed in the *game space*, a common feature in numerous action-based games such as *Counter Strike*. In such cases, the visual object of the bomb itself is linked to an effect sound object that signifies where the bomb is placed and informs the player about the time left until it will explode (usually a sequence of bleeps that increases its frequency or a ticking sound). The sound cue makes it possible to locate the object if it is hidden behind other objects and the frequency change of bleeps indicates the time that is left before it explodes. The ticking is a perfect illustration of indexical spatializing because the player initially has to learn to connect the specific sound with a visual object as well as a game event (either explosion or defusing) and then use audio cues for the navigation in the *game space*. As the defusing of bombs is a theme that is very common in action films and TV-series, one can assume a certain media-based cultural knowledge about the sound a bomb might produce. Indexical functions provide causal links between game events or visual objects, which means they have to be decoded consciously, and are of such importance for the gameplay that they have to be at the forefront of the player's attention. If they are an integral part of the game play, indexical functions are constituents of the *rule space* of a particular game.

In most cases, the visual indexical information leads the player to specific locations in a game; but there are situations where the diegetic structure of the game depends entirely on audio cues. This is the case in games that employ maze type territorial arrangements, where it is not possible to oversee the environment. In these situations it is vital for the player to gather significant information about the rest of the environment, opponents or locations by listening. Indexical spatialising functions are part of the diegetic structure of the *game space* and directly related to the game's

rule system. If the rules, for example, define movement from location to location, they can take over the role of informing the player about his/her momentary location in *the game space*.

In the case of *MGSII* a very interesting variation of indexical functions can be witnessed. The introduction of a directional microphone as a feature that has to be used in particular parts of the game exemplifies the intelligent use of sound for the game play. In one short episode of the game the player has to locate a specific hostage held by terrorists in a room with thirty other hostages (Oil Rig Shell 1, Core 1 B). The player is informed that to the hostage has a heart pace maker. Accordingly, the directional microphone is used to listen for unusual cardiac patterns that enable the identification and localisation of the hostage. This unusual significant sound is a textbook example for the indexical function, because the player is told to listen for this specific audio signal and it thus becomes an integral part of the rules of the game. To put it differently, the effect sound object "unusual cardiac pattern" is subjected to the indexical function because the sound is transformed from just being a sound to a significant signal that becomes part of a highly specific sub-game. Thus, this kind of game play based on listening for specific sound patterns in order to locate a subject demonstrates quite clearly how auditive elements of a game can be regulated by the modality of *rule space*.

In another situation (Oil Rig Shell 2, Core 1, Air Purification Room) the same directional microphone device is used to listen to a conversation that takes place behind a wall. Because the source of the voice is moving, the player has to point the microphone in the right direction in order to listen in and pick up elements of the game's narrative. Here dynamic acousmatic functions are intertwined with indexical functions, because the player has to follow the rules, which demand the localisation of a significant speech sound object, while the source remains hidden. This situation mobilises a highly complex spatial situation that is dynamically linked to the user action of moving the microphone in the right direction.

4.5.3 THE SPATIAL SIGNATURE FUNCTION

The phenomenon of one particular sound event possessing different qualities when heard by different people in different environments lies at the core of what will be referred to as the spatial signature function. Rick Altman gives the example of a

baseball that breaks a window that sounds very different for him outdoors, his father in the house and his mother in the basement. In a text about the material heterogeneity of recorded sound, he approaches this problem of perspective within recorded sound and asserts that "every recording carries elements of this spatial signature, carried in the audible signs of each hearing's particularities" (Altman 1992, 24). Following Rick Altman, Andrea Truppin defines this phenomenon as follows "[s]patial signature can be defined as a sound's auditory fingerprint that is never absolute, but subject to the sound's placement in a particular physical environment. These markers include reverb level, volume, frequency, and timbre that allow auditors to interpret the sound's identity in terms of distance or the type of space in which it has been produced and/or is being heard" (Truppin 1992, 241).

Following this definition, it is clear that recorded sounds can have multiple signatures: the specific spatial context of the original sound and the space of playback and its particularities. In the following, I will deliberately blend out the second order of signature - the space that is referred to as *user space* in this context - and concentrate on how the spatial signature appears in the *game space*. First and foremost one can differentiate between the spatial signatures of recorded sounds (qualities inherent to the sound object itself) and the functions that allow computer games to simulate the spatial signature connected with particular environments. Contemporary sound technology and real-time DSP are capable of simulating certain sound qualities that affect the spatial signature of sounds. If the factor of reverb of any given sound object (whether recorded or synthesized) is changed, this will simulate the experience of hearing the sound in a different type of environment. As large rooms suggest strong reverberation, a sound that is changed by a reverb filter will bear the spatial signature of being reflected within a large room. This simulation process literally turns the relation between source and surrounding, as observed by Rick Altman, on its head. The player follows an inductive process from the isolated sound to an assumption about the surrounding space. These simulations of particular spatial signatures are used by numerous contemporary games that employ real-time DSP. The most common factors are the amount of reverb or echo of sound objects, but as the game architecture gets more sophisticated, complex simulations like the reflection of sound from walls or objects are being introduced. Because the spatial signature of sound objects is defined by the space surrounding the sound source this process can be understood as a function that operates on the level of the zone. A

zone within the *game space* has one set of rules defining its spatial signature in order to create a coherent spatial structure. In other words if the zone sound object is connected to a particular room in a house, the qualities of reverb and echo within that room will be shared by all the sound objects that are contained within it or pass through it. Functions that define the spatial signatures of sound objects can greatly enhance the immersive qualities of a *game space*.

This can also be experienced in *MGSII,* which indeed presents us with zones and levels that have consistent auditive qualities that are derived from the location. Here, spatial signature functions also have an impact on the qualities of effect sound objects. For example, all the sounds we hear in the flooded level (oil rig, platform 2) of *MGSII* (effect sound objects linked to avatar movement as well as exploding underwater mines) are muffled in the same way and thus convey a highly particular spatial signature. An interesting example, that shows the range of influences of the spatial signature function on different sound objects and that can literally be understood as a type of "audio perspective", can be found in the outside levels of the oil rig. *MGSII* uses two optional game camera perspectives, a 3rd person PoP, which usually shows the avatar from behind and above, as well as a 1st person PoP that is mainly used for targeting or reconnaissance operations. The player alternates between these two game camera modes throughout the game. Interestingly, the two visual perspectives correspond to two different aural perspectives. If one switches to the 1st person PoP game camera in the outdoors areas of the oil rig one will hear a much louder rendition of the background sound (wind and waves). Essentially there are two different auditive spatial signatures at work, which are directly linked to the game camera. This function greatly enhances the feeling of being in the place, while it also seems to nod in the direction of conventions from early sound films, namely spatially consistent audio editing.

4.5.4 THE MOTION FUNCTION

Among all the functions discussed here, the motion function can be regarded as the most basic one. The attributes of sound objects that have an effect on the simulation of movement are changes in volume, pitch, and frequency as well as, in the case of 3D audio systems, the placement of a sound in the *game space*.

Ulf Wilhelmsson has pointed out that the perception of approaching and leaving objects can be induced by changes in volume, and up-down movement patterns are metaphorically linked to changes in the pitch of a sound. "APPROACHING-LEAVING is yet another complex schematic structure found in sound that relates to the perceived size of an object. We judge an object's distance from us not only from its visually perceived size but also from the loudness of the sounds it may produce. We can judge if a soundproducing [sic.] object is APPROACHING us or LEAVING – that is, if it is COMING CLOSER or GOING AWAY" (Wilhelmsson 2001, 117). He points out that just as large objects are metaphorically linked to louder sounds, the metaphorical organisation of sounds as high and low is often connected to up and down movement. The change of pitch from a low frequency to a high frequency can therefore be understood as an appropriate auditive quality of an object moving upwards and the movement from higher to lower frequencies might be perceived as a downward movement. These basic principles of sound perception are implemented to simulate the movement of sound objects within the *game space*. Another perceptive particularity that is used to simulate object movement is known as the Doppler effect. The sound produced by an approaching object is characterised by the shift from a pitch that is higher than normal to one that is significantly lower once the object has passed by. This phenomenon is due to the fact that the sound waves reaching the listener are compressed in front of the object and expanded behind it. Games dealing with aerial combat make frequent use of the Doppler effect.

The perception of moving sound objects has a direct impact on the directional positioning and the orientation of the player. Trevor Wishart, an electro acoustic musician and theorist, describes a situation which positions the listener in the centre of a virtual acoustic space, thus letting him form the frame of reference that enables the attribution of positions such as, in front, behind, left and right to sounds. In reference to this setup he puts forward that "[t]he principal distinction to be made is between 'in front' and 'behind'. In purely perceptual terms it can often be difficult to decide whether a stationary sound is located in front or behind the head. Motion of the sound (or the head), however, usually allows this distinction to be made" (Wishart 1996, 199). In a similar vein, the motion of sound objects through the *game space* helps to establish directional positioning. However, unlike the situation described by Wishart, in the case of computer games sound cues frequently

accompany visual objects. Sound objects that move through the *game space* are therefore very closely related to the dynamic acousmatic functions that have been discussed earlier.

In *MGSII* the motion of different effect sounds is an integral feature and can thus be witnessed throughout the whole of the game. Guards, vehicles and objects are linked with sound objects that move through the *game space*. Because this situation is so ubiquitous I will concentrate on examples where the motion function is especially important for the gameplay. In one sequence the player's avatar is located on a bridge of the oil platform and has to shoot down a helicopter that hovers above. The vehicle has an elliptical flight path, passes above the avatar and flies off into the distance to turn and approach again. Throughout this manoeuvre the effect sound object connected to the helicopter traverses the 3D space of the game and offers aural cues to its position. In this situation the player has to change the game camera's PoP from the 3rd person perspective mode to the 1st person perspective mode in order to be able to adequately target the opponent. This leads to a significant narrowing down of the visual field. Here, the motion of sound objects helps the player to orient the game camera in the right direction. The player can benefit from the moving effect sound object to decide from which direction the helicopter will approach the next time in order to change position accordingly.

Generally it can be stated that the player's orientation within the *game space* depends to a large extent on motion functions, because they facilitate the aural simulation of approaching or leaving objects (guards, vehicles) and convey their position in the representational space. A last example can be given with the flying surveillance drones that will initiate an alarm whenever they become aware of the player's presence. Such drones can be found in the outdoor areas of the oil rig and their moving effect sound object makes it possible to locate them, to study their movement patterns (sometimes without seeing them) and subsequently, to evade them.

4.5.5 THE MOTORIC FUNCTION

Temporally structured changes in the frequency and timbre of a particular sound generate the appearance of movement or locomotion. The impression of acceleration

and deceleration is achieved by an increase or decrease of the frequency of an effect sound object. Motoric sound functions, which are directly influenced by user action, can be referred to as locomotoric functions. Games based on the control of vehicles such as driving and flying simulations as well as all types of racing games employ these effect sound objects with locomotoric functions. Furthermore, motoric functions can also be found in a large number of first and third person perspective games. In general they provide a direct aural feedback of the user action and enhance the kinaesthetic bond between player and avatar. In this sense it can be argued that locomotoric functions are the essential elements of the *kinaesthetic space* of a game. Motoric functions of sound objects can be "adaptive" within the *game space*.

The game sound designer Andrew Clarke writes "[t]he archetypal example of adaptive audio is the sound of a car engine in a racing game – when the user steps on the gas, the effect must change to reflect the engine's changing RPM (revolutions per minute). This type of sound adds a unique extra dimension to the challenge of game sound design. Whereas an engine sound for a linear AV medium only has to fit with two contexts (the visual and the mix), an adaptive engine sound must also respond dynamically to pseudo-random user input events" (Clark 1999, 2).

Visually, the player's vehicle in a racing game such as *Gran Turismo 3* does not move at all. It doesn't change its size and if the game-camera option actually shows the driver's car, it permanently occupies parts of the visual field, while the background changes in order to simulate movement. In addition to the moving background, a crucial factor in the simulation of locomotion is the pitch-change of the effect sound object that is linked to changing the speed of the vehicle. Locomotoric functions have a very strong impact on the *kinaesthetic space* of games because they are responsible for the link between player action and sound feedback. In games featuring walking avatars, the sound of footsteps is the equivalent to these vehicle motor sounds. The phenomenon of footstep sounds is a very good example to demonstrate how a number of different functions that work in correlation with each other are responsible for the coherence of the auditory *game space*. Footstep sounds are effect sound objects, either connected to the player's avatar as locomotoric functions or to other objects in the game as motoric functions. Very often there is also a spatial signature function at work, if one considers that the sound of footsteps might change according to the qualities of the ground (snow, water, sand) and the acoustic features of the room (large hall, small room). If the

visual object that is connected to the effect sound object is sometimes displayed by the game camera and sometimes not, the dynamic acousmatic function is at work as well. It is the combination of all of these functions superimposed on the actual effect sound object that generates a coherent spatial representation of walking through a particular *game space*. Apart from vehicle motor sounds and footstep sounds, motoric sound functions are also at work whenever parts of larger objects or architectural elements are in motion.

The added value that sound brings to the image in the form of suggesting motion can also be observed in situations like the opening and closing of doors. As Michel Chion has pointed out in his example of moving doors in the film *Star Wars*, that are actually not shown to be actively opening or closing but in open and closed states accompanied by a "movement sound", the auditory illusion of movement is strong enough not to have to show the doors opening or closing. Similarly, objects that move through the architectural environment of games, such as lifts going up and down, are usually accompanied by effect sound objects with motoric functions. "Servomotor" mechanical sounds are very commonly used in conjunction with visual objects representing machines with movable parts.

In a game based on stealth and silent movement, the locomotoric function can be of specific importance. In *MGSII* the speed of the avatar movement defines the loudness of the locomotoric sound objects and thus the potential of being detected by guards in the game. The faster one moves, the louder the sound made by the movement will become. In this case the locomotoric function, not only enhances the illusion of movement, but the modulation of the loudness of the effect sound object (footsteps) also delivers audible feedback that helps the player to regulate the speed of movement and thus clearly affects the qualities of the *kinaesthetic* modality of space. Throughout *MGSII* the opening and closing of doors in the game is accompanied by motoric functions that strengthen the illusion of object movement.

4.5.6 THE IMMERSIVE FUNCTION

Immersive functions operate on the level of zone sound objects. In other words they define the sound of a wider area within the *game space*. Although immersion has to be regarded as result of the interrelated workings of all game objects, there are some

qualities of sounds that can significantly strengthen the state of immersion of a player.

