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This book is dedicated
to my mother Juliana and my sister Sophie, who gave me
the best roots in life possible, to Alina, who watered the roots
and soil and warmed me with sunlight, to my daughter Zora,
who shared her wings, and to my son Atreju,
who lifted me up with his smile.

Contents

1 Introduction

1.1 Themes and Problems

Gameworlds in video games are fundamentally different from other traditional fictional worlds such as in film, theater, or literature. They are spatial environment representations designed for the gameplay experience by the player and located between fiction, challenge framework, and game system. Rather than being mere copies of reality, video game worlds have their own set of rules, which define them as such. They can, at least in certain contexts, also be seen as worlds within worlds, mirroring what is outside and therefore be called heterotopias (Foucault and Miskowiec 1986). Interaction is a key aspect in describing those gameworlds.[1] Further, analyzing the relationship between gameworlds and game system information, Kristine Jørgensen came to the conclusion to define gameworlds as interfaces themself:

1 Naturally, classifications like games, literature, film or theater are never absolute and some authors, composers, designers or developers always seek to stretch their own borders. Mentionable examples from media other than video games that stretch their fictional worlds towards what is understood as gameworlds here are *choose your own adventure books* (CYOA, also called *game books*), where the reader can choose from various paths and change the story accordingly, or the corresponding movie form like *Black Mirror: Bandersnatch* (2018), which is labeled as an *interactive film*. In music theater, there are also approaches to more interactive experiences like *Augmented Reality Don Giovanni* from the Ulster Touring Opera (2021) (https://ulstertouringopera.com/shows/augmentedreality-don-giovanni/), although real interaction is still missing. To include all these interactive forms of fictional worlds, the broader term *cybertext* will be contextually introduced and used, which rather defines a whole textual media category than just one medium.

> "Gameworlds are environments built for the purpose of gameplay, and to support this activity they are governed by game mechanics. At the same time, they have a certain sense of worldness by being designed as an ecology that affects and is affected by player actions. Because gameworlds are regulated by the logics of the game system, we expect them to carry information that allows us not only to understand the environment, but to play the game. I argue that as a carrier of game information the gameworld *itself* is an interface: it is an informational space that mediates between the player and the game system." (Jørgensen 2013: 143)

It is precisely this interaction between the video game and the player that sound plays a pivotal role. Visual and auditory channels work together in supporting the gameplay, which is the primary feature of communication in video games. There are several ways in which video game sounds work to create an identification of self and experience of presence by the player through interaction and embodiment. At the same time, the world we live in is becoming increasingly abstracted and virtualized—the real and the virtual are converging as never before. As a study from the Nottingham Trent University's International Gaming Research Unit in 2014 has shown, many video game players experience what they call the game transfer phenomena: they hear sounds from recently played games overlaying the real-world soundscape, often triggered in spatial and functional situations they recall from their video game experiences (Gortari and Griffiths 2014). This interplay and intertwinement of virtual and real soundscapes has significant implications for conceptions of self and conceptions of presence in virtual as in real spaces.

Therefore, a deeper understanding of the sonic nature and function of video game spaces provides not just powerful tools in crafting game worlds and spaces,[2] but also has an impact outside of video

2 Bjørn Jacobsen, an experienced senior game sound designer who has been interviewed for this research (2022), criticizes therein the lack of knowledge and academic involvement of sound design within the industry.

games, as understanding how the perception of space, presence and self can be influenced, controlled, and manipulated.

This book aims to investigate the perception of, and the interaction with, sound in action-adventure video games through ethnomusicological fieldwork methods by combining existing and adapted game sound theories and finally proposing my own set of qualitative methodology to study video game soundscapes from a cultural anthropological standpoint. The key research questions are: How can ethnomusicological field research studies be conducted in video game spaces? What is the function of sound and music between game space, user system, and player, and how is information conveyed through sound in action-adventure video game heterotopias? And finally, how are virtual reality spaces created, manipulated, and experienced through sound?

By treating the gameworld in a similar way as any sonic and social field in the "real" world, the goal is, on the one hand, to provide a map of keynote sounds specific to different action-adventure gameworlds, and on the other hand, to gain insights into how to adapt ethnomusicological fieldwork methodically to gameworlds. This leads to a further understanding about the very nature of gameworlds and what makes them unique, how a player interacts with this virtual space and its rule system.

Specifically, this means that, after a careful examination of the theories that set the perspective on how gameworlds, game spaces and sounds are defined for fieldwork and further studies presented here, first approaches in the field of three case studies: *Horizon Zero Dawn* (Guerrilla Games 2017), *Star Wars Jedi: Fallen Order* (Respawn Entertainment 2019), and *Assassin's Creed Valhalla* (Ubisoft Montreal 2020) as well as additional soundwalks (Westerkamp 2007) are carried out (the selection of these titles will be further explained in Section 1.3). Based on the experience gained therein, game sounds are analyzed within the framework of the constant conversation, named by the game sound developer Bjørn Jacobsen (2016), and what I call the sound-strand, a model that combines presented game sound theories

and adapts and adjusts it for the understanding of game sounds laid out in this study, as a part of the constant conversation between player and game. For the broader understanding, the perspective from video game development is taken into account by qualitative interviews with three selected video game sound designers, namely Bjørn Jacobsen (Cujo Sounds), Claudio Beck (Stray Fawn Studios) and a third one that, sadly, asked to be removed from the final publication (all 2022).

However, it should be noted that, although this research is characterized as sound study in the cultural anthropology of music, it analyzes neither the contents and events from within the video games in terms of ideological, sociocultural or political impact, nor the reception by individuals or communities that play these games. It also does not review or compare the quality of given soundscapes, game mechanics or any characteristics of the case studies in any form.

The aim is to exemplary develop and provide a framework of theories and methodological approaches for a comprehensive understanding of the complex characteristics and functions of action-adventure video game soundscapes and their interaction with the player. The result identifies video game cybertexts as multi-layered audiovisual conversations with distinct codes as languages and proposes models to decipher their meaning and interactive function between player and system.

1.2 Theoretical and Methodological Background

While the academic field of game studies, as well as the more specialized game sound studies, are predicated by their interdisciplinary character, I approach this examination of video game soundscapes from a clear standpoint grounded within the field of cultural studies due to its methodological approaches and the way the topic and the main questions are handled. Although video games are understood as texts, their perception goes beyond a written, printed or displayed

text; they are interpreted as an organized set of discourses and meanings, as described by Jeff Lewis in *Cultural Studies. The Basics* (2008: 404). The question is not: "What is the soundscape of a game?", but rather, what sound and music in a (specific) game do and how they do it. Therefore, the case studies are analyzed not as pure artifacts nor through sheer perception, but as something in between.

As Jesper Juul argues (2005a), video games are defined by their virtual worlds and their user systems. In terms of narratives, they can best be described as cybertexts, a concept devised by Espen Aarseth (1997). Cybertexts, and therefore gameworlds, can be compared with the physics concept of possible worlds, where each decision makes some parts more and others less accessible. Through game mechanics, understood as rule constructs or game elements, they interact with the player. A cybertext does not represent a linear text; rather, it describes an element from which different texts can be read as a category of media. In this sense, games are understood as spaces of "participation and practice where players construct meanings" (Collins 2013: ix). The ergodic process (Aarseth 1997), meaning the "reading" from a cybertext, in video games is heavily influenced by its sounds, allowing the transport of various pieces and types of information on different diegetic levels from the gameworld and the user system to the player.

This theoretical approach is carefully laid out and contextualized within other existing theories of game models and game sounds. Especially Aarseth's model of a generalized role-playing cybertext (ibid.: 104; Fig. 4.1) and different theories in game sound diegesis, interaction and immersion are contemplated, adapted, and integrated in the final model of game sounds as part of a constant conversation.

Among the notion of video games as cybertexts, this study understands game spaces as heterotopias (Foucault and Miskowiec 1986), as real spaces that mirror or reflect all other spaces in a society, as opposite to fundamentally unreal utopias. While this presupposition is not fundamental for the final methodological and theoretical conclusions, it provides additional understanding for the field of the video game spaces and how to approach them.

That said, it should be added that the following study is partly conducted in grounded theory (Glaser and Strauss 1980) – not as the puristic idea of collecting data without any theoretical knowledge of the field (if that is even possible), but as a process of simultaneously sampling and analyzing the field. Despite having laid out a broad theoretical framework, first trips in the field of the respective case studies were carried out with as little bias as possible, laying the somehow narrowed-down focus of the soundwalks, which again affect where additional fieldwork leads, while simultaneously analyzing and comparing the findings, adjusting, and forming the theory.

The implementation of soundwalks, as introduced by the artist and sound ecologist Hildegard Westerkamp (2007), provide an experimental step between the initial, rather unstructured and the later, more focused fieldworks. Through focused perception of the sonic environment while moving through a gameworld, along several proposed concrete steps as a guideline, it is the goal to concentrate on the individual relationship to a soundscape, starting with the quietest possible sound of the avatar or player, building up to the complete composition of the soundscape.

Finally, the perspective of game sound development is taken into account through semi-structured interviews with two participants from within the game industry, loosely guided by qualitative in-depth interviews (Cote and Raz 2015; Boellstorff et al. 2012). The intention hereby is to get valuable background knowledge and broaden the perspective, but not to gather final answers on how sound is supposed to function, since the focus of this book lies on what video game sounds are representing, which is created while playing, rather than what they intend to be.

1.3 Case Studies

The selection of the three case studies is partly based on their genre, their variety of distinct settings (especially concerning their soundscape), but admittedly also on my own personal preferences. As a first step in a comprehensive soundscape study where sound is understood as a pivotal part of the constant conversation within the understanding of video games as heterotopias, it felt intuitively natural to choose modern third-person action-adventure games, which are story driven, have a rich audiovisual gameworld to explore, and provide a player-controlled protagonist who produces his own sounds too. Also, the action-adventure genre is probably the most numerous in the contemporary global video game industry (Arsenault 2014: 229).

Horizon Zero Dawn (Guerrilla Games 2017) is situated in a post-apocalyptical 31st century, where the structures of modern-day society are destroyed and people live in small tribes and remnants of once flourishing and advanced cities are overgrown with plants. Metallic machines dominate the land and live in herds, populating nature—hunting them provides the different pre-industrial societies with important materials for all kind of crafting. The player slips into the role of Aloy, a young girl outcast of the matriarchic Nora tribe, who, on her journey to learn about her missing mother, uncovers the secrets about the "Old Ones" and how their world once got destroyed.

As in all three case studies, the player controls the protagonist from a third-person perspective, from behind the character and slightly above her, navigating her with the left stick and panning the camera around her with the right one. The open-world regions are divided into snowy mountain regions, forests, jungles, and deserts, as well as small villages and cities. Fighting is most dominantly focused on stealth elements and the use of different bows and arrows, but also includes spears, traps, and bombs. The story is driven by side and main quests and the character development is based on collecting experience points (XP), which can be used to upgrade different crafting, fighting or regenerating abilities.

With an estimated budget of 45 million euros (Kist 2017) and development time of seven years, *Horizon Zero Dawn* was the biggest Dutch production at that time (now possibly passed by its successor *Horizon Forbidden West* [Guerrilla Games 2022]).

In *Star Wars Jedi: Fallen Order* (Respawn Entertainment), the player takes the role of Cal Kestis, a former Jedi Padawan, five years after the Order 66, the Jedi purge that started in *Star Wars: Episode III – Revenge of the Sith* (2005). The game takes the player to the franchise's galaxy "far, far away" and leads him to several different planets known from the movies. Cal's mission is nothing less than finding surviving Force-sensitive children and finally rebuilding the Jedi Order.

While gameplay is very similar to the other two case studies, the narrative is more linear, as there are no side quests or different outcomes from missions and the gameworld is not a full open-world environment as accessible paths and spaces are predefined and fixedly circumscribed. The gameplay is dominated through puzzle solving and combat, which is carried out with the iconic *Star Wars* lightsaber and other Force abilities. Cal is accompanied by a little droid, BD-1, who can scan the environment for interesting facts and spots and helps him overcome otherwise impassable obstacles or passages.

As part of the enormous *Star Wars* franchise, EA and the California-based Respawn Entertainment Studios were under strong restrictions concerning development and also communication, making it very difficult to gather information about its production. Some of the insights I had therefore had to be removed from this publication.

Also part of a long-running franchise, *Assassin's Creed Valhalla* (Ubisoft Montreal 2020) tells the story of two secret societies, the Assassin Brotherhood and the Templar Order, and the involvement of an ancient mystic species in human history. The player takes the role of Eivor, by choice either a male or female Viking during their expansion into the British Isles around 870 CE. The fictional world of the franchise intertwines closely with the real-world history but is clearly characterized as fictional with mystic and science-fictional elements. Out of the three case studies, *Assassin's Creed* gives the player

the most freedom as to how to progress the story and which paths he or she takes depending on his or her decisions which often influence the overall outcome.

The open-world is huge and there are numerous collectibles hidden throughout the world map. There are multiple ways and techniques in which the player can approach enemies and fight them, with a special focus on stealth elements.

With the lead studio responsible for this title situated in Montreal, *Valhalla* is a global production with fourteen additional studios worldwide involved in the development process, with an estimated budget of 500 million dollars (S. Smith 2021).

The decision to select solely titles from experienced development studios with big production budgets (triple A) ensures the state-of-the-art in contemporary use of sounds within certain conventions on what players expect, without challenging them too much with experimental approaches. This allows a certain comparability in terms of the genre and sound design production that I found important to form an initial methodological and theoretical framework, which can and should later be expanded to more special and different or divergent cases.

1.4 Structure of the Book

Including this introduction, the conclusions, references and the appendix, this book is divided in 13 chapters. These are further roughly separated into six sections:

After the introduction, Chapter 2 puts this research into the context of the current state of research in the field of game studies and game sound studies, showing where and how the book recognizes itself academically, and Chapter 3 sets the historical perspective on video games and video game sounds with the focus on how certain sonic functions are influenced by technical developments and restrictions and the evolution to modern video game sounds and music.

The second section presents the theoretical and methodological background used for the study. Chapter 4 covers the definition and understanding of video games for the fieldwork (4.1–2), the theoretical background on video game sounds and their function for the player (4.3–4) and soundscapes in general (4.5). The methodological approach and understanding for the fieldwork study is laid out in Chapter 5, with the methodological background on the developer interviews in sub-section 5.3 as well as the exposition of the technical equipment and setting in 5.4. The inclusions of the introduction to soundwalks (Westerkamp 2007) in Section 4.5, which marks rather a methodological approach to the field, as well as the theoretical reflections on video games as heterotopias and literary anthropology in the methodology chapter, are intentional and become evident through the line of argumentation. Also belonging to this section is the contextualization of the case studies in Chapter 6.

As the main section, Chapters 7, 9 and 10 are dedicated to the actual fieldwork, carrying out soundwalks, analysis of the played sequences, the game audio developer interviews, the findings gained through these steps and the embedding and contextualization within the theoretical background given above.

In between as a separate section, Chapter 8 concludes findings of the initial fieldworks to formulate an adapted and crystalized theory of the constant conversation with the implementation of the proposed sound-strand model, which is further contextualized in the fieldwork sessions of Chapter 10.

Finally, Chapter 11 concludes the overall structure and line of arguments, revisiting the theoretical points and methodological approaches being made and elaborating the findings in a summary of the research. Also, the used methodology is critically reflected and possible future research resulting from the findings is outlined.

To complete the book, the last section contains all references in Chapter 12 and the appendix with the pictures in Chapter 13.

1.5 Terminology

Since the academic fields of game studies and game sound studies are determined through their interdisciplinary character, it is essential to define the different terms and concepts precisely and consistently. Different academic disciplines and their respective schools of thought often use scientific and academic terms in distinct ways, sometimes without the necessity to concretely specify them contextually.

Throughout this book, academically used terms are introduced and defined as such and carefully specified, in which disciplinary perspective they are phrased. For example, the conceptual framework to describe the anatomy of video games, formulated by Petri Lankoski and Staffan Björk (2015) as a synthesis of several other theories for formal analysis in video games, is introduced and contextualized in Section 4.2 and used in the following as a common vocabulary to describe the basic attributes. Also, video game-specific terms are introduced in their respective context.

The term video game is used synonymously with digital games and other terms, like computer games, and also includes console games as well as PC, arcade and mobile games.

Quotations from other languages are translated into English and the original texts noted in footnotes.

2 Current State of Research

Most notably, Scandinavian countries have been featuring a comparably lengthy tradition in game studies—for example, Espen Aarseth published his concept of locating video games as cybertexts literature as early as 1997 (Aarseth 1997). The launch of the online journal *Game Studies* (gamestudies.org) in 2001 established international recognition for the research field for the first time. In the editorial of the first issue, Aarseth argued that the biggest challenge for the young discipline comes from the academic world itself, as making room for a new field "usually means reducing the resources of the existing ones" (Aarseth 2001). Further, he characterizes video games as perhaps the richest cultural genre "we have yet seen", which challenges the field of game studies as an independent one and the search for a suitable methodical approach. Yet, in the editorial of the fifth volume of *Game Studies*, Jesper Juul stated the theoretically and methodically research field of game studies was a "productive chaos" (Juul 2005b).

For many authors this makes game studies as a discipline seem non-homogenic and difficult for a reappraisal of an academic research field, since the research questions and methods are very broad. It is safe to say that game studies are interdisciplinary studies which require a wide range of methodical approaches for different questions, as is evident in this project. Although many authors struggle with the interdisciplinary nature of game studies in general (e. g., Backe 2008), for this research interdisciplinarity is not regarded as a problem but a chance. The methodological approach, though, has to be carefully laid out and the findings clearly located in the academic field.

As the "myth of origin" in game studies is told (Pfister and Winnerling 2020), the discipline finally consolidated, and still is in that process, in the 2010s from the dispute over methods between ludologists. On one side, mainly led by Aarseth (2001) and Gonzalo Frasca (2003), were those who saw video games as a new phenomenon genuinely distinct from any other media known up to date. On the other side were narratologists like Janet H. Murray (1998) who understood games mainly as a new form of narrative text form in media. However, historical source-critical examinations (Juul 2004b and Pfister 2018) have proven this polemic to be not merely a result of the methodological discourse, but rather as representing a starting point of a new academic field which was still struggling for recognition, and, moreover, funding (Pfister and Winnerling 2020).

Distinct academic departments are still scarcely spread, though as a result several interdisciplinary centers were formed, like the Centre of Excellence in Game Studies in Tampere, the Center for Computer Games Research at the ITU Copenhagen, and the Digital Games Research Association (DIGRA) which is situated in Finland, to name a few (ibid.). In the German-speaking part of Europe the decentralized *Arbeitskreis Geschichtswissenschaft und Digitale Spiele* (AK GWDS) was founded in 2015.

Studies in video game sounds—even a younger field than game studies in general—are found only from the early 21st century onward. An early printed source that is broadly seen as a first pivotal paper in the field is the article: "What's That Funny Noise? An Examination of the Role of Music in *Cool Boarders 2*, *Alien Trilogy* and *Medievil 2*" by David Bessel (2002) in *ScreenPlay. Cinema/Videogames/Interfaces*. Another pioneering approach to the research of video game music, particularly in ethnomusicology, is Kiri Miller's article on *Grand Theft Auto* "Jacking the Dial: Radio, Race, and Place in *Grand Theft Auto*" (2007). These theoretical examinations lay the ground for the video game music scholarship today.

As Rudolf Inderst and Pascal Marc Wagner point out in an interview with Melanie Fritsch, who especially helped shape the German

discourse in ludomusicology, this discipline can be seen exemplary as a first independent established academic field fragmented from the broader game studies with its own scientific journals (Inderst and Wagner 2022: 74–85).

Sound research in video games is closely linked to game studies' key concepts of representation, immersion, presence, and interactivity. It is considered necessary to create a new research field in the case of game sound studies, as Karen Collins explains in the introduction of her collection *From Pac-Man to Pop Music* (2008). She brings the reception of players and the production in the game industry together, as well as psychology, economy, popular musicology, computer science, the science of communication and other scholarly disciplines. In this way, she tries to turn away from the trend of discussing game music and sounds only related to, or within, film studies. Moving around in virtual worlds is, in most cases, linked to a body as a form of representation, i. e., a character or, in other words, an avatar; and the player interacts with the virtual world through the movement of this avatar. Collins shows that interactive sounds extend the virtual into the physical space by creating a connection between the avatar and the body and therefore support the immersion (Collins 2013).

Focusing on the functionality of video game sounds, the systematic of diegesis (Collins 2007; Collins 2008; Eckmann 2005; Grimshaw 2008b; Grimshaw and Schott 2007; Jørgensen 2007; Jørgensen 2008a; Jørgensen 2009; Jørgensen 2011; Stockburger 2003; Whalen 2004) is used, not to be confused with the theories of film studies. Distinguishing between diegetic and non-diegetic sounds, the systematic scheme tries to relate to the sounds that are not part of the gameworld, but provide relevant information on how to interact with the game system and behave in the virtual environment (Jørgensen 2011). Defining gameworlds as interfaces, Jørgensen describes all elements, sounds, and objects as representations of the black box that is responsible for the rules and user systems.

The relationship between game sounds, player activity, presence/immersion, and representation has drawn a lot of interest from dif-

ferent researchers (e. g., Grimshaw 2008b; Calleja 2011; Calleja 2014; Ward 2010). Mel Slater (1992, 2003) has shown that the representation of the observer's or player's body in a virtual reality environment is essential for an immersive experience. To feel present (state of full immersion) in any environment, a distinction between the self and the non-self/other has to be made by "discovering those parts of a world which we can act within and upon" (Walther-Hansen and Grimshaw 2016). Ermi and Mäyrä (2005: 8) suggest in their SCI model that immersion has to be "emphasized differently in the individual cases of different games and players." Hence, video games have to be analyzed from and in a social context.

In contrast to vision, listening can only be barred with artificial aid (Breinbjerg 2005), and in a video game, turning off the sound greatly decreases the immersive experience of the player. Through listening we immerse ourselves in the environment and learn about objects or actions that need our attention (ibid.; Grimshaw and Schott 2007; Kromand 2008). In a video game environment, sound is monitored and controlled by the developer, but for a game space to be immersive, "an understanding of the sociological impact of sound on the individual and society" (O'Keeffe 2011: 45) is essential. The central concept of soundscape was put forward by M. Schafer (1973, 1977) and gives us a method of contextualizing sound in an environment, not simply by categorizing it as noise, but by looking at social contexts and accepting soundscape as a holistic approach (Brooks et al. 2014). The soundscape is all "sounds heard in a real or virtual environment" (Wrightson 2000: 10). In our eye culture (Schafer 1973; Berendt 1988), the potential for a spatial experience trough sound has long been underestimated, but today, "hearing and several other perceptual modalities are considered equally relevant to user-experience" (Murphy and Neff 2011: 287).

3 A Short History of Video Games and Video Game Sounds and Music

People have been playing and programming digital games from the very beginning of computer history. While early computers only had one channel sound bipper, usually signaling warnings or errors, later sound chips enabled various pitches and soundwaves but differing from tonalities familiar to the European ear (e. g., the Atari VCS tonality). Creating recognizable sounds and music was technically a challenge for a long time, since either there were no distinct sound chips or they had to be coded separately for each model of computer; and even then, they sounded differently on different machines (Braguinski 2018: 184).

As the first games that could be called video games (that were more than mere copies of card and board games), most authors mention the sport simulation that was later named *Tennis for Two* (Higinbotham 1958) and the interactive space simulation *Spacewar!* (Russel 1962) (cf. Weske 2000 and Jørgensen 2009). Inspired by the science-fiction novel series *Lensmen* by Edward E. Smith (1948), *Spacewar!* even features a first narrative scenario (Beil 2013: 7–8). Initially, simple sound effects were implemented in the development of the game, but were excluded in the final release in favor of "other features that were deemed much cooler and more important at the time" (Weske 2000). Although absent in the public release, this is an important note, since it demonstrates an early recognition of the potential of the relationship between visuals, gameplay, and sound.

Jørgensen separates the history of video game audio into four phases: the earliest developments (1) from the very first video games as mentioned above; (2) the commercialization of video games; (3) the

establishing of functionality of sound; and (4) moving towards modern times (Jørgensen 2009: 13–23). Also counted as part of the first phase are mechanical pinball machines from the 1930s that included the first artificially-generated sound effects (Weske 2000). Jørgensen interprets this use of sound as a desire to have specific feedback signals with an "autonomous informative value of such sounds" (Jørgensen 2009: 16) that were not confused with the mechanical sounds of the machine and have functions in addition to its visuals.

In the 1970s, processor chips necessary for computers became more cost-effective and initially made the popularization of arcade machines and home consoles possible. Although independent audio hardware like designated sound chips was still missing, games like *Pong* (Atari 1972), named after its characteristic sound effect, already used audio as a key element. With home computing systems like the IBM PC, Apple I/II, but also the Atari VCS as well as arcade machines, video games experienced rapid commercial successes, in which classics like *Space Invaders* (Taito 1978) and *Pac-Man* (Iwatani 1980) emerged. *Arcade game* became a term for a whole genre which labels simple, yet difficult to master, games of skill, which gained a new popularity with smartphone games like *Angry Birds* (Rovio 2009) among others (cf. Juul 2010).

"[A]lthough it is hard to label the few sounds heard as music," *Space Invaders* marks the first video game with a functional soundtrack, following Jørgensen's argumentation (Jørgensen 2009: 17). Next to the innovative inclusion of a highly addictive high-score list (first time in a video game), the distinct soundtrack might have helped too, to popularize the game in noisy arcade halls. It also demonstrated how sound can follow "the rhythm of the game and indirectly influence the player's behavior" through this feature (Jørgensen 2009: 19).

1982 saw the rise of the Commodore 64 with its own sound-dedicated chip (SID 6581), which created the possibilities to fundamentally compose music for games and is still used by some sound designers today.

This second phase concludes with the American crash of the video game industry in 1984. The (American) market was flooded with numerous fast and cheaply produced clones of the classics and collapsed, from which most notably Atari could not recover any more. Mentionable as an exemplary incident is the case of the video game *E. T. the Extra-Terrestrial* (Atari 1982) to the identically-named movie, which sold so badly that unsold copies were apparently buried in the desert of New Mexico until the deposit that became a legend was excavated in 2014 (Feige 2015: 27).

The recovery of the (American) video game industry was made possible, among other things, by the introduction of the NES (Nintendo Entertainment System), which marks the beginning of what Jørgensen calls the third phase. This period is interesting in terms of video game sound and music in several ways. Limited amounts of storage (especially for sound features) asked for a creatively reduced and downscaled sound design that, at the same time gained in its functionality (Weske 2000 and Jørgensen 2009: 19). At the same time, to re-establish the trust of consumers after the (American) crash of the industry, game design as well as the respective game audio was developed with particular attention to its quality (Jørgensen 2009). At that time, many classic genres like jump'n'run, role-play games or beat'em up were established and in 1989, Nintendo introduced and for a long time dominated the new market of handheld consoles.

The introduction of the first 16-bit sound card in 1992, Creative's SoundBlaster 16, opened up several new possibilities: on one hand, it allowed for the first time the use of real-world sounds in CD quality that enabled a new level of audio fidelity (Nyre 2003: 13). On the other hand, this led to new ways of using sound in video games, especially in first-person shooters as for example in *Wolfenstein 3D* (id Software 1992), where stereo-panned sounds indicated the movements of enemies nearby and hinted their distance, so players could locate them spatially, although only one sound could be played at a time. Doom (1993) already allowed several simultaneous stereo voices and early demos and prototypes of *Duke Nukem 3D* (3D Realms 1996)

in 1994[3] offered real-time audio effects simulating the virtual environment, which enhanced the sense of presence (immersion) (Jørgensen 2009: 21).

The fourth phase is shaped through the *console wars*, the ongoing console competition, mainly led by Sony, Microsoft, and Nintendo. Not only did the combination of the CD-ROM as a new storage medium and improved 2D and 3D graphic cards on Sony's PlayStation 1994 dramatically increase the graphics of virtual game worlds, but also game sound and music benefited from specific sound cards and bigger memory capacities.

Nevertheless, next to digitized real-world sound and music recordings, well-known sounds and earcons from the early developments of video games were and still are in use, recognized in their functionality, like the sound of collecting coins in *Super Mario Bros*. (Nintendo 1985) and other extra-diegetic sounds.

Yet another important move towards contemporary video game music is the development of *adaptive music*, which allows sounds and music to adapt to the events going on in-game through engines designed specifically for this feature (Weske 2000 and Jørgensen 2009: 22).

While sound was mainly supporting the interaction functionally in early developments and thus allowed a certain substance (which was helpful when graphics were not precisely identifiable, for example), it intertwined with the virtual space later on. This virtual space was filled intuitively with gameworld sounds such as footsteps, conversations between animated people and other environmental sounds. In this way, a functional role of video game sounds was formed as well as a sense of space and actions or events within the gameworld—immersion (Jørgensen 2009: 23).

In place of handheld consoles, there are smartphones and tablets nowadays, which have brought another shift in video game sounds for

3 Weske (2000) falsely claimed the year of the official release to be in 1994 instead of 1996, which Jørgensen (2009) copied in her exposition.

casual games (cf. Juul 2010): games also need to work without sound and music, since they tend to be played in public places.

On a side note, I feel it is very important to emphasize that the historical narrative given above is a simplification with the focus on the American, British, and Japanese perspective, which does not represent the whole history of video games with distinct developments and characteristics around the world. For example, Europe stayed mostly unaffected by the American crash of the video game industry in 1984. Like the examples of Alexis Blanchet's and Guillaume Montagnon's publication on the history of video games in France (2020), or the freshly-started Swiss project in 2023 funded by the SNF[4] "Confoederatio Ludens—Swiss History of Games, Play and Game Design," only recently have studies started to examine different local and regional historical characteristics and developments which allow divergent perspectives and "contre-histoires."

Further, there is still a lot of catching up to do concerning gender perspectives to overcome a very outdated patriarchal narrative in game studies, though contemporary comprehensive studies like those named above or the works of Carly A. Kocurek (2015) or Anne Ladyem McDivitt (2020) address this debate.

4 Schweizer Nationalfonds.

4 Theory

In the following chapter—and for that, for the understanding of the whole study—video games are understood as a text.[5] In the understanding of cultural studies, the term *text* goes beyond a written or printed text, or even more general: a text is "any organized set of discourses (and meanings)," as Jeff Lewis describes it (Lewis 2008: 404). And in this understanding, video games are analyzed as something between mere artifacts and pure reception. The perspective is not based on the question "what is a game?" but more on what a (specific) video game does, with the focus on why and how. The investigation aims to answer to content, form and meaning of concrete video games. Methodically, as Stefan Schubert, scientific assistant at the University of Leipzig for American studies, expresses it, it is the goal to investigate a text, which possesses certain strategies to produce meanings which can be analyzed in the case studies:

> "[Whereas the methodological pleading from the perspective of the American studies, in basic terms, is to consider games as well as a novel, a poem, a theatre play, a movie or a tv show as a form of text, which holds its own set of specific strategies to generate meanings

5 By the end of this chapter it should be evident why it is not a contradiction to define a text—in this specific case a cybertext—as an ethnographic research field. This potential problem will also be briefly addressed in Section 5.1, p. 55. It is noted that this fact may be seen as a point of criticism of the overall study, but for the author of this book, this methodology approach is taken as an accepted axiom.

> that can only be interpreted and analyzed precisely on the object itself.]" (Schubert 2018: 159)[6]

For a concrete analysis of video games, therefore, there are several theories and methodologies which qualify for the present research, one of them being the concept of cybertext by Espen Aarseth. There is a range of similar concepts by other authors which relate to the same idea. Noteworthy, for example, is the concept of the storyworld by David Herman. It describes

> "mental models of who did what to and with whom, when, where, why, and in what fashion in the world to which interpreters relocate […] as they work to comprehend a narrative." (Herman 2004: 9)

The idea of a storyworld emphasizes the role of the recipient of a text who creates a meaning out of it by

> "attempt[ing] to reconstruct not just what happened […] but also the surrounding context or environment embedding existents, their attributes, and the actions and events in which they are more or less centrally involved." (ibid.: 13)

This process of a (re-)construction of a narrative, their figures and places in literature can very well be applied to video games (Schubert 2018: 159).

For the present research I chose Aarseth's concept of a cybertext as the basis because it does not merely concern the nature of video games as a text, but also provides further instruments that are essential for the analysis of video game sounds, as will be shown in this and the

6 Original German text: "Das methodische Plädoyer aus Sicht der Amerikanistik hingegen ist es, simpel ausgedrückt, Spiele ebenso wie einen Roman, ein Gedicht, ein Theaterstück, einen Film oder eine Fernsehserie als eine Art Text zu betrachten, der ganz spezifische Strategien besitzt, um Bedeutungen zu generieren, die aber alle konkret am Gegenstand selbst interpretiert und analysiert werden können."

following chapters. Later, building on this, playing video games, or, in the case of this research, conducting ethnological fieldwork, will be referred to as *constant conversations* (Jacobsen 2016: 21), a term defined by Bjørn Jacobsen who has been interviewed for this study (2022).

4.1 Cybertext

The primary understanding of the term *video games* in this book is based on the characterization of a cybertext by Espen Aarseth.[7] In *Cybertext* (1997), Aarseth constructs a theoretical model for the phenomenon of literary sequences in video games which works independently of its media and of its digital or analog origin. By stating a distinct theory not solely based on video games, he strengthens its significance and takes away the general suspicion of the game studies to unnecessarily emancipating itself from other study fields such as literature.

> "When I fire a virtual laser gun in a computer game such as Space Invaders [(Taito 1978)], where, and what, am I? Am I the sender or the receiver? I am certainly part of the medium, so perhaps I am part of the message." (Aarseth 1997: 162)

A cybertext does not describe a literary genre, but rather a broad textual media category. The epistemological problem mentioned above comes into focus, Aarseth states, every time a media increases in complexity. In contrast to a read text, which is—while reading—always produced in a linear way, a cybertext is a non-linear perspective on

7 Espen Aarseth is widely considered to be one of the pioneers in the field of game studies. He is a co-founder of the Department of Humanistic Informatics at the University of Bergen and is currently working as a principal researcher at the Center for Computer Games Research at the IT University of Copenhagen. He is most recognized and cited for his dissertation *Cybertext. Perspectives on Ergodic Literature* (Aarseth 1997).

the text to-read and its mechanics. The distinction between reader and author/writer vanishes.[8] There is always the potential for missing certain decisions and their following consequences by reading a cybertext:

> "[W]hen you read from a cybertext, you are constantly reminded of inaccessible strategies and paths not taken, voices not heard. Each decision will make some parts of the text more, and others less, accessible, and you may never know the exact results of your choices; that is, exactly what you missed." (ibid.: 3)

Aarseth calls the cybertextual process (e. g., playing a video game) ergodic, a term derived from the Greek words *ergon* and *hodos*, meaning "work" and "path." In contrast to simple "reading" from non-ergodic literature, an ergodic text demands a non-trivial effort to bring the text to an end.[9] In his introduction to *Cybertext*, Aarseth uses the analogy of labyrinths, which he analyzes extensively in different historical definitions of the term and applies to video games (Aarseth 1997: 1–17).[10]

In other words: a cybertext is not a representation or a description of a fictional (digital game) world, but rather this world itself. A cybertext "reader"[11] is at a constant risk of being rejected by the text. This causes a shift of text interpretation to an intervention or an

8 A forced authorship onto the reader/user puts the term *author* in a questionable position, since there must be another "real author" hiding somewhere else (ibid.: 165).

9 Non-trivial effort may be a misleading term since making no effort at all despite being present in a video game can also be interpreted by a video game system as an action and lead to certain experiences in a cybertext. A very interesting demonstration of this is the secret ending *in Far Cry 4* (Ubisoft 2014). The protagonist is held hostage by a military officer who leaves the player alone with the promise to return shortly, causing most players to escape as a consequence. But if the player waits with no input for fifteen minutes, the officer returns and the whole narrative comes to an early happy end.

10 The analogy of textual understanding of video games and labyrinths is also shown in a strikingly similar way (and examples) by Andreas Capek in *Die Reise ins Labyrinth* (Capek 2018).

11 Aarseth calls a cybertext reader more a *would-be reader* (Aarseth 1997: 4).

"cybernetic intercourse."[12] "I want this text to tell my story; the story that could not be without me" (ibid.: 4). Even if the individual consequences are an illusion, the aspect of manipulation is real.

The most notable tool to analyze a cybertext is Aarseth's typology (ibid.: 62–65): information is understood as a string of signs, which may or may not make sense to a given observer; strings, as they appear to the reader, are defined as *scriptons* and strings as they exist in the text as *textons*. For example, in Raymond Queneau's sonnet machine *Cent mille milliards des poèmes* (Queneau 1961), where the user can "compose" sonnets by folding the lines of a page, there is a number of 140 textons which can result in 100'000'000'000'000 possible scriptons (in this case, sonnets). Even if all the textons in a cybertext are apparent or can be found, for a user (or, in the case of a video game, a player) it is practically impossible to read and experience all scriptons. Furthermore, scriptons and the text read by the user are two different entities, similar to non-ergodic or linear texts. Therefore, it is necessary to describe the mechanisms by which textons reveal and/or generate scriptons and how they are presented to the user of the text—Aarseth calls these modes *traversal functions* (Aarseth 1997: 62; Table 4.1).

Variable	Possible value
Dynamics	Static, IDT, TDT
Determinability	Determinable, indeterminable
Transiency	Transient, intransient
Perspective	Personal, impersonal
Access	Random, controlled
Linking	Explicit, conditional, none
User function	Explorative, configurative, interpretative, textonic

Table 4.1: Typology (Aarseth 1997: 65)

12 Aarseth discusses the relationship between cybertext and structuralist and post-structuralist concepts of text in Chapter 3 (ibid.: 58–59).

1. *Dynamics* can take on three forms: A text can be completely static, where scriptons are constant; dynamic with a fixed number of textons (*intratextonic dynamics*, IDT); or, dynamic with a dynamic number of textons (*textonic dynamics*, TDT).

2. *Determinability* describes whether consequences from ergodic decisions are determinate or indeterminate. There are RPGs where the same response to a given situation always produces the same result. Others are unpredictable by using random functions to determinate the results. For example, *Fallout 4* (Bethesda Game Studios 2015) uses determinable speech options in interaction with NPCs.[13] The same answer always results in the same consequence. But there are exceptions: with special abilities like *charisma* there are extra speech options with different *speech check* colors, going from green to red. There, the consequences are not always the same, but indeterminable. The chance of the given answer being successful is a matter of probability, depicted through its color.

3. If scriptons appear through the mere passing of time, a text is *transient*; otherwise, if an action is necessary to trigger the scripton, it is *intransient*.

4. Cybertexts with specific roles that users impersonate, as in RPG's, have a personal *perspective*. In texts such as *Cent mille milliards des poèmes* (Queneau 1961), users have an impersonal ergodic function.

5. *Access*: if the reader can go backward and forward at any given time to any passage to find all scriptons, usually in full-text searchable hypertexts, a text is random access. If the reader must follow certain paths involving other specific passages, like in most video games, a text is controlled access.

13 NPC is the abbreviation for a "non-player-character" and describes any other person in a video game that is not controlled directly by the player.

6. The *linking* of a text may be explicit or conditional, so that the user can follow them only if certain conditions apply. There may also be no linking between scriptons at all.

7. The *user function* describes the role of the reader/user/player. Next to the interpretative function of the user, which is present in all texts, there are additional functions. If there is an explorative function, the user must decide which path/action to take. The configurative function gives the user the responsibility to choose and create scriptons. And if the user can add or create textons or traversal functions permanently, the user function is defined as textonic. If the only decisions the user can make are concerning the meaning of a text, then the function is simply interpretative.

Theoretically, this sums up to 576 ($3 \times 2 \times 2 \times 2 \times 2 \times 3 \times 4$) possible genre positions of cybertexts. This has yet to be proven, though, and Aarseth does not address the issue of whether it is possible for all combinations to exist in a logical way.

To get an understanding of the design of the internal flow of information in a cybertext, Aarseth provides a generalized conceptualization of a typical modern single user adventure game (Fig. 4.1). This will also be essential for the elementary understanding of functional video game sounds.

Bjørn Jacobsen (who also was an interview participant as a video game sound designer [2022]) calls this understanding of a game model *The Constant Conversation* in his master's thesis about informant diegesis (Jacobsen 2016: 21–24), which will be further elaborated in Section 8. Though he does not mention Aarseth's conceptualization, it underlines the same idea of constant communication between player and system. As a game design communication model, he refers to Steve Swink (Swink 2009: 1–33):

> "Swink defines game feel into a few examples and the first one being *Real Time Control*; Real Time Control is interactivity between player

> and game and it requires at least two participants, regardless of the fact that one of them may be a computer." (Jacobsen 2016: 23)

Different types of cybertexts have different mechanical structures, and this represents only a theoretical model—the mapping of actual components of the following video game case studies therefore must be investigated within the concrete cybertext genre.

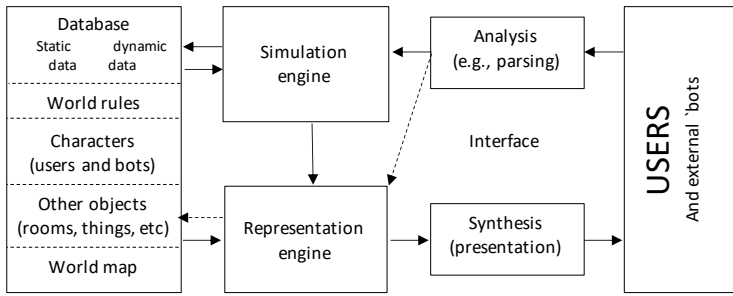

Figure 4.1: The Components of a Generalized, Role-Playing Cybertext (Aarseth 1997: 104)

There are four functional layers: data, processing engines, front-end medium (interface) and the users.

The data in the first layer defines information like the variables that contain the position and status of the user's character and other objects, topology, different characters and their respective position, rules of the gameworld/-space, and so on. They can be static or dynamic.

The processing engines are the core of the cybertext. Based on the players' input, the structural rules of the game and the current state of the gameworld (*game state*), the course of action is calculated and determined in the simulation engine and passed on to the representation engine. Aarseth defines two possible input events: user and system-generated events. But as will be shown in Section 4.2, there are, depending on the defined basic axioms, three kinds of events: *player, component,* and *system actions* (Lankoski and Björk

2015: 25–26). The representation engine passes the result of these events to the user.

The third layer, the interface, functions as the translation center between the user and the simulation and representation engine. It analyzes user inputs and translates them into a semantic code applicable for the simulation engine. On the other way, it uses the semantic information given by the representation engine and transforms it into an adequate form for the user. This can be realized in various forms, one of them concretized through sounds.

The fourth layer, the user, is not part of the design of the cybertext itself, but his/her input and perception are pivotal for the mechanics and, of course, the experience of such.

With this understanding of video games as cybertexts, the concrete case studies can now be referred to by their genre position and sounds can be examined through their mechanical function in a cybertextual model—not as every possible complete experience, but as functions connected with single textons and their impact on the experience and representation of the gameworld and narratives.

4.2 The Anatomy of Video Games: Components, Actions and Goals

Complementary to the conception of the internal flow of information in a cybertext, it is necessary to provide a vocabulary that allows a clear and unmistakable description of specific video game elements within the game space. Although the goal of this research is not a classic formal analysis of video game sounds and video games are not regarded as pure artifacts (as explained in the section above), I allow myself to use the conceptual framework proposed by Petri Lankoski and Staffan Björk in their article "Formal Analysis of Gameplay" in *Game Research Methods: An Overview* (2015). The concept itself is an integration of several other theories with sometimes differing terms (e. g., Järvinen 2008; Brathwaite and Schreiber 2009; Björk and Holopainen 2005).

Basic elements are called *primitives*: they are the building blocks of video games and could thoroughly be understood as the textons of a cybertext:

> "Each type of primitive may exist in several different instances and have individual values. During gameplay, the instances of primitives and their associated values define the *game state*. This is not a primitive, but a concept for referring to a game at a specific moment during play. For example, a game state in the chess game would contain whose turn it is and the positions of all game pieces." (Lankoski and Björk 2015: 25)

These primitives can be divided into three categories: *components, actions,* and *goals* (Fig. 4.2).

The individual entities of a game which can be manipulated either by the player or by the game system are called components. They define the game space and also set the boundaries to the gameworld like inaccessible rocks at the boarder of an open-world map. As examples, Lankoski and Björk name "ship, aliens, UFO, bullets, and bunkers in Space Invaders (Taito 1979)" as components. Components can also be combinations of several distinct components and/or variables as to who has control over specific components.

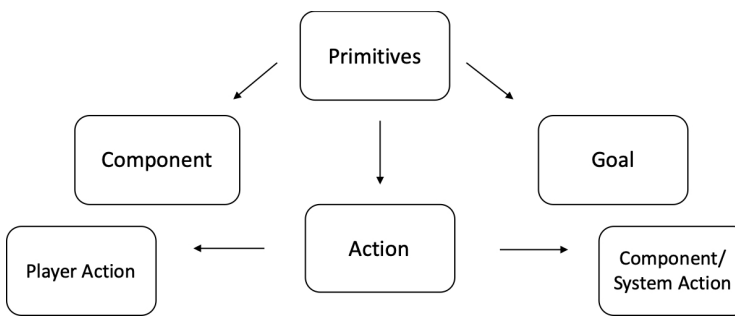

Figure 4.2: Video Game Primitives proposed by Petri Lankoski and Staffan Björk (Lankoski and Björk 2015)

Further, Lankoski and Björk propose considering variables that are not directly linked to any other components (e. g., the high score in a single-player game) as distinct components themselves to allow them a clear positioning in an analysis (Lankoski and Björk 2015: 25).

There are three forms of actions: *player, component,* and *system actions*. Player actions are events which the player initiates him- or herself, like the spatial movement of an avatar in a third-person adventure or the wielding of the lightsaber in *Star Wars Jedi: Fallen Order*. The relation to the owned component can be more or less direct. An example of a more implicit action would be in a tower defense game, where I can build a defense tower and own it as a component but cannot directly control its own actions—I delegate some of the actions to the component.

Component actions refer to the actions ascribed directly to components themself. This requires the willingness to attribute agency to components in the first place, although they might be in fact system-controlled. The AI algorithm of stormtroopers in *Fallen Order* which tells them what action they choose next may be system-controlled, but to describe them in an appropriate context, it makes more sense to ascribe them their own agency. Lankoski and Björk refer to components that can be perceived as intentionally initiating actions as *agents* (ibid.: 26), although I consider it unnecessary to introduce yet another term for components for they can be addressed more accurately as NPCs or in other ways.

Actions that are initiated by neither the player nor components are system actions. This includes, for example, the spawning of enemies in an open-world or new tiles in *Tetris* (Pajitnov, 1984), but also the handling of the game score or timers for specific tasks.

Goals describe specific game states or conditions of the game state that have a specific relevance to the gameplay. Often, they represent a certain state a player wants to reach to progress the events in a game or to complete it. Commonly there is a hierarchy in goals, especially if they concern the narrative of a game. Goals can be short or long term (Lankoski and Björk 2015: 26): A short-term goal, for example, is not

getting shot in *Space Invaders*; long-term goals are typically missions in open-world video games or even combinations of missions, or just to reach a specific location in a gameworld.

So where does the sound come in? In my master's thesis I argued that sounds cannot be regarded as primitives themselves but more as communication elements in between (Mauch 2016: 25). Although I hereby disagree with my previous statement (sounds can be coherently described as primitives), after taking a closer look at existing categorizations by other authors in the following sections, I propose to develop further tools to grasp the full function of sounds, the information they carry and the effect they generate on the player in my own categorical framework in Section 4.4,

In most cases, sounds can be regarded as component actions as in the sense of the act of a component producing a sound, for example a monster roaring. System actions are also possible, such as the game system producing a bling to catch the player's attention. Player actions are rather rare and games using them are still niche products. Most game systems nowadays provide an audio input and it can be used very creatively by game designers as a jumping mechanism through player voice for example. One mainstream example which uses sound as a player action, i. e., voice controlled, extensively is *SingStar* (London Studio 2004), a sing-along game where the player has to hit the note of a song (similar to karaoke) accurately enough to score. With the rise of voice controlled smart devices like Alexa and Apple Siri, there are a lot of new possibilities to play games through voice command (e. g., Chess Maven [Cole 2021]). Sound as a component itself could be imaginable as a tone which has to be manipulated to meet certain criteria to unlock a new game state. Whereas sound as a goal would be that manipulated sound as a potential component or otherwise the sound with the correct pitch level that has to be reached in *SingStar* to score.

4.3 Gameworld, Interface and the Diegesis of Sounds

Another basic understanding of video games for this book lies in the notion of the duality between user systems and virtual worlds as they are stated by Kristine Jørgensen[14] (Jørgensen 2009: 55) and Jesper Juul (Juul 2005a: 5–6).[15] [16]

The concept of virtual worlds[17] is taken from the theory of possible worlds in analytical philosophy (ibid.: 122). In video games, the narrative is bound to the virtual world—the gameworld: Games do not tell static and fixed stories, but exist as possible virtual worlds, which can be experienced. The user system is understood as the interface between the user and the computer, which is formed through specific rules. This rephrasing of the cybertext concept implies the pivotal understanding of the relationship between the real and the virtual world:

> "The fictional world of a game strongly depends on the real world in order to exist, and the fictional world cues the player into making assumptions about the real world in which the player plays a game." (Juul 2005a: 168)

In consequence of this duality there is a first differentiation of game sounds that can be made: sounds within the gameworld and sounds

14 Kristine Jørgensen wrote her dissertation with the title "What are those Grunts and Growls over there? Computer Game Audio and Player Action in Media Studies" in Kopenhagen and is now a professor at the Department of Information Science and Media Studies at the University of Bergen.

15 Not to be confused with the identically-named Danish family therapist. Jesper Juul graduated in *video game design* at the IT University in Kopenhagen and is now an associated professor at the Royal Danish Academy of Fine Arts, School of Design.

16 Juul uses the terms *rule systems* and *fictional worlds*. The concept is the same, but Jørgensen diversifies her phrasing because she orients her argumentation in another direction.

17 Instead of Juul's term *fictional*, Jørgensen uses the word *virtual* to avoid the misconception that actions in video games are merely fictional and not real.

on the level of the user system. Jørgensen notes that to create a soundscape as lifelike as possible, game designers seek for *credibility* rather than *realism*. Further, she distinguishes between *proactive* and *reactive* sounds as components of the user system. Proactive sounds ask for a reaction by the user—as for example a warning signal—while reactive sounds are a response of a user action—e. g., the click of an input button (Jørgensen 2009: 60–62). As it will be shown in the following paragraphs, this classification is not always conclusively and requires a more nuanced structuring.

Among other things, video games differentiate themselves from films by their representational function. While films are primarily seen as audiovisual representations, Jørgensen attributes a particularly functional embodiment of the real-world to video games:

> "Instead of seeing a similarity between a game's audiovisual surface and the corresponding audiovisual aspects of objects in the real world, it is important to see the similarity between what activities they model and how these are realized in the game." (Jørgensen 2009: 69)

With this approach she avoids the ongoing discourse from film studies of sound versus picture—sound and picture create a unit on a textual level taken from two cognitions.

Jørgensen constructs her video game sound theory notably on two basic concepts: on Denis Smalley's relationships between listener and source (Smalley 1996), and the *diegesis* taken from film studies.

In *The Listening Imagination* (1996), Smalley distinguishes different forms of relationships between listener and audio source. He combines the four listening modes from Pierre Schaeffer (1966), which differentiate listening from hearing, with the subject- and object-centered perception (*autocentric* and *allocentric*) from Ernst Schachtel (according to Smalley 1996: 80) and identifies thus three basic correlations between the perceiving subject (listener) and the objects of perception (sound).

An *indicative relationship* understands sound as a message or information about events in the environment. In this context, the focus lies on the object, and listening can be either active or passive.

The *reflexive relationship* concerns the listener, therefore subject-centered, and his emotional reaction to sound. It may be active as well as passive—the forms work simultaneously, and the listener can switch between the two or concentrate on one.

The third relationship is *interactive* and involves the active listening to the structure, the aesthetic attitudes of the sound and the semantic listening. There is no differentiation between listening to the meaning behind a specific sound and listening to the characteristics and *timbres* of sounds (1996).

The use of spoken words in video games does not mean automatically that the player has to understand their semantic information; spoken words can be used just as well indicatively. On the other hand, linguistically important information is often accompanied by optional subtitles in separate cutscenes.

Music as background music appears often reflexive and helps to put the player in a specific mood. These meanings and implications must be learned by the user, who otherwise misinterprets the music as bare non-informative background and runs the risk of missing specific information or warnings (Jørgensen 2009: 74–81).

The duality between virtual worlds and user systems mentioned above leads to a classification of audiovisual fiction and user-system sounds, which have specific consequences for the sound design through the way they relate to each other. These two aspects can never be completely separated: some noise in a virtual world has always some use on the user level, while sounds generated for usability are always intertwined in the gameworld.

The theory of diegesis, taken from film studies (e. g., Chion 1994; Thompson and Bordwell 2010), classifies diegetic and extradiegetic attributes: everything that has the potential to be experienced by a character within a fictional or/and virtual world is called diegetic. Thus, diegesis is a concept to separate information, which exists in a

fictional and/or virtual world, from information outside this world, from extradiegetic information (Jørgensen 2009: 97–98).

Bjørn Jacobsen introduced the term *informant diegesis* to describe a third layer in the analysis tool of diegesis—sounds that carry information for the player:

> "I have named these informant diegetic because they can be both diegetic and non-diegetic, but will contain information about the current situation or event in the interaction process. They may be completely irrelevant to the audience, but none the less adaptive to the interaction process and therefore be built upon information inside the medium." (Jacobsen 2016: 16)

While he provides excellent examples from the perspective of a game sound designer of how information is implemented in sounds through earcons and leitmotifs, I do not see any gain from this term for the topic of sounds and diegesis. First, because as seen above and in the following section, there are other tools to describe the nature of information sound is carrying, and second, because I doubt that there are sounds in video games that do not carry any information for the player. To the last question, Jacobsen admitted himself in the interview conducted for this research:

> "I guess you can argue that all sounds are informant. But you could also have sounds that have so little information that their only information is about aesthetics and not a gain wise informant. So the sound of, you know, wind and trees and birds—they are not there to inform you that there are trees and birds, they are only there to give you the feeling of trees and birds. So yes and no, because of course it's some very quite subjective discussion because you can't say that a sound is not informant—the same with colors and so on." (Jacobsen 2022)

There are still many authors who try to apply strict diegesis in game studies (e.g., Ernst 2018), although with certain adaptions of the theory. However, because of specific properties that video games possess—like the players presence and actions in a gameworld that trigger sounds themselves, and the sounds of other players in a multiplayer game (Grimshaw 2008b; Grimshaw and Schott 2008; Grimshaw 2016)—Jørgensen proposes a concept that, instead of describing a dividing rule, rather characterizes qualities of video game sounds: the *transdiegesis*. Grimshaw's own concept of *ideodiegetic* and *telediegetic* sounds will be discussed in Section 4.5.

The term extradiegetic is still applied to sounds which are located outside of the gameworld but (primarily) do not influence it. A classic example is non-adaptive background music. On the other hand, a diegetic sound would be, for example, a bird's twittering in a park inside of a gameworld.

External transdiegetic sounds are essentially characterized as extradiegetic, but they have a clear impact on the inside of the gameworld—as battle background music in most video games. This applies if the player is influenced in his gameplay through this sound and consequently, if the avatar in the gameworld reacts differently. In this way, extradiegetic music, for example, evokes implicitly a change within the diegesis.

Internal transdiegetic sounds represent the contrary: these are produced by a diegetic source, but they communicate to the player outside of the gameworld, without having another diegetic function within the gameworld. Examples specifically in RPGs are avatar monologues, where the game wants to raise the players' attention if, for instance, the health bar is low, or the player needs a hint for a riddle because he or she takes too long to solve it.

Jørgensen revises her own and other terminologies taken from the film studies in the essay "Time for a New Terminology?" (Jørgensen 2011). Her reasoning for a new concept is on one hand the participatory character of the player, and, on the other hand, the fundamental difference between gameworlds, which are designed to play,

and traditional fictional worlds. The functional representation of a gameworld is, as mentioned above, not fictional, but "a functional and playable gameworld, built for ease of navigation" (Aarseth after Jørgensen 2011: 87).

This leads some authors to the conclusion that the debate over diegesis in video games itself is obsolete. Daniel Hug argues:

> "If the game is part of the same system as the player, the narrative world and the existential world of the player merge into one." (Hug 2011: 415)

In *The End of Diegesis As We Know It?*, Anahid Kassabian also questions the diegesis as a valid theory in video games:

> "[V]ideo games problematize everything we think we know narratologically, psychoanalytically, and musically about the engagements between players and forms." (Kassabian 2013: 96)

Instead of giving up on the question of the implementation of video game sounds in a gameworld, Jørgensen replies to the obvious vagueness of the diegesis with a new model, which is based on existing theories and is adapted to the specific problematics and characteristics of video games. The diegesis is still used for the distinction between the gameworld and the newly introduced game space. Game space defines the complete space within a video game through the whole extended digital interface, including all the navigation, pause and options menus.

Sounds are divided into five categories, defined as interfaces through their partial integration into the gameworld, again, not understood as strict dividing lines:

Metaphorical interface sounds are the sole category, which is not *naturally* produced by the video game universe. Nevertheless, these sounds inherit an external relationship to it by system generated orientation, information and/or atmosphere. A typical example would be the background music of video games.

Sounds belonging to the *overlay interface* are directly connected with overlay menus, maps, and action-bars. Usually they appear in interface-heavy video games like the real-time-strategy game *Command & Conquer 3: Tiberian Wars* (EA Los Angeles 2007).

User system elements, which are integrated into the gameworld, are described as *integrated interface sounds*, as for example the sound that is played the moment an avatar reaches a new level by collecting enough experience points (XP), as heard in all three case studies.

Usually defined as diegetic, *emphasized interface sounds* are completely generated within the gameworld. But, at the same time, they are system-controlled and adapted and conventionalized to the gameworld. When the small android companion BD-1 in *Star Wars Jedi: Fallen Order* scans an object for example, he produces some peeping sounds and Cal, the protagonist, answers with "Good work!" This signals the player that BD-1's scan was successful and new information in the overlay menu about the gameworld is accessible.

The last category, *iconic interface sounds*, is completely integrated into the gameworld, for instance sounds produced by the avatar while walking. Source, substance and information content are everything possible within the gameworld (Jørgensen 2011: 91–93).

4.4 An approach to a Game Sound Grammar: The Sound-Strand

In my master's thesis, "Leap of Faith" (Mauch 2016), I made an approach to map sounds in the cluster of Jørgensen's interface sounds (Jørgensen 2011) and crystalized 30 distinct categories of game sounds in the open-world action-adventure and stealth game *Assassin's Creed Syndicate* (Ubisoft 2015). The goal was to propose a comprehensive categorization model that includes all relevant aspects of each individual sound in a specific video game. In my never-ending objective to simplify complex concepts without losing their content, I ended up with an overwhelming list of combinations of different sound

characteristics that could be categorized again in each concept with corresponding sub-categories that addressed the other aspects. What remained was the feeling that there had to be a more intuitive understanding and concept of all these (game) sound theories combined.

One major realization I gained during my fieldwork, which will be elaborated in Section 8, is that the subject of fieldwork in video games focusing on the sounds is the conversation between the player and the video game itself: the constant conversation. The basic elements of this conversation are defined in Section 4.2 as the anatomy of video games. However, ascribing specific sounds to these primitives says little to nothing about their diegetic and interactive characteristics and their function for the player, but looking at Aarseth's generalized role-playing cybertext model (Fig. 4.1) it allows an exact mapping of a component itself.

As Bjørn Jacobsen, one of the sound design interviewees, stated in his master's thesis (Jacobsen 2016), and as should be evident from the theoretical approach here so far, video game sounds always carry some sort of information. With this focus, Keith Nesbitt and Patrick Ng from the University of Newcastle divide single sounds into three different forms: auditive icons, earcons and language (Nesbitt and Ng 2013); Arno Görgen also outlines the function of video game noises and sounds in the essay, "The In Sound From Walk Through" (Görgen 2020). However, in my opinion, this is again a simplified classification that does not do justice to the level of complexity of information in video game sounds and pretends to provide a distinct raster it cannot provide.

Therefore, I propose a sound-strand model to specify the characteristics of sounds, or, figuratively spoken: the grammar of video game sounds (Fig. 4.3), which maps distinct sounds exactly in their cybertextual role, in their diegetic implementation (building on Jørgensen's model and taking it a step further), and, in their function for the listener/player.

Adapted to this research and its case studies, only component and system action sounds are taken into account, since, as explained in

Section 4.2, components sounds themselves, goals and player action sounds are special cases (at least concerning the game genres considered here). This does not necessarily result in their being incompatible with the proposed model, but for the current consideration they are not significant.