R. Murray Schafer hints at these qualities when he writes in reference to the Viennese music sociologist Kurt Blaukopf "[t]he sound in Norman and Gothic churches, surrounding the audience, strengthens the link between the individual and the community. The loss of high frequencies and the resulting impossibility of localising the sound makes the believer part of a world of sound. He does not face the sound in 'enjoyment'–he is wrapped up by it" (in: Schafer 1977, 118). Low frequencies have the tendency of making it hard to localise particular sound sources, therefore they are used frequently for zone sound objects. Other examples of sounds with specific immersive and therefore non-localising qualities are sounds that are multiplied and overlaid in such a way that it becomes impossible to focus on singular sound events. These are sounds like insect sounds or sounds related to water (the rolling of sea, flowing water, rain) or wind. In these cases it is not only the frequency that produces the immersive effect but the seemingly indefinite number of individual sound events, again specific localisation is impossible. Immersive functions of sounds within the *game space* depend on low frequencies and the diffusion of individual sound events. These functions are unfocused and tend to span over longer durations than those related to distancing or movement. Immersive functions are generally used as a background in a wider area of the game.

In the case of *MGSII* one can identify several zones that feature sound objects which are subject to immersive functions. In the opening section of the tanker mission, rain and wind sounds are used precisely in the manner that has been described. These sounds can be heard while the player is outside on the deck of the ship. Here, the rain not only immerses the player immediately into the simulated environment but also makes it slightly harder to identify and focus on the effect sound objects of the guards on deck, thus adding a degree of difficulty. Interestingly, the rain on deck is also reflected as a factor that diffuses the visibility of the game camera image, when rain that drops on the simulated "camera lens" blurs parts of the view. In this sense a kind of aural and visual diffusion significantly increases the immersion into the simulated environment.

4.6 CONCLUSION

The discussion of sound objects and functions in the *game space* comes to a close at this point. Since the subject of auditory space has so far widely been neglected in the literature related to digital games, I have taken the freedom to propose a typological structure that might help to orient oneself within the complex set of issues surrounding sound in games. Clearly, the proposed terminology is speculative and is thus meant to open platforms for discussion and areas for further research. However, since this chapter has to be regarded as a sub-topic within the wider framework of this thesis, it is intended as a starting point for other investigations rather than an exhaustive account.

Nevertheless, I hope that it was possible to shed some light on the decisive role of hearing for the emergence of and navigation within *game space* and that the enormous importance of the auditory realm for the spatial practice in video and computer games has been clarified. Lefebvre writes that "[h]earing plays a decisive role on the lateralization of perceived space. Space is listened for, in fact, as much as seen, and heard before it comes into view" (Lefebvre 1991, 200). And at this point it has to be reiterated that space "does not arise from the visible-readable realm, but that it is first of all heard (listened to) and enacted (through physical gestures and movements)" (ibid. 200). Thus, what is heard is much less prone to be subjected to forces of the confusion between the visual and different rational conceptions of space. The aural realm points toward the user's space that is "lived – not represented (or conceived)" (ibid. 362). In other words, the surrounding sound space is experienced with a high degree of immediacy and hearing seems to bypass the conceptual clutter piled up in the wake of the dominance of the visual. This immediacy, that should not be confused with any kind of "naturalness", has an impact on the entirety of the spatial practice when it is connected with visual representational elements and accessible as part of a dynamic system. This is also why sound events, which are dynamically interlinked with visual events, extend deeply into the kinaesthetic space of digital games. In this context, it is hoped, that concepts such as the proposed dynamic acousmatic function can serve to analyse crucial moments in this dynamic web of forces. Here, one of the most important observations concerns three-dimensional spatial representation in games. Namely, without sound it would be impossible to realise a continuous link to the space that

surrounds the player. It can be stated that, on the one hand, the full use of the third dimension in 3D games is only possible within the aural field and, on the other hand, the intelligent spatial sound design literally transformed 2D games into 3D games long before three-dimensional objects could be fully rendered. To put it differently sound, rather than the visual information on screens, has to be regarded as the privileged medium for the realisation of three-dimensional spatial representations.

Clearly, all of the spatial modalities that have been set forth maintain distinctive relationships with the aural realm. *Narrative space* is increasingly realised as recorded or synthesized speech. If sound becomes the carrier of the gameplay, it effectuates the modality of *rule space*. Most importantly, one has to acknowledge the fact that sound has a crucial importance in bringing about the rhythmic link between the game and the player which emerges as *kinaesthetic space*. For the sake of clarity a brief summary of the proposed analytical framework is presented. Initially it was pointed out that a distinction between *user space* and *game space* is necessary to separate the research area pointing towards sound hardware and acoustics from the sounds emanating from the game. Subsequently, the notion of the *sound object* has been introduced to signify the discrete nature of sound elements in the game. The following catalogue of different types of sound objects has been put forward:

Sound objects

- *Speech sound object* - all the sounds related to speech (e.g. narrator).

- *Effect sound object* - all the sounds that are related to objects or actions in the *game space* (e.g. shooting sounds, explosions, movement sounds).

- *Interface sound object* - the sounds connected to actions outside of active gameplay but still connected with the game (e.g. navigation of load and save menus).

- *Zone sound object* - sound that is related to a specific location or area in the *game space* (e.g. machine sounds in the machine room of a ship).

- *Score sound object* - the usually non-diegetic game music or score.

A set of so-called spatialising functions, which govern the use and the characteristics of the identified sound objects as well as the relations between them has been established. Individual sound objects can be subject to a combination of these functions. The major reason for the proposal of these functions is to enable different perspectives towards distinctive spatial aspects of sound in games.

Spatialising functions

- *Acousmatic function* – defines the relation between a sound object and the visibility of the related visual element.

- *Indexical function* – delivers information that is vital for the gameplay (e.g. ticking sound of bomb).

- *Spatial signature function* – is present when the surrounding space affects the qualities of sound objects (e.g. echo, reverb).

- *Motion function* – defines the motion of sound objects.

- *Motoric function* – simulates movement or motion (motor sounds in racing or flying games, footstep sounds in FPS games).

- *Immersive function* – is responsible for atmospheric immersion (e.g. water, rain, wind sounds).

The present chapter comes to a close with the above summary and we will move on the final chapter that is dedicated to the relationship between contemporary artistic work and the spatial practice in video and computer games.

5. CONTEMPORARY ART PRACTICE AND DIGITAL GAMES

5.1 INTRODUCTION

Between the years 1999 and 2006 there has been a significant surge of gallery and museum exhibitions focusing on artistic work that shows a strong connection with video and computer games. Among many others, exhibitions like *Game Over* (1999) at the Museum fur Gestaltung in Zurich, *Synworld* (2001) at Museumsquartier in Vienna, the online exhibition *Cracking the Maze* (1999) and *Game On* (2002) at the Barbican Gallery in London can be identified. Artists have appropriated the aesthetic styles and iconography of games, incorporated game technologies into their work and started to produce original games of their own. Simultaneously, digital games themselves are increasingly seen as works of art in their own right. For example, Henry Jenkins writes "[g]ames represent a new lively art, one as appropriate for the digital age as those earlier media were for the machine age. They open up new aesthetic experiences and transform the computer screen into a realm of experimentation and innovation that is broadly accessible" (Jenkins 2003, 4). Here, digital games are posited as a new form of public art that leaves traditional spaces of art such as the gallery and the museum behind.

In the following, the relation between games and art will be analysed and different artistic perspectives relevant to the context of this study will be examined. Before moving on to examples of contemporary art practice I will briefly touch upon the historical roots of the connection between art and games. This relation goes far beyond the surface of the mere appropriation of pop cultural themes that has been a driving force in contemporary art. Most significantly, the spatial model presented in Chapter 3 is employed as a structural framework for the discussion of artworks, enabling a deeper understanding of the characteristics of *game space* and suggesting the impact of this new spatial medium on contemporary society.

5.2 THE RELATION BETWEEN ART AND GAMES FROM A PHILOSOPHICAL PERSPECTIVE

Johan Huizinga, the famous Dutch game scholar, posited play and games at the roots of all cultural activities and demonstrated their permeation across various sectors of society such as art, philosophy, law and politics. Concerning the influence of what he terms the "play-factor" upon the sphere of the arts, Huizinga directs us towards ancient forms of ritual, music and dance. He writes "[i]f in everything that pertains to music we find ourselves within the play-sphere, the same is true to an even higher degree of music's twin-sister, the dance. […] it is always at all periods and with all peoples pure play, the purest and most perfect form of play that exists" (Huizinga 2004, 164).

Play within the sphere of the sacred and the ritual entails a number of important characteristics, such as the element of participation, forms of spatial demarcation and the notion of the seriousness of the act. The sacred rite as a form of enactment that is played out presents us with a movement from representation (the re-enactment of a mystic event) to identification with the action and participation in it. In this sense, "[t]he rite produces the effect which is then not so much shown figuratively as actually reproduced in the action. The function of the rite, therefore, is far from being merely imitative; it causes worshippers to participate in the sacred happening itself" (ibid. 15). Furthermore, the sacred ritual takes place in a demarcated space. "Just as there is no formal difference between play and ritual, so the 'consecrated spot' cannot be formally distinguished from the play-ground. The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act or part" (ibid. 10). Within this context, it is plausible to understand modern phenomena like the gallery and the museum as similar places that obtain specific rules, which among other things define the difference between the profane and banal object and the object of art. I will return to this thought at a later stage, because it is crucial for the analysis of certain artists who have integrated ludic structures into their work. Here I will pursue

a notion that seems to be as important for the realm of art as it is for the sacred ritual: both are approached with a kind of seriousness that initially seems strangely at odds with the notion of play. It is exactly this moment that appears to define the border between forms of play and entertainment as non-serious activities from the seriousness of art and the sacred. Huizinga refers to the Platonic identification of play with holiness, which leads him to reassert the homology between play and the ritual. Play is indeed impregnated with a very specific kind of seriousness and this important point will be taken up when Gadamer's efforts to ground the work of art on the basis of the game are discussed in more detail. For now it has to suffice to note that we can identify the historical roots of the arts within play and the ritual.

McLuhan similarly perceives games and play as forces internal to a wider array of cultural activities when he states that "[g]ames are popular art, collective, social reactions to the main drive or action of any culture" (McLuhan 2002, 255). Like Huizinga he refers to the historic importance of games as a form of collective art at the heart of ancient non-literate societies. A form of ritual that was responsible for the constant re-modelling of the universe through dramatization and enactment. According to McLuhan, the shift towards literacy brought about a change of focus from a mimetic relation to the outer world to the inner world of the human psyche. Tribal and participatory forms of art, which were homologous with games, evolved into literary substitutes and private dramatizations of the human psyche. In this context games have to be seen as a social art, demanding bodily involvement and mutual participation.

Following this reading, the cultural forms of art and play seem to depart onto separate tangents with the coming of written narrative and the potential to address individual readers. Thus, written text and the emergence of the individual narrative gradually lead to forms of art which are directed towards individuals, and increasingly seem to remove art from the participatory nature of the ritual and the game. However, the "play-factor" never vanished completely from the sphere of the arts if we consider its importance in poetry, the dramatic arts and music. Yet play seems to move to the background in the plastic arts as well as in painting. In relation to these forms of art Huizinga states, "when there is no visible action there is no play" (Huizinga 1950, 166). He is, however, convinced that the play-factor might show itself somewhere else, in the subjective creative action of the artist while he/she is making the work. Furthermore, insofar as rivalry and competition guarded by

specific rules can be made out in the field of artistic production, the play-factor is thought to be present in the entire cultural field.

I will not focus on Huizinga's understanding of the different forms of art, and his remarks in this respect could be criticised from various perspectives, which cannot be followed here. His view has been presented here because at its core, his argument illustrates the development of forms of art which highlight the growing importance of the individual subject. In other words, the play-element is relocated from the participatory ritual to the artist and the audience as separate subjects. The participant in the enactment of a sacred rite is transformed into the binary pair of distinctive singular subjects: the artist and the spectator or participant. Clearly, it would be very interesting to devote a more detailed analysis to this historical transformation from participative forms of art to more subjectified ones, but this undertaking has to be delivered elsewhere, due to the limited scope of this study.

Accordingly, those theorists and thinkers who have shown a particular interest in the relation between art and play have to be considered in more detail. In this context Schiller's famous aesthetic project outlined in the letters *On the Aesthetic Education of Man* from 1795 cannot be overlooked. Schiller's approach is indebted to Kant's highly influential thoughts on aesthetics. *On the Aesthetic Education of Man* is as much an investigation into the relationship between the beautiful and art as it is a political manifesto that conceives the autonomy of art as the ideal means to improve humankind and to lead the individual to freedom through aesthetic means. In this sense it has been characterised by Habermas as both aesthetic utopianism and the first aesthetic critique of modernism (Habermas 1995, 45). Schiller's ambitious text posits art at the centre of the ideal aesthetic state and he is convinced that freedom of humankind from natural and cultural constraints can only be reached through the aesthetic education of the individual. Most importantly, play is presented as a central function in this aesthetic theory. Based on Fichte, Schiller posits a chiasmic structure of the material instinct [*Stofftrieb*] and the formal instinct [*Formtrieb*] as the basis of human existence. The former can be identified with nature, the animal, the sensible and the un-ordered, whereas the latter is directed towards the spiritual, rational thought and moral order.

Subsequently, Schiller proposes the aesthetic sphere, and at its core, what he calls the play instinct [*Spieltrieb*] as the mediating and conciliatory force between material and formal instinct. Not only is the function of art here understood as an

autonomous force in the ideal aesthetic state, but play is promoted as the major power that enables the reconciliation between sensual nature and rational order. Ultimately, the play-instinct directly leads to the beautiful, and Schiller locates true freedom from constraints of nature as well as rational or moral order within the realm of aesthetic play. The function of the play-instinct in a dynamic interplay with the two other instincts is conceived as follows "[t]he instinct of play, in which both act in concert, will render both our formal and our material constitution contingent; accordingly, our perfection and our happiness in like manner. … [E]xactly because it makes both of them contingent, and because the contingent disappears with necessity, it will suppress this contingence in both, and will thus give form to matter and reality to form" (Schiller 2000 [1795], letter XIV).