The sound-strand is divided in five units that could also be defined as the meta data of a specific sound.

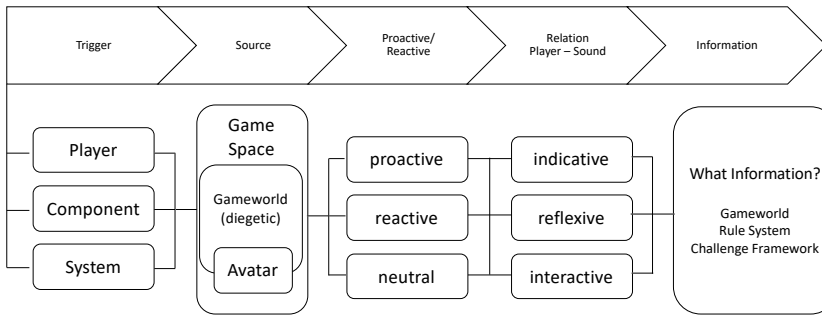

Figure 4.3: Sound-Strand of Component and System Action Sounds

The first unit defines the action that triggers the sound (which is not the same as the sound as an action itself).[18] Again, looking at Aarseth's model (Fig. 4.1), it has to be noted that on some implicit level the user (player) is always the trigger for his or her mere presence within the game space. Without the player, there would be no game state which could not trigger any sound at any time. That said, a sound can be triggered directly by the player, a component, or the system, or, from the perspective of Aarseth's model, triggered by the first or the fourth layer. The triggers themselves can be characterized as diegetic or extradiegetic.

The second unit tells where the sound originates. Background music is rooted in the broader game space, while the rushing of a creek nearby comes from within the gameworld (diegetic), namely

18 Therefore, a sound triggered by the player is not the same as a player action sound, which would also have the player as a source (second unit).

the creek itself. Sounds produced by the player's avatar can be diegetic, extradiegetic, or somewhere in between. For example, heavy breathing of the protagonist is a sound from within the gameworld while his or her thoughts that are audible to the player could be termed as extradiegetic or at least transdiegetic.

A sound can be a carrier of information that asks for a reaction by the player (proactive), e. g., the signaling of a low health bar, or it can be reactive to a player input, drawing the lightsaber in *Star Wars Jedi: Fallen Order* by pressing the corresponding button for example. The previously mentioned rushing of a creek near the player is most of the time neither, therefore tagged as neutral in the third unit.

The fourth unit refers to the relationship between the listener and the audio source proposed by Smalley (1996), which has been outlined in Section 4.3.

And finally, the fifth unit declares the concrete information(s) the sound delivers, as understood by the player. This information can be roughly divided into information ascribed to the gameworld, to the rule system or the challenge framework (which will be introduced more precisely in Section 7.2.4.1) within the broader game space, although its exact attribution is sometimes difficult and may be argued about in some cases.

The middle of the strand marks a line between the objective first part that is determined by the first two layers in Aarseth's cybertext model (Fig. 4.1) and the perception and interpretation of the synthesis (presentation) in the third layer, the interface. It may be argued that the second part is purely subjective, but as will be shown, within the context of the occurring sounds—and also how these sounds are introduced by the game design—there is at least a strong guidance in its perception for the specific functions that lead to a conversation between player and system. It is a matter of how well this conversation is designed and how (or if) the cybertext reader understands it. A fictional goal in a mission setting might be for example: "Draw your lightsaber as soon as you hear the nearby creek." In this case, the sound was to be proactive for the player in that specific case instead

of neutral in the third layer of the strand. The interpretation of the third unit therefore may also change the attributes of the fourth and fifth units and even their diegetic implementation.

Despite saying this model allows for a more precise localization of the diegetic implementation of a sound than Jørgensen's interface concept, it does not render it obsolete in describing its characteristics. As shown in my master's thesis (Mauch 2016), there are a lot of sub-categories of each interface type and some sounds which are difficult to categorize. With the sound-strand model it is possible to pinpoint these examples and map their exact diegetic use and function to the player, which will be shown in examples of the case studies.

The aim with this model is to bring said theoretical attributes into one concept and show their relation, dependence, and impact on each other. With the separation between objective characteristics and player perception, it is possible to make more explicit statements about the diegetic and functional implementation of game sounds, which again can give insights into which attributes, understandings and interpretations of sounds are understood naturally, learned by game design, or are conventional in a broader context.

Finally, it serves as a kind of basic grammar for the understanding of the contextual function and use of game sounds instead of trying to squeeze them into fixed categories.

4.5 Soundscape and Soundwalks

The three case studies in this research are situated in completely different settings. This is not only represented in each title visually and through storytelling, but also to a large degree through sonic environments. Therefore, it is only natural to take R. Murray Schafer's[19] concept of soundscape into account.

19 The Canadian composer, journalist and sound researcher Raymund Murray Schafer (born 1933) studied composition in Toronto. He is regarded as one of the most

Schafer defines soundscape as the acoustic environment, "[t]echnically, any portion of the sonic environment regarded as a field for study. The term may refer to actual environments, or to abstract constructions […]" (Schafer 1969: 274). He characterizes the industrial revolution as a *lo-fi* soundscape, in which a sonic overload fogs natural and human sounds, in contrast to a rural and/or older *hi-fi* soundscape, in which individual sounds are clearly distinguishable (ibid.: 71). While *Horizon Zero Dawn* and *Assassin's Creed Valhalla* play for the major parts in obvious hi-fi soundscapes, *Fallen Order* can be, depending on the specific levels, qualified both as lo-fi and hi-fi.

Further, Schafer divides single elements of a soundscape into *keynote sounds, signals* and *soundmarks*. Keynote sounds are the fundamental tones of a soundscape, the background on which other sounds are perceived and set in relation to without necessarily being heard itself consciously (ibid.: 9, 272). These sounds, on which the attention of the listener is focused, are *sound signals* (ibid.: 10, 275). *Soundmark* is derived from the word *landmark* and characterizes sounds which are typical and specifically identify a particular soundscape (ibid.: 10, 274).

Schafer's attribution to *lo-fi* and *hi-fi* soundscapes in relation to its *keynotes*, as well as its *sound signals* and *soundmarks* will be critically examined in each case study. Furthermore, the *acoustic design* will be analyzed to gain an understanding on how the sonic overload of a *lo-fi* soundscape and the *keynote* is created, transmitted, and arranged to a coherent composition.

This concept is further developed and adjusted by different authors such as Barry Truax, Steven Feld, Charles Hirschkind, Hildegard Westerkamp, Anahid Kassabian, and Helmi Järviluoma. Two schools of thought have thus been established: while the older generation prefers more archaic sounds, younger academics turn their attention rather to loud cities (Burkhalter 2010).

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important contemporary Canadian composers. He created the *World Soundscape Project* which aims to collect and analyze soundscapes from around the world.

Noteworthy for this research is particularly Tim Ingold's objection to Schafer's theory (Ingold 2007). He argues that the concept of soundscape treats sonic perception as a recording and playback device. However, sound functions in the same manner as light for visualizations: light illuminates objects, so they can be seen—yet the light and the object are two completely different entities.

> "[A] landscape may be audible, but to be aural it would have to have been first rendered by a technique of sound art or recording, such that it can be played back within an environment (such as a darkened room) in which we are otherwise deprived of sensory stimulus." (Ingold 2007: 10)

The term soundscape is misleading due to the fact that sound as a medium dissolves and can never be perceived the same way twice, although the environment is the same: "The world we perceive is the same world, whatever path we take, and each of us perceives it as an undivided center of activity and awareness" (ibid.).

While I agree with his concept of perception, there is no relevant contradiction to Schafer's concept. No player ever hears the soundscape of *Horizon Zero Dawn's* apocalyptical Northern America of the 31st century or a *Star Wars* ship breaking yard the same way another player does (except some cutscenes), but everyone perceives the same sonic environment. All sounds were recorded in development and are now digitally replayed and located to new objects in a newly created space to compose a new *keynote*.

Mark Grimshaw's contribution to this matter includes the concepts of *ideodiegetic* and *telediegetic* sounds (Fig. 4.4), which are used to characterize the distinct soundscapes for different players in the same multiplayer session (Grimshaw 2008b; Grimshaw and Schott 2008; Grimshaw 2016).[20] Soundscape is understood as a part of the

20 In my opinion, the terms *ideodiegetic* and *telediegetic* are used inaccurately in Grimshaw's argumentation, because they do not refer to the understanding of the term *diegesis* in the sense of a differentiation between the inside and outside of a

acoustic ecology, which is defined as the relationship between player and sound, and "is created in real-time through the agency of game engine actions (the sounding of game status feedback or ambient audio samples, for example) or through the agency of player input acting upon the discrete audio samples which form the soundscape's palette" (Grimshaw and Schott 2008: 4).

In a multiplayer environment, sounds that any one player can hear are defined as *ideodiegetic*. Further, these are divided into *kinediegetic* (triggered by the player) and *exodiegetic* sounds (all other sounds)—a sound that is *kinediegetic* for one player (e. g., gunfire) can be *exodiegetic* for another player, while global game status sounds are *exodiegetic* for all players.

Sounds that one player does not hear but have consequences for him are *telediegetic* ("for example, the blast of the shotgun which kills an enemy may draw others of her teammates to that location which itself may provide opportunities for the opposing team" [Grimshaw and Schott 2008: 4]). These sounds may be *kinediegetic* for another player and *exodiegetic* for yet another one.

This concept clarifies and demonstrates how soundscapes work in video games, how different players perceive different soundscapes and the function and information carried by individual sounds. Thus, its classification of sounds is distinctly specialized on multiplayer video games; it does not give new insights into single-player games and its terminology will therefore not be further implemented in this research.

Finally, it can be said that in 2014, the *International Standards Organization* (ISO) formalized the definition of soundscape "for the purposes of measuring, reporting, planning, and management (ISO 12913–1: v)" (Picker 2019: 155), emphasizing human perception. The ISO distinguishes between the *acoustic environment*, which is "sound at the receiver from all sound sources as modified by the environment," and the soundscape, which is the "acoustic environment as

fictional world as it is used in literature, film, and game studies, in which context he lines it up.

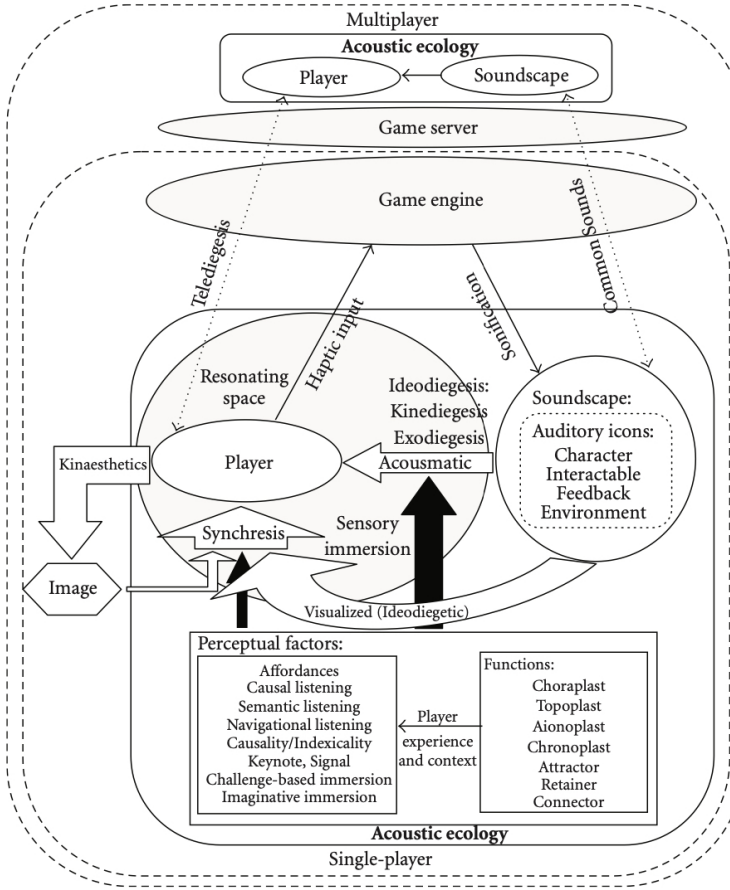

Figure 4.4: A conceptual framework of the FPS game acoustic ecology in multiplayer mode (Grimshaw and Schott 2008: 2)

perceived or experienced and/or understood by a person or people, in context (ISO 12913–1: 2)" (ibid.). This further underlines the understanding of soundscapes as it is used here in setting of video games.

Soundwalks, as defined by Hildegard Westerkamp,[21] are one way to elaborate the individual relationship to a soundscape through the focused perception of sounds while moving through the environment in which they are located. They are purposely participative and subjective, and their attention is directed towards collecting and portraying location-specific events. Westerkamp proposes several steps as a guideline to separate individual sounds and hear them as a complete composition in the end (Westerkamp 2007).

She "start[s] by listening to the sounds of your body while moving. They are closest to you and establish the first dialogue between you and the environment" (Westerkamp 2007: 49), then moves away from oneself to sounds near the listener and further away, paying attention to all sorts of pitches, sound intensities, tones, and patterns. Once distinct sounds have been collected, isolated from each other, and regarded as individual entities, she asks the soundwalker to "reassemble them all and listen to them as if to a piece of music played by many different instruments" (ibid.).

There are thousands of recorded electro-acoustic soundscape compositions by Westerkamp and those inspired by her since she also encourages the use of recording devices on soundwalks. This contrasts the original aim of Schafer, which states the "soundscape's inextricable connection to place" (Polli 2017: 82). Westerkamp responds to this discordancy by underlining that the "recording, manipulation, and broadcast of soundwalks can actually bring listeners closer to the environment" (ibid.). In this context, understanding audio game designers as composers, this would mean not only to bring them closer, but to enable them in the first place to perceive the soundscape of a gameworld.

21 Hildegard Westerkamp (born 1946) is an initial member of the World Soundscape Project and founder of the World Forum of Acoustic Ecology. She is also a composer, radio artist, teacher and sound ecologist.

The schizophonic character of the recorded medium in video games will be addressed in Section 4.6 and touched on again in the developer interviews. However, it will not be further discussed here, since gameworlds are considered and analyzed as real environments themselves, regardless of who created them.

Noteworthy herein is also the related methodological approach by Lucius Burckhardt, a Swiss sociologist and economist from Basel, of *promenadology* (initially termed *strollology*),[22] and the concept of *walkscapes* by Francesco Careri, professor of architecture in Rome.

Like soundwalks, promenadology is also based on the focused and conscious perception of our environment (though mostly on visual aspects) and the transformation of mere seeing to cognition and knowledge. In retrospective, a promenader does not describe a real existing site that he saw, but a synthesis or composition of passage sequences of his perception (Burckhardt 2006: 330).

Taking this idea a step further, the concept of walkscapes by Careri describes a transformation of a place and its meaning through the act of walking. Through the mere human presence and perception in an environment, the observer modifies the meaning of space culturally and therefore also forms space itself (Careri 2002: 32).

Within the research at hand, the concept of soundwalks provides an experimental, yet pivotal step between the first unstructured encounter with the field in Section 7.1, and the in-depth fieldwork later on, and will be carried out in Section 7.2.

4.6 Immersion and Presence

In the same manner as the research at hand, Karen Collins, holder of the *Canadian Research Chair in Interactive Audio* at the *Game Institute* and associated professor at Waterloo University, understands video games in *Playing with Sound* not just as mere texts, but rather

22 German: Spaziergangswissenschaft.

places of participation, where users create content: "Without a player – without the act of play – [a video game] is just code, lying in wait" (Collins 2013: 2). Only the presence and actions of a player in the gameworld and game space trigger sounds, even if it causes just a range of ambient sounds to play (cf. Grimshaw 2016: 327).

She describes interaction with sound categorically distinct from listening to sound without interaction. Listening, causing pre-produced sounds, and creating new sounds differentiate essentially from each other. The key issue to this question is in which way a player interacts with sounds and what those distinctions are.

According to Schafer, the technical possibility of recording sounds detached from their original source is an unnatural process: "a *schizophonic* activity" (Schafer 1969: 43–47). He calls sounds cut off from their origin artificial and disembodied. Collins, on the other hand, argues that sound is always embodied. The synesthetic disposition of sound implies multimodal implications: sound contains haptic and visual associations, which are linked in a causal relationship to sound. Sound embodies a new causality if it is connected with new images (*synchresis*) and the result is newly formed content. From this the causal connection from actions and sound can be derived (*kinesonic synchresis*) where sound is triggered by the player, such as feedback from a touch of a button for example.[23] In video games, sound may occur for itself, *schizophonic* with haptic or visual association, connected with images or with actions. According to the interaction with the sound, its occurring function, meaning and content change, which is remembered, learned, and can be applied by the player (Collins 2013: 19–38).

Studies with infants have shown how self-produced sounds create and strengthen the perception of the environment. The same effect happens through interactive sounds in video games. As a consequence

23 Visualization as well as haptic perception can thoroughly arise in pure imagination, as for example in an audio drama. Collins explains this phenomenon with the notion of the synesthetic impact of sound. Experiments with visually handicapped and non-handicapped have shown that audio-only games can generate a clear concept of a physical game space (see Collins 2013: 24).

of game pads becoming a component of the human body,[24] self-produced or triggered sounds create an identification with the video game avatar and intensify the immersion through the connection of the peripersonal space (the environment in the physical range) and the virtual gameworld.

Further, Collins explains different modes of how sounds generate and strengthen the perception of space and identification in differing degrees (ibid.: 58). For this research, particularly the understanding of the interactive impact of sounds on immersion (presence) and identification should be taken into account. Her additional discussion on the correlation between physical effort and the virtual space as well as the creative production of music in video games will not be further addressed.

Here, it might be useful to get a better understanding of the term immersion. *Immersio* in Latin means submerging a body in water. Figuratively, immersion is used in the fields of literature, film, and game studies to describe the feeling of being engaged in a "non-immediate reality in the context of mediated representation," usually linked to the "degree of vividness and credibility of the represented reality" (Therrien 2014: 451).

In the conference paper, "Fundamental Components of the Gameplay Experience: Analysing Immersion" (2005), Laura Ermi and Frans Mäyrä proposed a framework that brings together numerous theories and concepts around the understanding of immersion. The SCI model (sensory, challenge-based and imaginative immersion) identifies the three key dimensions of immersion that are related to several other fundamental components, which play a role in the formation of the gameplay experience: sensory, challenge-based and imaginative immersion (Fig. 4.5).

24 In *Understanding Media* (1964), Marshall McLuhan explained extensively how every medium and each technology can be seen as an extension of our senses and therefore of our self. Furthermore, neuroscientific studies by I. Morrison and T. Ziemke (2005) have shown that sensorimotoric sections in the brain respond the same way with game pads as with one's own body parts.

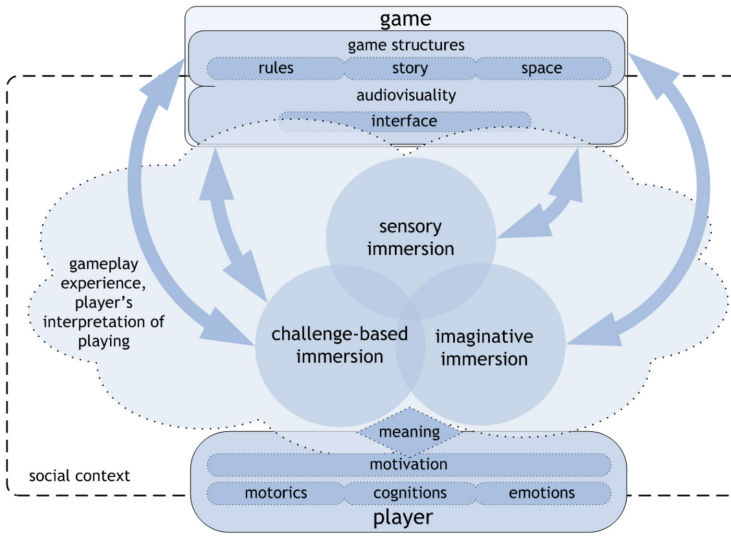

Figure 4.5: SCI model (Mäyrä and Ermi 2005: 8)

In this model, gameplay is characterized as an interaction between a specific kind of game and a specific kind of game player with key elements that form the gameplay experience. Mäyrä and Ermi emphasize that "[T]he gameplay experience can be perceived as a temporal experience, in which finally the interpretation made by the player takes into account also other information such as peer influence, game reviews and other frames of socio-cultural reference" (Mäyrä and Ermi 2005: 7).

The sensory immersion is probably nearest to the original term and is related to the audiovisual execution of games. The second form, which is central and exemplary for video games, as it is based on interaction, is the challenge-based immersion. This describes "the feeling of immersion that is at its most powerful when one is able to achieve a satisfying balance of challenges and abilities" (ibid.). This can be referred to motor or mental skills (e. g., strategic thinking or logical problem solving) or both. In contemporary games as the case studies

in this book, where the gameworld and story elements play essential parts in which a player can become absorbed in and identifies him- or herself with a game character, there is also an *imaginative immersion*. This is where the player can "use her imagination, empathize with the characters, or just enjoy the fantasy of the game" (ibid.: 8).

While sound definitely has a major impact on sensory immersion and an implicit influence on the imaginative immersion, its direct effect on the challenge-based immersion has yet to be shown.

Mark Grimshaw[25] describes immersion a difficult concept to quantify and sees the term often used—inaccurately—in the same way as presence. There is an ongoing scholarly debate for an objective basis that shows the connection between immersion and sound, but an accurate quantification of the concept remains ambiguous (Grimshaw 2016: 328). Further, he explains that immersion is not only related to the notion of the engagement of the player in the game but that a player becomes part of the gameworld itself. Grimshaw suggests "that the player's ability to trigger sounds whose hearing has an effect on the game's diegesis means, in effect, that the player is part of an acoustic ecology and thus is immersed in that ecology" (Grimshaw 2008a; Grimshaw 2012; Grimshaw 2016: 329). Therefore, his conceptualization of immersion lines up with the understanding of the diegetic systematization of sounds (Section 4.3), soundscapes (4.5), and the interactive characterization of sounds mentioned above. But while I argue that these concepts concern both sensory and imaginative immersion, Grimshaw's understanding of immersion only addresses sensory immersion, deriving from a more natural and physical science perspective.

This becomes clear in "A Step Back from Reality: Sound and Presence in Computer Games and Other Worlds" (Grimshaw-Aagaard 2021), where he defines the distinction between immersion and pres-

25 Mark Grimshaw writes extensively on sound in video games and has a special interest in presence through sound in virtual reality, emotioneering and biofeedback through video game sounds. He is the Obel Professor of Music at the Aalborg University in Denmark and chair of the Music and Sound Knowledge Group.

ence. He states that in presence research, as opposed to game studies and industry marketing, most follow Mel Slater's view that immersion "delivers" (Slater 2003: 1–2). Hence, immersion could theoretically be objectively measured in means of technology "while presence is a subjective experience that lends itself less readily to precise measurements" (Grimshaw-Aagaard 2021: 277).

From the ethnomusicological and cultural anthropological point of view, I therefore stay with the term immersion for the study of sounds in video games throughout this book, indicating it in the SCI model. It should be noted that sensory immersion in this context is used synonymously with the term presence as defined by Slater and Grimshaw.

5 Methodology and Practice

5.1 Ethnographic Fieldwork in Virtual Game Spaces

With the given theoretical background described above, for me as a cultural anthropologist and ethnomusicologist, it was natural to explore video game worlds and spaces similarly to the way I study other cultural phenomena in the "real" world. I am aware of an intuitive discrepancy of ethnographic studies within a textual media. But not only since the cyberpunk novel *Ready Player One* (Cline 2011) has it become a habitual perception that cultural performance occurs not only in real physical worlds, but also in digital fictive space.

Despite the notion of a literary anthropology that emerged in the 1990s (e. g., Poyatos 1988 or Iser 1993), I still have not found examples of ethnographic studies in fictional worlds as I aim to do.[26] Undoubtedly, there is a lot of scientific literature about ethnographic or even ethnomusicological fieldwork in digital space or virtual worlds (e. g., Miller 2008; Boellstorff et al. 2012; Harvey 2014), but all the methodological approaches I found so far did not exactly meet my idea of the study as I intended it. On a personal note, this led to an extensive writing crisis while working on this book, where I was not able to point out the inconsistency between already existing scientific concepts and my own understanding of an anthropological fieldwork in video game worlds and spaces. In hindsight this was fundamental to finding my own methodological approach presented later in Section 5.1.3.

26 For Poyatos, literature is primarily an archive of anthropological relevant data, whereas Iser is on a quest to find anthropological constants in literature, which roots in the structuralism and formalism of art history and literature studies.

To overcome this writing blockade, it was necessary for me to think outside the box. The result was strikingly simple and brought me back to my initial and now somehow crystallized proposition: to do ethnographic fieldwork in video game worlds and spaces—whereas the existing fieldwork and fieldwork methods I have found mostly do ethnographic studies about users, performers and social groups behind the avatars of a game, *outside* the gameworld and -space (e. g., Cooley, Meizel, and Syed 2008; Harvey 2014). In the following section (5.1.1) I will lay out the two crucial turning points, namely the idea to consider video games as heterotopias[27] and my recent studies on in-game photography that led me out of the crisis and helped me clarify my idea. In Section 5.1.2 I will show the relation to the literary anthropology, and finally present my own approach in Section 5.1.3.

5.1.1 Video Games as Heterotopias and In-Game Photography

While Michel Foucault's concept of heterotopia was crucial in finding an adequate perspective for an ethnography in video game worlds for this book, it is neither the goal to discuss the validity of the idea to regard video games as heterotopias in-depth, nor to explore the possible further consequences this could have for the game studies or Foucault's concept itself. This idea is far from new and has been suggested several times (e. g., Bruno 2010; Challis 2011; Unterhuber 2013), but at the time of the development of this book, it had not been analyzed as a comprehensive study. The concept of heterotopias has only been mentioned by Foucault in a short paragraph in *The Order of Things* (1971), in an article for *Architecture, Mouvement, Continuité* (5) (1984, translated in 1986) and in a radio report for France Culture (1966). Nevertheless, it has become a popular concept by academics in literature, film-, culture- and theatre studies.

27 Thanks to the input of Dr. Lea Hagmann, Institute for Musicology, Bern.

Space, in Foucault's argumentation, is the basic axiom after the 19th century of theories and systems for the understanding of social questions at the junction of time and space. In his text *Of Other Spaces*, he is mainly interested in sites "that have the curious property of being in relation with all the other sites, but in such a way as to suspect, neutralize, or invert the set of relations that they happen to designate, mirror, or reflect" (Foucault and Miskowiec 1986: 24). Namely, there are two different types of these sites: utopias and other, real spaces–heterotopias.

Utopias "present society itself in a perfected form, or else society turned upside down" (ibid.). These are fundamentally unreal spaces.

But then, there are in every culture and civilization real spaces which are formed by the founding of society—"enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted" (ibid.): heterotopias.

In his online blog, the freelance journalist JRG Bruno, who writes about video game culture and was one of the first to mention video games in relation to heterotopias, notes:

> "Videogames communicate through the strategic use of space. These spaces are virtual, but no less 'real' than actual spaces in so far as they depend on the very same kind of spatial relationships that define how we relate to an environment. These virtual spaces allow us to briefly escape the moralities and identities that define (and limit) our actions in the 'real world', only to replace them with a new set of values and identities determined by the game designer." (Bruno 2010)

This describes the nature of a space—in this case a virtual space—that exists outside of the society that forms a part of it. It is disparate from other sites because it transforms space into mythical and real negations of the space we live in. There are various forms of heterotopias, as these other spaces are characterized here, for example for rites of passage or for individuals of deviation (Foucault and Miskowiec 1986:

25), but they all have in common that they cannot be entered and/or exited without a certain set of criteria. It is a place which can be visited for specific reasons at specific times.

A video game, or the playing of video games to be precise (Unterhuber 2013), has in fact all the characteristics of a heterotopia, which Foucault links to six distinctive principles:

By picking up a controller and turning on a console or a computer, we meet the specific criteria to enter that specific heterotopia and create it at the same time as long as we chose to take that refuge from the "real space" ("Fifth principle. Heterotopias always presuppose a system of opening and closing that both isolates them and makes them penetrable" [Foucault and Miskowiec 1986: 26]). Just like a theatrical stage, video games are capable of juxtaposing different spaces that are themselves incompatible in a single space (third principle [ibid.: 25]). Heterotopias are also defined through *heterochronias* (fourth principle [ibid.: 26]): time, or linked slices of time, break with the traditional concept of time. Although time in video games is typically linear,[28] the perception of it is very different to the physical world, mirroring, manipulating, and negating it, for example by playing through several centuries of world politics within a few hours in the turn-based video game *Sid Meier's Civilization* (1991). Sitting in front of a monitor, on which the visual aspect of a video game is projected, hearing the video game sounds on headphones or through speakers and maybe even getting haptic feedback on a controller, a player is simultaneously in the conventional space as well as in a heterotopia.

To consider gameworlds somehow mirroring the world and society we live in a heterotopia thus emphasizes the significance of eth-

28 Juul argues that with a chronological time experience in video games the narrative unfolds during the play and thus feels like it is happening in the *present*. This "duality of play time" allows the perception of a mapping between the *real world* and the time in the gameworld and creates a basic sense of *now* while playing, which again enhances the immersion in a video game. Thus, while other media like films or novels tend to employ temporal sequences that shift backwards and forwards, video games generally rely on more linear time structures (Juul 2004a: 134 and Hanson 2014: 205).

nographies in video gameworlds and spaces. Johan Huizinga, a Dutch historian and one of the founders of modern cultural history, states in *Homo Ludens* that there is a very strong intertwining between all cultural property and play and play sites and even declares it as a pivotal condition for the production of culture itself. His description of spaces of play, the *magic circle*, is remarkably similar to Foucault's heterotopia: "[They are […] segregated, enclosed, sanctified territories, where specific rules are applied. They are temporal worlds within the ordinary world, dedicated to the performance of an act apart]" (Huizinga 1939: 19).[29] Foucault's first principle on heterotopias "is that there is probably not a single culture in the world that fails to constitute heterotopias" (Foucault and Miskowiec 1986: 24).