In letter 15, beauty as the object of the play-instinct enters the framework: "The object of the sensuous instinct, expressed in a universal conception, is named life in the widest acceptation; a conception that expresses all material existence and all that is immediately present in the senses. The object of the formal instinct, expressed in a universal conception, is called shape or form, as well in an exact as in an inexact acceptation; a conception that embraces all formal qualities of things and all relations of the same to the thinking powers. The object of the play instinct, represented in a general statement, may therefore bear the name of living form; a term that serves to describe all aesthetic qualities of phenomena, and what people style, in the widest sense, beauty" (Schiller 2000[1795], letter XV).

Here, play leads to "living form", synonymous with the idea of beauty. This conception of play as mediator between nature and culture, and therefore a deeply human need, culminates in the famous and frequently cited sentence: "For, to speak out once for all, man [Mensch] only plays when in the full meaning of the word he is a man, and he is only completely a man when he plays" (Schiller 2000[1795], letter XV). Thus, play is awarded an ontological function for the subject. One might ask how this conception relates to the fact that animals also play, but we have to understand it within the framework of Schiller's political and educational project. For him play is always a play at beauty that can neither be separated entirely from nature nor from conscious rationality or ethical being. Schiller understood subjectivity as the result of a process of development or formation [*Bildung*] of the self, brought about by aesthetical education. Since the field of the aesthetic is conceived of as an

autonomous sphere, which balances out the sensual and the rational, the subject can attain a form of freedom via an engagement with art through play.

Gadamer proposes a contrasting perspective on the relation between play and art, which leads us back to our point of departure in this brief historical overview. In *Truth and Method*, he intends to resurrect the importance of art as a proprietor of knowledge [*Erkenntnis*], which is produced and attained beyond the field of natural science and empirical or positivist thought. As a student of Heidegger's hermeneutical philosophy, his intention is to critique the exclusion of art from the dominating discourse of natural science vis a vis the establishment of truth. Since such an idea of truth cannot be entirely based on the autonomous subject, he introduces the notion of play or indeed game [*Spiel*], precisely because it is capable of dissolving the subject/object dichotomy. Schiller's idealist legacy concerning subjectivity is rethought from a different angle, when Gadamer shifts the focus away from the subject of the player to consider the nature of the game itself. He writes "[i]f we speak about games in relation to the experience of art, game does not mean the relation or the emotional state of the producer or the recipient and most definitely not the freedom of a subjectivity, which confirms itself in the game, but the mode of being of the work of art itself" (Gadamer 1990, 97). Gadamer argues that there is a paradoxical relation between seriousness and the game. On the one hand, what is a game is not deemed serious; yet, on the other hand, the player does not regard the game as a separate object, rather becoming part of it through taking seriously the game's rules. It is precisely this seriousness that the player shows toward the game that makes the game a game. Furthermore, a player who does not share this seriousness is regarded a spoilsport. This complex function of the game reverberates with some of the characteristics of the concept of flow that have been discussed in Chapter 3, notably where the loss of self-reflexivity is concerned. This is the interesting situation where the player in flow knows that he is playing, but the flow is broken if he becomes self-conscious of that knowledge. Stated differently, if the relation between game and outside world, with all its implications, becomes evidently conscious to the player, he is immediately expelled from the fictional world established by playing the game.

Gadamer writes "[w]hile playing, the player himself knows, that the game is just a game, which is itself based in a wider world that is defined by the seriousness of intentions. But he knows this not in such a way that he as a player can relate back to

this seriousness. Only then, does playing serve the purpose it has, when the player is fully absorbed in playing". This is precisely where Gadamer's train of thought diverges from Schiller's. Since, if "[t]he player knows very well what a game is, and that what he is doing is 'just' playing a game but he does not know what it is he knows", the mode of being of the game cannot be explained from the perspective of the playing subject. Thus it follows that "[t]he game has a unique being, independent of the consciousness of those who play". In Gadamer's view, the subject of the game is not the player, but the game itself, which is merely represented by being played. Paradoxically it seems to be precisely this dominance of the game over the consciousness of the player that enables the particular kind of freedom that is so often brought up as a characteristic of the game. "The structural system of the game incorporates the player in such a way that it takes from him the burden of taking the initiative, which constitutes the actual strain of existence". In this sense, Schiller's ontological grounding of man in play is turned on its head when Gadamer proclaims that "[a]ll playing is a being played". How then does this understanding of game as a mode of being relate back to the work of art?

Just as the player of a game does not view the game as a separate object to be perceived, but is being played and thus transformed by it, a work of art constitutes a world of its own that invites participation but also a kind of subjugation under the rules it generates. This view of the work of art as a being that cannot be grasped by focusing solely on the aesthetic subject - because it generates an autonomous field that has an existence beyond its creator and the subjective participating recipient - seems to share characteristics with the initial unity of the producer/recipient in the ritual game that we introduced at the beginning of this chapter. Furthermore, the Cartesian rift between subject and object is closed in the experience of art, because it entails a mode of being that dissolves perceiving subject and perceived object and understands them both as parts of an event.

Gadamer takes the intricate relation between play and art one step further when he introduces the notion of the "transformation into structure [*Gebilde*]". Here he refers to the shift from play as a temporary activity (*energeia*) towards the work (*ergon*) that emerges from the game when its self-presentation is disconnected from the actions of the players (producer as well as recipient). Transformation into structure also hints at the historical dimension of the work of art, for it is thought as that element which remains true to itself throughout time and interpretation.

Furthermore this transformation into structure also enables a kind of recognition [*Wiedererkennen*] and thus a production of knowledge [*Erkenntnis*] that is specific to the work of art. Gadamer points out that "[…] what we experience in a work of art and what invites our attention is how true it is – to what extent one knows and recognises something and oneself. But we do not understand what this kind of 're-coginition' is in its profoundest nature if we only regard it as knowing something again that we know already. The joy of recognition is rather the joy of knowing more than is already familiar. In recognition what we know emerges, as if illuminated, from all the contingent and variable circumstances that condition it; it is grasped in its essence. It is known as something" (Gadamer 2004, 113).

This notion of recognition as, at once, a reduction to the essential as well as a process of generating knowledge through realisation resulting in a joy of knowing is crucial if we want to understand the role of art in the context of this study. The works of art presented in this chapter are intended to allow us to recognise various aspects that we have discussed so far in a different light. Furthermore, the kind of knowledge that emerges from the work of art is significantly different from scientific and rational logic and it will therefore complement and transform the thoughts that have been developed throughout this thesis.

It seems that a contradiction to Gadamer's notion of the work of art as an autonomous object based on a mode of being that surpasses all players arises if we follow important shifts in the art of the 20th century, namely the appearance of the ready-made. Let us consider the problem as follows: the ready-made seems to have shown that every object can be considered a work of art if it is shown in the appropriate context. Thus, the fact that Duchamp's question of whether it is even possible to create an object within the art context that is not art has been answered negatively, seems at the first glance to invalidate Gadamer's view. To put it differently, the producer seems to have too much power within the equation at this point. He seems to master the game rather than being subject to it. Yet, if we reconsider the notion of the game in Gadamer's thought, we might also gain a different perspective towards the meaning of the ready-made.

Gadamer reaffirms that human play needs a playing field. He writes that "[t]he playing field on which the game is played is, as it were, set by the nature of the game itself and is defined far more by the structure that determines the movement of the game from within than by what comes up against it - i.e. boundaries of the open

space-limiting movement from without" (Gadamer 2004, 107). The playing field is set off from the ordinary world, just as the sacred precinct creates a different sphere. Importantly, this process is intrinsic to the game's rules. Objects of art emerge from being perceived as different from profane objects and it can be argued that this process is similarly based on rules that are intrinsic to art.

As Boris Groys has shown in his famous examination of the concept of the new in art, we are only able to identify works of so called "high" art based on processes that generate a difference between the profane world and the "playing field" of art. For him, the locus of differentiation throughout the history of modernity is the museum. In relation to the avant-gardes of the last century he states that "[t]he less an artwork differs visually from a profane object, the more necessary it becomes to draw a clear distinction between the art context and the profane, everyday, non-museum context of its occurrence" (Groys 2003, 19).

What is important here for my argument is that every profane object or practice which is brought into the sphere of the museum potentially has the opportunity of being valorised and transformed into a work of art. Groys identifies Marcel Duchamp as one of the most important artists to have directly addressed the process of transformation from non-art to art or the profane to the sacred. The concept of the ready made challenged the differentiation process and has thus also transformed the rules of art itself from within the game. To put it differently, the work of art itself in this case directly emerges from a bending of the rules and a widening of the playing field to include objects which result from industrial mass production. Interestingly, what seems to reinstate Gadamer's notion of the ontological prevalence of the work of art over the players involved is precisely the fact that Duchamp's work has been fully and completely integrated into the canon of art to such an extent that his *Fountain* now represents a high material value within the art market. Furthermore, it can be stated that artists are more and more interested in the processes that lead to a "transformation into structure" in Gadamer's sense. Some artists might even try to prevent such a transformation from concept to realisation deliberately. The importance of the game of chess in Duchamp's work seems to lead us in this direction. For him, "chess is undoubtedly one of the most private forms of artistic activity, since the artist's constructions, however beautiful, occur on the invisible plain of thought and could not be said to please a wide audience" (Arman 1984, 17). The simple rules of chess are able to generate a universe of "plastic"

constructions. Part of the pleasure that can be derived from this process is its solipsistic nature. It creates a private aesthetic spatiotemporal realm.

Groys asserts that in recent years the artistic focus has gradually moved away from the transformational power of the object in the museum space to the creation and examination of the context surrounding the artwork. He writes "[i]n the modernist tradition, the art context was regarded as stable - it was the idealized context of the universal museum. Innovation consisted in putting a new form, a new thing, in this stable context. In our time, the context is seen as changing and unstable. So the strategy of contemporary art consists in creating a specific context which can make a certain form or thing look other, new and interesting – even if this form was already collected before" (Groys 2003, 22). In other words, in his view contemporary artistic practice is particularly concerned with examining, creating and transforming the rules governing the emergence of art itself. All of these cultural transformations that have indeed reshaped our understanding of the work of art have to be kept in mind throughout the following discussion of different artists and their work. In Marcel Duchamp's oeuvre, play and game elements feature prominently in a variety of works. I have already hinted at his interest in the game of chess that led to a series of drawings and paintings, a multiple featuring a pocket chessboard and a plastic glove, a book focusing on specific chess problems (*L'Opposition et les cases conjugées sont reconciliées* with Von Halberstadt) and the live chess performances with, for example, Eve Babitz and Teeny Duchamp. Ernst Strouhal (1996) has presented a highly detailed account of Duchamp's relationship with the game.

Figure 19: Marcel Duchamp and Eve Babitz (1963), Pasadena Art Museum.

But play also enters his work in the form of numerous language games related to the titles of works as well as a continuous play with representational identity and gender stereotypes.

Figure 20: Marcel Duchamp as Rrose Selavy (1921), photographed by Man Ray.

Furthermore, the use of aleatory structures and chance has to be regarded as an important factor in his work. John Cage's artistic contribution to 20th century art cannot be understood without taking into account the immense importance of chance and aleatorics. The Fluxus movement and the idea of the Happening define a new role for the audience and invite various forms of participation. Play and games are central to avantgarde movements from Dada through the Surrealists, Situationists to Fluxus and Pop Art and can be traced into the work of numerous contemporary artists. In this context, the work of contemporary artists such as Uri Tzaig and Gabriel Orozco is relevant because it engages with different types of games. Tzaig's performance piece *Universal Square* (Lod, Israel, 1995) illustrates perfectly that games can be used as a form of stringent political comment. He organised a televised football game between an Israeli and a Palestinian team that was played according to slightly but significantly modified rules: he introduced a second ball. According to Salen and Zimmermann "[t]his elegant design act created resistance in several ways. The game could not be played in a 'normal' fashion: players had to invent new forms of interaction that took into account the loss of a single, unifying object around which all of the game activity was centered. Similarly, the behaviour of spectators was transformed as well … Photos of the crowd show them looking in many different directions, rather than the typical, singular focus of a sports spectator audience" (Salen, Zimmerman 2004, 563-564).

Figure 21: Uri Tzaig, Universal Square (1995), Video Screenshot, Lod, Israel.

This artistic intervention in the form of a subtle rule change can be read in the context of the theoretical model presented in the previous chapter as belonging to *rule space*, because the spatial structure of the event is changed for the spectators (multiple viewpoints) as well as the players. Furthermore, the game can be read as a metaphor for the current political and social struggle in Israel, with different parties following divergent objectives.

Figure 22: Gabriel Orozco, Ping Pond Table, (1998), installation.
Figure 23: Gabriel Orozco, Oval Billiard Table, (1996), installation.

Other examples for recent works by artists related to games outside of the sphere of the digital can be seen in Gabriel Orozco's work, especially in his sculptural installation pieces *Ping Pond Table* (1998) (consisting of 4 ping pong tables surrounding a lily pond) and the *Oval Billiard Table* (1996) (a round billiard table with 2 white balls and a red ball attached to a pendulum). Both pieces are, in a sense, 'hacked' versions of existing games which are played by the audience. In this case we

can state that the change of the playing field has a direct influence on the type of game that is played. Moreover, the rules are transformed and adapted to the new situation.

Another inroad into the role of the game in contemporary art practice could be seen in the discourse surrounding the notion of *relational aesthetics* developed by Nicolas Bourriaud, which concentrates on art taking the form of the social interstice, based on audience participation and interaction. Artists such as Felix Gonzalez-Torres, Carsten Höller, Rirkrit Tiravanija, Gordon Matta-Clark and Phillippe Parreno among many others have created game-like situations, environments and installations, which are brought to life through social interaction. Clearly there exist numerous examples of works integrating game and play that have to be ignored here, due to the limited scope of this study. In the following we will direct our interest towards works of art in the vicinity of digital technologies and computer games. Here it is, however, impossible to overlook the efforts of pioneering artists in the field of interactive art such as, for example, Jeffrey Shaw, Peter Weibel, Karl Sims and Lynn Hershman. Brief descriptions of certain pieces that have come to be regarded as key works in the development of digital interactive art and that share numerous formal and structural features with digital games will serve as the background for those examples directly related to computer games.

5.2 THE FIRST GENERATION OF INTERACTIVE DIGITAL ART

In this respect, the early interactive piece *Points of View* by Jeffrey Shaw, which was first shown in 1983, has to be considered. *Points of View* was a 3D computer graphics simulation projected onto a large screen in front of an audience. The navigation through the visual 3D environment was directed by a member of the audience with two modified joysticks. Based on technologies similar to flight simulators and indeed early first person PoP computer games such as *Battlezone,* the operator could move his virtual point of view within a 360 degree sphere, as well as up and down.

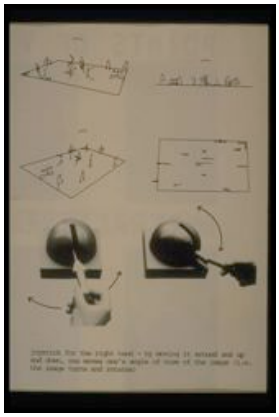



Figure 24, Figure 25: Jeffrey Shaw, Points of View (1983), Computergraphic Installation, Mickery Theater, Amsterdam.

A further description from Jeffrey Shaw's website delivers additional information: "The representation of the actors on the stage was derived from the ancient Egyptian alphabet - each figure was a hieroglyphic character. This constellation of signs was used to articulate a world model with an underlying set of physical and conceptual relationships. Sixteen sound tracks - mostly spoken texts - were interactively linked to the image via the same joystick that controlled the visual movements. Functioning like an audio mixer, this modulated the relative volume of the various voices with respect to the changing spatial positions taken by the viewer. Here again an intrinsic conceptual structure was articulated in the spatial mapping of these sound tracks to four positions on four levels of a semi-sphere" (Shaw 1983). This early work of interactive digital art already shows a very strong connection to the medium of video and computer games. However, interestingly the *user space* for this piece was a theatre and the piece was performed for an audience. In other words, although the structural and technological means were quite similar to videogames of the time, the cultural context for the piece seems to partake in a much older tradition of art and presentation.

This is further clarified when Shaw says about the piece, "[i]t is the particular audio visual journey made by a spectator who operates the joystick which constitutes a 'performance' of this work. For the other spectators that performance becomes 'theatre'" (Dinkla 1994, 3). Thus, to paraphrase Söke Dinkla, we could state that this piece is positioned on a threshold between earlier participative forms of art and an evolving paradigm of interaction with computers in the artistic context. On the one hand, *Points of View* investigates computer-generated representational spaces and importantly auditory aspects in an interactive environment, paralleling developments

in computer and videogames of the time. On the other hand, it seems to have been impossible for artists from the first generation of interactive computer art to enter into a dialogue with the realm of popular entertainment in the form of video games. Dinkla poignantly remarks, "[a]ll in all the multi-layered, encoded levels of meaning in early interactive works, which disclose their actual content only after a sort of decoding, contributed to a certain acceptance of Interactive Art in the 'art world'. However, this strategy had its price: the narrational contents often do not come from contemporary social contexts, but from the safe context of history. With this, some artists of the first generation addressed the 'reading-habits' of the art critic's establishment. They negated the achievements of the avantgarde, which clearly saw that art only has a chance when talking to the masses and not only to a small bourgeois elite" (ibid. 8). We will see later on that the current generation of artists in this field has a very different approach towards mass media and so-called *low-culture* that seems to be much more in line with the intentions of the modern avant-gardes. Jeffrey Shaw developed his approach to computer generated interactive works to create *The Legible City* in 1989 - now regarded as one of the key works of interactive computer art.

Figure 26, Figure 27: Jeffrey Shaw, The Legible City, (1989), Ars Electronica: Im Netz der Systeme, Linz, Austria.

In this interactive installation, the user navigates through a city represented by portions of text via a bicycle-interface. As in *Point of View,* the crucial moment shared with the medium of computer and video games here is the stationary user controlling a computer-generated audio-visual representation of space through an interface. The use of a bicycle as interface device, entailing the physical involvement of pedalling, is a very important element in this work. Again similarities with game devices and specifically those which can be found in public arcades and theme parks are striking;

and one can argue that the notion of the *kinaesthetic spatial modality* with all its characteristics can be consistently applied to this work. Indeed, Shaw has developed a very interesting modification on the level of the interface that points toward full bodily interaction with a computer generated representational environment. Furthermore, a specific version of this piece shown in Manhattan in 1989 integrated narration in the form of eight separate fictional stories based on monologues and represented in different colours, thereby literally generating a navigable *narrative space*. The symbolic exchange of text for the city seems to exemplify the notion of *narrative space* perfectly. Firstly, the user can decide to follow stories which are themselves based on spatial content and, secondly, reading becomes a bodily activity coupled with spatial operation within a visual representational space. Interestingly, the problem of navigation through such a representational environment which this piece shares with numerous computer games is approached by placing a smaller screen on the bicycle that displayed a dynamic abstract map representation of the environment.

The artist, curator and theorist Peter Weibel has written extensively on interactive and new media art in addition to developing numerous convincing pieces in this field. Weibel has scrutinised the phenomenon of the viewer "entering" the work of art and the paradigmatic shifts this transformation entails both in his theory and his practice. His interactive installation *The Wall of Lascaux* from 1993 perfectly highlights his theoretical approach. In this piece, the user is confronted with a brick wall that, shows an 'impression' in the wall made by the image of the user taken by a camera. Here the user effectively enters the work of art in the form of a slightly distorted silhouette and becomes part of what he/she observes.

Figure 28, Figure 29: Peter Weibel, The Wall of Lascaux (1993), interactive installation.

The Wall of Lascaux refers simultaneously to the famous prehistoric cave paintings said to constitute the historic roots of human artistic endeavours and to Plato's famous cave allegory and the philosophical tradition it has instigated.

Moreover, Weibel's piece seems to be embedded within a theoretical investigation into 'endophysics' that he started in conjunction with the theorist Otto E. Rössler. As the curator of the Ars Electronica Festival 1992, he posited this theoretical approach as the major theme. In the opening article for the catalogue some of these ideas are presented. Endophysics is introduced as a form of science that asks how the classical notion of scientific objectivity can be thought if the observer is always an internal part of the system he is scrutinising. Endophysics is based on specific form of constructivism that has its precedents in system and chaos theory. Drawing on the assumption that a complete description of a complex universe in the classical sense is only possible from an outside position, a situation that cannot be reached in the "real" world, endophysics suggests that only an approach via simulations and models which integrates the problematic function of the observer can yield scientifically objective results. As models, computer simulations and imaginary universes are promoted as a viable scientific approach to the world, art comes back into play for Weibel: "[i]s not electronic art, because of its participatory, interactive and observer-centered virtual character the world of the internal observer par excellence? This shift from an external and dominating standpoint to an internal and participatory standpoint determines the character of the electronic arts. In this sense, electronic art is driving the development of the arts from a phase of object-orientation towards one of focused on the context and the observer" (Weibel 1992). Seen from this perspective, *The Wall of Lascaux* takes on a different meaning as the culmination of scientific investigations and artistic production of models. But, simultaneously, the piece sets forth a kind of game that involves the user physically, as he/she constantly re-evaluates the influence of his/her position and posture on the visual representation in this interactive installation. If one compares the camera interface used here with similar ones emerging from the realm of contemporary games, such as Sony's Eyetoy device, for example, one can state that the artistic use predates the entertainment industry implementation significantly.

Concerning the influence of chaos theory and theories of emergence on early interactive art, the work of Karl Sims has to be considered. We will see later on that numerous contemporary artists working with game spaces share Sims' fascination with algorithmic emergence. Sims' interactive installation *Genetic Images* (1993) is located between generative art and interactive environments and consists of 16 monitors with tactile foot sensors and a computer-simulated evolution of generative images. Users make decisions about whether a particular stage in the image process will become the basis for further evolution thereby making selections based on aesthetic principles the defining factor for the piece.

Figure 30: Karl Sims, Genetic Images (1993), installation, Ars Electronica, Linz.

Genetic Images is based on the interplay between random structures and user selection. Sims writes about the installation: "[c]an this interactive evolution of images be considered a creative process? The participants are just repeatedly choosing among groups of 16 images presented to them. However, after only five selections, the users choose one out of over a million possible paths. This is a large enough number of paths that users with different tastes usually do end up with quite different results. This is certainly a different type of process from the execution or realization of a preconceived visual concept, but an element of chance can be an important component in some modes of creativity" (Sims, 1993).

While chance and user participation govern the aesthetic direction of the work, the artist has created the framework for it in the form of a particular algorithm and interface. While some of the images generated by the setup might be akin to kitsch, there is a subversive undertone in the fact the sum of subjective aesthetical decisions controls the objective reality of the process. In this sense, *Genetic Images* seems to

reverberate strongly with Gadamer's notion of the game within the ontology of the artwork. On the one hand, the rules of the piece, represented through the algorithm, create a structure for the subject to be played, on the other hand the aesthetic subject can assert itself, if only temporally, within a dynamic whole. If we regard this work from the perspective of computer games, it is a multi-player game, since up to 16 people can influence the generative imagery.

A final example for the first generation of interactive digital art is Lynn Hershman's piece *America's Finest* (1993-95), which won the Golden Nica at Ars Electronica in 1996. Hershman had created the first interactive laser-disc in the art context with her piece *Lorna* (1979-83) and worked across a variety of different media, most prominently video. *America's Finest* is an interactive installation using the famous American M16 rifle as an interface. In the rifle's scope, the user sees a video consisting of media footage from the numerous wars America has waged throughout the last century.

Figure 31: Lynn Hershman, America's Finest (1993-1995), installation, (computer, LCD, M16).

Every time the trigger is pressed, an image of the user, taken by a hidden camera is superimposed onto the video. The title refers to the use of the M16 in numerous wars, from Korea through Vietnam to Iraq. For Hershman, the gun is not only a means to criticise violence and warfare but also a vehicle that points towards the historical relationship between photography and film and the violent act of shooting: "[t]he associative notions of gun/camera/trigger link all media representation to lethal weapons" (Hershman 2000). Once the weapon is fired, the roles of aggressor

and victim converge in the viewfinder/scope and are framed by the media representation of war and death. In this sense, *America's Finest* aligns with work from a new generation of game-related art that critiques the overt violence and military style adopted in numerous computer games.

Following Dinkla, it has been argued that the interactive work that has been presented so far seems to share a certain disregard for the popular entertainment medium of computer and videogames. A new generation of artists who have grown up with the medium and are familiar with computer technology have started to use and abuse games in their practice. However, it is not yet possible to speak of a game art movement, nor even a homogenous field (such as new media art) that would feed such undertakings. Positions are extremely diverse, and practice varies from painting, through sculpture, performance, net art, interactive works to music. This immense variety and heterogeneity brings about the question whether any patterns or regularities can be discerned. As indicated in the introduction to this study, there is an opportunity here to exemplify the influence of the specific spatial qualities of video and computer games on contemporary artistic production.

5.3 CONTEMPORARY ART PRACTICE AND DIGITAL GAMES

Considering the enormous variety of practices that reaches from painting of games and players as subjects (Miltos Manetas, Mauro Ceolin), through web based games (Natalie Bookchin, Mary Flanagan), musical performance (Beige, Micromusic), to installations (Pierre Huyghe, Cory Arcangel) one has to find some way of approaching this rich web of work.

In a previous paper (Stockburger 2003) I presented a tripartite focus on artistic strategies towards video and computer games of *appropriation*, *modification* and *production* of games, differentiating works according to their relative vicinity to the medium. Firstly, there are works that appropriate the visual styles and iconography from video and computer games and embed them in different media, from painting to sculpture and video. This process reverberates with avantgarde strategies known from pop art and does not necessarily reflect a deeper engagement with the medium of games, their rules or technologies. *Appropriation* of elements from the audiovisual

apparatus of computer games and their transportation into the art context is probably the most widely used artistic strategy in this context.

Secondly, a growing number of artists adapt and modify existing game engines or translate game principles into other media forms. *Modification* demands a certain amount of knowledge of the rules and system of a particular game, but even more importantly an understanding of the wider context, such as the game's fans and communities. The artist here changes a functional or aesthetic element in an existing game and these frequently critical or ironic interventions are referred to as *modifications* (mods) or patches.

The third major artistic strategy in relation to computer games is the *production* of unique and innovative games. The term *artist game* (Holmes 2002) has been proposed for these products. What usually unites these games is their relatively low budget in comparison to the game industry, with most based on the programming languages Java or Actionscript (Flash) ensuring their deployment on websites. Numerous games are loosely based on classic arcade titles from the 80s, such as *Breakout*, *Space Invaders* and *Tempest*. But artist games are becoming increasingly complex and engaging. Although this tripartite classification is sensible, and has to be kept in mind, at this point it is necessary to relate back to the core model of this study and attempt to structure an approach along the lines of the spatial modalities that have been introduced in Chapter 3. This will allow for a more detailed scrutiny of how different works approach the hybrid spatial structures emerging from digital games. Furthermore, if the same theoretical framework for spatial practice can be employed in relation to art and games it might deliver evidence for the hypothesis presented at the beginning of this study, namely that contemporary artist practice is significantly informed by the specific characteristics of games. In this respect I will follow the structure that has been outlined in Chapter 3 and arrange specific artworks according to their dominant spatial modality. It should be reiterated that the model of spatial modalities is a dynamic and interrelated one - while a particular spatial modality might be stronger in one work, all the others can also be present, albeit with diminished importance.

5.3.1 USER SPACE IN CONTEMPORARY GAME RELATED ART PRACTICE

As was indicated in reference to Groy's theory of the emergence of the "new" in art, contemporary artistic practice is often concerned with establishing the context for the artwork itself. In other words, the art of the last century has increasingly started to reveal and modify the rules of the playing field of art itself. This also means that artworks can exist outside of their dedicated spaces, like the museum or the gallery, if the context is sufficiently developed. Certain emanations of so-called street art operate according to this strategy.

It is possible to address the spatial modality of *user space* in the work of game-related artists from this perspective. A very interesting example for this phenomenon is the ongoing work by a French artist working under the pseudonym Invader. The Invader project takes the initial narrative of the game *Space Invaders* and takes it further into urban space. He posits a world in which the aliens that have to be fought in the game have invaded our cities. Iconic replicas of the space invaders are placed in the urban environment in the form of ceramics. Thus, on the one hand the invader project is clearly establishing a strategy of iconic appropriation, but on the other hand it widens our understanding of *game space* to the whole of the city environment. Furthermore, the notion of invasion is a perfect metaphor for the work of a street artist as they invade bureaucratically ordered and tightly controlled public space.

Figure 32: Space Invader (1999), Paris, XIXe Arrondissement.
Figure 33: Space Invader (1998), Louvre, Paris.