This relationship between society and games is supported by several other authors. The Canadian philosopher Marshall McLuhan states that everything that moves a society will be manifested in games sooner or later: "Games are popular art, collective, social reactions to the main drive or action of any culture" (McLuhan and Lapham 1964: 235). And the media theorist Ian Bogost states that the persuasiveness of digital games lies in its *procedural rhetoric*, a term that describes the ability to simulate and make systems and causal coherencies of events and processes of the real world experienceable, instead of only visible: "The art of persuasion through rule-based representation and interactions" (Bogost 2007: ix). Video games are a reflection of our culture while at the same time mirroring it; they make it experienceable and through this, let us play with cultural rules and concepts and influence it back again. In Foucault's words on heterotopias:

> "The last trait of heterotopias [sixth principle] is that they have a function in relation to all the space that remains. This function unfolds between two extreme poles. Either their role is to create a space of

29 Original German text: "Sie sind […] abgesondertes, umzäuntes, geheiligtes Gebiet, in dem besondere Regeln gelten. Sie sind zeitweilige Welten innerhalb der gewöhnlichen Welt, die zur Ausführung einer in sich geschlossenen Handlung dienen."

> illusion that exposes every real space, all the sites inside of which human life is partitioned, as still more illusory […]. Or else, on the contrary, their role is to create a space that is other, another real space, as perfect, as meticulous, as well arranged as ours is messy, ill constructed, and jumbled" (Foucault and Miskowiec 1986: 27).

Foucault's remaining second principle states, "that a society, as its history unfolds, can make an existing heterotopia function in a very different fashion; for each heterotopia has a precise and determined function within a society and the same heterotopia can, according to the synchrony of the culture in which it occurs, have one function or another" (Foucault and Miskowiec 1986: 25). This is not further outlined here, but it should be pointed out that video games can impersonate different functions for a culture, for example as serious e-sport gaming, as pure recreational gaming or as training for real tasks.

Up to now, it is not possible for a player to immerse completely, physically, and mentally, into a gameworld. So-called 4D virtual reality experiences[30] still have a very limited range of gameplay, mostly limited to a walking simulation. One reason for this is simply because media-historically, there is a central differentiation between the gameworld and the game space[31] which is represented in the gameplay through interfaces and interplay between different diegetical levels[32] and which is vital for the experience of a video game.

Matthias Leitner, author for radio, television and film, writes in his article "What's the Difference" on the movies *Tron* (1982) and *Tron: Legacy* (2011) about video games which function as agents in movies:

> "[Steven Lissberger, the director of the original, says that the strength of these two films is the fact that the line between reality and virtual space is 'hardly distinguishable'. But the difference could not be more

30 Virtual reality with full body suits, where a user can walk around physically in a real room and simultaneously in a virtual environment.

31 Explained in Section 4.3.

32 See Section 4.3.

> evident, because in 2011 the cyberspace of Tron still has to be entered, a magic threshold has to be crossed. […] Scholars as professor Wolfgang Wahlster, winner of the German 'Zukunftspreises' and researcher at the German Center for Artificial Intelligence in Saarbrücken, have given up the term cyberspace a long time ago and speak of a smart space instead, and that is not a distinctive sphere, but long since all around us and in our pockets.]" (Leitner 2014: 52)[33]

While the statement he makes is mostly true, the message is misleading: the gap between reality and virtual space may indeed dissolve in some sort of a smart space, but that does not mean that there is no more magic threshold from reality to video games. Otherwise, video games would become mere training or simulation spaces for reality instead of a playground. There has to be a magic circle, a mirror of reality or a heterotopia for a video game to be a game, or else it would just be part of a smart reality, like for example a soldier pilot controlling a drone. And since *Tron* is a gameworld, there has to be a system of opening and closing.

Therefore, considering video game worlds and spaces as texts (cybertexts in the sense of a media category) and heterotopias is most relevant to gain insights into their nature and their influence from and for our culture and society. This brings along an impact on ethnographic fieldworks in video games: the gameworld has to be seen in the context of the game, with the inclusion of the game space, the magic circle and its "relation to all the space that remains" (Foucault and Miskowiec 1986: 27).

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33 Original German text: "Steven Lissberger, der Regisseur des Originals, nennt als Stärke beider Filme, dass die Grenzen zwischen Realität und virtuellem Raum 'kaum auszumachen' seien. Doch eigentlich könnten sie deutlicher gar nicht sein, denn der Cyberspace von Tron muss auch 2011 noch immer betreten, eine magische Schwelle überschritten werden. […] Wissenschaftler wie Professor Wolfgang Wahlster, Träger des deutschen Zukunftspreises und Forscher am Deutschen Zentrum für Künstliche Intelligenzforschung in Saarbrücken, sprechen schon längst nicht mehr von Cyberspace, sondern von Smart Space und der ist keine distinktive Sphäre, sondern längst um uns und in unseren Hosentaschen."

Examples of fieldwork that take these circumstances into account can be found in the field of in-game photography. New video games and their gameworlds are increasingly approaching the physical world in their photo-realistic rendering, but they differ from it fundamentally, as should have become evident by now. They request a focused intervention by the player. Although photographers often turn to subjects which can easily be overlooked by straight forward-looking players and search for perspectives outside the main game events, the fact that gameworlds and -spaces are constructed for playing games is unmissable and plays an important role.

Analogical to all experienceable sounds in a modern video game, it is practically impossible for an in-game photographer (or in that sense a "cybertext-reader") to find a scene twice in the exact same way.[34] In most open-world video games, the prevailing weather is generated randomly, times of the day are simulated, the light incidence changes, NPC's behave differently or spawn randomly based on algorithms, etc. The in-game photographer stages a composition from a unique scripton (Aarseth 1997) and creates a picture, similar to someone reading a sonnet from *Cent mille milliards des poèmes* (Queneau 1961) and putting it into context.

Therefore, the question about the originator of cultural or social substance in a video game that may already have arisen with Bruno's quote above,[35] or the creative process of screenshots could rather be compared with architecture photography or pictures of Andy Warhol than still pictures from movies (see also Talley 2015). In the words of Martin Geisler, in-game photographer, professor for media and cultural pedagogics at the Ernst-Abbe University of Applied Science Jena and head of the video game institute Spawnpoint in Erfurt:

34 See also Tim Ingold's objection to the classic theory of soundscapes and Mark Grimshaw's concept of ideodiegetic and telediegetic sounds, Section 4.5.

35 "These virtual spaces allow us to briefly escape the moralities and identities that define (and limit) our actions in the 'real world', only to replace them with a new set of values and identities determined by the game designer" (Bruno 2010).

> "[I do not create the environment, I embed it with my own experiences. Of course, at that I depend on the boundaries of the creators – but herein there is no difference between in-game photography and classic photography.]" (Geisler after Sigl 2012)[36]

Without any in-game photographer, ethnographer, anthropologist, or any other player who turns on the console or computer to enter and experience the heterotopia of a video game, the gameworld and -space would not exist. Pictures (and in this sense also sound recordings and soundscapes) come only to actual existence through the unique and concrete perception of a user—and so its cultural value and substance.

There are different ways of how in-game photographers approach these spaces. Some explore gameworlds (and gameworlds exclusively) exactly in the same manner as real sites: noteworthy is Leonardo Sang, artist, designer, and photographer from São Paolo, who has had his works curated internationally. He states that "[a]ll the pictures created are composed just like *real world* photography. […] Game photography allows you to do and see things that do not exist, surreal situations that only belong to the ludic world" (Sang 2015). By eliminating all visual elements that remind the viewer of a video game, such as interface, energy bars or the like, he presents virtual and sometimes surreal worlds, but removes all ludic elements. He shows gameworlds, where the game was removed.

Others find somewhat more creative ways to portray video game worlds and spaces. Robert Overweg, a Dutch photographer, eliminates some characteristics of the game in a different way, making it visible at the same time:

> "I try not to follow the roads I am supposed to take, but try to seek out my own path within and outside the given boundaries of the game. I find joy in making use of a glitch which gives me the possibil-

36 Original German text: "Ich erschaffe die Umgebung nicht, ich besetze sie mit meinen Erlebnissen. Natürlich bin ich dabei auf die Grenzen der Schöpfer angewiesen – aber hier unterscheidet sich In-Game-Fotografie nicht von klassischer Fotografie."

> ity to have a different look at the virtual world. Flying around and running through walls which I am not supposed to do gives me a sense of freedom and the ability to move in ways I can't in the physical world. I want to look behind the curtain of the virtual facade and show it to the world." (Robert Overweg after Bittanti 2010)

By manipulating the game code in such a manner that he removes certain elements of the game space, which lets him see through the curtains, he ignores the provided gameplay which determines the relation of the gameworld to the game space. By breaking through and ignoring the real rules of the user system (Juul 2005a) within the game space, he is emphasizing them and makes them visible. The result combines familiarities with abstractness and surrealities—the viewer holds on to the gameworld while certain basics of the game space are manipulated (see examples from his series *The end of the virtual world*: Figs. 5.1 and 5.2).

> "These environments appear in first and third person shooter games but I see them operating as a direct extension of his physical world, revealing the new public space of contemporary society." (Overweg 2015)

For Overweg, photography as such in virtual and real sites is identical, although with distinct possibilities.

By not removing but adding new gameplay features, Kent Sheely, a New York-based media artist, makes the heterotopia visible in a different fashion. In an early project, DoD[37] (2009–2012),[38] he uses the first-person shooter as a simulation for a war photographer. He draws off all weapons and armor of the avatar and equips him with a camera—he replaces the button to fire a gun with a shutter release for a screenshot of the digital war.

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37 *Day of Defeat: Source* (2003) is an officially released mod of the title *Half-Life* (1998) from the developer studio Valve.

38 Kent Sheely (2009–2012): *DoD* (http://www.kentsheely.com/dod).

Figure 5.1: Robert Overweg: *The facade* (half-life 2) (www.shotbyrobert.com)

Figure 5.2: Robert Overweg: *Glitch-Hug* (Left 4 dead 2) (www.shotbyrobert.com)

> "A lot of multiplayer games are similar in structure, allowing players to choose from a selection of *classes* that focus on different styles of play, but all of these classes are meant to be combat roles; I wondered what would happen if I could subvert this *class* system, and take on a new role (that of a photojournalist) in a live online game, playing war in a new way and breaking the rules a little bit." (Kent Sheely after Jansson 2011)

Sheely transforms the game into a simulation, where the goal is to shoot pictures of the war of other online players, while they experience the gameworld in the way the developer designed it to be—as soldiers. Herein, he addresses the ambiguousness between the real world and the gameworld.

From his further involvement with war photography, particularly with Robert Capa's (1913–1954) photography of the invasion of the Normandy in the Second World War, he developed *World War II Redux* (2009)[39] (Fig. 5.3).

> "In World War II Redux, by deconstructing well-known historical photographs and reenacting them within the confines of the video game technology, my intent was to highlight the loss of meaning that occurs between real historic events and the interpretations of those events we experience through simulation." (After Jansson 2011)

The scene in which the video game takes place—namely the combat between the allies and the axis powers—represents a real event. With this work, Sheely wants to show this parallel and concurrently ambiguity, which shows the heterotopic character of this gameworld and its function for our society.

These are only a few examples of how in-game photographers are searching for ways to make the complex construct of pictures in video games visible—between gameworld, game space, the real world, and

39 Kent Sheely (2009): *World War II Redux* (http://www.kentsheely.com/world-war-ii-redux).

Figure 5.3: Kent Sheely: *World War Redux* (2009) (www.kentsheely.com/world-war-ii-redux)

the user system. The fieldwork methods of visual artists cannot be transferred to anthropological soundscape fieldwork one-to-one. But they give a sense of how the manifold nature of video game sites can be explored and portrayed and make the character of the cultural substance, wherein this research in hand understands its content, comprehensible, as further explained in Section 5.1.3.

5.1.2 Literary Anthropology

In the 1990s, the German literary scholar Wolfgang Iser revived the term *literary anthropology* from the anthropological turn in the 18th century. He considers it a method belonging to a subfield of cultural anthropology, rather than a part of literary studies, which might be of interest for this book, since video games are understood as texts but not literature as such.

While Aarseth notes the work of Iser on the phenomenological description of the reading experience as influential for his own concept of cybertext,[40] Iser's later understanding of literary anthropology (Iser 1993) takes a much broader point of view in regard to fictional texts as not limited to a certain form of literature media, but all media that present fictional worlds. Based on his reflections on the reading process (Iser 1972), his goal is to analyze fiction itself and why it seems to be a fundamental human need in his understanding.

Instead of opposing fiction to reality as in traditional models, he is proposing a triad consisting of the fictive, the imaginary and the real. The mere duality between fictional text and the empirical reality would "shorten the discussion about the fictive in a text on his crucial dimension; obviously, there is a lot of reality in a fictional text that not only has to be an identifiable social reality, but also possible as a reality of feelings and sensations." (Iser 1993: 19).[41]

40 Cf. Aarseth 1997: 76, 82–83 and 111.

41 Original German text: "[…] würde die Diskussion des Fiktiven im Text um seine entscheidende Dimension verkürzen; denn offensichtlich gibt es im fiktionalen Text

The imaginary represents the "diffuse, formless, un-fixed and not object referenced" (ibid.: 21)[42] world of imagination, which is featureless and inactive potential, whereas the real stands for the empirical world we live in, including the experiencing of that world. The fictive mediates between and connects the imaginary and the real. It takes something real and transcends it towards the imagination—the fictive causes the real to become unreal and the diffuse imaginary to become real.

Further, this leads to the fictional pact: a reader of a literary text identifies him- or herself with a literary character which is projected into a fictional world, allowing him or her to experience an alternate way of living while having his or her own way of living in his or her mind—"we are both ourselves and someone else" (Iser 1989: 244), that is, doubly real:

> "In other words, literary fictions reveal themself as something constructed and staged. And by way of their fictionality signals, literary fictions establish a communicative situation between text and reader which we call the fictional pact. The fictional pact invites readers to suspend their natural judgements of statements about the real world. Thus, we can on one level believe that we read is real while knowing, on another level, that we are dealing *only* with fiction." (Schweighauser 2009: 121)

In his essay, "Doubly real. Game Studies and Literary Anthropology" (2009), Philipp Schweighauser, professor of North American and General Literature (University of Basel), points out seven major contributions of Iser's work that can be applied to game studies, implementing Iser's reflection on the active role of the reader in the reading process and on fictional worlds.

While these insights are undoubtedly very beneficial on a theoretical level in terms of what literary anthropology can offer to game

sehr viel Realität, die nicht nur eine solche identifizierbarer sozialer Wirklichkeit sein muss, sondern ebenso eine solche der Gefühle und Empfindungen sein kann."

42 Original German text: "[…] diffus, formlos, unfixiert und ohne Objektreferenz."

studies, for this research they just endorse the theories and methods already presented above, which are better suited and offer more concrete support for the approach on this specific topic. But as a new perspective to Aarseth's cybertext and Juul's game model, the fictional pact may be a helpful phrasing of the relation of the user to the gameworld and system.

5.1.3 Fieldwork

> "I accidentally stole a car today. It was a bizarre experience – I was just trying to ride this BMX bike I found on the street, which had a lot of play in the steering and kept landing me in bustling city traffic. I fell off the bike and was trying to get back on when I found myself pulling a driver out of his SUV and driving away, with the radio blaring 'I Know You Got Soul' (the Bobby Byrd song, not Eric B. & Rakim). Maybe I have more road rage than I thought—it seemed like the easiest thing in the world to toss this guy onto the pavement and get behind the wheel." (Miller 2008)

Kiri Miller, Professor of American Studies and Music at Brown University, is using this tale from the field in *Grand Theft Auto: San Andreas* (2004) as an introduction for her argumentation for an ethnography in single-player gameworlds *The Accidental Carjack* (2008). It shows a situation that many players who had a chance to play this game are familiar with: "that shock of surprise and pleasure when an avatar does something the player at the controls did not quite have in mind." While most of her lines of reasoning are coherent with the study of this book, her introduction shows one essential difference in the fieldwork: the exclusion of the game space and the player, or, in other words, the missing conscious view of the fictional pact (Iser 1989: 244) within the field.

Her discourse about the potential of a single-player gameworld for ethnographic fieldwork can largely be skipped with the notion that

gameworlds are made for the experience of playing games as stated above extensively in the sense of a cybertext and heterotopia. Nevertheless, some of her assumptions are also important for the following cultural anthropology study.

She starts off with the relation between gameworlds, tourist sites and fieldwork sites. Ethnographer and tourists often face the question of the authenticity of experiences in the field. Martin Stokes (King Edward Professor of Music, King's College London) describes this as the "semiotic anxiety" (Stokes 1999: 143), "the perpetual nagging question of *is it real or is it just a show*?" (Stokes after Miller 2008). The good thing with gameworlds is, the player does not have to be concerned with the question of whether anything he or she is experiencing is authentic or a show: everything is a show just as everything is authentic—the show is authentic. There is an intimate and individual ownership of the gameworld by the player in a single-player video game: ethnographers can explore the complete detailed field with touristic anonymity, "never subjecting themselves to other players' judgements about their behavior, skills, or appearance" (ibid.). They can even experiment with different behaviors that could be considered antisocial or hostile in different settings to see how the gameworld around them reacts without having serious consequences for further investigations.

There are some similarities between ethnographic fieldwork and playing games, like the acknowledgement of subjectivity by the ethnographer as the central organizing principle of the field or special field technologies to master (how to control the avatar, interpret city maps, etc.). However, the trickiest question for an ethnographic fieldwork in a single-player video game is how to locate actual ethnographic subjects or informants. For this issue, Miller suggests three different approaches:

For the first approach, interestingly enough, she breaks the fourth wall[43] and takes other players as subjects. Since her case study, *Grand*

43 The metaphor of the fourth wall describes the distinction between the space of the stage and space of the audience (Wulff 2012).

Theft Auto: San Andreas, is an open-world single-player video game, she needs to find her subjects on platforms other than the game itself, such as on fan sites, in discussion forums or any other virtual or real space where players talk about their experience in the specific gameworld.

The same method applies to the second approach she mentions, but instead of other participants experiencing the same gameworld, the creators of these sites serve as subjects, where "[t]he in-game characters are vehicles for their real voices and physical gestures." This "requires the ethnographer to cycle between in-game fieldwork and in-real-life efforts to communicate with the game designers" (Miller 2008).

As a third way, Miller describes the possibility of treating gameworlds as real sites with actual human inhabitants. She characterizes this approach as strictly local and attributes the ethnographer with a "god's-eye view of their cultural system", comparing it to "early fieldwork narratives" which describe a "primitive society frozen in an era distant from our own, accessible only to this lone intrepid ethnographer" (ibid.).

The forthright truth for the following study is: there are no direct single human ethnographic subjects in the traditional form—except for the researcher. This may be seen as a major critique of this book, but with the theoretical and methodological substructure synthesized up to here, this is an intentional decision and necessary implication of the nature of the field.

The subject of this anthropological study on music and sounds is the mere ethnographic structure of gameworlds and spaces with the focus on their soundscapes and interaction with the user, which will be also referred to as the *constant conversation* in Section 8. As has been shown, heterotopias (as video games are characterized in this book) and play sites as seen in the sense of Huizinga (Section 5.1.1) are in relation to all other sites, functioning as mirrors of the social world usually described as the real world and formed by the founding of society. In some way, they represent a crystallized form of our social world.

Indirectly, all three approaches Miller indicates to locate actual ethnographic subjects are applied, but with the focus on the overall anthropological structure and its aural representation. While the exchange with other players may have a mostly unconscious influence on the researcher's perspective, the developer interviews are intended to collate actual findings in the field with initial concepts or intentions behind it.

So how does the fieldwork presented here differ to early structural anthropology as outlined by Claude Lévi-Strauss (Lévi-Strauss 1949), for example? Certainly, it could be argued that video game worlds and spaces (in the sense of cybertexts and heterotopias) are indeed plain structures—but that would not do justice to the interactive nature of the medium.

Also to call it a traditional autoethnography as defined by Walter Goldschmidt 1977, which is focused on the self, personal investments, interpretations and analyses (Goldschmidt 1977), would not be precise enough. Ethnographic participation and immersion in the field, which naturally involves "subjecting yourself," should be part of every modern anthropological fieldwork (cf. Emerson, Fretz, and Shaw 2011: 2–5) and is not the center of this study.

As stated in the first paragraph of Section 4, the question of this anthropological study in video games soundscapes lies on what a (specific) game does, and why and how it does it, rather than what a video game (or, in that sense, the gameworld and game space soundscape) is. This is crucial in regard to the question of the field and its subjects in the case study single-player video games. Going back to Aarseth's model *The Components of a Generalized, Role-Playing Cybertext* (Fig. 4.1), there are four functional layers of a role-playing cybertext, which all should be taken into account in this fieldwork.

While a structural anthropology in the traditional way would focus on the first layer (database, world rules, characters, objects, and world maps) and an autoethnography on the fourth layer (the user/self), this anthropological soundscape fieldwork spotlights the action between the user (fourth layer) and the information (first layer). That

is where sound plays the most important role, within the interaction between the user and the raw coded data. That is where the *why* and the *how* happen, where the *constant conversation* takes place.

These different approaches, including the perspective of this present study, can be demonstrated and mapped clearly on Juul's table representing his traditional game model (Table 5.1), based on the duality in video games introduced in Section 4.3:

	The game (The game as an artifact)	The player (The player and the game)	The world (The playing of the game and the rest of the world)
Rules	• The rules of the game • The state machine • The game tree	• Gameplay • Learning • The player repertoire	• Rule negotiations • Repertoire of skills the player brings • Social interaction • Winning and loosing • Consequence negotiations
Fiction	• Signs that project a fictional world	• The way the player actually imagines the fictional world	• Film conventions • Game conventions • World knowledge • Interpretation conventions

Table 5.1: Rules and fiction meet the game, the player, the world (Juul 2005a: 198)

A pure structuralistic analysis concentrates on the first column, the game as an artifact, and an autoethnography on the second one, with the subjected self, the player. The line between *the player* and *the world* can be seen as the line between the heterotopia and the real world, the magic circle, the threshold that has to be crossed or the fictional pact. As mentioned in the beginning of this chapter, most anthropological theories and methods to date are positioned in this last column and focus on user groups, performers and social groups behind the avatars

of a game, outside the gameworld and -space (e. g., Cooley, Meizel, and Syed 2008; Boellstorff et al. 2012; Harvey 2014).

The goal of this research is to map and analyze the soundscapes in the interactive triangle of the user (subjected self), the gameworld and the user system through an anthropological fieldwork. Once insights of this study are gathered, it is the intention to conclude and show possible implications on *the world*—the third column in Juul's game model. In the understanding of a heterotopia this would mean reconstructing the anthropological reality from the reflection of the mirror.[44] As in any other anthropological study, this last step has to be done very cautiously and marked clearly as such, since it includes the abstraction of the bubble of the field and the subjectivity of the player (the ethnographer in this case).

5.2 Reflexive Grounded Theory

This research is partly, but not explicitly, conducted in grounded theory (Glaser and Strauss 1980). In *Ethnography and Virtual Worlds. A Handbook of Method* (2012), Tom Boellstorff and colleagues dedicate a whole section to the "myth" that "ethnography is the same as grounded theory" (pp. 45–46). They conclude with the notion that "grounded theory can be used as an analytical approach in conjunction with ethnographic methods but is not in and of itself ethnography" (Boellstorff et al. 2012: 46). This is partly true: grounded theory is not the same as ethnography, but it is commonly used and termed an ethnographic method itself (e. g., Emerson, Fretz, and Shaw 2011: 172–173)—and as such it is considered in this book. Furthermore, in *Game Research Methods*, Nathan Hook, too, excludes grounded theory from ethnography, arguing that ethnographic research seeks to "produce descriptive accounts and descriptive theory; GT seeks

44 Here, a methodological parallel can be drawn to the approaches of the presented in-game photographers in Section 5.1.1, who explored this same triangle and its relation to the rest of the world.

to produce new explanatory or predictive theory" (Hook 2015: 313). However, this reasoning is not further explained or based on any assertions from other grounded theory authors in his article, but more a subjective intuition on the matter.

While the initial idea of grounded theory was to collect data without any theoretical background (if that is possible) and form new theories merely based inductively on these samples, contemporary approaches are more inductive and deductive, also termed "retroductive": "The process is like someone who is simultaneously creating and solving a puzzle" (Emerson, Fretz, and Shaw 2011: 173).

Crucial for this method is the simultaneity of data collection and data analysis. After an initial sampling in the field, the analysis of the data defines the next sampling, the theoretical sampling, gradually building up categories. In this process, data, coding, and analysis are constantly compared and theory and sampling formed and adjusted to the findings. "By making frequent comparisons across the data, the researcher can formulate, modify, and extend theoretical propositions so that they fit the data" (ibid.: 172). In this understanding, grounded theory is not about theories discovered purely out of data without any previous knowledge, but more about forming and adjusting theories and categories of data in the process—the research process evolves continuously and there is no obvious endpoint of the theory determinable.

In the case studies of this research, the first experiences are gathered on the *first day in the field* (Section 7.1) which affects where the focus on the soundwalks (Section 7.2) lies, and further, where the later fieldwork leads. Whether this process may be labeled justifiably as based on grounded theory or not does not matter for this research, as the reflection on the process is declared here.

5.3 Video Game Developer Interviews

Alongside all other qualitative methods mentioned above, it is essential to also include the production side of video game sounds and soundscapes, the video game sound/audio design. Although the study in itself is focused on the reception of video game spaces or heterotopias through sound and music and what realities they create for the player, the perspective of their designers should be taken into account too. It should be noted that the intentions, concepts, or ideas from the sound designer for the concrete soundscapes in-game are not to be confused with the reality that a video game is representing—which is created while playing—but rather as background knowledge and adding another perspective to the field. In fact, studying video game soundscapes allows the unique possibility of talking to their creators unlike most other soundscapes in the physical world.

The interviews that were conducted are oriented on the guided semi-structured interview applied in social research, in which questions are formulated so the interviewee can answer in an open form. In particular, qualitative in-depth interviews (Cote and Raz 2015; Boellstorff et al. 2012) are used as loose guidelines.

5.3.1 Selection and Recruitment

The first intention was naturally to talk to sound designers who were involved in the design of the case studies from this research. Since they are triple A productions from international companies, it was not an easy task to contact them, and it took quite some investigations to get to the correct e-mail addresses. Only two game sound designers answered my call, Anton Woldhek from Guerilla Games (*Horizon Zero Dawn*) who sadly cancelled because of personal circumstances and another person who chose to remain anonymous and be excluded from the final publication.

In my research I stumbled upon Bjørn Jacobsen, filed under the sound design team from *Assassin's Creed Valhalla*. Although it turned out he only listed the title because of some software consulting he did for the sound department, he agreed happily to the interview and had some very interesting and relevant insights to the topic in general. Through contacts to the Stray Fawn Studios from Zurich I could win the in-house sound designer Claudio Beck for an interview.

5.3.1.1 Bjørn Jacobsen

Bjørn Jacobsen replied instantly to my request for an interview and shared his thoughts and ideas willingly. He lives in Copenhagen (Denmark) and worked as a video game sound designer for several development studios before starting his own company, so he could focus on several projects at the same time instead of being pushed into methods by the industry which he did not agree with. He worked on big projects as *Cyberpunk 2077* (CD Project Red 2021) as well as on small indie games like *DARQ* (Unfold Games 2019).

Jacobsen started producing electronic music in the mid 1990s as a teenager and toured as a DJ and live performer. Through his interest in interactive media, he got into audio game design and after first experiences in the industry he graduated in audio design from Aarhus University in Denmark. In his master's thesis he developed the concept of informant diegesis (Section 4.1 and Section 4.3), in which he aims to combine his experience in the industry with the theoretical approach in audio design:

> "[O]ne of the things that I back then realized was that there were only theories for audiovisual media, discussing do you hear something? Do you see something? Are they combined and that's it? Nobody was ever discussing what if it's part of your response to the game. Because in motion pictures and movies you cannot talk to the movie but you

> can talk to the game. Like nobody was discussing if that was even a thing." (Jacobsen 2022)

Jacobsen runs his own YouTube channel where he shares his experience in, and his opinions on, the video game industry. He also offers mentorship programs.

He is very keen to build an active community with audio game developers as well as the interested public and to share open-source knowledge and exchange experience.

5.3.1.2 Claudio Beck

Claudio Beck also replied instantly to my request for an interview and was very interested in the topic. He, too, started out producing electronic music (drum'n'bass) and got into audio game design later through personal contacts in the gaming industry, namely the Zurich-based Stray Fawn Studios, which gained an international reputation through several indie video games like *Niche* (Stray Fawn Studios 2017) and *ReTimed* (Team Maniax 2019).

Unlike Jacobsen, he works mostly alone on music and sound, except for his current project Wandering Village (Stray Fawn Studios 2022) where he was given a trainee as support. Whereas he did not talk about the interactive character of game sounds as the other two (mainly because he produces sounds simply on demand of other game designers), he showed greater interest in pop culture's influence on games like anime and the specific recognition values through sounds. He also shared interesting thoughts on the abstraction of sounds and how to make them recognizable within a specific corporate sound design of a game.

5.4 Technical Equipment and Setting

All case study video games are played on a Sony PlayStation 4 Pro (PS4 Pro) console, which was released at the end of November 2016, three years after the original PlayStation 4 (PS4) came out. These games were enhanced for the pro version with better use of the upgraded CPU and GPU. The video material is recorded with the built-in function of the PlayStation itself.

The fieldwork is carried out in two different locations: in the gallery of my personal home and in a studio office located in an old Bernese industrial building, shared with two other people (Fig. 5.4). Although both locations are used in all stages, the latter is prioritized in the phase of detailed systematization of sounds.

At home, the picture of the console is displayed on a QLED (Quantum dot display) Samsung television set The Frame (2020) with a display size of 55 inches. The television supports a 4K resolution (a horizontal display resolution of approximately 4000 pixels) and HDR (high-dynamic-range imaging), which allows a broader range of luminosity. The audio signal is received through Beyerdynamic DT 770 Pro over-ear headphones with 250-ohm impedance and a frequency range from five to 35'000 hertz. The sitting position is roughly two meters away from the screen on a couch.

While this is definitely the more comfortable location for long sessions, it is also less suited for parallel in-depth research on-the-go with only a notebook for notes as field equipment and an overall less work-appealing environment. In winter, this is the preferred location, since it is cozy and warm, but in summer it gets a bit too warm from time to time. Also, its availability is limited, since it is an open gallery with my family living in the same apartment.

The setup in the office includes a curved Samsung 4K monitor with a screen diagonal of 32 inches (model: 32R59x) next to the working computer and a relatively large work desk, which can also be used as a standing desk. Here, audio is received through a Sony PS4 Platinum Wireless Headset (over-ear), optimized for the console,

Figure 5.4: Fieldwork setting at home and at the office

and supporting 3D audio (virtual 7.1 surround sound). The supported frequency range is unspecified. In both settings, the DualShock 4 Wireless-Controller provided with the console serves as the input device for the video games.