But the Invader project is also taken into the museum; for example, the space alien was illegally installed in a room in the Louvre in Paris. Invader's practice

demonstrates perfectly how certain cultural phenomena can act like viral infections and permeate all spheres of culture from media systems like TV and magazines to public spaces. The second part of Invader's work involves the creation of maps of the cities that have been invaded, indicating the exact locations of his creations.

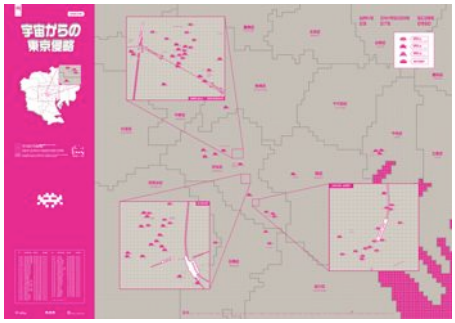


Figure 34: Invader (1999) map Paris, English/French/Japanese, (60cm x 42cm).
Figure 35: Invader (2002) map Tokyo, Japanese/English (60cm x 42cm).

Invader's work has also been shown in numerous exhibitions, although the artist remains anonymous due to the illegal nature of his interventions in the public sphere. The Invader project appears to facilitate the *user space* as a physical environment, including its social and intercultural connotations and elevates it to the level of the whole city. This widening of the *user space* from the confines of the dedicated game arcade and the private sphere of the home to the whole of an urban environment is also present in the work of artists who create location based games.

Here, the group Blast Theory has to be seen as one of the most important and prolific. In projects such as *Can You See Me Now?* and *Uncle Roy All Around You* they have presented a very stimulating hybrid between performance, new media art and computer games. In this sense Blast Theory's work has to be understood as a strategy leaning towards the production of unique games and participative performances.

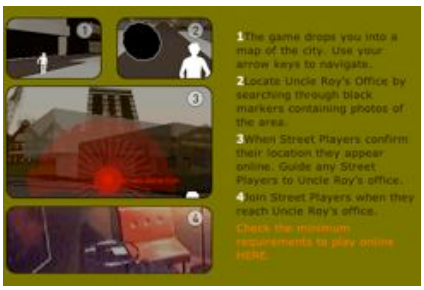


Figure 36: Blast Theory, Can You See Me Now? (2003), location based game.
Figure 37: Blast Theory, Uncle Roy All Around You (2004), website excerpt.

The game scenario *Can You See Me Now?*, that was awarded the Prix Ars Electronica Golden Nica in 2003, happens simultaneously online and on the streets. Blast Theory describe the game on their website as follows: "Players from anywhere in the world can play online in a virtual city against members of Blast Theory. Tracked by satellites, Blast Theory's runners appear online next to your player on a map of the city. On the streets, handheld computers showing the positions of online players guide the runners in tracking you down" (Blast Theory 2003). During the game, players can exchange tactical advice and communicate with Blast Theory via audio. The rules of the game are based on the idea of online players who are located in the representational space of the online map being pursued and hunted down by the so called "runners" who are moving in a physical environment. This hybrid spatial structure at the core of the game, oscillating between representational online space and urban environment, has led Blast Theory to describe their work as research into *Mixed Reality*.

A project like *Can You See Me Now?* can be seen as another example of games whose *game space*, or the complex structure of interlinked spatial modalities, depends on the user-space, the physical environment. Moreover, in this specific case, it seems most interesting to concentrate on the relation between the two spatial modalities of the *user space* and the *rule space* (the spatiality emerging from the game's rules). The hunting theme that is so important for a number of location-based games belongs to one of the oldest games known in humanity. What makes its use in *Can You See Me Now?* so interesting in this context is that the hunter and the hunted are not present in the same location, they only meet in the representational space of a constructed map. It seems quite obvious that in order to make the game functional, there has to be a correlation between the real urban environment the hunters are moving through and the construction of the map, which leads us back to our claim that all spatial modalities in this specific game are to a certain extent extruded from the core modality, the *user space*. However, although it seems quite clear that the *user space* of the "runners" in this example is crucial for the game, what makes this setup so remarkable is the confrontation with the second form of *user space*, the private online player at home. In *Uncle Roy All Around You* a strong narrative that depends on the player's movement through urban space is developed. Thus, the spatial modalities of *user space* and *narrative space* are intertwined and inform each other. In this case the bits of the story are uncovered, by collecting fragments from phone calls, bit of text

placed in physical locations as well as information given by other players. The narrative is uncovered and developed through a cooperation of players.

The following examples related to *user space* all take place within the gallery context. To a certain extent they all share the approach of translating the gallery space into the *user space* for a game. Pierre Huyghe's installation *Atari Light / Pong* (1999) that was shown in the French Pavilion at the 49th Venice Biennale in 2001 is a perfect example for such a practice. He has transformed the ceiling lights in the main gallery space in such a way that two players could play the prototypical tennis game *Pong* against each other.

Figure 38: Pierre Huyghe (1999) Atari Light / Pong, installation, ceiling lights, PC.

Huyghe's installation plays on several levels, it appropriates the vintage game *Pong* and taps into a sort of romantic historicism for the game, but it also actualises a spatial experiment, by transforming the architectural gallery space into the *user space* of the game. Like every other game, the piece only presents itself when it is played, thus we are also dealing with aspects of performance. Lastly, the reduced light grid on the gallery ceiling reverberates strongly with references to modern minimalist aesthetics, which are humorously reflected through the game form.

In the following, I will present my own artistic practice within the framework of this study. I hope that the discussion of my own works of art will confirm that artistic practice and theoretical work can share a common object of enquiry. Although both modes of cultural production can have a common focus, I am convinced that they realise their endeavours in different spheres and with different means. In other words, artistic practice would render itself entirely redundant if it simply

demonstrated a theoretical enquiry; the same could be said about theoretical work that tries to recreate artistic freedom within the rules of the academic field.

While art is often merely hinting at something, or creating an environment that has to be fully realised by the visitor within his/her time, the academic approach seems to be characterised by the exact opposite, a drive to explicate complex issues in detail. Both ways of generating knowledge have to be able to exist in their own right and under their own terms and conditions. Yet, this state of affairs does not invalidate the interest in experimentation and critical observation they obviously share. If one accepts the model of the game for both forms, it could be stated that there are two different sets of rules and, while the knowledge generated by either activity clearly informs the other, it is necessary to leave space for both. This becomes even more important when the subject that is working on a theoretical study aimed at the mutual understanding of certain issues from within the shared perspective of an academic community and the universe of text it depends on is simultaneously creating artistic works from a singular perspective, which themselves become objects of discussion. This is clearly a complex situation that can be approached best by playing both games well instead of trying to create a hybrid form that cannot realise the respective strengths that emerge precisely from the difference.

As a final example for the artistic examination of *user space* I will focus on one of my own works, the audio installation *Quake 1.0,* shown at the Junge Szene exhibition (1998) at Secession, Vienna. The installation used a system of wireless headphones to "map" the sounds one can hear when playing specific levels of the hugely popular FPS game *Quake* onto the different rooms of the exhibition space. While walking through the main exhibition hall, the listener would hear sounds from the level entitled *The Palace of Hate*; in the basement - *The Tomb Of Terror,* in the upstairs room (Graphisches Kabinett) *The Tower of Despair* and in the Klimt room with the famous Beethoven Frieze, *Shub-Niggurath's Pit*.

Figure 39, Figure 40: Axel Stockburger, Quake 1.0 (1998), Audioinstallation, wireless headphones, Secession, Vienna.

This application of pop cultural themes within the exhibition space, largely only decipherable to an experienced *Quake* player, thus creates a game of its own, that of smuggling references from the gaming community into the art context. Thus, this piece has to be seen as one among those that choose an *appropriational* strategy. However, the installation also attempts to bring about a particular spatial experience through the recreation of what could be heard in the *user space* of the game inside the exhibition space.

The curator of the exhibition, Kathrin Romberg, writes about this installation "[t]he wireless headsets offered to visitors of the exhibition … enable us to make a similar 'shifted experience in space' … as he/she walks through the exhibition, i.e. the experience of space in parallel with that of the show. Sound as the primary element of the installation uses stereo and volume effects to create a three dimensional experience" (Romberg 1998, 98). The use of stereo effects in *Quake's* soundtrack for example, creates the illusion of objects moving in the environment. What has been discussed in Chapter 4 applies here: acousmatic functions are key elements in the creation of sonic spaces.

5.3.2 NARRATIVE SPACE IN THE CONTEXT OF GAME RELATED ART

Natalie Bookchin's work *The Intruder* (1999) is a striking example for an artwork that tells a story through the use of games and thus creates a very unique *narrative space*. It is based on an experimental adaptation of a short story by Jorge Luis Borges and subverts 10 different game principles from classic arcade games. The story involves two brothers, Christian (the elder) and Eduardo (the younger), who fall in love with the same woman, Juliana, and decide to share the woman, which leads to an untenable situation that is only resolved when Christian kills Juliana. Players can only access the narrative through playing the game, enabling us to speak of an experimental *narrative space* in the precise sense that has been developed in Chapter 3. Unique implementations of gameplay that are bound up with the narrative include, for example, the player having to catch words tumbling downwards in order to recreate the correct sequence of the story that is told. A metaphorically and critically strong image emerges when the woman, Julianna, becomes the playing ball in a game derived once again from the prototypical *Pong*. Tiffany Holmes writes about this game, "[g]amers can only advance in The Intruder by perpetrating violent gestures. This novel, first person shooter structure invites gamers to see how popular computer games perpetuate masculine ideologies of spatial conquest, combat fantasies and sexual domination" (Holmes 2002, 136).

Figure 41, Figure 42: Natalie Bookchin, The Intruder (1999), Shockwave game.

In this work, Bookchin manages to deploy the game elements as critical devices and makes the player complicit in the enrolment of the violent narrative thereby

employing a strategy that seems to share a lot of characteristics with Lynn Hershman's approach in *America's Finest*. *The Intruder* was built with Macromedia's Shockwave and is accessible online, which also reflects Bookchin's strong reception within the net-art framework. This artist game is a perfect example for the *modification* of existing games, which manage to move into an entirely different terrain.

The piece *Trigger Happy* (1998) by the artists Thomson & Craighead is an artist game that adopts the principle of *Space Invaders*. However, rather than telling a particular story, like in Bookchin's piece, they have created the opposite scenario: the aliens of the original game are exchanged against the words of Michel Foucault's famous text *What is an Author?*. At the same time, each word that is shot can is used as a search term for use with an online search engine.

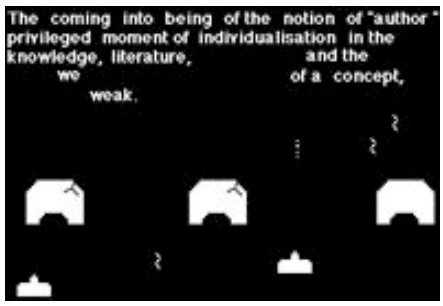


Figure 43, Figure 44: Thomson & Craighead, Trigger Happy (1998), Shockwave game, installation.

Here, the player is literally destroying the text through playing the game but simultaneously a new space, that of the potential internet search, opens up, which creates a very different perspective towards our notion of *narrative space*. Here the narrative is that which has to be removed from the *game space* in order to lead to a much wider web of potential narrative in the form of URLs to websites. Thomson & Craighead manage to generate meaning on several interwoven levels in this piece: the player becomes simultaneously the author of a temporary text that might or might not be meaningful, at the same time one of the most famous philosophical texts questioning the status of authorship itself is disintegrated through play and opens up to the vast textual universe of the world wide web. *Narrative space* is transformed into a philosophical game in a process that seriously questions the borders of the narrative in games by linking the game to the net. The piece has been shown in different exhibitions and is also available online.

A third work that gives evidence for the artistic interest in *narrative space* can be given with my own video piece *Walkthrough* (1999) which is based on a so called walkthrough text for the game *Tomb Raider*.

Figure 45, Figure 46: Axel Stockburger, Walkthrough (1999), Video (40 min.).

An excerpt from the book *Sample Minds* contains a thorough description of the piece: "[a] walkthrough is a descriptive text availing itself of the imperative mood and reflecting the entire field of action of a computer game and offering solutions for various mysterious tasks. The world sketched out in *Tomb Raider*, one of the most successful computer games in the 90ies, by now has become a part of the collective media consciousness. Whoever has once tried to reach the final level of the game will remember its topographical characteristics, the scenes and puzzles. In the installation *Walkthrough* the "virtual" space of the game reappears in the form of a text-based cartography that is representing every spatial detail in a succession. […] a 40 minute video tape was shown unwinding, in the manner of the final credits in a film, the entire walkthrough text to the computer game *Tomb Raider 1*. Formal characteristics of the feature film, the 20th century mass medium, are thus the blueprint for the emerging mass media forms, computer and video games. Walkthroughs are poetical texts on territories familiar to those who spend their spare time in programmed alternative realities. They are guided tours, as it were, through computer generated spatial structures. By means of the text the spaces, we might say, are given an additional realism boost" (Stockburger 2004, 150).

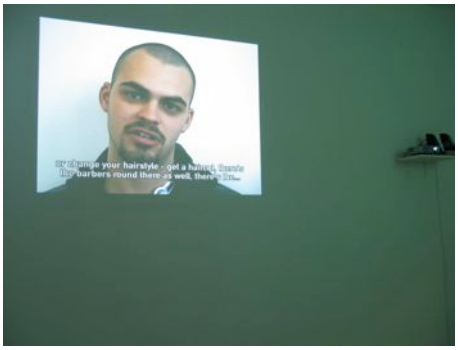
In order to gain a better understanding of the form of the narrative structure of walkthrough texts, we can turn to a short excerpt from the walkthrough:

"Tomb Raider – Complete Walkthrough and Secrets

Caves – Items: 7 – Secrets: 3 – Kills: 14

Follow the tracks running past the slots with the poison darts. If you keep running the darts will miss you. Continue around the corner. Lara will look up at a ledge indicating the way to go but first we need to get a secret. Continue straight into a larger square room with a door in the corner. You must use the slanted rock to jump onto this door. You can either jump back then forward off the sloped face or you can climb up the back of the sloped rock and jump as you slide down. Either way you will grip the base of the door to enter SECRET 1 and get the medkit" (ibid.). The role of the walkthrough text as a textual form of the *narrative space* generated by a computer game is also followed up in a paper entitled "Head Left – Climb Up – Jump In" (Stockburger 2002).

A recent work deals with *narrative space* from a different angle. The video *Boys in the Hood* (2005) consists of a series of interviews with five different players of the game *Grand Theft Auto: San Andreas*. The interviewees were asked to describe the *game space* as well as their actions within it based on memories of playing the game. Here, the *narrative space* emerges from the subjective stories of the players and their particular views and activities within the *game space*.



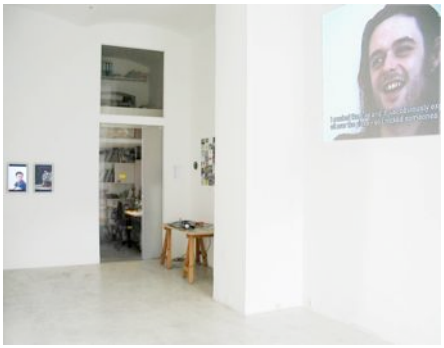


Figure 47, Figure 48: Axel Stockburger, Boys in the Hood (2005), Video (90 min.).

Their stories are told exactly like real life stories would be, taking on modes of conveying spatial information well known from everyday life situations. Their stories about events in the game and detailed descriptions of the spatial structures and specific locations seem to be distilled from memories of real life events. The video tries to highlight the fragile border between fiction and fact or between *game space* and everyday life. The art critic and curator Walter Seidl writes about the piece "[i]n this video the viewer is presented with stories, whose authenticity, especially concerning

their moral and ethical treatment of people is taking on frightening dimensions. The emotional involvement of the young storytellers is growing in such a way that the real people seem to fully take on the roles of fictional players, and the authenticity of their stories is enhanced further because none of them ever mentions the game" (Seidl, 2005). In the case of *Boyz n the Hood*, the *narrative space* is approached through the filter of the playing protagonists who have their own spatial stories to tell. Furthermore it demonstrates quite clearly how diverse and subjective the shared representational *game space* is used and remembered. While one interviewee tells the audience how he went to the top of a mountain in order to experience a thunderstorm in the game, another one describes in great detail why the top floors of certain buildings are perfect spots for snipers.

5.3.3 RULE SPACE IN THE CONTEXT OF GAME RELATED ART

Relating the spatial modality of *rule space* to artistic practice reveals an immense number of relevant works. For instance, purely aesthetic uses of a game engine as an image generator which entirely discards the original rules of the game amount to the creation of different *rule spaces*. The floodgates would be opened unless we restricted ourselves to a few very specific examples that are most clearly concerned with changing the rule system of games.

The online game *Activate: 3 player chess* by Ruth Catlow is a perfect example for an artwork that is focused on the rules of an existing game, thereby changing the gameplay and creating novel spatial action. The game has been developed as part of the net art initiative *Rethinking Wargames* that invited artists to rethink the rules of conflict based games. As suggested at by the title, the game uses the ancient game of chess and introduces a third player as well as a new form of cooperative rather than antagonistic play. The adaptation of chess transports this piece into a direct line with classic chess-based works of art such as Yoko Ono's subversive interpretation of chess *Play it by Trust*, consisting of an all white set of figures.

Figure 49: Yoko Ono, Play it by Trust, (1969-1999), sculpture, MDF painted.

It also seems to be in touch with the version of chess developed by the composer Arnold Schönberg, entitled *Koalitionsschach* or *Bündnisschach* (coalition chess) that was conceived for four participants using 36 figures on a 10x10 board. Ernst Strouhal writes about this particularly interesting adaptation of the rules of chess in relation to art in more detail (Strouhal 2005, 109-117).

In one sense, the modification and adaptation of chess in the art of the 20th century can be seen as a phenomenon *avant la lettre* in relation to contemporary computer and video game adaptations. However, Catlow's piece - that can be played online and as a physical entity - is motivated by transforming a game that has a history of being read as a metaphor for war into a game that allows different parties to collaborate in order to "pacify" the game and point out alternatives to competitive and antagonistic actions.

Figure 50: Ruth Catlow, Activate: 3 player chess (2004), online game.

In an interview with Molly Hankwitz, Ruth Catlow explains that her game modification was inspired by the protests surrounding the build up to the war in Iraq and the idea that the pawns in the chess game could be seen in analogy with the crowds of protesters. The powerful conflict metaphor of the chess game is transformed into a metaphor for popular peace activism.

She delivers insights into the development process for the game conversion: "Ideas for the game's interventions evolved from the emailed contributions from the early participants and from Robert Axelrod's 'Evolution of Cooperation', in which he carried out scientific research into the conditions in which cooperation can evolve amongst egoists, without the intervention of a central authority. In the newly created Activate: 3 Player Chess, pawns are played by a third player, and they preserve peace by stopping other pieces from being captured. If the pawns succeed in blocking the aggression of the higher pieces, the checkerboard is overgrown with grass and the black and white checks of the battleground disappear in the undergrowth" (Hankwitz 2004). *Activate: 3 Player Chess* represents a very good example for the use of games as critical simulation devices, which can be used to comment and paraphrase political reality. The fact that the artist has invited an open discussion about the possible rule changes and their viability is also important in this context.

Velvet Strike, a game project developed in 2002 by Anne Marie Schleiner, Brody Condon and Joan Leandre, is also directed towards establishing new rules within an existing *game space*. Anne Marie Schleiner is an artist, theorist and curator who has created numerous game-related pieces and curated exhibitions dedicated to computer game patches and hacks. All her projects can be accessed from her webpage (available at http://opensorcery.net). She was among the first theorists to introduce a critical feminist position towards computer games and game modification. One of the earliest art exhibitions that highlighted the practice of modding and patching in the context of computer games was the online exhibition *Cracking The Maze - Game Plug-ins and Patches as Hacker Art*, curated by Anne-Marie Schleiner in 1999.

In her curatorial statement, Anne Marie Schleiner delivers an overview of the historical evolution of mods and patches, emphasising the importance of the Internet as distribution medium and hinting at the subversive potential of mods. These mods, for example, were the first attempts to include representations of female bodies into the realm of player avatars in first person shooter games like *Doom* and *Marathon*.

Schleiner points out that these hacks introduced female avatars into games before they were officially included in games like *Resident Evil, Final Fantasy VII* and *Tomb Raider*. From this perspective, unofficial fan mods have transformed the representational strategies of the game industry. Mods also constitute an incentive for artists who are interested in transforming the often stereotypical representations and narratives in computer games. Schleiner writes "[o]n a technical level, of course, the artist(s) avoids having to put in the extensive time required for programming an interactive game engine. But the parasitic game patch is also a means to infiltrate gaming culture and to contribute to the formation of new configurations of game characters, game space and gameplay" (Schleiner 1999). It is important to note that *Cracking the Maze* included patches from artists as well as gamers and hackers who did not produce their interventions with an art context in mind. This shows that in addition to the image of the hacker becoming interesting for contemporary media artists, the artistic context has itself been widened to include a number of previously excluded activities such as programming software. All of these facts are similarly important in the context of net art. Patches and Mods lead to a number of different interventions: some affect the architecture, lights and sounds in a level (maps); others affect the player representation (skins); some might use the well known game-play of classic games like *Pong*, *Breakout* or Space *Invaders* and exchange the visuals; some transform the whole aesthetic machinery; while others only change certain rules of a game.

Velvet Strike is such a mod, based on a modification of the highly popular online FPS *Counterstrike,* which was itself developed by a group of fans out of the commercial game *Half Life*. The gameplay of *Counterstrike* is made up of terrorists fighting versus counter terrorists. It is this stereotypical antagonistic setup that has motivated the *Velvet Strike* modification. The actual patch is explained as follows on a website dedicated to the project: "Velvet-Strike is a collection of spray paints to use as graffiti on the walls, ceiling, and floor of the popular network shooter terrorism game 'Counter-Strike'. Velvet-Strike was conceptualized during the beginning of Bush's 'War on Terrorism'. We invite others to submit their own 'spray-paints' relating to this theme" (Velvet Strike 2005).


Figure 51, Figure 52: Anne Marie Schleiner, Joan Leandre, Brody Condon, Velvet Strike (2004), game modification, screenshots.

In the case of *Velvet Strike,* the *rule space* is infiltrated with new gameplay ideas that react critically towards the existing rules and the ideological background of the game. Rather than cooperative shooting of virtual enemies, the new set of rules, which is implemented via the game patch, allows players to "spray" tags onto the textured walls of architecture in the *game space*. Accordingly the new rules allow a spatial intervention, rather than the usual activity within a FPS game. But this work of art does not have an end in itself in the game modification, it also provides a background for the *Counterstrike* player community in the form of a forum-based website that invites discussions and critical reactions, thus reaching out into the social *user space* of the original game. The so called "sprays", or graphical tags can be submitted and shared via the site and performative interventions during gameplay on ordinary *Counterstrike* servers are proposed. Such intervention guidelines, or in other words, alternative behaviour rule sets for performances inside online games read very much like Fluxus performance prescriptions. Visitors of the site contributed the following proposals for intervention guidelines:

"*Recipe for Martyrdom by John Brennan (aka BigJB):*

You and several friends join a busy Counter-Strike server. During the battle, tell everyone you are martyrs for peace, then jump off the tallest structure in the level, killing yourselves.

Recipe for Heart Stand-in by A.M.S.:

Ask the members of your Counter-Strike team, (must be at least 14), Counter-Terrorist or Terrorist, to stand in a large, low, flat open area in the game that can be viewed from above. Arrange everyone to stand in the shape of a heart. Do not move or return fire. On all player chat send out the message repeatedly: "Love and Peace" Retain position stoically" (Velvet Strike Recipes 2005).

The last intervention guideline, inviting players to stand in the shape of a heart, clarifies how this project examines spatialising actions in the *game space* that is facilitated by the *rule space*. Additionally *Velvet Strike* represents a satirical and critical intervention in the social space surrounding online games like *Counter Strike* by means of proposing alternative behavior through questioning the rules in an existing game.

5.3.4 AUDIOVISUAL REPRESENTATIONAL SPACE AND GAME RELATED ART

Audiovisual representational space is clearly the largest field for artistic intervention. It can be argued that the vast majority of artistic creations related to games, beyond the purely conceptual ones, deal in some way with the audiovisual representational aspects of *game space*. This means that a large number of possible examples have to be omitted here and that it will be necessary to focus on a small selection of works. Thus I will present certain positions that can be regarded as prototypical and refer to other artists who follow a similar interest without discussing their work in more detail. In this respect I will at first focus on a phenomenon that has been taken up by numerous different artists, namely the recreation of gallery or museum spaces with means of game engines. With the advent of *Doom,* players were enabled to create their own maps for games and a culture of modification of existing games started to grow. The players created maps or avatars that could be used with game engines such as the *Doom* or the *Marathon* engine. One of the earliest examples that exemplifies the interest of contemporary artists in this culture of modification and manipulation of existing game engines dates from 1995 and was called *ARSDoom,* by Orhan Kipcak, Curd Duca, Rainer Urban, XRay and others. The *Doom* engine was used to architecturally recreate the Brucknerhaus in Linz, the site of the yearly Ars Electronica Festival. Mugshots of curators and artists taking place in the festival were pasted on the monsters in the game and the player used a paintbrush to splash paint over "enemies" rather than kill them. This intervention had a humorous and satirical impact in the context of the festival, because it allowed an opportunity to live out inside the game the evident rivalry and competition amongst artists participating in the festival.


Figure 53, Figure 54: Orhan Kipcak et al., ARSDoom (1995), game modification, Doom engine, screenshots.

The game was accessible online and players could choose to play well-known artists like Beuys, Baselitz, Rainer or Koons. The interesting idea here is that the museum space was entirely recreated in the form of a navigable 3D model. Rather than bringing an object from outside the art context into the white cube, the gallery or museum space itself was presented as a model that could be opened up to the wider world via the Internet. *ARSDoom* became the prototype for a whole series of artistic modifications loosely based on the idea of recreating museum or gallery spaces with game engines.

In the following year, the artists Tobias Bernstrup and Palle Torsson started a series of works that follow a similar trajectory entitled *Museum Meltdown* (1996-1999), initially based on the game *Duke Nukem 3D* and later *Quake* and *Half Life*. In all of these works the architecture as well as the collections of different museums, such as the Museum of Modern Art in Arken, near Copenhagen (1996), The Contemporary Art Center of Vilnius (1997) and the Museum of Modern Art in Copenhagen (1999) were recreated as maps for the game. The players could battle each other running through rooms lined with representations of famous works of art. On the website for the first installment of *Museum Meltdown* in Arken the artists state "[t]he technology has a vast influence on our perception of reality. As it shapes the world around us, the environment and the actual tools of perception and the question of identity become more complex and important to redefine. As the concept of space and our own presence becomes more and more inseparable, the relation between democracy and technology gets even more important. We decided to take the architecture of the museum one step further and turn the space into a violent computer game and hereby emphasize these questions" (Bernstrup, Torsson 1996).


Figure 55, Figure 56: Tobias Bernstrup, Palle Torsson, Museum Meltdown (1999), game modification Half Life engine, screenshots.

Bernstrup and Torsson's work poses questions about the importance and validation of emerging spatial technologies in relation to traditional forms of the collection and presentation of art. At the same time numerous museums were beginning to show an interest in digital technologies and their role in the presentation and dissemination of their collections. Research into various forms of virtual museums and forms of online presentations was undertaken. Bernstrup and Torsson's use of a popular entertainment medium such as computer games seems to present an ironic commentary within the discourse accompanying new forms of presentation. In *Museum Meltdown* an audiovisual representation of the museum space becomes the site for a popular game. In this sense, the artists created a bridge to the culture of computer games that was at the time not deemed worthy of being considered within the framework of cultural institutions.

However, in the following years, this initial idea was taken further. Exhibitions such as *Synreal,* which was part of a wider exhibition called *Synworld/Playworld Hyperspace* (1998), organized by Konrad Becker and Public Netbase at Museums-quartier Vienna, and *Reload* (1999), organized by Matthias Berghammer at the Shift Gallery in Berlin, invited artists to create levels with specific game engines. *Synreal,* which used the *Unreal* engine, presented levels by artists such as jodi, Max Moswitzer, Margarete Jahrmann, Vuk Cosic, Axel Stockburger, Mathias Fuchs and Sylvia Eckermann among others. At the opening of the exhibition a LAN Tournament invited the public to play against each other in these levels and the game was also accessible from the Internet. In contrast to works such as *ARSDoom* and *Museum Meltdown,* these works shared a deeper interest in the internal workings of the original games, such as their rules as well as conventions and stereotypes presented by them. Some of the levels were not playable at all, because they exploited certain glitches and

faults in the programming and others enabled strategies of use that differed significantly from the original game.