The ceiling is about seven meters high and ventilation pipes from the old textile manufactory for which the building was originally built are still installed and audibly running. Although it is theoretically a small co-working space, most of the time I have the room for myself. In contrast to the setting at home it gets rather cold in winter at the office but is more comfortable in summer.

While the setting may have an impact on the overall experience of a video game and should be taken into consideration as the threshold of the heterotopia (Foucault's fifth principle, 1986: 26), the experience of playing is astonishingly similar in both settings. The visual representation on screen is comparable quality-wise, even with the screen-size difference, which is relativized by the distance to the eyes; and the sound quality is on an identical level too. However, the imminent reflection of the occurrences in the case studies is influenced by the environment and should be noted where observed.

But not only is the influence of the setting observed, it is also consciously utilized: for the first explorations of the fields, as in the following section, I intentionally chose the setting at home, for a more relaxed and unbiased experience which is not yet to be too narrowly analyzed as would be the risk in a working environment. The last part of the study, on the other hand, is carried out at the office for a more analytical ambiance.

6 Contextualization of the Case Study Video Games

6.1 Selection

The case studies in this book are selected partly based on personal preferences, but with particular attention to the distinct settings and comparability in terms of the genre and sound design production.

In the preparation phase, the idea of this study was focused on video game sounds in cyberpunk settings. Due to the specific case of *Cyberpunk 2077* (CD Project 2020), which would have been one of the main subjects, but experienced a whole year of delay in release and even then was almost unplayable because of unresolved bugs, I started to rethink the whole concept. It was more the gameplay genre that I was in interested in rather than a specific setting of the fictional gameworld. Moreover, different gameworld settings provide a broader perspective and comparable insights into how information is transported through sounds.

The present case studies are situated in a post-apocalyptical tribal era (*Horizon Zero Dawn*), a *Star Wars* science-fiction environment (*Star Wars Jedi: Fallen Order*) and in the medieval period during the Viking expansions into the British Isles (*Assassin's Creed Valhalla*).

Previously, the selection also included a cineastic Marvel version of New York (*Marvel's Spider-Man: Miles Morales*), among other titles, but was eventually broken down into three settings by sorting out titles that were not suitable or were too different from the others.

Along with the setting and genre, which will be elucidated in the following section, the classification of the titles as a triple A production was another selection criterion. Since not only smaller produc-

tions often use sound as mere completion of the game experience[45] and bigger productions have the possibility of a senior game sound designer taking part in the whole game design, as Bjørn Jacobsen points out in several talks (e. g., Jacobsen 2018a), it only makes sense to ensure that the case studies are produced in full capability of how sound is used in video games.

6.2 Genre

The definition of the video game genre goes along with the first step of an analysis of the nature of a specific video game. Genres represent a summary of conventions and function as communication between developer, publisher, and player:

> "Genres mark a set of conventions, they function as a communication matrix between producer, distributer and recipient, in the case of video games i. a. between developer, publisher and player. Thus, genres represent specific expectations – an arcade-shooter promises fast and straightforward action whereas a turn-based strategy game demands less of a reaction rate from the player, but rather an extensive practice in a complex rule system."[46] (Beil 2013: 39)

45 Of course there are various exceptions from indie game productions that use sound in very creative ways, but to point these out and analyze these special cases would be another study.

46 Original German text: "Genres markieren ein Set von Konventionen, funktionieren als Kommunikationsmatrix zwischen Produzenten, Distribuenten und Rezipienten, im Fall von Computerspielen also u. a. zwischen Entwicklern, Publishern und Spielern. Genres stehen somit für bestimmte Erwartungshaltungen – ein Arcade-Shooter verspricht schnelle, unkomplizierte Action; ein rundenbasiertes Strategiespiel wird dem Spieler hingegen weniger Reaktionsgeschwindigkeit, aber die Einarbeitung in ein vielschichtiges Regelsystem abverlangen." The same phrasing is also used in *Game Studies und Genretheorie* (Beil 2015: 29).

To an outsider, the amount and complexity of video game genres may look overwhelming, but to the versed community of diverse players they can describe very concrete expectations. But as in every other media, like literature or film, genres can also be vague to a certain audience or there may be numerous overlapping genres and hybridizations of genres.

On one hand, classifications are indispensable in praxis, but on the other hand problematic in theory as there are no absolute dividing lines. While in literature and film studies the correlation between content and stylistic elements is mostly defining a genre, in video games it is their gameplay/game mechanics that is decisive.

Several authors still proclaim a strong scholarly deficit of a genre systematization despite the versed mundane practice in the game culture (cf. Rauscher 2018; Beil 2015; Beil 2013). Andreas Rauscher, visiting professor for media culture at the Albert-Ludwigs University in Freiburg, ascribes this to two extremes: "Either genres are understood as fixed entities with concrete expressions that require no further reflection after their initial definition, or, they are comprehended as so dynamic that their analysis becomes a lengthy Sisyphus-job" (Rauscher 2018: 343).[47]

Nonetheless, there is an ongoing scholarly debate on the typology of video game genres from an overwhelming systematization of 42 genres based on interactivity in *The Video Game Explosion* (Wolf 2008) to a rather vague reduction to four categories (action, adventure, strategy, and simulation games) in *Understanding Video Games* (Egenfeldt-Nielson, Tosca, and J. H. Smith 2008: 41 et seq.). Benjamin Beil,[48] who has been conducting this debate in the German-speaking field for a long time, proposes a systematization of genres based on

47 Original German text: "Entweder werden Genres als gegebene Einheiten mit festen Ausdrucksformen verstanden, die nach ihrer einmaligen Erfassung keiner weiteren Reflexion bedürfen, oder sie werden als derart dynamisch begriffen, dass ihre Analyse zur langwierigen Sisyphos-Arbeit gerät."

48 Benjamin Beil holds a professorship for Media Studies and Digital Culture at the Department of Media Culture and Theatre at the University of Cologne.

three classification criteria (Beil 2015 and Beil 2013: 39–46) which will also be applied here to describe the case studies in addition to their own classification, respectively the classification based on the player community.

The first and often most dominant criterion is the game mechanics or gameplay, which defines how the interactivity between player and game is designed. The second criterion defines its space and/or perspective. Through these two, the player gets a quite concrete idea what to expect from a game. Examples like first-person-shooter or side-scroller-jump'n'run (sometimes also referred to as platformer) are self-explanatory, although they may have certain historically-evolved aspects and conventions that are expected under that label.

The third criterion concerns the narration and style. This again can address multiple layers from the setting (e. g., fantasy, science-fiction) to stylistic features like horror, thriller or fun, to aesthetics (e. g., realistic, comic, retro-aesthetic) to name some examples.

Well-established genres are often a mixture of these criteria, however. Looking exemplarily at the different genre descriptions of developers, publishers, distributers,[49] and recipients (as examples Wikipedia and Fandom, a wiki fan platform created by fans for fans)[50] in Table 6.1, there are different and overlapping categorizations.

First, for all three games the term *action* appears at some point, which is primarily a classification of game mechanics that include a fast and well-coordinated interaction by the player. It can also be understood as a super genre with sub-genres like first-person shooters and third-person games (Apperley 2006: 15) which is also appropriate in these cases.

The term *adventure* suggests a more story-driven nature with a player character carrying out commands of the player and a gameplay focused on puzzle solving (Fernández-Vara 2014: 233). *Action-adven-*

49 All case studies*: Sony Playstation Store* n. d.

50 It should be noted that Wikipedia and Fandom are not understood as scientific sources, but in this context explicitly as sources created by groups of recipients and fans to express their opinions.

ture games are probably one of the biggest genres in modern gaming, they stand "par excellence for third-person video games in which the player must navigate a player-character through space, fight enemies, pick up objects, solve puzzles, and talk to other non-player characters" (Arsenault 2014: 229).

	Horizon Zero Dawn	*Star Wars Jedi*	*Assassin's Creed*
Developer	[n/s][51]	"A Story-driven 3rd person Action-Adventure" (*Respawn Entertainment. Games* n. d.)	"A mysterious and beautiful Open World set against the brutal backdrop of England's Dark Ages" (*Ubisoft Store. Assassin's Creed Valhalla* n. d.)
Publisher	"Action, Role Playing Game"[52]	"Third-Person Action-Adventure" (*EA. Star Wars Jedi: Fallen Order* n. d.)	(Publisher is the same as the developer)
PS Store	"Action, Role Playing Game"	"Action, Adventure"	"Role Playing Game"
Wikipedia	"Action Role-Playing Game played from a third-person view" (Wikipedia contributors n. d. (b))	"Action-Adventure video game" (Wikipedia contributors n. d. (c))	"Action Role-Playing video game/Open-World Action-Adventure game" (Wikipedia contributors n. d. (a))

51 Developer links directly to the publisher.

52 Publisher is Sony Entertainment, same as the distributer.

	Horizon Zero Dawn	*Star Wars Jedi*	*Assassin's Creed*
Fandom	"Open-world Action-Adventure Role-Playing video game" (Fandom contributors n. d.(b))	"Action/Adventure single- player-game" (Fandom contributors n. d. (c))	"Twelfth main installment in the Assassin's Creed series developed by Ubisoft/ Sandbox style Action-Adventure-Stealth video game" (Fandom contributors n. d.(a))

Table 6.1: Genre Description of the Case Studies

Therefore, media-historically evolved, this genre describes not only game mechanics, but to a certain extent also the second criterion of space and perspective. The third-person view in video games usually describes the visual perspective of the player in a three-dimensional space from a distance behind and slightly above the avatar.[53]

Not explicitly, but to a great extent, it also stands for at least partly open-world games, which means big parts of the gameworlds are accessible early on and the player is free to choose where to go in a non-linear way, and for single-player games, opposed to online multiplayer games. The term "sandbox style" used on Fandom for *Assassin's Creed* is another, yet broader description for open-world games.

Some of the genre descriptions include "role-playing game" (or RPG), which describes the kind of play in which we behave "as if": "as if we were someone else, somewhere else, in imaginary bodies,

53 There are other theoretical third-person perspective possibilities like a 2D platformer, but conventional ones are "over the shoulder, rear view, axonometric, top-down, and front view" (Sharp 2014: 112).

worlds, or identities" (Burn 2014: 241). Media-historically, this genre evolved from games that focus more on character-building and development, leveling them up and collecting items and armor to improve the character. It is very story driven, often with multiple free choices in narration that end in different outcomes. In modern gaming, role-playing and action-adventure are very overlapping genres, more frequently used synonymously.

So far, all three case studies can be described as third-person open-world action-adventures to address Beil's first two criteria. Further, their setting in a post-apocalyptical tribal era (*Horizon Zero Dawn*), a *Star Wars* science-fiction environment (*Star Wars Jedi*) and in the medieval period during the Viking expansions into the British Isles (*Assassin's Creed*), as noted in the section above, describe the third criterion. All three games can be categorized as science-fiction (latter in the broader story of someone from the future visiting the medieval age, or alternatively as historical).

The developer's description of *Assassin's Creed*: "A mysterious and beautiful Open World set against the brutal backdrop of England's Dark Ages" focuses on the setting, while the term *open-world* alone is often associated with action-adventure/RPG games and suggests certain gameplay characteristics. The most accurate description comes from the fan-curated platform Fandom: "Twelfth main installment in the *Assassin's Creed* series developed by Ubisoft." Since it is a long-running franchise, recipients know exactly what to expect from a new installment of the series, better than any genre description.

Finally, the term stealth game addresses the (not explicit) focus on stealth gameplay, where sound design is a vital aspect as the player seeks to hide and produce as little noise as possible to stay undetected. Also, stealth characteristics occur in all three case studies, but is most prominent in *Assassin's Creed*.

6.3 *Horizon Zero Dawn* (Guerilla Games 2017)

Synopsis

Although it is said many times in this book that video games are not linear stories and the player experiences his or her own adventure each time, there is a narration in each game that can be told in a certain way. The player in an open-world video game is like an explorer, searching for clues and explanations for the gameworld he finds him- or herself in and the main quests follow events which can be summarized. Like a scholar, the player is to a certain degree free, how detailed he or she is going to unwrap the constructed universe as well as in which order he or she discovers which sources, when and if he or she talks to specific NPCs, reads notes left behind in the gameworld and so on.

In *Horizon Zero Dawn*, the player finds him- or herself in a post-apocalyptical world where a massive disaster destroyed the structures of modern society, people live in small tribes and perform primitive rituals. Rusted remnants of cities are overgrown with plants, their former inhabitants and their cultural and scientific achievements and knowledge long forgotten and referred to as the "Old Ones."

People live in harmony with machines made of steel, which dominate the land. These machines behave much like animals made of flesh and blood, living in herds and populating nature. Hunting them provides the tribes with valuable materials, although they do not have a technical use for them as the Old Ones did. They live in different stages of pre-industrial societies. About twenty years before the events of the story, some corrupted machines started to act differently, more aggressively and destructively, and powerful new forms, constructed for war, appeared.

As an outcast by the Matriarchs from the Nora tribe, the protagonist Aloy learns to survive in this world and becomes a skilled hunter of machines, mentored by her adoptive father, Rost, also an outcast. As a child, she finds a small ancient device called Focus in the ruins of

the Old Ones which provides her with crucial information about the machines and the environment around her through an augmented reality interface only she can perceive.

Driven by the urge to find out who her mother was, she participates in the tribe's coming-of-age ceremony "the proving," where the winner is granted one free wish from the Matriarchs. As she wins the proving, the tribe is attacked by a group called the Eclipse. After being almost killed by the ambush, Rost sacrifices himself to save her, Aloy is granted the status of a Seeker, a member of the Nora tribe that is allowed to leave their territory without punishment, to find out more about the aggressors.

On her journey, she discovers the military faction targeted her because of her resemblance to the scientist leader Dr. Elisabet Sobeck who died a millennium ago. While freeing the world more and more from the rogue machines, recognizable by their red eyes and fog around them, and their breeding places (underground facilities called Cauldrons), she learns about the Old Ones and their downfall.

Guided by the mysterious voice which introduces itself as Sylens through her Focus, Aloy travels to the ruins of a company called Faro Automated Solutions, or FARO, and later to the ruins of the Zero Dawn Project Facility, where she uncovers the background story of the previous apocalypse:

The destruction of the Old World in the 21st century was caused by military war robots constructed by FARO. They lost control over their machine swarms after they were given the ability to replicate exponentially by consuming biomass as fuel, which is exactly what they did, with trees, plants, animals, and finally, humans. To answer this threat, Elisabet Sobeck created the project Horizon Zero Dawn, which should have stopped the war machines and started nature and human life anew. The restoration of earth was to be coordinated by GAIA, an artificial intelligence, after the initial extinction of humanity. The AI was programmed to deactivate the war machines and to clone human beings of saved DNA, teaching them about society, culture, and science of the Old World.

But in the end, GAIA was sabotaged by Theodore Faro, founder of the war industry company, because he wanted to hide his responsibility in destroying humanity, which led to the post-apocalyptical tribal era in the present. As a result, HADES, a GAIA subsystem, was activated to repeat the extinction of earth in the case that *Horizon Zero Dawn* failed to cause a clean restart for the project. Dr. Sobeck tried to stop HADES to reach GAIA and sacrificed herself which caused the AI to deactivate. As a last act in hope to save the world, Sobeck created a clone, Aloy, to finally destroy HADES.

Before HADES achieves a reactivation of all FARO machines and destroys all humankind for good, Aloy defeats the program with her newly gained knowledge with GAIA's Master Override and saves the world and society in its present state.

In the last scene, she travels to Dr. Sobeck's home, where her millennium old corpse is lying in an armor suit, surrounded by flowers, and closes her quest in finding her mother.

Gameplay and Interface

Some of the basic game mechanics are already described through the genre classification as an open-world third-person action-adventure as shown in Section 6.1: The player controls Aloy from a perspective behind and slightly above her, navigating her spatial movements with the left stick and panning the camera around her with the right stick. The other buttons are each linked to imminent actions like attacking, aiming arrows, healing, changing weapons or tools and generally interacting with the game space environment (see screenshot of the controller mapping Fig. 6.1).

The open-world contains snowy mountain regions as well as forests, jungles and deserts. By pressing the touchpad on the controller, the interface changes to the overview map of the regions the player already discovered with quest markers and other important locations marked. There are fire camps all around the map and activating them

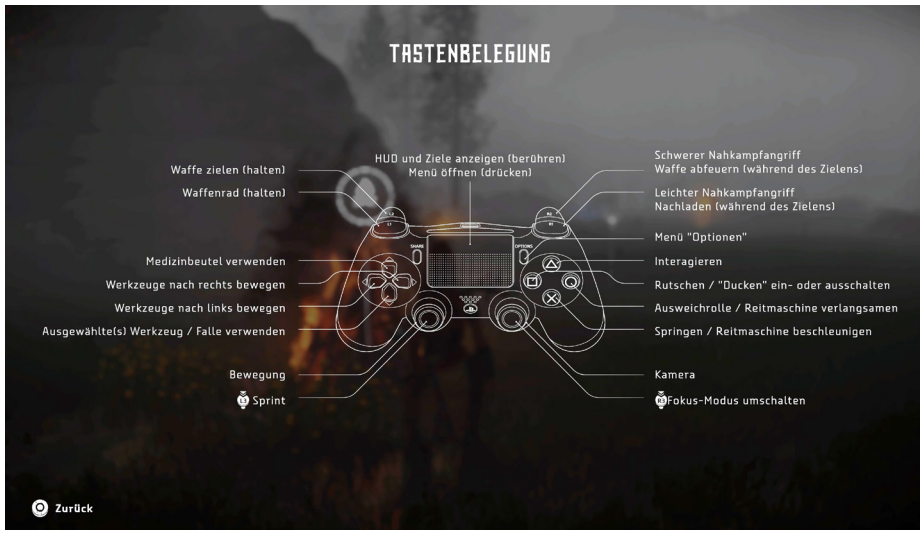

Figure 6.1: Button Mapping on Controller in *Horizon Zero Dawn*

allows the player to fast travel (travel within a click on a button from A to B).

There are several ways in which Aloy can fight enemies and machines, using a spear, traps, bombs, but most prominently by using a bow with various types of arrows. Stealth is a central tactic to approach enemies and there is a lot of tall grass to hide behind in the gameworld. With the Focus, a small device sitting over her left ear, she can activate an augmented reality interface which highlights important information about her environment as weaknesses of machines, their strengths and patrol routes, and notes left behind from people of the Old World.

Next to the main and side quests, there are numerous collectibles scattered all over the gameworld like Ancient Vessels, tribe figures and written or recorded messages from the Old Ones.

Completing quests, finding collectibles, and fighting enemies generates experience points (XP). In a level system based on the amount

of these points, Aloy increases her health and gains skill points which can be applied to special skill trees to boost her abilities. Arrows and traps can be manufactured by the player with the sufficient crafting level and improved armor and weaponry can be acquired from merchants or by completing certain quests.

Development

Horizon Zero Dawn was developed by the Dutch company Guerilla Games, located in Amsterdam, previously mostly known for their first-person shooter franchise, Killzone (2004). They started production right after the release of *Killzone 3* (2011). The development took seven years and had an estimated budget of 45 million euros, the biggest so far in the Dutch gaming industry (Kist 2017). Asking their team of 150 people to propose ideas, they ended up with the riskiest idea instead of another, safer shooter like *Killzone*, as their executive producer Angie Smets admits in an interview with *Venture Beats*:

> "It was amazing. We got about 40 ideas, I think, in total, over six or eight weeks. People would team up. A programmer would have a great idea and then get a concept artist to visualize it. […]
>
> Then, one of the concept artists said, 'Well, maybe we should go back to this fantasy of primitive man, tribal life. You're the underdog fighting against these amazing robots, so let's go back in time to when humankind wasn't the dominant species, the stone age, the dinosaurs. Maybe they should be more like dinosaurs.' I remember people saying, 'Oh, dinosaurs, that's a silly idea, sure.'" (Takahashi 2018)

But it was more than just robots and dinosaurs. The team at Guerilla Games studied societies around the world and dove into anthropology literature to gain insights into the cultural intertwinement of

nature and technology and how a matriarchal tribe might operate, as John Gonzalez, narrative director at Guerrilla, said in an interview:

> "It has this idea that one's geography is destiny, in a way. The material conditions in which a group of people are living really determine the technologies that they're going to develop. We tried to use some of that in imagining these groups." (Conditt 2017)

As game engine, the development team used the adapted in-house engine Decima[54] and recorded real actor performances through motion capture.

Music and Sound

Lucas Van Tol, who is music and sound supervisor at Guerilla Games, employed the classically trained percussion player Niels Van De Leest for all diegetic music, Joris de Man, who worked already for Guerilla Games, and the production duo The Flight for all compositions in the game. He proposed three pillars with a clear vision: machines, tribes, and nature (Flint 2017 and MCV, Stuff 2017). While nature music was representing "a beautiful place full of colour and space," which can be heard in the exploration music, machine music was to be dark and mostly fighting music with a "a hi-tech, metallic edge" (The Flight, Stuff 2017).

For the tribe music, Guerilla asked the composers explicitly not to pull its representation towards any known ethnicity, and not to use instruments in a traditional way, so they approached instruments in different ways like "cellos with plectrums and the back of the bow, bowed guitars and piano strings, that sort of thing" (Joris De Man, ibid.).

As an overall concept, they aimed "for a much smaller and more intimate sound, and a bit less polished, as opposed to the big block-

54 https://www.guerrilla-games.com/read/decima.

buster sound that some games go for, with focus on solo Instruments and 'found sound', rather than bigger ensembles" (ibid.).

For an average player it takes about 40 hours to complete the game and the composers were asked to compile about four hours of music material. With having a system of single parts of music that can be rearranged in different ways like single instruments playing depending on the current game state, they tried to avoid boring repetitions, as Joe Henson from The Flight explained:

> "On this game there's built-in silence so, for example, you might have a single 'cello playing for a while, then 30 seconds of silence before another stem is triggered. Maybe the 'cello will come back in with chords under it next time, then ebb away into silence again. It's a really subtle system. Lucas would take just the string section, flute, a pad or some percussion, and use those elements in different areas so that you get a hint of the main theme. You'll get the full theme at some point, but spacing it out that way means that there isn't much repetition." (Flint 2017)

To process the distinct variables that define which music is played, but also how the diegetic environment sounds, Guerilla Games used their own system called *Guerilla Dynamic Audio* (GuDA) to keep constant track of the game states like location and time of the day. Anton Woldhek, principal sound designer of *Horizon Zero Dawn*:

> "GuDA helps us collect as much information about the game and the player's actions as possible, while simultaneously allowing us to decide what that information means for the environmental effects, the reverb, the music, and finally, the mix." (Hughes 2018)

In sound design, they used different pillars for development: the robots, the narrative, and the environment. The team collected bird and other animal sounds from all around the world and assigned them for different game states. Depending on the location, the time

of day and the weather, the player hears different birds singing for example.

Sometimes, repetition of particular sounds was intentional. Collecting stones or plants Aloy can use as medicine, for example, produce only two distinct sound effect variations, which becomes very repetitive or even boring in the long run. As Lucas Van Tol explains, this was made on purpose, because "it also serves as a UI-sound, something we want the player to instantly recognize, so in this case we've just made sure that the sound is relatively unobtrusive" (ibid.).

6.4 *Star Wars Jedi: Fallen Order* (Respawn Entertainment 2019)

Synopsis

Out of the three case studies, *Star Wars Jedi: Fallen Order* is the most linear game in the way the narration unfolds for the player. The story starts with the ship breaking yard on the planet Bracca five years after Order 66, the Jedi purge in the events of *Star Wars: Episode III – Revenge of the Sith* (2005), where the former Jedi Padawan[55], Cal Kestis, hides while working as a scrapper of old spaceships from the Clone Wars.

Rescuing his working colleague and friend Prauf from an accident, Cal uses the Force to save him from falling into the depth. This incident alerts the Inquisitors, led by the Second and Ninth Sisters. After Prauf is killed by the Second Sister, Cal reveals himself as a Padawan by drawing his lightsaber. After a fast-paced escape on a cargo train, Cal ends up in a duel with the Sister but is rescued at the last moment by the former Jedi Knight, Cere Junda, and Captain Greez Dritus on the Stinger Mantis, their luxury yacht. Fleeing from Bracca, Cere unveils her ambitious plan to rebuild the Jedi Order with Cal's help.

55 A Padawan is an apprentice from the Jedi Order trained under a Jedi Knight or Master.

On Bogano, a green planet on the Outer Rim Territories that is not located on any Empire's map, Cal is to find access to an ancient temple. On his way he meets BD-1, a small droid who proves himself helpful in many ways and follows Cal for the rest of the journey. When they reach the vault, the droid plays back a hidden hologram record of Jedi Master Eno Cordova, who is also the former Master of Cere. He tells him about the ancient Force-wielding race, Zeffo, that built the temple. Before the execution of Order 66 he hid a Holocron in this vault, an information storage unit with a list of Force-sensitive Children on it. To be able to open the vault in order to get that list, which Cere believes to be the only way to rebuild the Jedi Order, they have to follow Cordova's path.

The first clue Cordova gives leads the team to the Zeffo's homeworld planet Zeffo that is now under Imperial control. The Imperial troops too, as Cal and BD-1 find out, searched for ancient Zeffo artifacts, but had to stop because of electro-magnetic winds on the planet. Reaching the tomb of Eilram, BD-1 unveils another record of Cordova, telling Cal to look on the Wookie planet Kashyyyk for further clues and contacting Wookie chieftain Tarfful[56] there.

Once on Kashyyyk, the team on the Mantis is drawn into the battle between the Empire and the local resistance; Tarfful ended up being captured in the conflict before they arrived. With new intel about the Empire's discovery of another Zeffo tomb, they return to Zeffo, postponing Tarfful's rescue for later.

Entering the tomb of Miktrull, Cal realizes he got caught in a trap by the Second Sister. As BD-1 saves Cal from the duel at the last moment, and the Second Sister reveals herself as Trilla Suduri, Cere's former Padawan. She tells him how she got captured by the Empire after Cere gave up her location under torture. Further, Cere had been using the Dark Force to escape after seeing Trilla being turned into the Dark Side. On his journey alone again, the discovery of the tomb

56 Tarfful had his first appearance in *Revenge of the Sith*, where he helped coordinate Yoda's escape after Order 66.

triggers BD-1 to show Cal yet another record of Cordova, instructing him to search for a device called Zeffo Astrium to finally access the vault of Bogano.

Before Cal reaches the Mantis again, though, he is captured by a bounty hunter and brought to a prison of the crime syndicate Haxion Brood. He finds out that because of Greez's huge gambling debts to the syndicate, he is to fight in an arena against aggressive monsters by himself. Again, in a last-minute rescue mission, Greez and Cere arrive with the Mantis in the arena and take him on board.

With the information from Tarfful hiding in the Shadowlands, the team travels back to Kashyyyk and finally meet him in person. He tells Cal how Cordova managed to climb the Wookie's sacred Origin Tree when he last visited the planet. On his way up, Cal is confronted by the Ninth Sister and is rescued by a mystical being called the Shyyyo Bird who takes him to the top of the tree. Here he learns from another recording shown by BD-1 that Cordova has found the ancient Zeffo Astrium in this place and that there is another one in the tomb of Kujet on the planet Dathomir, home of the Nightsisters.

Arriving on the planet, Cal and BD-1 meet a Nightsister, a Force Witch of Dathomir, called Merrin, who accuses the Jedis of the massacre of her people during the Clone Wars. She sends out the Nightbrothers to kill them, but eventually they make it to the tomb. Meditating in front of the sealed vault, Cal has a vision of his old Jedi Master Jaro Tapal who sacrificed himself to protect him from the Empire. He ends up fighting a Dark Ghost of his old Master and as a consequence breaks his lightsaber crystal.

Back on the Mantis, Cal expresses his remorse about his Master's death to Cere, who in return explains how she cut herself off the Force after seeing her Padawan turning into an Inquisitor and using the Dark Force herself. She encourages him to pursue their plan and brings him to the snow-covered planet Ilum, where the source of all kyber crystals lies, to build a new lightsaber. With Cere's hilt, Cal follows the young Jedi Padawan's tradition in the search of his own crystal on Ilum.

After his newfound crystal breaks into two pieces, he is tempted to give up the mission, when BD-1 reveals his final recording to him. This shows Cordova telling the little droid to find someone to truly trust to lead him to the Holocron. Cal pulls himself together and creates a two-sided lightsaber made of the two crystal pieces.

In front of the sealed vault on Dathomir again, Cal is once more confronted with the dark image of his Master, but this time he chooses to face his past with its truth and pain. This opens the door to the tomb and reveals the Zeffo Astrium, the final key to the Holocron. Here, he also convinces Merrin that it was the Sith and not the Jedi who caused the massacre on her planet and wins her to join their mission in rebuilding the Jedi Order.

But on Bogano, before restoring the Holocron from the vault, Cal has a vision that brings back the debate the team had on the Mantis, whether the discovery of list of Force-sensitive children is a threat to them or not. In this vision, Cal sees himself rebuilding the Jedi Order. But then he is found by the Empire and after they killed all the new Padawans he is turned to the Dark Side. The moment he awakens from the vision, the Second Sister Trilla who followed him appears, fights him, and finally escapes with the Holocron, but loses her lightsaber to Cal.

On the Mantis, Cal tells Cere about the events that happened. As a consequence, she reconnects with the Force and knights Cal to a true Jedi Knight with Trilla's lightsaber.

They follow Trilla to the Fortress Inquisitrorius, an underwater fortress on the moon Nur, where the Sith turn captured Jedis into Inquisitors. Cal and Cere manage to find Trilla with the Holocron and turn her down. Just as Trilla was to forgive Cere and turn from the Dark Side again, Darth Vader shows up for the final battle and kills Trilla. Unable to fight the most powerful Sith in the Galaxy, Cere and Cal destroy the underwater facility and use the chaos to escape.

Recalling his vision on Bogano on the Mantis, Cal realizes the danger into which the Holocron could bring the children and af-

ter some deliberation, he destroys it. Nonetheless, he asks the now slightly bigger crew where to go next to pursue the mission to rebuild the Jedi Order.

Gameplay and Interface

As in *Horizon Zero Dawn*, the player controls Cal in third-person view from behind, slightly above with the ability to pan the camera around him with the right stick. The buttons are assigned to different offensive and defensive actions and lightsaber skills as well as special Force skills that can be applied in battle and on the environment (see screenshot of the controller mapping Fig. 6.2).

The map (a three-dimensional hologram projected by BD-1) is accessible with the touch pad button. On the Mantis, Cal can control a panel that shows the different planets that can be visited in the course of progression.

Figure 6.2: Button Mapping on Controller in *Star Wars Jedi: Fallen Order*

With XP earned in battles and mission accomplishments, the player can fill skill trees. Certain Force skills are unlocked during the storyline, which allows Cal to find or open new pathways along the way. Saving the game and developing the skill tree is only possible in marked *Meditation Circles*, which refills his health bar but also causes enemies to respawn (appear again in the gameworld when they formerly were killed).

Unlike in the other two case studies, there is only one single main quest line and no side quests that can be followed. There are also no diverse pathways within that narration and therefore no selectable conversation options or different ways the story unfolds and ends for example. Collectibles that can be found hidden in the gameworld only affect the cosmetic appearance of Cal, BD-1, the lightsaber, and the Stinger Mantis.

Development

Star Wars Jedi: Fallen Order was developed by Respawn Entertainment, an American studio based in California. The development took five years. Respawn and especially their parent company, Electronic Arts, remain silent on the development costs.

The project started off as a non-*Star Wars* game, but eventually EA liked their demo and asked them how they feel about turning it into the *Star Wars* franchise (Hussain 2019). Lucasfilm and Disney who own the *Star Wars* franchise were critical about a core franchise Jedi story and the team behind *Fallen Order* had to win their trust in the canonical implementation of the story with all its details (Tach 2019).

The team of game designers was somewhat a game development supergroup coming from different companies and franchises as *God of War* (Santa Monica Studio 2005), *Batman* (Rocksteady Studios 2015), *BioShock* (2K Boston 2007), *Metal Gear Solid V* (Kojima Productions 2015), or *Uncharted* (Naughty Dog 2007), as game director Stig Asmussen explained: "To say we're a mashup

crew is an understatement. But everyone has a really high pedigree" (Strickland 2019).

Other than that, information about the development process is very scarcely spread since EA and Lucasfilm/Disney have strict communication regulations on not giving away unintended information about the production.

The game runs on the Unreal Engine 4. For the characters and cutscenes, Respawn recorded actors by motion capture.

Music and Sound

The score to *Star Wars Jedi: Fallen Order* was written by Stephen Barton and Gordy Haab and recorded at the Abbey Road Studios with the London Symphony Orchestra and the Bach Choir of London. There are several new melodies and leitmotifs specifically for game characters like Cal or the Second Sister, but also distinct orchestral pieces for the different planets accompanying the environmental narration through the game, woven into well-established and familiar *Star Wars* sounds and themes.

In the development process of the sound design they set three pillars to act as guidelines: gameplay feedback, unique character, and realism. Through Lucasfilm the team had full access to the original *Star Wars* sound library which they took as a starting point and modified them to fit the unique character of the game (Andersen 2020).

In the beginning of the production, the audio team did a lot of free-form experimental field recordings in nature but also on film sets, which they sorted later and used in completely different contexts, sometimes even played backwards (Andersen 2020). For the soundscape of the distinct planets, the audio team had very clear directions from the visual art and narration department.

For the unique vocal sounds of the small droid BD-1 the audio team contacted Ben Burtt who also created the sounds of R2-D2, the original lightsaber sound, the breathing of Darth Vader, but also the

voice of Disney's WALL-E (2008).[57] The audio designers at Respawn assigned these sounds and created BD-1's animations accordingly without Burtt ever revealing them how he created it (ibid.).

As audio middleware they used Wwise (Wave Works Interactive Sound Engine) to handle the implementation of sound into the Unreal Engine.

6.5 *Assassin's Creed Valhalla* (Ubisoft Montreal 2020)

Synopsis

The *Assassin's Creed* franchise created by Ubisoft tells the story of two secret societies, the Assassin Brotherhood and the Templar Order, and the ancient connection between a mystic and powerful species and humanity. This ancient advanced civilization called Isu inhabited earth before humans and were destroyed by a solar flare. Traces of individual Isu's can be found in all societies and religions as gods or other mystic beings.

Assassins seek peace through free will of humankind, the Templars through control. Sometimes, the narration takes inspiration in the Dark and Light Side of *Star Wars*, telling the story of Assassins like the story of the Jedis, but in the recent titles often criticizes the methods of the Brotherhood too. The franchise takes place in a fictional world which intertwines with the real-world history; the accuracy of it is a lively discussed debate among fans, critics, and scholars.

The plot of every title in the franchise plays along two timelines. The present (with some science fiction elements) forms the frame-

57 On a side note, Ben Burtt is also responsible for the term *Wilhelm scream* which he repeatedly used as a film student and finally found in the Warner Bros. sound library when he was working for *Star Wars*. From there on, he and his colleague Richard Anderson used it in several Hollywood productions and spread the Wilhelm scream, though they were not the first ones to reuse it (Stillich 2009).

work, where Assassins and Templars battle over the control of information and manipulation of media.

In 2020, Layla Hassan is studying the archaeological finds of a Viking raider grave in New England which seems to be somehow connected with the momentary change of Earth's magnetic fields that could threaten the planet. Layla is a former Templar who turned to the Assassin Brotherhood and has an expertise in the Animus, an apparatus invented by the Templars that can read the genetic memory of a subject and make it experienceable in virtual reality.

This is where the Viking story begins, as Hassan enters the memories of Eivor Varinsdottir. In 855 CE, she[58] witnesses the killing of her parents in a raid by the warlord Kjotve the Cruel and is rescued by the Raven clan. As an adult, now adopted by Styrbjorn, King of the clan, she seeks revenge but fails.

In her village, Sigurd, son of Styrbjorn, introduces her to members of the Hidden Ones (predecessors of the Brotherhood) who travelled to Norway to assassinate Kjotve, who apparently is a member of the Order of the Ancients (predecessors of the Templars). After their victory over Kjotve's clan with King Harold's help, he declares his intention to unite Norway under his rule. Sigurd, who hoped to inherit the Styrbjorn crown, and Eivor gather the loyal Raven clan to set sail to England to build their own kingdom.

Starting with a small town they name Ravensthorpe, they form alliances with other Viking and Saxon clans and kingdoms by interfering in their politics in battles, assassinations, and raids. Simultaneously, Eivor helps the Hidden Ones to find and eliminate members of the Order.

In a vision induced by an elixir by their clan's shaman, Eivor finds herself in Asgard in the role of Odin. In preparation of Ragnarök, he finds a mead that allows their souls to reincarnate and drinks it with

58 The storyline can be played as a female or male Eivor, due to a special DNA occurrence. It can be manually set during the game, or it can be set so the game system decides when it uses which gender. Although played in both genders, the summary here uses the female form.

the other Æsir but forbids Loki to take it. Back in 2020, stepping out of the Animus, Layla realizes this vision is actually a modified memory of the Isu before the Great Catastrophe, and that Loki secretly took the mead too, against the will of Odin.

Back in England, Sigurd, Eivor and Basim, a member of the Hidden Ones that travelled to Norway, find an ancient relict called the Saga Stone. As a surprise to everyone, Sigurd can read the hieroglyphics on it. In a series of events, he grows to believe himself a god and is captured by a woman called Fulke and King Aelfred of Wessex, both members of the Ancient Order who see him somehow connected to the Isu. By torturing him they render him disillusioned when he is finally rescued in Canterbury by Eivor and Basim in an epic battle with the help of all of Eivor's allies.

Returning to their clan, Sigurd is ungrateful and bitter and claims the torture awakened the god Tyr in him. His fate is to return to Norway to face his final battle. Although Eivor does not recognize the Sigurd she once knew, she agrees to accompany him. Following his vision, and with the help of the Saga Stone, they uncover an ancient Isu temple in the form of Yggdrasil, the tree of life in Asgard. After connecting themselves to the tree, they are transported to Valhalla. Sigurd seems to regain his joy in endless feasts and battles.

But after a while, Eivor realizes this Valhalla is only just an illusion and convinces Sigurd to escape. Outside the Animus-like tree-machine, they are confronted by Basim, who came to realize that it was not only Sigurd who reincarnated as Tyr, but also Eivor as Odin and himself as Loki. Seeking revenge for imprisoning his (god) son Fenrir, he attacks Eivor. Together, Sigurd and Eivor are able to trap him into the tree-machine. As a consequence of these events, Sigurd hands the leadership of the Raven clan to Eivor, who depending on the player's choice, takes Sigurd back to England or leaves him in Norway.

In 878 CE, Eivor joins her allies in the combat for Wessex. In the battle of Chippenham, the Vikings defeat King Alfred the Great and Eivor finds out that he is the Grand Master of the Order of the An-

cients. As such, he wanted to replace it with a God-fearing Knights Templar Orden. Eivor lets him escape.

Back in 2020, Layla tracks back the source of the magnetic field to the events in *Assassin's Creed III* (2012) that saved the world from a massive solar flare in 2012. To prevent a new catastrophe, she travels to the Isu temple in Norway and connects herself to the tree Animus. Once inside, she learns that Basim, who is still trapped, sent the Signal of Eivor's location to Layla in the first place. She can avoid the disaster but is unable to leave the simulation again. Meanwhile, Basim manages to escape the tree and contacts the present Brotherhood, where he enters the Animus in the hope of finding the location of his children.

Gameplay and Interface

Most of the basic game mechanics are again described by the third-person open-world action-adventure genre. Out of the three case studies, *Assassin's Cree*d is probably the least linear title in its narration in terms of different side quests or different strings of the main quest that can be followed in parallel or left out completely. Often, quests can be solved in a violent or in a diplomatic way, depending on the player's choice. Most of the open-world map is accessible right from the beginning and is only restricted by the difficulty and level of enemies.

There is a level system based on the XP the player collects from any kind of event in the game that increases the character's health and fighting power and allows him or her to invest in a finely branched skill tree. The player controls Eivor (see screenshot of the controller mapping Fig 6.3), who can be selected as female or male without affecting the storyline.

As in any *Assassin's Creed* title, there are numerous collectibles hidden through the whole map and Eivor can change his/her hairstyle and tattoos. Clothing affects different values like health or strength.

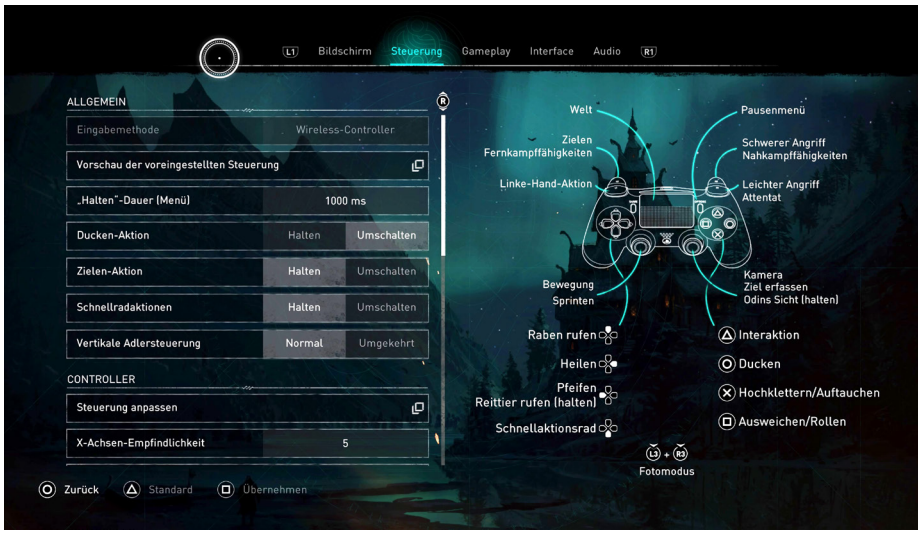

Figure 6.3: Button Mapping on Controller in *Assassin's Creed Valhalla*

There are many different types of weapons too. The player can choose in which hand Eivor wants to carry or even dual-wield it. All gear accessible to the player is unique and can only be found once in the game. Also typical for any *Assassin's Creed* game is the focus on stealth, moving silently, hiding in tall grass and attacking enemies unseen.

Eivor has a raven accompanying her almost everywhere. With *Odin's Sight*, she can switch to the view of the raven, getting an overview of the site and marking special locations like treasures or enemies.

In friendly settlements and towns, Eivor can interact in several ways with its inhabitants, like participating in drinking games, hunting or several traditional Viking games and activities like a special Viking dice game. The player can also participate in a traditional spoken-word contest called flyting, where contesters insult each other in creative ways in specific rhythms and rhymes, which happens in-game through a selection of three speech options to answer the opponent.

Development

Next to Ubisoft Montreal that took the lead in the development of *Assassin's Creed*: Valhalla, there were fourteen other Ubisoft studios worldwide involved in a two-and-a-half-year process (Phillips 2020) with an estimated 500-million-dollar budget (S. Smith 2021).

Before creating the massive map of the British 9th century of *Assassin's Creed*, level design director Philippe Bergeron and his team did six-months of research through reading books, looking for pictures online, watching documentaries and traveling around the area. Based on data taken from, modified, and rescaled from Google Earth, they crafted a first model in their own game engine Ubisoft Anvil with recreations of known Viking settlements and their terrain of that time (Kennedy 2021). To avoid clichés about the Dark Ages of the area, they took several trips to define the lightning style and other topographical details.

Although there seems to be very little evidence about Viking history in the 9th century compared to other settings of the franchise, Ubisoft's history advisor Thierry Noel had a whole team of experts, historians, archeologists, and linguists working on the details from recreating the Norse language to the culture and the spirit of the time. One pillar was to present Vikings culture apart from its stereotypes:

> "The global idea of the super barbarian brute, we wanted to challenge that and to show behind this. It was understandable from the point of view of a monk from the 9th Century, he definitely could not have had a good image of Vikings. But we wanted to show beyond that, that they were their own culture, with their own society; with dreams and logic." (Thierry Noel, Burrows 2022)

Since the development occurred during the COVID pandemic in 2020, the final year before completion was conducted fully in home-office, as Ubisoft states (Ubisoft 2022).

Music and Sound

In producing the sound and music, the audio design team's key message was "What does it sound like to be a Norse in a foreign land?" Alexandre Poirier, music designer at Ubisoft, explained:

> "We thought and researched very hard on what the native sounds were within Norway at the time, for example, the Old Norse language, the flora and fauna, the musical instruments used, etc. And in contrast, we blended this together with the Anglo-Saxon way of life through their own sounds and unique activities and how these two cultures came together to form the rise of England. The tone of the music in Valhalla set this dichotomy perfectly." (Poirier 2022)

This required lots of field trips and long local recording sessions in the Nordic nature.

The score was written by Sarah Schachner and Jesper Kyd, who both worked on the franchise before, and the Norwegian black metal and Nordic folk musician Einar Selvik. They used as many historical instruments as possible to set the mood, like the war horn carnyx, which only a few people in the world are able to play. But also modified effects and synthesizers are woven in to adapt to the science-fiction scenario of the game, as Schachner illustrates:

> "For my score, I blended Norse and Anglo-Saxon influences, combining period instruments [including bass and alto tagelharpa, a horsehead cello, a plucked lyre and various animal-hide drums] with modern synthesis to subtly reflect the fictional sci-fi angle of Assassin's Creed." (Sundstrom 2020)

Einar Selvik, who has been working on Nordic historical instruments and Nordic ethnomusicology for 20 years, added the more authentic folk feel. He sang the skaldic ship songs accompanied by a lyre when traveling on the long ship and did most of the drumming sessions.

But also Jesper Kid played most of his period instruments himself and sung the deep voices in the score.

As in *Star Wars Jedi: Fallen Order*, the audio design in *Assassin's Creed Valhalla* was conducted through Audiokinetic's middleware Wwise.

7 Fieldwork

7.1 First Day in the Field

My first steps in the field are carried out with as little previous knowledge about the games as possible. The order is determined by the actual chronology in which the fieldwork has taken place.

This is maybe the nearest attempt of a "pure" grounded theory methodology approach (Section 5.2). As will be shown, there are plenty of (pop) cultural references in the first few hours of the case studies that point to global cultural knowledge, other media or even history, which is questionable to ignore in favor of not having any concepts to draw to. In contrary, it will help to understand, simultaneously with data collection, proposed models like Foucault's heterotopia (Section 5.1.1), gradually building an understanding of the (sonic) nature of video game spaces. The impartial perspective on this first initial sampling helps to determine how the next steps, namely the soundwalks, are carried out and where the focus will be more clearly defined. It also provides the chance to observe details or characteristics that could easily be overlooked in more focused fieldwork later on.

7.1.1 *Assassin's Creed Valhalla*

It is 8 a. m., I just had my cup of coffee and prepare myself for my first trip to the field. Outside it is still dark and there is snow lying on the attic window of my gallery which dampens the sound outside. A

short check if my equipment is ready: a small notebook, a pen, my headphones, the controller, and a bottle of water. And of course, the television set and the PlayStation with the video game installed are ready to start. I have to admit it feels a bit bizarre to sit on the couch at this time of the day and play video games. Though it is not the first time I do on-hand studies on video games, with other games I was more familiar with, and it did not feel the same way – it did not feel like fieldwork. I am still not sure if it does just now.

Starting up the console, a thrill of anticipation becomes noticeable. First the black screen with the PlayStation logo comes up and a few seconds later the console user interface (UI) appears with a short friendly jingle. With the controller I navigate to the folder "PhD Case Studies" I created a while ago, producing a clear and simple "bleep!" with every jump, and press the X button on the controller on the icon with the *Assassin's Creed* logo formed from two Viking axes (Fig. 7.1). But instead of diving into my field, a message on a blue screen with a loading bar pops up: I need to update to the latest version of the game before I can start. I come to the conclusion that reaching the field is sometimes difficult, no matter if it is a "real" or a digital field. At least I do not have to hold out somewhere on the sea in the cold north and pay a bribe to some Viking boatsman to take me to my field or something of the sort.

Another cup of coffee and I begin anew, with success. Again, the anticipation is here, but I am a bit confused. The Viking-themed and animated Ubisoft logo comes up, with no sound, then the logo of the development engine in the same manner. It feels tense, without any sound, the earphones dampening the natural sonic environment around me, I only hear the movement of my head and my own breath. I check if my headphones are properly installed. They are. The statement coming up in white on black feels like a mantra in this void:

> "Inspired by historical events and characters, this work of fiction was designed, developed and produced by a multicultural team of various religious faiths and beliefs."

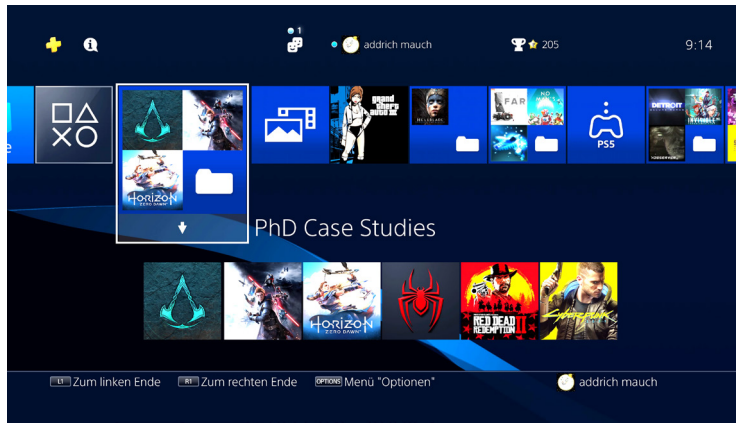

Figure 7.1: PlayStation 4 User Interface (System Software V. 8.03)

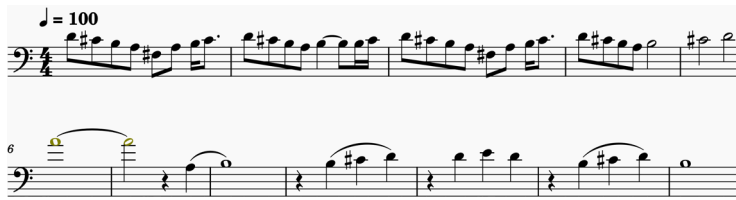

Figure 7.2: *Assassin's Creed Valhalla* Main Theme

After being instructed not to pull the power off the console while saving, the screen goes black for five seconds, just before the title screen comes up, introduced by a massive beat of a drum, something that sounds like the chant of monks and metallic chinks (Mauch 2023: Assassin's Creed 01 [01.15.2021]). I also hear ravens far away. Then, with another drumbeat and some synthesizers, the sound switches over to a mystic and yearning melody played by a cello (the first four bars of Figure 7.2 are repeated until the final setting, then the remaining eight bars are also included in the loop), sounding more like a talharpa than a classically played cello, with a massive reverb, accompanied by a crackling fire, from which sparks can be seen flying across the screen.

The setting of the atmosphere is grim and sombrous, at least in the beginning, yet the fire and the string melody make it feel warm and soothing at the same time. The sound of the drums and the sonic ambience will follow me for quite a while.

In this sonic environment I set the last adjustments like graphic settings, languages and so on. I tried to set English as spoken language, but of course another download is required for this, so I start with German for now. Every change produces a little metallic "clack" and confirming a whole menu triggers a massive bassy sonic explosion. Up to here the colors are all in cyan, varying from blue to green, and black, reflecting the northern light in the night sky in the background of the menu.

Following the final settings, I hope to finally jump into the world of the game, although already now, not even having set one foot into the gameworld, I am fully immersed in the game space and I am barely aware of the surrounding outside the screen, the headphones, and the controller in my hands. Now another, yet biggest sonic explosion occurs, visually something between the spares of a fire when watching the dark sky and the big bang. Fittingly, a female voice tells the story of Ymir and the creation of the world of the Norse mythology, all accompanied by mystic and emotional synthesizers, morphing into nature sounds of wind, dropping water, rustling wood and Viking war cries (Mauch 2023: Assassin's Creed 02 [01.15.2021]). Finally, out of the mist, the player's view moves into a Viking longhouse where a feast is in full play and the story begins with the player avatar still being a kid—the kid of a clan leader who is about to plead his honor to another king. The soundscape is dominated by the feast, musicians playing northern dance music, people shouting, laughing, and drinking. Visually, the colors black, blue, cyan, and red (of fires) characterize the events. I notice the music playing and its volume does not seem to match the musicians just in front of me. But otherwise, the sound is convincingly immersing me into the role of a kid in an overwhelming environment of adults celebrating.

Controlling the avatar, this introductory part of the game is shaped in a very passive manner with cutscene sequences and film alike orchestral background music embedded all through. A queue of tragic incidents follows, where my parents die in an upcoming attack of another Viking clan and fleeing alone, I am attacked by a mystic wolf (Mauch 2023: Assassin's Creed 03 [01.15.2021]).

The story makes a jump and I wake up as an adult, kneeling in front of the clan leader who killed my parents. After some more cinematic events, where I am able to free myself, accompanied by the main theme heard on the title screen, it seems as if my environment shows itself for the first time by daylight and in a clear manner. Again, the drums, overlaid with war cry, introduce a text on screen, but this time much more subtle: "Nordvege 872."

Orchestral strings are still playing in the background, but not as dominant, and Eivor says to herself—and in that moment rather to me who controls her as my avatar—that I have to save my crew who is in danger. This declaration triggers yet another war cry with drums, though on a higher pitch, which draws my attention to the fact that a new mission is starting (also displayed on screen). The HUD[59] now shows my health bar and a line representing a compass, showing me in which direction the mission goal lies and other interesting spots.

I have reached my field. The gameplay mechanics feel very familiar with the third-person action-adventure genre and with older entries of the *Assassin's Creed* franchise I am used to. But the environment, the gameworld and space is new, ready for me to be explored, the physical surrounding in my gallery nonexistent for the moment.

The soundscape suddenly appears naked and raw, supporting the sensation of a freezing and harsh landscape with a lot of snow, rocks,

59 The abbreviation HUD stands for *head-up display* and was initially used as a term for the digital display in the field of vision of combat aircraft pilots. In video games, the HUD describes all elements which belong to the user interface with information about the system and are not part of the gameworld. They are usually layered on top of the gameworld, mostly in the corner of the screen so as not to cover too much of the game's visual.

and cliffs. Every sound is intensely compressed, my footsteps in the snow and the nearby crows almost exaggeratedly loud. It makes me realize that the introduction is over, almost like waking up, and I am in the unforgiving, cold, and brutal Viking north. Supporting this perception, with the entering of a new area I explore, I hear the mix of a very deep sound of a carnyx played like a didgeridoo and synthesizers. I climb up the first mountain peak I see and hear my feet on loose rocks, my bare hands clapping on the cold stone, my clothes rustling as well as myself loudly exhaling with the effort. While sitting comfortably on my couch, I felt a hint of cold and cold air within me.

The top of that mountain is the first synchronization point I reach, giving me a bird's-eye view of the area and allowing me to fast travel back here anytime (coming here with a single click on a button rather than walking). Pressing the △ button to synchronize, again a massive drum with synthesized crow sounds confirms my action and the camera does an impressing pan with a view over the lands around me. The second theme of the main theme with high singing voices highlights the event.

Right after, jumping down in a little pond, Eivor reminds me through a little monologue ("It is freezing, I shouldn't stay too long in the water") that remaining in cold water could compromise my health bar. The loud and compressed water sounds and the sudden stop of the music make me feel vulnerable (Mauch 2023: Assassin's Creed 04 [01.15.2021]). But the way to my next goal is an almost peaceful walk in the snow, through some woods accompanied by soothing ambient synthesizers. I meet some wildlife and my first enemies, triggering Eivor to say: "I should not get caught here!" Also, my very first fight with a Viking of an enemy clan happens on this way, forcing me to arrange myself with the fighting mechanics.

I press the options button, which activates the menu. While it stops the time in the gameworld, sonically it is closely intertwined with it and the sounds resemble mostly the ones encountered at the very start. I play around with it for a moment before I resume into

the gameworld, without getting the feeling of being drawn out of the immersion.

Just before reaching the first village, Eivor hears some "Clash of iron" which indicate a fight nearby. And indeed, I find a member of my own clan fighting another and giving me hints for the liberation of my crew. I have to go into the longhouse of the village, where they are being held hostage. The next part serves as a tutorial for a lot of game mechanics, how to sneak near enemies and so on. My monologues, which give me hints on how the gameplay works, are underlined by a massive reverb now, possibly suggesting they are more like thoughts in my head than actually words spoken out loud.

Entering the huge longhouse, the background music changes and becomes more intense. I can hear the kidnapper and the hostages talking loud and clear. Only their and my own movements and synthesizers complete the soundscape with the echo of the huge longhouse for now. After a short cutscene, my first boss battle starts to free my crew with tutorials on fighting gameplay. Stressful talharpas are playing fast and make me feel nervous and aggressive. After a short break and freeing my men and women from the cages I run outside where a battle awaits me with people shouting, swearing, provoking and all kind of other fighting sounds. I flee the scene to my longboat to escape. The sounds of the combat itself disappear into the background only to make the battle music seem louder.

Once the boat is out in the water, the talharpas finish their last loop and the soundscape is defined through the rushing water, the cold wind of the sea and my boatsmen talking to, or rather, shouting at me. Then, the most overwhelming thing happens to me on that first day in the field. Overwhelming because it just comes over me although I control the action and it happens on my intention:

Still in the rush and heated up from the preceding battle, and in my perception driven from the impulsive fighting sounds and pushing talharpas, I approach a little island with an enemy outpost. Trying to remember how things came about, I do not know if this is part of

the story or just a coincidence, but once close enough, a text like an instruction shows up:

△ raid

(Mauch 2023: Assassin's Creed 05 [01.15.2021]).

One single pressed button later, I see myself blowing into a war horn and my crew cheered by the action. Drunken by my heated blood for a raid, I run into the outpost and do what Vikings do—or what it makes me feel in that moment—fighting and raiding. What starts as deep ambient background music becomes a mixture of a slow male choir and something I would identify as middle age heavy metal with war drums, later more like folkloristic Nordic sounds with a leading voice. I hear splatter sounds and screaming voices, both by aggressive and dying warriors.

Like coming back to mind, I find myself outside the settlement, the last syllable of the song fading away, a few splattering sounds and a loud "uuaghh" scream from the last enemy I was chasing. I am left with a short silence of background music, only with the pattering of the cold sea and my own footsteps in the snow.

Back in the boat, the conversation with my crew continues where it last stopped before the raid, backed by the peaceful sounds of the sea, making me feel like this is just a normal day in the life of a Viking.

I come home to my own village, warmly welcomed by my own people, now that the language package download is finished speaking in a northern English to me, which changes the set of tone a bit. People in the background are chatting in Norwegian from what I can tell, which always sounds a little cute and funny to me, especially in contrast to the harsh environment. Of course, this first day is far from over, but the sonic tone and my initial impressions of it are captured. In the later main course of the game, the geographical setting will change to the coast of the British Isles, with its own soundscapes of different regions, but not today.

The whole soundscape of the gameworld as well as the game space on that first day in the field create a very distinct impression of a Viking environment in the *Assassin's Creed* universe. Some sounds might be exaggerated, and the overall soundscape comes across too compressed sometimes in retroperspective, but for me, this emphasizes the setting of a credible invented Viking age, based on historical influences, converted into a modern video game.

After shutting down the television set and the console, I take a little walk outside in the snow, just to get some fresh air and real time comparison. While there are no Northern lights but streetlamps instead, I can really feel the cold air now. Footsteps in the snow feel *real* now, yet ironically, not as *credible* as the ones experienced from the couch in the gameworld of *Valhalla*.

7.1.2 *Star Wars Jedi: Fallen Order*

The real-world weather outside is unpleasant and rainy and telling me to stay inside—a cozy day on the couch with a cup of tea, immersing myself in a fictional world from a long time ago in a galaxy far, far away… Before putting my headphones on, I listen to the sound of the raindrops pattering on the gallery window, enjoying the comfort of the warmth of my environment. It is daybreak. Other than the rain it is quiet inside. The console is turned on, gently buzzing from the hardware, and reading the DVD. Everything is prepared. Happy with the setting, knowing all the updates are installed and the world ready to explore, I take one more sip of tea, clearly hearing the swallowing sound of my body, now that my ears are muted by the headphones, and press the button to start my next adventure. Then, the screen goes black.

From the first tone on, the first strings and blow on the English horns, it feels like meeting an old friend. It is a warm and nostalgic 1980s feeling. Pictures of me sitting in the living room of my childhood friend and watching *Star Wars* or *Indiana Jones* movies pop up

in my head, on very old tube televisions but still fully immersed merely in our imaginations. When the flutes start to play, the imagined—yet fully to be explored anew—universe is already filled with life and stories untold. The melancholic tone gives a feeling of familiarity and the incredible vastness and mesmerization of outer space at the same time. The shiny *Lucas Film Ltd* logo appears with glittering sounds and the rhythmic low end of the string section, followed by spacey synth sounds like a very compressed explosion which introduce the title of the game in the same letters that are imprinted in my cultural memory of the *Star Wars* franchise: *Star Wars Jedi: The Fallen Order* (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 00:00–00:35 min).