My level for *Synreal*, entitled *Loopwalker* (1998), examined the possibilities of creating a sound environment with the *Unreal* game engine, which makes it possible to designate sounds to specific areas of space in the game environment. 150 sound loops were positioned in different rooms of the level. The rooms had a spherical form and a basic beat was placed in the center of the sphere, while other beats and bits of sound were organized in concentric circles around this center. The user could generate a unique soundtrack by navigating through the space and triggering the different sounds. The sounds were connected with volumetric lights in order to give the user a visual indication about the locations of new sounds in the game environment.

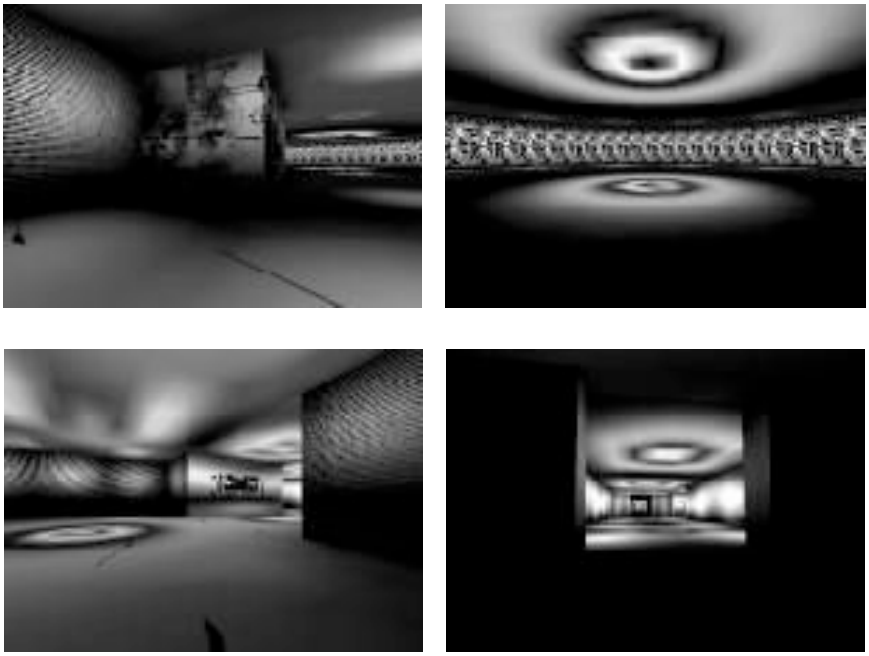


Figure 57, Figure 58, Figure 59, Figure 60: Axel Stockburger, Loopwalker (1998), game modification Unreal engine, screenshots.

Loopwalker is an attempt to highlight the possible applications of spatial sound in computer games and experiments on with what we have termed the audiovisual representational modality of space. It proposes uses for game engines that go beyond the stereotypical patterns of FPS games.

The artists Sylvia Eckermann and Mathias Fuchs, who also created a level for *Synworld,* developed this practice further and have been presenting various projects

based on the *Unreal* and *Unreal Tournament* engines. With *Expositur* (2001) they have created what they refer to as a "virtual knowledge space", thereby taking the initial idea of the virtual museum presentation one step further.

Figure 61, Figure 62: Matthias Fuchs, Sylvia Eckermann, Expositur (2000), game modification, Unreal Tournament engine, screenshots.

Expositur is a virtual environment that delivers specific information about historical artifacts such as a prehistoric fish that once lived in the river Danube and is now part of the collection of Vienna's Museum of Natural History or urban locations and architectures with their specific history. Fuchs and Eckermann thus research the use of computer games as educational devices that convey information in a playful manner.

In a research paper that accompanies the project they lay out their intentions as follows: "[w]e developed a system of connotations amongst the objects, which then was translated into a spatial structure of rooms, corridors and places of different sizes, shapes, remotenesses [sic] or proximities. The viewer/listener of our knowledge space explores a semantic structure by navigating virtual spaces with the topics being contained in these rooms. The connecting architecture between these rooms resembles staircases, passages, elevators, hidden doors or portals, each of them referring to the nature of the connotation. Quite contrary to web-based databases and hypertext structures, the links therefore possess a quality of their own, carrying much more information than just 'is connected with'" (Eckermann Fuchs 2001). *Expositur* examines the connection between memory and spatial location that we have discussed in relation to mnemotechics in Chapter 3 of this study. It is an important example for the possible use of computer games in an educational context and the careful consideration of the interplay between *audiovisual representational space* and *narrative space*.

A very different approach that nevertheless mainly takes place in the realm of *audiovisual representational space* is presented by the work of Jodi. The group, comprised of Joan Heemskerk and Dirk Paesmans, were initially famous for their net art pieces, but they also started to appropriate and modify computer games such as *Castle Wolfenstein and Jet Set Willy*. Jodi are most interested in the hidden aspects of software that are the technological basis for computer programs. In this sense they exploit errors and glitches, change details in the code base and focus on obsolete programming languages and devices. They have developed a series of hacked versions of id Software games such as *ctrl-space* (1998-99) based on network enabled *Quake* and *SOD* based on *Castle Wolfenstein 3D*. Their approach to these games is similar: they exchange the textures and avatars for abstract black and white graphic elements and transform all of the visual representational elements in the original games. The modification of textures and shaders leads to a radically different and highly abstracted aesthetic. Although the games remain playable, users who are familiar with the original are confronted with an entirely changed appearance. The use of flat black and white textures transforms the representational space and flattens the appearance. In this respect Jodi are a perfect example for an artistic strategy that is mainly interested in the audiovisual representational aspects of computer games, rather than the *rule space* or narrative aspects of games. They transform games in order to enable original aesthetic experiences for the user. Jodi's interventions bridge the gap between the practice of the fan based modding community and elements of the fine art canon, such as Russian constructivism, minimalism and Op Art.

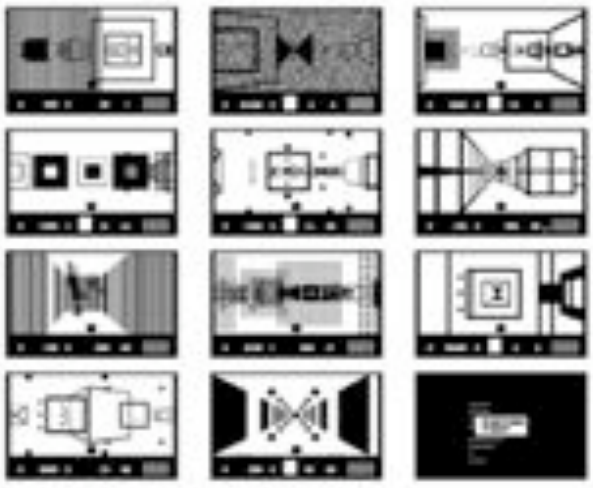


Figure 63: Jodi,SOD (1999), game modification, Castle Wolfenstein 3D, screenshots.

Tilman Baumgärtel writes about SOD "[…] this precursor of 'Quake' […] is now reduced to just a mysterious black and white landscape in which only rarely can be seen what is being hunted or what is blocking the way. The castle with the intertwined passageways, through which the player has to find his way, looks like a gallery in which only copies of Kasimir Malevitch's 'Black Square' are hanging on the walls; Nazis have become black triangles—they are recognizable because they occasionally yell 'Achtung!'. Of all the game modifications that Jodi has produced, it is the graphical aspects that are the most reduced. At the same time however, the mechanics of play of the original game are respected. 'SOD' is quite playable and is really 'fun to play', as the reviews in the computer game magazines have so often noted." (Baumgärtel 2004, 5).

Baumgärtel (2004) has shown that the works of artists such as Tom Betts, Arcangel Constantini and Joan Leandre belong to an emerging field of code-based abstract digital art that has its origins in hacker culture. The Mexican artist Arcangel Constantini's piece *Atari Noise* (2000) is a very good example for this practice.

Figure 64: Arcangel Constantini, Atari Noise (2000), installation, videoprojector, Atari VCS, Museo de Arte Carrillo Grill, Mexico City.

The central element of this interactive installation is an original Atari VCS system. Constantini has hacked the hardware in order to transform the game console into a kind of "video synthesizer". *Atari Noise* does not use any recognisable visual elements appropriated from the original Atari games. Here, the game console has been completely transformed into an interactive device that generates random patterns of colours. In relation to our context, it can be stated that an installation like *Atari Noise*, turns the *audiovisual representational space* of the original games into an abstract non-

representational colour-space that seems to share much more with minimalist painting than with computer games. Accordingly, *Atari Noise* marks the perimeter of our study of artistic strategies in relation to *game space*. However, the fact that Atari's VCS console - one of the most widely-used entertainment devices of the last century - is at the core of this piece points towards a trend among contemporary digital artists; namely to salvage obsolete and historical devices as a means of highlighting the increasingly fast-moving technological cycles inherent to contemporary consumer culture.

Tilman Baumgärtel, who, as a curator has shown this piece in the exhibition *Games: Computergames by Artists* writes that "[t]his deconstruction of 'visual raw material' is not only part of a long, modernist tradition of alienating and modifying found images, but also alludes to one of the most seminal works of media art: Nam June Paik's 'Videosynthesizer' (1972). While Paik had to hire the engineer Shuya Abe to develop a machine that allowed you to manipulate moving images in real time, 'Atari Noise' reflects a media culture in which the necessary hardware is available as electronic scrap" (Baumgärtel 2003). *Atari Noise* and its complete transformation of the *audiovisual representational space* marks the endpoint for the discussion of artworks that interfere with *game space* on the level of audiovisual representation. In the following we will turn to artworks which primarily address the modality we have introduced as *kinaesthetic space*.

5.3.5 KINAESTHETIC SPACE AND GAME RELATED ART

In Chapter 3 it was argued that the kinaesthetic link between the player's body and the representational space of the game can be regarded as one of the most important phenomena in this context. As in the previous cases, the examples that follow are not exclusively based on the kinaesthetic spatial modality. In parallel with all the other works – and, for that matter, the games we have discussed - spatial modalities are interrelated and work in conjunction with each other. Thus, the examples have been chosen not because they exclusively focus on *kinaesthetic space*, but because their crucial moment is the physical bodily involvement of the user. Works that focus on *kinaesthetic space* often experiment with interfaces.

Such is the case with the installation *Painstation* (2001-2005) by the German media artist group *Fur* (Volker Moraw, Roman Kirschner and Tilman Reif). *Fur* looked at the kinds of feedback delivered by computer games and concluded that although physical involvement is present in most games, the feedback itself is often audiovisual rather than tactile, and rarely results in the suffering of physical pain. *Painstation*, which is based on a rewritten version of *Pong*, is a game console that punishes the players who let the ball slip through with three different modes of inflicting pain: heat, electroshocks and a tiny whip made of wire. These different types of pain are unleashed if the players hit three different types of symbols which are placed at the edge of the screen, behind the paddle. The introduction of physical pain changes the nature of the game significantly, because the reward system is shifted from the psycho-symbolical level to the visceral. Furthermore, if one understands physical pain as an important signal in the feedback system of human bodies it becomes evident that the *Painstation* installation tightens the kinaesthetic linkage between game system and human body. In other words, by connecting the body's own pain feedback system to the cycle of the game the players are paradoxically enmeshed even further in the cybernetic situation.


Figure 65, Figure 66: Fur (Volker Moraw, Roman Kirschner, Tilman Reif), Painstation (2001-2005), Installation, Pong, Console, PC.

Spatial action in the *audiovisual representational game space*, such as missing the ball by steering the paddle to the wrong place, is accompanied by a painful reminder that one's body is indeed a part of the game system. This kind of experimental setup allows the players to experience the consequences of their actions in the game in the most drastic way, one that heightens concentration on the gameplay immensely. Players bear very real wounds on their hands, which bear testimony to their engagement with the game. At the same time Fur deliver an ironic reading of certain types of contemporary computer games as modern versions of the age-old duel between two opponents. The *Painstation* project seems to be part of a wider tendency that experiments with stronger physical feedback in computer games. While game companies try to develop more complex physical feedback systems, such as vibrating controllers some artists experiment with more extreme forms of feedback that could not be employed in commercial games due to safety considerations.

It can be argued that installations like *Painstation,* whatever their sinister undertone, amount to artistic inquiries into the new environments that make our bodies perceivable again. It is precisely the joy of a spatial transgression between the body space of the player and the *game space* that shows itself in these biofeedback experiments. Developers of computer and video games are constantly researching alternative feedback methods to enhance the sensation of bodily immersion into the game system and it is conceivable that mild and harmless electric shocks could feature in a commercial device in the future. In our context, the crucial point is that these experiments heighten the experience of a kinaesthetic link between the player's body and the game machine. Thus, in a seemingly perverse twist, physical pain is used to fuel the turn from represented and representational space to lived space. In a

Painstation game the shock connects the representational space on screen (the missed ball hitting a pain symbol) with a spot on the player's left hand and this link is immediately felt and lived.

A piece by Eddo Stern addresses embodiment in computer games and *kinaesthetic space* in a different manner. The installation entitled *Runners: Everquest* confronts the user with three different projections and three computer mice connected to them. Each mouse steers the movement of a character, which is present in real-time in the popular online MMRPG *Everquest*. In this sense the piece also amounts to an online game performance and Eddo Stern notes on his website that the game performance ran for exactly 180 days.

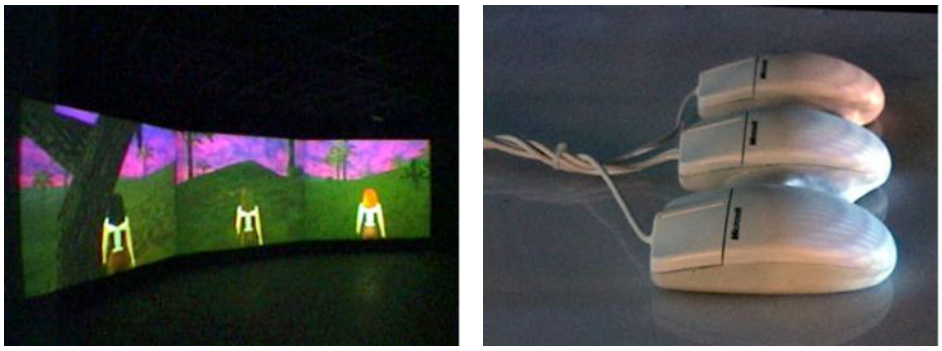


Figure 67, Figure 68: Eddo Stern, Runners: Everquest (1999-2000), online game performance, interctive installation.