With the appearance of thin circles around the title logo, somewhat illustrating a star system with little dots being labelled in foreign letters, the synths are pitching higher, producing a spacey feeling before going silent again with the loading screen. The loading screen shows the same moving light circles around the symbol of the Jedi Order, two wings around a lightsaber, all gray on a black background.

A few moments later a very light click announces the screen with the user and privacy agreement with *EA* which I have to approve. A string orchestra starts to play in a very melancholic way, while I have to go through the initial settings for visuals and audio, all inputs confirmed with high pinched washed-out metal clicks with lots of reverb.

Arriving on the title screen, showing the Jedi Order symbol on the left with the menu "Start a new journey" and "Options" beneath it and something that looks like a huge, wrecked star destroyer in the background, the orchestra reaches a new height accompanied by damped timpani and horns. Going through the options menu to adjust my final settings, each interface input accompanied again with a very light, high-pitched click with sparkly textures, I am listening a little longer to the melody, now and then getting reduced to a few strings. After the final chord I wait a little longer to see if the orchestra plays again. But the only thing that remains is the humming of what I imagine it would sound on a spacecraft and wind blowing, so I decide to start the journey.

To confirm the start, I have to hold the x-button a little longer, which results in a longer click as building up an electric voltage. Followed by some whooshing sounds, I briefly see the main character sitting or meditating in front of a huge circle-like drawing on rocky ground in front of me. Then, with a massive sound like a mountain rock that breaks loose from a cliff, the screen goes completely white, then dark, and the sound diminishes to full silence (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 04:27 – 04:37 min).

After half a minute of a silent black loading screen, I notice myself wondering about the situation of myself waiting in a loop of nothingness and losing the immersion—and in that moment, a night blue sky with a moon becomes visible. Through a little bit of clouds, I can still see stars and rain. With the sound of raindrops, a flute starts playing, just before a massive spaceship slowly covers the whole screen, recalling the opening sequence of *Star Wars: Episode IV – A New Hope* (1977) for a moment, with a deep, overwhelming metallic noise. The orchestral strings start to play impressive characteristic Star Wars chords just to reveal a few seconds later that the starship hangs in huge ropes on a massive building site, with innumerable other shipwrecks on the ground. Three TIE fighters cross the screen with the typical almost screaming sound and disappear again. The orchestra reaches its climax with a loud horn section on a panoramic view of the site.

With the fading tones of the orchestra, a war drum beat sets in, and the camera follows a drone, unintelligibly talking or bleeping from time to time. On the surface of the planet, there are tentacles of a huge living creature visible, which is somehow integrated in the deconstruction site. The drums are just the introduction of a song with a deep, throaty singing voice which fills now the whole aural perception.[60] The camera flies into a room inside a massive rocket engine and shows a humanoid druid shaking hands with a reptile-like

60 The song being played is called *Sugaan Essena* by the Mongolian band The Hu (Lucasfilm Ltd. 2020).

alien. Only after this alien walks across the room to a young man welding something on the wall and tips on his ears, does it become obvious that the music was only on the headphones of this character. The boy, who turns out to be the main character of the game, Cal, turns around and takes off his headphones, the music coming from them now playing much more quietly, and the alien tells me (as I assume I will be playing this guy): "Listen, I really don't want to interrupt your rhythm, Cal, but the boss wants something from you." Then, he brings me over to the droid (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 05:08 – 06:12 min).

In a matter of seconds, I switched the aural perspective from a spectator led by an anonymous camera to Cal's perception back again to an outside observer while the visual stayed by the observer—but I did not feel any interruption in my immersion. On the contrary, it gave me a very first identification with Cal, before I even had a chance to interact in any way with the game.

While walking to the droid (still in a film sequence like cutscenes), the song diminishes completely and is substituted by the sounds of the wind, rain, and welding of someone working next to us. Again, a gentle melody of flutes is playing. "Here's the boss."

The droid, which seems to be our superior, tells us in a robotic voice about some sort of defect in a mechanism on a higher deck which has to be fixed manually. Since it is not an easy task, the guild will pay double. I conclude I earn my living as a freelance worker for some deconstruction guild.

After a small discussion, the alien runs ahead, his footsteps producing a deep bass beat sound, and calls to me, "This way!" The sound of gentle orchestral strings comes in. "I'm right behind you," I hear myself saying, and the camera moves into the typical third-person perspective behind my shoulders, making my whole body visible in the center of the screen (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 06:48 min). This is a subtle, but very clear hint that I am in control of Cal now.

I follow him up a metal ramp (the whole environment is made of metal plates, building site spotlights, cables and tools lying around),

producing wet footstep sounds and I can hear the textiles of my coat from the movements.

While jumping up a platform, somehow, I intuitively press the right button which has become a convention in third-person video games; Cal breathes noisily to the movement. I can see and hear other workers around the site working and talking in German and alien languages while I jump over to the next platform and up a ramp again. A few corners and platforms later, I reach a viewpoint to the site; my character moves automatically up in a mini-cutscene. Three TIE fighters cross the screen again screaming and in the same moment of a thunder strike, writing appears on the center left: "Bracca Shipbreaking Yard" (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 09:00 min).

Trumpets and uplifting string section underscore the setting. "Look at this, a Separatist ship, I haven't seen a Lucrehulk[61] in a long time." Cal answers in a sad tone of voice: "Yeah, in a long time …"—"The scrapping of it will bring a lot of money … Come on, let's go." A huge flying platform passes with loud engines above our heads, ending the scene and the melancholic strings section sets in with the clearly audible rain falling. I regain the control over Cal and follow the other guy.

Passing a narrow door, I hear other workers scream "Caution!" and the ladder behind the alien crashes, so I have to find a new path. The rainfall intensifies and I hear the rain differently depending how near I am to walls and nearby surfaces. While I run in circles trying to figure out that first puzzle, I wonder how much I already approached the field. Checking the real-world attic window to see if the weather outside still matches the in-game weather (it does), I cannot distinguish the sound of in-game rain to possible audible rain on the window, so I leave this question for now and just go with it.

Drums start to play, then the string orchestra joins again with tightening staccato notes. Finally, I see a big ascent like a water slide;

61 Lucrehulk-class Droid Control Ships were warships in the Trade Federation and Separatist Navy, seen *Star Wars: Episode I – The Phantom Menace*.

I jump on, producing an ice or water skating sound. At the end of it a droid awaits me and tells me I am not allowed to be here since I am not permitted garbage. A platform further, Cal counters: "Garbage…? But not permitted garbage."

Traversing the shipbreaking site, jumping, climbing, and squeezing myself through narrow paths which dampens the sound to a minimum only to hear my character's voice echoing from the metal walls, I hear and see other people working. Some of them seem to know me, others are just annoyed as I cross their way. Flying droids and rats catch my aural attention from time to time and the typical *Star Wars* trumpets accentuate the scene in about just the right moments. When I fall into the deep, a whooshy sound accompanies the blackout of the screen and I respawn a few meters behind, causing the orchestra not to interrupt, but only halt for a second (Mauch 2023: Star Wars Jedi 01 (02.19.2021): 12:52 min). Now and then the game system shows me some tutorial gameplay instructions, only on screen and without any sonic sign.

Finally, I reach the outer parts of the ship; other people working at the site tell each other to hurry up, because apparently the huge plane we are all on is about to be detached. After climbing on the outside of the wrack and manipulating the levers, I reach my companion and a cutscene starts to play where we find a Jedi Starfighter, "a real scrapping jackpot," as he says. In the following conversation he tells me he thinks not all Jedi were traitors. He wants me to get out of that pit hole planet with the finder's fee of the Starfighter and not ending up the way he did. Then, steel ropes holding the wing we are standing on rip apart and interrupt the scene violently.

The camera turns behind my back telling me I am again in control and can navigate while slipping down the plane, just to turn over in the next cutscene of the two of us hanging on the edge of it. After my companion falls down, emphasized by orchestral horns, a simple instruction on the screen appears to use the Force by pressing R1, which concludes with him landing on a flying platform. After we escape on a small flying transporter, he realizes that Cal is capable of using

the Force and therefore a fugitive (Mauch 2023: Star Wars Jedi 02 [02.19.2021]).[62]

Next scene I see the two characters sitting in a train on their way home, machine engines and other workers whose talking is softened behind the orchestral backing and our conversation. Cal decides to disappear for a while and closes his eyes for a moment, just to wake up in the same place, sounds even more muted and all other characters turned with their faces away from me and Prauf, my companion, gone. I follow him to the next wagon, the environment is getting darker and silently standing nameless workers disappear inconspicuously with a faint whooshing sound. Turning around I see the lights fading. The next wagon is completely empty, only Prauf at the end of it is moving to the next part of the train. My own metallic footsteps become dominant, and a bluish fog makes the place mystic. Noticing I cannot open the next door, I turn around and the scene has changed to the clean white inside of a spaceship, causing the orchestra to play a final deep chord and compressed timpani to underline the moment. Complete silence—except my own body movements, steps, and clothing rustling. Trying to reach the end of the tunnel, a very big alien manifests in front of me accompanied by dramatic orchestral strikes lifting me up by the Force and telling me: "My apprentice, listen to me very carefully: Only trust in the Force!" And with pompous final chords he slams me to the ground. I wake up again next to Prauf in the train—realizing this was a dream (Mauch 2023: Star Wars Jedi 03 [02.19.2021]: 00:00 – 03:30 min).

At this moment I ask myself for the first time if at any point I feel sure that I am in the field. I am definitely immersed in that specific *Star Wars* universe of *Fallen Order*, although not very familiar with the teenage character Cal, but in a mixed manner between a linear movie and an interactive story. For sure, I am more involved in this prologue than with the physical environment around me, so it com-

62 The events of the game happen in the aftermath of the Order 66 (*Star Wars: Episode III – Revenge of the Sith* [2005]), where Jedi Knights were persecuted and executed thorough the whole galaxy, after the Clone Wars.

pares more to the journey to my field—not yet there, but I left my desk and home with my mindset already in the field.

The train stops and the sound of the environment sounds very real and close again. The door opens, louder and in a more aggressive tone than before, and two stormtroopers appear: "Everyone get up! Prepare for identification!" We and all the other passengers are directed outside to stand in a row in the heavy rain, guarded by special Troopers wearing black, the scene lightened by cold spotlights in the night. A loud screaming TIE Inceptor approaches and two persons exit, one of them addressed as "sister two," with the orchestra playing heavy trumpet and drums parts to their entrance. The orchestral score accompanying everything in this world has become normal but still impresses. She tells us they are looking for a very special fugitive, a Jedi, and asks him to step forward, otherwise everybody will be killed. Her voice sounds slightly distorted through the black helmet.

Prauf walks to the sister and tries to explain the situation, trying to protect Cal and everybody else. Coldhearted, she kills him instantly with a two-sided lightsaber. After a very short moment of silence, Cal screams "Nooooo!" emphasized by high string notes and draws his own lightsaber. "FVISH!"—the sound of his lightsaber starting up for the first time and the two swords clashing a moment later feels like a revelation, a key moment that manifests the core essence of the game and the whole *Star Wars* franchise.

After a brief fight, Cal falls down a cliff, landing in a bypassing train in front of two stormtroopers, pointing their guns at him, asking how he got here. The camera pans behind him like a demand to take action. "Keep calm," Cal says. Then, an unobtrusive little text pops up in the right center with a faint high-pitched bling:

· □ · Attack with lightsaber

(Mauch 2023: Star Wars Jedi 03 [02.19.2021]: 06:42 min).

Pressing the □ button and hearing the lightsaber producing the "FVISH! Vrummmummmmm FVISH!" sound as an exact reaction to every input on the gamepad for the first time is astonishingly satisfying and feels like the first step in the actual field. Even more than hearing it the first time, this is it, the sensation I waited for: I am in control of one of the most iconic elements of the *Star Wars* franchise—the Force itself, personified in a lightsaber. Drawing the lightsaber and hearing it instantaneously react to me lifts me straightaway up to a new level of enjoyment of immersion.

What follows is a classic, very cinematic fast train chase, along, inside, and outside of the wagons, serving as a tutorial for the fighting and other gameplay mechanisms. I can hear the airflow and the heavy rain hammering on the train, the orchestra playing menacing stringendo with timpani and deep horns. Blocking incoming blaster bolts at the right moment causes them to be directed back to the firing stormtrooper and he instantly loses consciousness, all with the very satisfying sound effects of the lightsaber "vrummming" to the speed of movement and the blaster bolts being reflected. All of this combines in an almost overwhelming flow of a playable space opera.

Finally, in an apparently hopeless situation where Cal is targeted by deadly blasters of a hostile vessel, I am rescued by another spaceship. In the noise of electricity sparking around me, someone from the ship is shouting: "We want to help, we will get you as soon as it's possible!" With a loud blaster of their engine, the ship engages, chased by another small fighting vessel. To underline the new momentum of hope, the orchestra plays the leitmotif of Cal (Fig. 7.3) in a very uplifting and strong way, led by clear and loud horns (Mauch 2023: Star Wars Jedi 03 [02.19.2021]: 14:50 min).

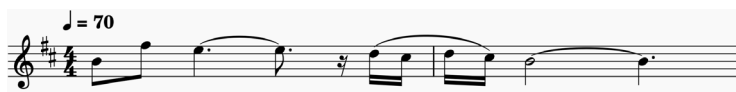

Figure 7.3: Cal Kestis' Theme

The theme sounds familiar and has already occurred several times before, but much more subtle in slight variations, as on the title screen or the moment Cal reached the viewpoint of the shipbreaking yard (Mauch 2023: Star Wars Jedi 01 [02.19.2021]: 09:00 min). Explosions, fighting noise and the rain are still very near, keeping me immersed, but the orchestra dominates the soundscape now, menacing and pushing forward. A few fights and wagons later, the whole train gets attacked by a bigger vessel and falls with me into the abyss in an impressive mixture of cutscenes and me controlling Cal in the downfall. Finally landing on a platform, the orchestra plays its ostentatious final chords, falling silent simultaneously to the sound of the Second Sister's TIE Inceptor landing in front of me.

The silence, broken only by the rainfall, is building up a vacuum.

A light long synthesizer sound sets in as the Second Sister comes flying to the ground, with another bassy blurry sound, followed by the lightsabers "FVISHing" up. After a small villain's speech, the very first boss fight starts, underlined by unsettling long and undissolved violin bows. All other sounds are almost muted under her voice, the sounds of the lightsabers and the violins, as if the scenery is telling me that it is impossible to win this fight, her asserting to me I am still just a Padawan.

Just as her health bar is down to three quarters, a dramatic cutscene follows where an unknown character with the spaceship seen earlier is rescuing me, the orchestra reaching its most intense climax up to now (Mauch 2023: Star Wars Jedi 03 [02.19.2021]: 19:30 min).

The ship jumps into hyperspace[63] and for the first time I feel like I can catch a breath, sit back on my sofa and watch the events on the screen like a movie. I am on the *Stinger Mantis*, and the two rescuers, Cere Junda (human) and Greeze Dritus (latero) are on a mission to rebuild the Jedi Order all on their own.

A while later we land on Bogano, a planet unknown to the Imperium, with friendly flute melodies playing in the background. Ap-

63 Hyperspace in the *Star Wars* universe is understood as an alternative dimension which is reached by traveling faster or at the speed of light.

parently, the key for reconstruction of the Jedi Order is in the cove of a high structure visible on the horizon, only accessible through the force, which is where Cal comes into the plan.

This is it—I am set out in the green, not running from something in an immediate reaction, in an (at least partial) open-world environment to discover on my own. This is finally my field.

The setting in the green grass, hearing birds whistle and happy music cheering me up in a lighthearted way makes me think of "Yoshi's Island" in *Super Mario World* (Nintendo 1990) or the "Green Hill Zone" in *Sonic the Hedgehog* (Sega 1991): A peaceful and natural region with sharp hills that are topped with lots of green vegetation and cute animal inhabitants as well as some minor natural enemies, but all not too dangerous with a low frustration difficulty level. The whole scenery is emphasized by lighthearted woodwind instruments playing along.

Yet there is one more "thing" to be unlocked before I am fully equipped for my definitive work in the field in *Fallen Order*: a small companion that I meet in these hills that follows and helps me through the rest of the adventure.

While jumping and climbing along the cliffs, I hear frogs and insects all over the place. Somewhere imprinted in the grass I see a shining circle like on the very first screens and Cal says to himself in a calm voice: "A place to meditate, I have to concentrate." I am not sure if he says it aloud or if I can hear his thoughts, but the instruction on screen tells me what to do:

· R3 · MEDITATE.

With a loud whooshing sound, Cal sits down in the middle of the circle, the woodwind instruments are slowly fading out and mystical space synths and humming are setting in. The environment around me disappears and is replaced by gray fog, the circles expanded to the horizon, filled with planet-like spheres and asteroids. In several tutorial windows I am informed that these meditation spots are safe spots

(to save the current game state) and interfaces for my skill tree, where I can apply skill points that I earn with certain actions to level up my abilities and overall character level. The reactive input sounds are the same as in other pause or setting menus like in the introduction.

After exiting the interface, i. e., finishing my meditation, and opening my eyes, the first thing I hear is the tweet of birds and the soft cheering background music. And suddenly, in a cutscene, Cal sees and hears something else, sounding only slightly different than the birds, but a little lower pitched. Call, who seems to understand the bleep-blop language of the little droid comparable to the iconic sounds of R2-D2 of the original *Star Wars* trilogies, identifies him as BD-1 and tells him about who he is looking for (Mauch 2023: Star Wars Jedi 04 [02.19.2021]: 05:20 min).

With little metallic clacking footsteps, the little droid, which is about 30–40 cm tall and consists of two feet and a big flat head with two camera-like eyes, runs ahead and hacks an interface which unlocks a bridge to lead my way. He not only turns out to be a very helpful little fellow who leads the way and gives me hints sometimes, he also provides me with some essential tools like holographic maps and new possibilities such as traversing long slopes or accessing new areas (Mauch 2023: Star Wars Jedi 04 [02.19.2021]: 10:15 min). From now on, BD-1 will be my steady companion who follows me wherever I go, running in front of me or just sitting on my shoulder, with his uplifting bleep-bloping sounds.

As for the first day in the field and in the quest to rebuild the Jedi Order, this day is far from over. But from here on, the gameplay basics and the overall feeling for the game and the gameworld are set. I reached my field, equipped with all tools, weapons and my little companion BD-1.

Just like I did after the first day of *Valhalla*, I turn down all my equipment after the complete session, take off my headphones, stay on the couch for a few moments to let all the impressions set in and then go outside for a little stroll to catch some fresh air and physical world sounds. It is weirdly strange how the weather of the last place I

visited in *Fallen Order* (the rocky and water-rich planet Zeffo) meets again the mood and atmosphere of the early evening outside, wet ground and slightly dark, just like after a cold and rainy day, last bits of snow sparsely spread on some corners under a gray sky. The constant orchestral accompaniment is missing, but I am reminded how in this physical world I can feel certain sounds like the wind and footsteps and experience them with overall more senses.

7.1.3 *Horizon Zero Dawn*

Another day for the digital field, and I am starting a little late this time. The sun is already up and the air outside the window promises a beautiful warm and sunny day. I can hear the birds singing and smell the late springtime. A little proud of myself—I prepared everything and checked for potential updates the day before—I put my cup of coffee on the sideboard, close the windows and sit down. The silent environment gets even quieter with my headphones on, I can almost feel a numb underwater pressure, rendering my slight tinnitus louder.

After the short and loud "beep!" produced by the console itself (not coming from the television audio but locally from the hardware) assures me it is turned on and starts gently humming outside the earphones, the white PlayStation logo on black background amplifies the silence, only to be interrupted by the startup jingle and the blue interface screen. With a few clean "bleeps" I navigate to Horizon *Zero Dawn* and press the x-button to start the game.

"Sony Interactive Entertainment presents"

Again, the clean and clear white writing on a black screen with no sound reinforces the numb feeling with a slight pressure on my head. Like emerging from the water with snowflakes showing up on the screen, a rocky forest landscape appears with the sound of wooden flutes and rhythmic chimes. This time the in-game weather does not

suit the outside weather at all, but besides the temperature being really warm, I hardly notice any lack of immersion for that reason.

A wooden door creaks and a big, bearded man with a gentle and warm look appears with a little baby in his arm. A longer prologue plays where I learn about this baby being an outcast, given to this man who has been an outcast for years. Despite the child having no mother, she will be given a name in the tradition of the tribe on this day. Accompanied by the developer names on screen cineastically, Rost (that is the name of the outcast man) walks through an impressive setting of ruined remains of what looks like our twenty-first century civilization and machines, overgrown by nature. The baby on his back, he talks to her, telling her about the Old Ones, how they turned away from the goddess. It feels like he is talking to me, though. He praises the creation of nature and beasts in the air, water, earth … and steel. On that headword he passes several enormous robot-creatures that look and behave like animals made of steel. It reminds me of *Jurassic Park* (1993), where they walk into the park the first time (especially the huge creatures, from which I can only see the massive legs remind me of the scene with the Brontosaurus). Not only visually, but also the roaring sounds they make are oriented in what Hollywood thinks dinosaurs sounded like, in combination with machine sounds which could originate from *Terminator* (1984) just as well—since I'm already using film comparisons. All the time a cinematic orchestra accompanies the scenery, sometimes gentle, sometimes ostentatious with energetic wordless voices.

Surprised to see an arch mother, matriarch of the tribe, on the top of the mountain to witness the baptism, he names the child Aloy by the sunrise on a ledge with a big tree on it. Right after, other arch mothers appear and question the right of an outcast to be named like a Nora, as the tribe members call themself. While the arch mothers argue, Rost promises Aloy to raise her and always be there for her.

The camera zooms out with Aloy babbling in a happy baby tone and melancholic cello playing accompanied by a higher string section. In the final picture, Rost sits on the ledge with Aloy in his arms, the

friendly arch mother in front, and a majestic view of the mountains in the light of the red sky. The wordless voice comes in to sing the first part of Aloy's (main) theme (Fig. 7.4) while the writing "Horizon" is silently formed like white chalk on the screen. Then, forming like a digital glitch, "Zero Dawn" appears underneath with a sound effect that sounds a bit like a skipping CD[64] with an organic tone to it (Mauch 2023: Horizon Zero Dawn 01 [05.14.2021]: 05:15 min).

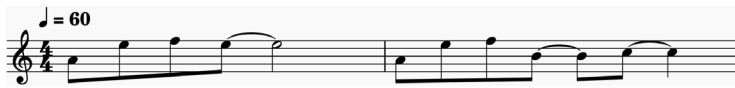

Figure 7.4: *Horizon Zero Dawn* Theme

The end of the prologue movie becomes the title screen, where I can choose between "New Game", "Load Game", "Options" and "Extras" on the left bottom of the screen, the sound reduced to a single flute now. I drink the rest of my now cold coffee and wait a little longer to see what happens. Still a little numb through the earphones I can hear my own swallowing rather through my bones than my ears. The snow keeps falling and the orchestra, voice and flute alternately keep playing the main theme. I feel a bit thrown back to the start and glance out the window to the blue sky, but with a reinforced motivation I dive into the adventure and new universe with its stories.

With the x-button I reach a new loading screen showing what looks like the inside of a cave with lots of totems and flags of the tribe in a cozy red light which seems to be coming from a campfire, but

64 The digital distortion and skipping sound of a CD, which is typically connoted with a computer glitch in movies like *The Matrix* (1999), was first used by the Japanese experimental music composer Yasunao Tone in the performance *Music for 2 CD Players* in New York 1986 (Tone 2003: 12). This technique was later used on his Album *Solo for Wounded CD* (1997) and had a strong influence on the music genre *glitch* as well as to the avant-garde music in the United States and later on popular culture in general.

not animated. The feeling of a big space created by the main theme crushes to silence and new music starts to play—it feels a bit like elevator music played through a cheap radio though. In the middle of the screen gameplay tips are shown, but they do not make much sense to me yet.

The adventure starts with another film sequence where I watch children gather blueberries and bring them to a woman in the early morning light. I can hear a creek nearby, the wind in the tall grass and trees and a gentle flute plays gently to an accompanying piano and orchestra, just as I imagine *Star Trek: The Next Generation* (1987–1994) would have accentuated an alien society that lives in harmony with nature. Aloy—I only assume it is her, she must be around six years old now—watches the scene from behind a bush and in the next scene, she walks up to the woman with some berries too. The woman turns around and the music stops. Menacing drums beat one time and a melancholic cello signals the change of mood when she gathers all children and tells them to avoid the outcast.

Aloy starts crying and in her anger runs away. She falls into a black pit and with the screen going dark, the forward-driving staccatos of the orchestra break off and are replaced by deep synthesizers and the silence of an underground cave with the dripping of water with a cave-like reverb and birds singing far away outside the pit. She calls for Rost: "Rost! Down here! Rost!" And then, the voice a little capitulated: "Rost! He can't hear me. [Pause] Is this kind of a cave?"

With the last sentence, the screen goes black once more, and when Aloy becomes visible again, I can hear a glitch sound like a CD skipping once—the text "New Main Quest: A Gift From the Past" appears in the top middle screen. The angle of the camera behind her shoulders tells me subtle but inviting to take control over the avatar, Aloy. Reinforcing the request to take action, on the left top a text tells me to go into the cave, its appearance accompanied by a deep synthetic beat of a kettledrum.

"Ugh, Rats!"

I do not see or hear any, but my childish footsteps in the cave puddle make me almost shiver a bit and give me the feeling of a cold and wet stone cave. Wet dew and the light reflecting off the water and again off the wet stone walls complete the impression. Going farther into the darkness, scared bats face me with flapping sounds, causing the screen to shake a little and although I am moving forward on my controller, they keep me back for a moment. Except for some water drops and my own footsteps silence takes over again.

Facing a wall of stalactites, Aloy says in her child-like and vulnerable voice: "Very narrow, but I can fit through." In that moment, with a little longer glitch sound, a text tells me:

Press □ to cower/stand up.

I walk through and reach a bigger hall with iron stairs and platforms. "This has to be a ruin of the steel world! One of the ancient sites…" Aloy tells herself, the echo sounds big, cold, and iron now. I go down the stairs that are overgrown with moss and violins start playing in a sinister way before falling silent again the next moment, my footsteps on stone and in the water making me feel even more lonely down here.

In the next room there is a huge pipe hole that looks a bit like a canalization and the violins start to play a major third lower. There are stalagmites standing in the way everywhere. "Rost says I am not allowed to come to these sites… But he's not here," she says in an almost witty tone.

The farther I go, the deeper the water gets and there are a lot of spooky very old installations standing around, even some screen monitors which were used as computers ages ago, I guess. No more music is audible, just water on cold stone and echoes, some rats squeaking from time to time. Again, a horde of bats flapping. Creepy noises I cannot identify. Fearless, Aloy spots something: "There's something ahead!"

"A corpse…!" she says, just a little bit scared, "there is something shiny!" In this moment, the mission instruction on the left side tells

me with the same glitch sound as before: "Examine the strange object." Another bigger text in the middle instructs me:

△ Examine the strange device.

The corpse lies in green grass with a few white and yellow flowers in a beam of sunlight coming from a hole in the ceiling, providing the scenery almost a holy atmosphere. The corpse looks mummified like gray stone.

Pressing the △ button, a brief cutscene starts with the orchestra underlining the moment, the sinister yet hopeful melody played by the cello taking the lead to this key moment (Mauch 2023: Horizon Zero Dawn 02 [05.14.2021]: 05:30 min). Birds from far away are now audible much more clearly, yet with massive reverb. Aloy takes the blinking device sitting on the ear of the corpse, and the moment she takes it away, a strumming on the strings of a piano resonates the event. The moment she brings it near her ear, a virtual blue circle appears around her ear and the device turns itself on with a sound of an electric and digital machine activating itself (Mauch 2023: Horizon Zero Dawn 02 [05.14.2021]: 05:55 min).

After first being scared away and fallen to the ground, she marvels at the second attempt: "Lights—everywhere!" A see-through violet sphere appears around her and old computers and interfaces in the room glow in tones of violet in a mixed-reality kind of way virtually on top of the physical environment around her. A reticle, also violet, appears in the middle of the screen to focus on special objects.

While the mission goal is updated to "Find an exit," with the now already familiar glitch sound, the instruction tells me:

Turn the focus on and off by pressing R1.

Turning it on and off produces a high-pitched clear "zip" sound. Some of the interfaces on old computer surfaces stay lit up in violet even

after I turn off the device. Turned on, the surrounding soundscape is pitched down slightly with a little bit of reverb.

After running around in circles for a bit, I find a yellow marker on a door with a virtual glowing red circle on it, standing out from all violet interfaces: "A metal door. Locked," Aloy says to herself, "Maybe I can get out with this device?" The reticle gets a green circle around it with a little monitor next to it which describes the bunker door in a very formal way: Power status: off—Emergency fire door. Reinforced.

Glitch sound—mission goal is updated to: "Use the device to scan the room."

With the scan of the device on I can see a tube connection in right angles from the door to another apparatus in the next room: "There is something, it is joined to the door." The yellow mission marker tells me the same. It is some kind of a holo lock I simply have to spin the right way to open the door. The lock and the door change color and I can exit, long horn and string tones confirm the success. Aloy: "Done!"

The next room is filled up in a more violet light and I can see some markers. Pointing at them activates them, some are mysterious messages from some sort of control room and reports, some audio, and some text only. The orchestra comes and goes from time to time with long, drawn-out sections and deep synthesizer parts.

Down the stairs in the next room, focusing on a similar device on a corpse, a hologram of a man appears. In a cutscene, he seems to be talking to his son on his birthday. Aloy starts to laugh and enjoys the warm birthday wishes of this long-dead father, not realizing the dramatic context. Some more audio diaries I find indicate that these people were aware of a catastrophe that meant their imminent death.

Finally, I hear some distant birds twittering again. Around the corner and I can hear Rost calling me. "Rost, down here! I'm coming! I'm coming!" Daylight and green plants lighten the scenery up and the birds are close now.

Some cutscenes later, where Rost was concerned about Aloy's safety and where he observed her playing with the new "toy," moving her

hands in the air controlling the interface (which he cannot see); he decides to teach her hunting, gathering, crafting, and surviving in the wild starting the next day.