Stern deliberately confuses the player's kinaesthetic link between interface device and avatar by multiplying the options. Since it is impossible for a single player to control three avatars simultaneously, the direct link between interface device and avatar is put into question. Stern writes "[u]sing a custom made 'Triple Mouse' participants can, and must control all three characters, who simultaneously navigate a separate area of the game world, respectively. The player is forced to make a decision about which character to embody and which to abandon, while a varying live web-audience of thousands follows his or her performance within the online game" (Stern 1999).

The simple multiplication of avatars/interfaces sharply highlights the questions regarding embodiment and *kinaesthetic space*. Furthermore, *Runners: Everquest* develops a highly complex spatial setup since the piece connects one *user space* (in this case the gallery) with three different locations in the *game space* of the online game and thus three different *audiovisual representational spaces* (although they all follow the same pattern defined by a 3rd person PoP camera). In this way, the singular connection

between player and avatar that guarantees the function of embodiment within the game is shattered and the player has to come to terms with the fact that he has to simultaneously control 3 different Game Egos in three different locations of the game universe. Stern's piece amounts to a critical study of game conventions and clearly shows the central role of the kinaesthetic link between player and avatar.

In a series of pieces entitled *PSX Warriors (1998-2004)*, I have taken a different route to the kinaesthetic link between player and game by focusing on the faces of players in a variety of different user spaces and types of games. Depending on the type of *game space*, the player's spatial action in the *game space* is mirrored by his/her body movement. In the video *PSX Warriors: Gran Turismo,* the face of a girl playing the highly successful racing game *Gran Turismo* is shown accompanied by the original sound for the period of one race. The *game space* is translated into her subdued movements, which are directly linked to her actions during the race. If she is moving through a tight curve, her posture shifts to the opposing direction and vice versa. Whenever she has to brake in the game, she moves nearer to the observer and in phases of acceleration slightly backwards. At the same time these actions are accompanied by the sound that is by its own accord capable of generating the sensation of movement through space as we have discussed in Chapter 4. Since we are dealing with a racing game in this case, the sounds emerging from the moving car follow what we have termed the *locomotoric* function; the pitch shifts according to the speed.


Figure 69, Figure 70: Axel Stockburger,PSX Warriors: Gran Turismo (2001) Video(4min).

Furthermore, the stereo sound generates hints regarding the direction of the movement. The miniscule motion in the user space that clearly traces the spatial

action in the game can be read as visual evidence for what we have termed *kinaesthetic space*. With this final example the presentation and discussion of contemporary artistic practice in the light of the spatial modalities of digital games is concluded. I am aware that this short catalogue of works has barely scratched the surface of the wide array of creative practice connected to computer and video games. Nevertheless I have attempted to select the strongest and most striking examples in the context of this study.

5.4 CONCLUSION

At the beginning of this final chapter the ontological kinship between notions of games and art were traced and it became obvious that these two cultural forms share a number of similarities. Games and play were seen to constitute a prominent thematic concern of modern art and, equally, contemporary video and computer games are hailed as a new form of art. Based on this understanding, works of interactive art were explored in order to establish a coherent historical context. Subsequently, an overview of artistic practice's relation to the highly specific spatiality that presents itself in computer and video games was delivered. The chapter and the different examples have been structured along the lines of the core model of spatial modalities in order to assess its viability in the realm of the artistic production. It was possible to demonstrate that the system of spatial modalities that has been proposed for computer and videogames, namely *user space*, *narrative space*, *rule space*, *audiovisual representational space* and *kinaesthetic space* can be employed to shed some light on the different artistic approaches towards this new medium.

Moreover it became clear that artists are indeed fascinated by the spatial practice in digital games and that they experiment in highly specialised ways with different aspects of this phenomenon.

On the one hand, game developers might well become more interested in those experiments in their search for new and original games, on the other, this work represents a very important critical reflection of the tools and ideologies presented by the entertainment industry. As a phenomenon of contemporary culture, digital games will stay with us and artists from different backgrounds will continue to use and abuse them in novel and original ways.

6. CONCLUSION

The present chapter is dedicated to the re-evaluation of the work that has been done and to the identification of open questions that might lead to areas of further research. Now that a fuller picture has emerged it is possible to briefly touch upon broader issues that have emerged from the thesis but could not be addressed in the preceding chapters.

The point of departure of this study was the hypothesis that video and computer games generate new and different kinds of spaces and that their players perform equally novel spatial actions. Research from the field of game studies initially supported the understanding that video and computer games generate highly specific spatial constructions. However, as has been established, the interest in space always seemed to have been part of wider agendas, often focusing on narrative or formal structures in games. A theoretical perspective that considered the underlying spatial paradigm of video and computer games in detail did not exist. Thus it seemed crucial to take up the challenge to address the issue with the complexity and sophistication that it demanded.

A rigorous inspection of various theoretical approaches to space and spatiality was undertaken in Chapter 2. It became clear that the task at hand made it necessary to draw on a wide variety of disciplines and approaches to forge an adequate model. In this sense, Michel Foucault's notion of the heterotopia and Henri Lefebvre's spatial theories were chosen as metaphorical and theoretical frameworks for the development of a truly spatial perspective towards computer and video games. Due to the nature of this undertaking, those spatial theories and concepts had to be scrutinised and adapted to the needs of the present study. In this sense it could be argued that a side effect of this process has been the chance to shed new light on these theoretical approaches.

In order to fully map out the meaning and function of spatiality in the context of digital games it was initially necessary to criticise approaches to *game space* that regard it as being dominated by visual perception. It could be demonstrated that instead of a clearly delineated aesthetic phenomenon it has to be treated as a complex and dynamic system of distinct modalities. *Game space* was shown to be a complex heterotopic assemblage of diverging forms of spatiality, rather than a purely aesthetic

or technological function. Based on this fundamental insight, a model that introduces *game space* as the result of a dynamic process involving different modalities of space was put forward. In essence, the development of this model entailed two different movements of thought. One set out to dissect the matter at hand and led to a disentanglement of formerly confused ideas of space in the context of digital games. The second one brought previously disparate ideas and conceptions from different disciplines together in the fashion of a synthesis. The final result of this process is a theoretical framework for the analysis of *game space* that does account for formerly disregarded or separated areas of spatiality in games, such as, most notably the impact of the physical space of the player, the importance of sound and the issue of experiential space. All of these essential aspects had been discussed in the literature before. Yet, crucially they were not regarded as interrelated elements in a complex system that also includes the player and the game itself.

At this point it is sensible to briefly recapitulate the key elements of the proposed model. In general, it was indispensable to work out the intricate details of the different kinds of space, some of which are ostensibly less noticeable but nevertheless crucial for the characteristics of the phenomenon in its entirety.

At first, the physical space surrounding the game and the player (*user space*) as well as its impact on the other forms was considered. It was shown that the qualities of different kinds of spaces (public, private) are correlated with the characteristics of other modalities such as *narrative space* and *audiovisual space*. In this sense, the notion of *user space* could prove to be beneficial as a background for further research. For example, it could be interesting to take a closer look at the gendering *of user space* in relation to specific forms of game play or formal aspects of game devices (interfaces).

Secondly, the concept of a kind of spatiality that is produced by the rules of a game (*rule space*) was proposed. This notion is intended to fill an analytical gap because it caters for the intrinsic qualities of the medium from a theoretical point of view but it also allows for a new and original perspective towards the design of game spaces. Here, the insight that very simple rules may lead to highly complex spatial operations, acknowledges the realisation that the medium of computer and video games mobilises a transition from paradigms of representation to those of simulation. Following this thought, it can be stated that we indeed increasingly become aware of new and different types of spatiality that might reveal a profound

impact on spatial practice in everyday life. Again, further research is necessary and it is hoped that the proposed category can be used as a platform for further inquiries into spatiality that is not conflated with issues of audiovisual representation.

The comprehension that narrative elements in digital games belong and give rise to spatial structures (*narrative space*) enables a different understanding of the specific functions of narrative concepts in digital games. It could be shown that the spatial nature of the medium shows itself very clearly in its narrative sphere. Although this area is undoubtedly one of the most heavily debated in the field of game studies, and a number of significant advances have been made (Aarseth, Ryan, Jenkins) there still remain open questions. For one, as of yet, there seem to be no conclusive formal structures or methodologies that assist game designers with the creation of intricate and compelling narrative spaces.

With the *audiovisual representational modality* a rich and varied sphere of *game space* was scrutinised in detail. The historical roots of visual paradigms in digital games were analysed and the dividing lines and similarities between games and other visual media systems were discussed. On this basis a model that is grouped around the core element of the *game camera* was presented in order to enable the precise analysis of spatial aspects of the visual representational sphere in digital games. The proposed model takes issues such as visual perspective, dimensionality, movement as well as the simultaneous presence of different visual openings onto the visual game universe into account. Furthermore, the relation between so-called 2D and 3D games was approached critically. It could be demonstrated that three-dimensional representation does not depend on the rendering of objects in a 3D space but on an intricate set of visual strategies that has its roots in historic visual devices. The formulation of the *game camera* concept as a means to discuss and analyse the visual characteristics of games ranging from the earliest incarnations to contemporary 3D games depends on this insight. It is hoped that the thoughts that were presented in this segment of the study will benefit not only theorists but also game designers who are planning new visual strategies to represent space.

The dynamic link between the player's body space and the *game space* (*kinaesthetic space*) has to be regarded as a decisive dimension of video and computer games. It is this kind of embodied spatial practice that holds the key to questions regarding the immense appeal of the medium. Furthermore, the kinds of *kinaesthetic spaces* emerging from game play facilitate the development of truly novel, original and unique spatial

practices. Most importantly, any rigorous study of *game space* has to consider the player as the nucleus of the phenomenon, because it is he/she who realises the *game space* in the here and now of the dynamic feedback process with the programmed machine. This is why the proposed model sets out with the player's physical surroundings (*user space*) and comes to a closure with the player's internalised body space (*kinaesthetic space*).

In this sense, any theoretical approach that tries to grasp the fundamental principles of the unique spatiality emerging from computer and video games without acknowledging the human being at the core of the process is doomed to fail. Thus, even if one wants to focus on the detailed mechanisms of visual representation, the importance of the kinaesthetic dimension has to be kept in mind. At this point it has to be repeated that the kinaesthetic modality of space is the single most decisive characteristic that marks the gap between digital games and other media systems such as film or TV. The contemporary development of game technologies reflects the significance of kinaesthetic space. To give a brief example for future developments in this respect, Nintendo's Revolution game console will introduce a new controller with an in-built motion sensor that will further explore the dynamic link between the player's body movement and the resulting actions in the *game space*.

It has been established that none of these modalities appear in isolation and that they have to be understood as part of a dynamic system that, on a macro level changes its structure between different types of games and, on a micro level, even during different phases of the gameplay. Thus it would potentially be possible to consider the aspect of time and to analyse a longer playing session with the proposed model in order to reveal how certain aspects of spatiality can be employed to vary the experience of the player and make the game more compelling to play.

In Chapter 4, the significance of sound in this context was reassessed and a theoretical framework for the analysis of sound space in digital games was developed. Since the importance of hearing and sound for the generation of spatial representation had, as of yet, not been researched in detail, an attempt to describe and analyse the complex interaction between visual and sound objects was deemed to be of vital importance. The portion of the visual space that is presented at any given time in a contemporary 3D game, however detailed it might be in terms of resolution, only delivers a reduced section of the entirety of the representational

space. Thus a key element of this analysis is the apprehension that sound facilitates access to this vast area of potential space that cannot be experienced by other means. Moreover, it was attempted to expose and formalise how sound is used in digital games as a means to generate different spatial situations, to orient and lead the player through the *game space* as well as to enhance the feeling of immersion. However, as has been pointed out, the discussion of soundscapes in games has mainly focused on games that employ 3D engines and thus it could be beneficial to widen the area of research to include more and different types of games. In this context it is necessary to bring up one of the problems of the present project: the attempt to speak for all digital games without being able to even barely scratch the surface of the vast number of actual games. This problem is shared with other approaches to game research and the only way to avoid it would have been to narrow down the scope to specific types of games. However, such a narrowing down would have contradicted the attempt to approach the differences between types of games from a spatial perspective. In other words, in order to demonstrate that *game space* might also be beneficial as a system of differentiation among games it was necessary to avoid the exclusion of specific types of digital games.

It is hoped that the present study serves to enrich the methods of research and the theoretical models employed in the emerging field of game studies. The intention was to take a detour from the dominant inroads to the subject that consider games from the perspective of rules or narrative and to generate a different view on the subject that can account for rules and narrative structures as being part of an entirely different system, namely the spatial paradigm of a game. Yet, this perspective was not only developed as an option to bypass or synthesize the seemingly entrenched antagonism between ludologists and narrativists, which already shows signs of loosening up, but also most importantly, because the spatial practice in games has to be regarded as a phenomenon that affects contemporary spatial practices in everyday life. I have claimed, in reference to Lefebvre, that the spatial practices emerging from popular entertainment media and new technologies have a significant impact on the whole of a society's space. Not only do games as cultural phenomena tell us a lot about societal habits and phantasms, but the spatial practice of a society constitutes a core dynamic that permeates all other fields. It is in this sense that space has to be regarded as a true medium that affects numerous other areas of contemporary life.

Following this thought I have argued that it is possible to trace and describe transformations of everyday spatial practice that are directly related to *game space*.

This is why the work of contemporary artists was brought up in conjunction with the proposed spatial model in Chapter 5 in order to demonstrate that there is a conscious field of experimentation and critique that has a direct connection with paradigms set forth by digital games. Artistic practice has to be regarded as an important early indicator for deeply rooted transformations and shifts in the habits and practices of a society. In this sense, it has been established that the novel spatial practices of digital games clearly have an influence on other fields of life.

I hope that the present work will enable theorists as well as artists and designers to approach the challenges and novelties emerging from these vast social universes of representational space from a well developed and grounded perspective. In other words, if those who ask similar questions find some of the parts for the generation of their own machines of analysis, creation and desire in this study, the project has reached its intended goal.

"On the horizon, then, at the furthest edge of the possible, it is a matter of producing the space of the human species – the collective (generic) work of the species – on the model of what used to be called 'art'; indeed, it is still so called, but art no longer has any meaning at the level of an 'object' isolated by and for the individual" (Lefebvre 1991, 422).

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