I can almost smell the spring morning with the gentle light and the rushing of the creek. First, I learn how to gather herbs that can heal me. The birds sound different and are flapping nearby, the orchestra with strings and flutes playing gently in full spectrum again. The main quest now changes to "Lessons of the Wild" and instructs me to hide in the tall grass, as Rost tells me about the mechanic machines in a father-child teaching kind of way while I follow him.

After silently passing some small animalistic machines called Watchers, which produce metallic and hydraulic pump sounds with every footstep, I see a young Nora tribe member climbing and running through the rugged landscape across the valley. Jolly fiddles and flutes generate a lighthearted atmosphere. He smiles at us before being called home and me being reminded by Rost that we as outcasts have to ignore him.

"Come on now, let us look out for the herd. Follow me," he says, and a gentle flute melody accompanies the sound of the near creek as we walk down a small trail. He spots some Straiders, machine versions of draft horses (which I will later learn to ride on), and we follow them farther down into the valley.

As I am collecting stones to distract Watchers as I am told, the quest status changes from "Follow Rost" to "Collect stones 1/3" to "3/3" and then to "Follow Rost" again, each update produces a "zip" and "whoosh" sound (Mauch 2023: Horizon Zero Dawn 02 [05.14.2021]: 25:00 min). The short interval of the high-pitched sounds annoys me for a second, not only for taking me briefly out of the immersion, but because it almost hurts my ears. Shortly after Rost stops talking, I notice the volume of the constant playing flute turns up a little bit again and also the soundscape, my footsteps, the creek and the wind blowing become louder.

Around the corner I cower next to Rost, and he instructs me on how to distract a Watcher. The light is darker now in the shadow of

the mountains around the valley and deep and high drums start to beat so as to mark the start of the hunt. Moving my viewing angle towards the creek, the water gets louder. A few "bleeps" (the Watcher trying to communicate with others) and hydraulic and air burst sounds later, the Watcher is dead, if I can say that of a machine, and I approach to loot it—repeating "zips" and "whooshes" again. The drums stopping again indicate the fight is over.

A looting overlay interface opens on the right third of the screen while Aloy looks like she is working something on the dead machine, resulting in the right side of my headphones muffling the soundscape and producing other sounds I would expect from inside a workshop like screwing bolts or something, until I close that menu again (Mauch 2023: Horizon Zero Dawn 02 [05.14.2021]: 27:12 min).

Drum beats again—time for my first own kill of a Straider. As I activate my ear device and focus on the machine, environmental sounds become quieter and the machine sounds louder, but still very faint. As I fire two arrows, I can hear the same air bursting sounds and as it falls to the ground, blue electricity bursts can be seen and heard, indicating its death.

Just as Rost calls it a day, we hear screams far away: "The boy on the warrior's path!" Aloy shouts and runs ahead. Fast-paced, high-pitched drums mix with the water sounds as we cross the river, and more drums join in the deeper we go into the valley. They are suddenly replaced by deep drumbeats as the cutscene starts. It shows the boy from before, Teb, hanging from a cliff and falling down in the middle of a Straider herd, a deep synthesizer and a war horn add tension to the mood.

Rost fears the boy is lost and we cannot help, but Aloy believes she can save him, because her device can predict the routine walk lines of the machine by little blue/violet arrow lines on the ground. Of course, Rost does not believe her, so she jumps ahead into the tall grass to reach Teb. It is only in this cutscene I realize that daylight turned into sunset light, and I wonder how fast time passes in-game. Maybe it was not morning when the hunt training started thirteen minutes ago?

Right after the cutscene switched to the accustomed third-person view, the intensified drumbeats stop just to start in a more tempered way led by deep and melodic synthesizers, and gongs, the beginning sounds very much like a children's music box (Mauch 2023: Horizon Zero Dawn 02 [05.14.2021]: 31:47 min).

"I have to move silently and slow so I can avoid the Watchers," Aloy tells herself. By pressing R1 I can mark the moving lines on the floor, the loud electric blip and hydraulic sounds of the Watcher just in front of me drown the zip sounds of the instructions. While standing still they almost sound like frogs in their mating season with a metallic tone to it. The soundscape with the synthesizers sounds is very tense, the only environmental sound I can hear is the water flowing down the creek. I feel lost between the individual tall grass fields and the Watchers, but I follow the yellow quest marker. After I found it, we start the way back, the drumbeats are fully electric now.

Following the rescue, Aloy is again confronted with the meaning of being an outcast in a longer cutscene, cinematically accompanied by the dramatic orchestra. She wants to know why she is an outcast, why she is motherless. The only way to find that out according to Rost is to win the Proving, a tournament of the Nora tribe that tests the adolescents' capability of being a tribe warrior. Even as an outcast she could become a member of the tribe again and the winner is granted the chance to ask anything of the Matriarchs.

In a *Rocky*-like (1976) montage, Aloy trains hard running on trails, hunting, jumping, climbing with Rost's help until she lands on her feet in a new cut as a grown-up woman, and in that moment, the orchestra climaxes with the main theme (Fig. 7.4). The screen goes black and Aloy opens the same door as Rost did in the very first scene of the game and it is winter again, snowing.

For the first time I walk around as adult Aloy and as far as I know I have learned all basic game mechanics thanks to the tutorial as a child. Still, it does not feel like I have reached my field yet. I recognize the already familiar orchestra with drums and flutes playing in the background; the snow dampens most sounds except for my loud footsteps,

my climbing noises, and the small creek nearby. I meet Rost on a outlook and he wants to teach me one final lesson which will happen right outside the northern gate which guards the whole Nora territory, which lots of the tribe never leave.

There are still some side quests and other stuff to do before I can enter the Nora village to participate in the Proving, and until then I stay with the slight feeling of not being fully in the field. But for now, the Nora territory serves as a mini open-world as a preview of the complete map, which will only be unlocked piece by piece. I have control over the gameplay and got a first consistent impression on the soundscape.

I pause the game for a moment, look at the snow-covered valley with its plants, rocks and cliffs and decide to come back later that day to this beautiful apocalyptic world. But for now, I liberate my ears from the pressure of my headphones and by opening the window, a second wave of a brighter soundscape (compared to the snow-damped environment) reaches my head. I take a stroll outside, happy there are no machines around attacking me, and take a deep breath of warm spring air—not too long, because I am already looking forward to re-entering the tribal future of humanity (and machines).

7.1.4 Conclusion

All three field trips start and end at exactly the same spot, but already there, the soundscape differs a little bit due to the time of day, time of year, and the weather outside. Soon I find myself in completely distinct spaces, but before, the steps I take to get there are very similar.

The threshold is more than simply turning the console on, putting the headphones on and grabbing the controller. Entering the magic circle (cf. Section 5.1.1) is a gradual process beginning with the physical sounds the console produces and the dampening of the environmental sounds by putting my headphones on. Diving into these video game spaces requires going through a system of opening

(Foucault's fifth principle of a heterotopia) which isolates this space from the outside and makes it penetrable at the same time.

After the navigation through the PlayStation interface, all three experiences start with a silent black screen (which is also a sonic experience). This might be partially caused by a software loading process, but it also marks the cut from the mutual interface used to enter that space. The fact that I was refused entry into the first space because the installed software version did not meet the rules of the system is also interesting, as it excluded me completely from entering the field if I did not adapt to their requirements.

After this, the gradual ways to reach the field take different but still very similar turns, different approaches to introduce the space with its own rules and environment that define them to the player. Following Jesper Juul's theory, video games are defined through fiction and rules, and these have to be introduced to the player for him or her to be in the magic circle. Whereas physical games like board games do this beforehand, i. e., explaining the rules of chess before it starts, video games like these start with immersion.

In *Assassin's Creed* and *Star Wars*, the player is first confronted with specific overlay interfaces of the game space to make adjustments to graphics and gameplay. Besides defining necessary parameters, this is the first immersive contact with the game space. This shows how the following constant communication with the game will feel. Not only does the background music set the mood, but every action in menus produces a sound that fits the overall game setting. Whereas the campfire sounds in *Assassin's Creed* reveal the Viking setting, *Star Wars* catches with its very first tones the corporate aesthetic of the whole franchise and thus immerses the player in its universe. *Horizon Zero Dawn* on the other hand immerses the player through an extended film sequence in the story and setting of the game before introducing him or her to the overlay interface of the game space. This results in a brief cut of immersion that feels a bit thrown backwards in the process of entering the heterotopia. The other two case studies introduce the main characters and their story after presenting the interface setting.

The sonic experience of entering the video game heterotopia starts with the physical "blip" of the PlayStation console, carries me off from the natural soundscape around my couch with a gentle humming of the machine, over to the common systems menu sounds to the specific interface sounds of the game spaces, and finally to the soundscape of the particular gameworlds and spaces.

It is notable how quickly and convincingly I am immersed in the distinct settings before there is any fictional pact (cf. Section 5.1.2) with an avatar, with someone I identify. Especially in *Star Wars*, the first moment of that identification with the avatar is striking, when the player realizes the music playing in the background is the music playing on the headphones of the main character, Cal. In both other case studies, the player controls the main character as a child at first, with the camera turning behind the shoulders as a hint to take control.

Only now the first hints of the specific rule systems are introduced. War drums, space-hydraulic synthesizer "bleeps" or glitch sounds indicate new instructions, or, depending on the pitch and tone, inform about a new accomplishment, like the discovery of a new location for example. Latter sounds are conditioning me to feel a little excitement, a feeling of achievement, maybe even making me release a little dopamine in my system.

The fictional pact between the protagonist and the player is strengthened in all three examples through monologues, spoken or just thought instructions and hints on the gameplay or the current quest, which are reinforced by written instructions addressed directly to the player.

Although these sounds on various diegetic levels distinguish themselves from each other in their respective game space, the patterns are very similar and the monologues as instructions feel very familiar.

It takes a certain degree of competence in the rules—mostly about the gameplay and mechanics—and a rate of freedom of action for me to recognize I have reached the field. In retrospect, these first field trips where mostly about actually finding the field in the first place, which I expected to reach much sooner, and learning the basic rules,

the language for the conversation between player and system, very motivated by challenge-based immersion (see Section 4.5).

Other sonic indicators for the final field—if that can be said at any time—are the very specific and typical keynote sounds and soundmarks. From the very beginning in *Assassin's Creed*, I am introduced to the constantly present drums and the main theme that is played at key moments in different variations as a leitmotif. The campfire sounds give the feeling of warmth and familiarity of a Viking village with its typical longhouse. Finding these elements later in-game with full control over my avatar connects me with the game space inside the heterotopia. Also, the repeatedly used sound of war horns and war cries as soundmarks strengthen the fictional pact.

In *Star Wars*, the leitmotifs are even stronger, as anticipated from the franchise. Although the unique main theme is new, the overall timbre and aesthetic of the orchestra and the instruments used follow a certain corporate identity (which every time passes the controlling eyes of the composer of the original trilogy, John Williams). A very impressive and iconic moment for the sonic feeling of the franchise universe was the first time a lightsaber was drawn, which becomes very familiar and common in the later course of the game.

Horizon Zero Dawn introduces its main theme as well as the particular use of instruments such as flutes, singing voice and drums from the very beginning and reinforces it in all key moments concerning the main character, Aloy. Notable soundmarks that reoccur very often are the hydraulic sounds of the machines and the computer glitch sounds.

Furthermore, every game makes extensive use of the voice of the main character, another soundmark in every case study. After a while, the voice becomes very familiar and provides a pivotal contribution for the recognition of and identification with the respective game space.

After this initial first contact with the field, the next step, the soundwalks, mark a more focused sampling of the specific soundscapes. The goal, the exact approach and implementation, and how

they are influenced by this initial sampling, are outlined in the following section.

7.2 Soundwalks

After a first initial data collection in the first day in the field, where the goal was mainly to find the field and to get the feeling for it, the soundwalks mark a more focused perception of sounds in the game space, almost entirely in the gameworld due to the nature of the approach outlined in Section 4.5 and the instruction by Hildegard Westerkamp (2007).

Much like Leonard Sang's procedure in his in-game photography (Section 5.1.1), a video game soundwalk somehow takes away the ludic element and replaces it with another element, a stroll through the game space with an observant aural focus.

The sequences taken for a soundwalk are taken mid-game: where most of the regions are already discovered, but not in the endgame, where open-world games tend to become more linear. Like choosing the best spot as a tourist site, I wanted an area that is somehow representative for the whole game space and authentic in that sense, as well as one which is interesting and rich in its aural variety. I fell into the trap of searching that one real spot instead of accepting that in a video game, everything is a show and authentic at the same time (see Section 5.1.3), and there is possibly no site that can stand for the whole game or the soundscape of it, so it does not matter where I conduct the soundwalk. The aural perception of the avatar and the soundscape around him or her is conceptually the same, no matter where I find myself on the digital game map, although, of course, the soundscape differs from location to location, in some cases also from daytime to daytime.

7.2.1 *Assassin's Creed Valhalla*

Before moving myself through the landscape—I am standing on a hill at the edge of a wood in Glowecæsterscir, around mid-day with blue sky and some clouds—I wait for possible idle animations[65] or any other sounds my character produces without any active input from my side (Mauch 2023: Assassin's Creed 06 [09.10.2021]). After a few seconds, as I turn the camera around the Avatar, Eivor shifts from one foot to the other. While I can hear these two footsteps in the seemingly wet grass, there is no according animation to them. Almost a minute later, she scratches her nose, producing a rustling sound from her clothes. Half a minute later, she shifts her foot again and touches her left arm with her right hand; the sound the movements produce are very loud compared to the distance from my viewpoint.

At the same time, I hear my own breath and I have to swallow empty, which also sounds louder than usual with my ears covered by the headphones. Switching my attention to the outside of the game, I pick up the swooshing sound of the room ventilation and footsteps far away, outside my office.

Just a moment later, Sýnin (Eivor's accompanying raven) lands on her right shoulder, without any sounds of her wings, but again with a very loud rustling of Eivor's clothes.

"Alright," Eivor answers, "just a little break." The low but very loud voice echoes a tiny bit on the hills and the valley around me. Sýnin picks her softly in the face, but completely silent. Also moving her wings produces no further sounds. Finally, one clear and loud crowing is audible.

Up to this moment, the soundscape was dominated by rushing sounds, not clearly recognizable as coming from the wind in these heights, the nearby river down in the valley or the woods behind me, and the chirping sound of small birds, occasionally a clattering of a

65 The term "idle animation" describes the action a video game avatar is sometimes programmed to do when there is no active player input for action for a certain period of time.

grille. Sometimes I even think I can recognize some people talking or working through the whooshing sound, but that might just as well be my imagination.

But now, with Sýnin on my shoulder, music slowly drowns out the lively soundscape. First, only a talharpa lies on top of the rushing, then a flute and a cello slowly eclipse almost all environmental sounds but some occasional chirping and crowing from Sýnin. A wordless friendly chorus comes in with single-placed timbal drumbeats.

As I push the left stick on my controller slightly to turn Eivor around to establish a dialogue with the environment, I try to concentrate on the sounds of my (digital) body while moving. The dialogue starts with the sound of Sýnin's wings while flying away and the whooshing sound of the wind coming to the front again. The two steps Eivor needs to turn herself around produce again a very loud rustling, not scaled to human proportions in a natural way, more like recorded by a microphone placed on her body.

The music is gone, and I can hear grilles and birds again. I press the o button to cower as I do when I sneak in enemy territory to produce the quietest sound while moving. I hear Eivor's clothes, and the environmental sounds seem to become more intense. I cannot move without sound, my footsteps sound just the same in the tall grass, maybe a bit slower. I get up again and try to move the left stick just slightly and cower again. There is no difference in sound.

With the increasing speed as I tilt the left stick farther, walking towards the forest, the sound of the footsteps is replaced suddenly by the heavier rhythmic sound of my baggage and clothes with each step. I stop in a small puddle and hear my feet stamping in water.

I walk farther, varying my walking speed and focus on the composition from my footsteps, the irregular birds chirping and the now fainter rushing sound. Suddenly I am interrupted by a metallic rattle that sounds as near as my footsteps: a text in the middle of the screen informs me "New Territory Discovered—Druid's Cottage." After the text disappears, I notice a faint sound far away from the top of the right side of my headphones that sounds a bit like throwing coins.

Simultaneously, the cyan XP container appears shiny, also on the right top of the screen, with the notion "+120 XP." I notice a little excitement that this soundwalk might get more interesting, but I do not want to get too involved in the game and stay on my intention of perception.

As I approach the cottage that sits on a high rock, I spot a small pond in front of me and encircle the cliffs, covered with mist. I hear the sound of a nearby crow and the splatter of still water with some fish reaching its surface or frogs moving. The water gets louder but is still faint, until I jump right into it, producing a clearer and louder splattering noise. I can hear my hands clapping into the water while I am swimming, and a loud splashing sound as I exit the pond. Eivor shakes the water off her sleeves loudly.

On the way, I jump into the water again, this time I dive in completely. In the free fall, I briefly hear the wind around my ears, before it becomes the numb sound of human ears under water, covering everything else with water stream sounds from Eivor's body moving underwater. Exiting the water directly to climb up the cliff, there is no time to shake off the water, but I can still hear it dropping down into the pond and on the rocks. On the rushing background, I can hear the bare hands on the stone and Eivor's voice in exertion: "Ughh … […] errh."

The rushing from water and wind mixes with something new: fire crackling. Walking around the house, I see three big fireplaces, several small fire bowls on chunks of wood and two cats straying around. I follow one of them and just before I reach a small wooden bridge I notice the option on screen:

△ pet.

The cat answers with a mild "meow!" as she sits on my arm, and I can clearly hear Eivor's hands stroking over its fur.

After the cat jumps off my arm again, I try to focus on the somewhat shifted soundscape here and grasp the whole picture of it.

"Try to move without making any sound, is it possible? […] Which is the quietest sound of your body (Westerkamp 2007)?"

I move my head (my personal physical one) and hear the headphones rub around my ears, I notice myself breathing and moving my office chair produces some decent cracking sounds. I slightly tilt the left stick on my controller which makes Eivor walk onto the wooden bridge and produces loud steps on the wood, much more present than the sound of my chair or of my fingers on the controller, which actually cause her to move in the gameworld.

"Lead your ears away from your own sounds and listen to the sounds nearby."

I am several steps away from the fires now, so their sound is fainter than before. Depending on how I turn the camera around Eivor, different sound signals are clearer and nearer than others. The overall keynote sounds from rushing waters and wind and the birds chirping though stay steady, yet very natural and organic. I realize there is a second keynote, for my perception farther away: the ventilation of my office room is very clear and steady, but at the same time its sound is not as full and present as the game sounds within my headphones.

With the perspective towards the cottage, wooden wind chimes resonate sporadically with the wind, not setting in on a rhythm, building a cozy picture with the sound of leaves from the trees touching each other, some erratic crows and seldom some movements from the still water.

From another level I can also hear people walking and talking in the corridor outside the gameworld and as the highest pitch an electric saw from the carpentry next door. Although pervasive as a mechanical sound, it cannot compete with the high pitch of some birds in-game.

Next to the sound of the wooden chimes, drops of water in the pond around me mark the lowest pitch of the soundscape.

I decide to continue my soundwalk and follow the path over the bridge leaving the cottage. As if the system reads my intention, a low-tuned talharpa sets in, accompanying my further journey. I pass some

friendly soldiers on the way, and almost ironically, the first one greets me: "Always the same, isn't it! You march here, you march there…" and wanders off again.

I hear rain fall and my footsteps sound wet suddenly. The birds and the leaves rustling on the trees in the wind become quieter, I cannot figure if it is because the music gets more dramatic and present or if it is because of the rain. A few seconds later the rain stops again, and I meet a few children looking at a warrior corpse on the roadside. Recognizing the setting as a small side quest, I leave them aside and continue my way and walk into the next temptation of a cursed area which I cannot resist, and I am soaked in by the challenge-based immersion into the game.

After lifting the curse from the area, I wander off, call my horse and ride to the next village to reach a different soundscape. I take a walk through the longhouse, around the church to the marketplace. Sure, the soundscape is very rich here and I could list plenty more sound signals and soundmarks, beautiful little details like a woman weeping at the graveyard or villagers preparing for the first night of Samhain (possibly predecessor of Halloween). But I realize again that my attempt was not to find the most interesting or complex soundscape, but the conceptual character of a soundwalk within the game space. For that goal, I leave it to the experience described above and move on to the Star Wars universe.

With an initially planned duration of an hour for each case study, this first attempt was more challenging than expected, though very successful conceptually and in the numerous findings for the study. As mentioned above, there was a feeling of missing out in the diversity of the soundscape. The aim, however, is not to portray the soundscape of every aspect of the game, but of a specific environment and more as a conceptual experience, which will be further outlined in the conclusion, Section 7.2.4.

Therefore, the next soundwalks in *Star Wars Jedi* are adapted and planned to be shorter, more concentrated and focused.

7.2.2 *Star Wars Jedi: Fallen Order*

This time, based on my experience in *Assassin's Creed Valhalla*, I start in a very minimalistic setting in a small corridor in the Imperial Refinery on the Wookiee planet Kashyyyk. The room holds nothing more than two doors, a box with some sort of aesthetic customization for my avatar, BD-1, the lightsaber or the Mantis, a window and myself, Cal. It is about five meters wide, twenty meters long and two and a half meters tall, all mantled in blackish metal. Although white clean light illuminates the room from the ceiling and some small red lights around the doors add to the tone, it is rather dark. From the window I can see some green grass, but most of the view seems to be inside of a cave (Mauch 2023: Star Wars Jedi 05 [09.24.2021]).

The keynote sounds make me feel like in an underwater facility or what I imagine a spaceship would sound like: a constant damped ventilation and/or machine rushing noise which completely covers my ears, scarcely a faint metal creaking far away.

While standing there without an active movement from my input on the controller, I can hear BD-1's tiny metallic feet climbing around on Cal's back. After about ten seconds, Cal reaches with his hands for his hair and scratches his head, I can hear the rustling of the hair as well as his heavy clothes while moving. He audibly moves his weight from one foot to the other, but not as loud as Eivor did. I try to move without producing any sound by tilting the left stick only a tiny bit. The footstep on the metallic ground resonates in the empty and cold room. I move Cal a little more and my clothes and heavily-packed belt with the lightsaber and other equipment rattle. Faster steps produce a loud, higher pitched "clack" on the floor grid. I jump and Cal breaths a bit under the effort, the metal clacking with a high-pitched sound again from jumping and landing.

Next thing I do is to use the force by pressing R2 only slightly, the force-push, a quick movement to push small obstacles or enemies away. It sounds a bit like someone putting down a heavy box on a workbench. I try a second time, this time pressing the button

more firmly, producing an impressive explosive sound with a lot of bass, echoing and reverberating for a moment before the rushing sets again on its initial level. The room stays unchanged despite the almost brute power unleashed on the walls in front of me.

Because I am a Jedi (a Padawan, more precisely) and because I can, naturally, I have to swing my lightsaber for a soundwalk too. Cal's belt rattles as I press the □ button and he grabs the lightsaber, and "FVISH FVISH," he swings it around his wrist elegantly before putting it back right away with a new rattle. The lightsaber sound covers the whole soundscape for a second, rendering the cold emptiness of the room even more intriguing after.

Not all sounds from the environment are mechanical, there are some frog-like underwater noises from time to time and listening close to the ventilation rushing, I detect faintly tiny footsteps and screeching noises from mice or something alike. I can even hear a loud animal or bird through the window, but it makes me feel as if the window is very thick and the bird far away.

The highest pitch I can detect is the screeching and Cal's belt rattling. The lowest key is marked by the rushing ventilation, almost producing an airy sound of someone hissing the vocal "u" for a very long time.

Although I did listen carefully to everything, I did not notice sounds from outside my headphones.

I am surprised in what detail Cal interacts with this minimalistic environment with minimal player input and how complex the soundscape is constructed for a simple area inside a metallic building. Still, after roughly one and a half minutes I feel I perceived all sonic features experienceable in this small corridor and I decide to do another soundwalk on Kashyyyk, outside the refinery in the green (Mauch 2023: Star Wars Jedi 07 [09.24.2021]).

First thing I notice is how the aural environment is much quieter and cleaner, the numb underwater feeling in my ears from the lo-fi soundscape inside is gone. My footsteps have a higher pitch, and I can hear the mud under my shoes. There is no longer the echo of the

sounds Cal produces while walking, also the sounds feel more direct, cleaner as well. Sometimes I can hear Cal stepping into puddles.

By pressing the touch pad, BD-1 projects a three-dimensional holo-map in front of Cal, which renders him blurry, focusing the view on the hologram. This perspective is conceptualized completely into the gameworld, producing a loud electric sound like powering and starting up an interactive electric device, overwhelming the background soundscape or rendering it blurry analogue to the picture. Moving around the fine grid of the map bleeps constantly at a very high pitch. I turn the map off again with a clear and short clicking sound.

I pass a small bridge made of a metallic grid, moving on it sounds the same as on the grid in the refinery. The sounds of Cal's movements feel more imminent and louder. Activating the lightsaber completely changes the keynote with its synthetic conductor hissing sound. Turning it off feels like a revelation to the quietness of nature and clearness of its vivid animal sounds.

Depending on the camera's perspective, a faint generator is audible, and from everywhere I can hear big birds—the sound is dampened like I know the sound from the zoo or how I imagine they sound in a jungle. It is as if I could hear the wet hot air.

Walking in a small corridor with rocks and trees on each side, my footsteps produce a clear reverb. The sounds of the animal life in this area are a complex layering of birds that seem to be more in the distance, grilles and bugs very near and frogs and other animals moving in puddles. A constant keynote sound is given by very high-pitched grilles. The low bar of the audio spectrum is set by the water drop sounds, or, alternatively, when I activate the lightsaber, its pervasive humming. Fitting for the setting, there is also no ventilation perceivable outside my headphones (the moment of this soundwalk is on a Saturday, where they turn off ventilation in the building I am working in), but listening closely, I can hear the sound of the strip lights.

In the narrow corridor, much less wildlife was audible, except the grilles and bugs, bird sounds are far away and very quiet. Coming to

a more open area and finally standing in front of a muddy pit, the birds singing and croaking fill the foreground like in a jungle. I stand there for a while to listen to the rich texture of the soundscape which sounds very organic and non-repetitive. Finally, I take a jump and slide down the way, producing a wet muddy sledding sound, reverberating from the rocky tube.

Arriving on steady ground with two short footsteps on dirt, a massive strike from the orchestra's double bass section comes in, shortly followed by the higher string section. The camera behind Cal pans back automatically and reveals the impressive overlook to Kashyyyk's Shadowlands and the base of the Origin Tree, a jungle-like landscape overgrown with plants and trees. After a first immediate dramatic climax, the title's theme is played softly, almost melancholically, by the double bass section, shifting over to the higher sections and the horns taking over the theme, slightly modified.

Immediately I am taken back to the story, reminded that I am on the right path and discovered the entrance to the dark forest where the resistance of Kashyyyk hides. Not willing to follow the narrative quite yet, I take a turn and climb up a metallic grid on the left side. The orchestra continues to play in a thrilling way and Cal tells BD-1: "Stay with me, these things look fast!" I actually do not know what he is talking about, BD-1 stayed on my back the whole time, but I guess it was some hint as to where I should head next. He answers with some short and cute "beeps." The string section stops as a single horn plays out his last tune and the jungle birds take over the dominant keynote sounds again.

Around the corner I follow a little tunnel through mud and tree roots where the jungle sounds get fainter and I can hear the wind rushing through, but there is an artificial cold and metallic tone to it too. Reaching the end of the tunnel, my muddy footstep sounds reverbing more openly again, I see why: I am on the outside walls of the refinery again. Next to the bird noises, which are louder again now, and my loud footsteps on metallic grid, there is a noise I cannot identify—it sounds a bit like ghosts faintly screaming.

On the left wall I see a violet small round nebula with an interaction point. Activating it by pressing the R3 button causes Cal to reach his hand in it and use his ability in sensing the Force Echo to gain information about something that occurred here in the past—with the loud noise of an explosion overwhelming all other sounds. In this memory I can hear a report of a stormtrooper entering the Shadowlands, saying: "It swarms with enemies!"

I realize how I lose the awareness of the soundwalk and get pulled into the game again. With this notion I conclude this sonic tour, give in to the game and proceed curiously with the story of this young Padawan.

In contrast to the first soundwalk, the first approach here was almost too short, but still proved successful for the intention of this section. Overall, the soundscape feels more familiar to natural sonic experiences and even after a lengthy overall playtime, the sound effect of drawing the lightsaber is still very satisfying, also in relation to the remaining soundscape.

Some aspects are reconfirmed, like the perception of specific sounds that immerse the player or others that have the distinct function to guide the player ludically further into quests or challenges.

Conducting two shorter soundwalks in different settings proved to be fruitful, thus no further methodic adjustments are made for the next fieldwork.

7.2.3 *Horizon Zero Dawn*

Coming back the post-apocalyptical 31st century, I decide to take a similar approach as in the *Star Wars* universe and start inside a metallic underground breeding facility for the machines inhabiting this world, the Cauldron RHO (Mauch 2023: Horizon Zero Dawn 04 [10.05.2021]), and later do a second walk outside in the lush jungle of the southern region of the Carja Sundom called the Jewel (Mauch 2023: Horizon Zero Dawn 05 [10.15.2021]).

"Looks like I'm not the first to look for a way in, what a waste…" Aloy says to herself in an almost whispering tone as she discovers a dead body in the corner, telling me that I am on the right path. Her armor is rustling loudly and rhythmically to her pace, resounding from the cold stone walls around her while walking down the trail into a cave, looking for the entrance to the facility made by an artificial intelligence. The path is illuminated by big but silent oil lamps on wooden stands, although there is no one around who could have lit them but the dead adventurers.

High-pitched synthesizers like flutes and whistling accompany the descent. There are rhythmic wooden chime sounds in the air, but I cannot make out their origin. Approaching a triangular tunnel filled in blue light at the bottom, the quest instruction on the top left corner that says "Find the entrance" is being crossed out with a short glitch sound just to be replaced by "Explore the tunnel" with the same sound.

"They were curious too, but I'm better prepared. I hope it's enough." Aloy steps on the metallic flat ground and I can still hear some frog sounds from the area behind me.

With my spear I can override the door in front of me which produces an overwhelming powering up sound, followed by loud hydraulic sounds as the massive metallic door opens, the last "bang" echoing in the hall in front of me.

After a few steps I try not to move and listen more closely to the soundscape. For a second, the environment is completely silent but synthesizer playing church-like melodies. Panning around the camera I can detect the electric chattering and hydraulic movements of a Watcher. I try to listen to the faintest sounds, also outside my headphones, but the synthesizers are too intense. The Watcher comes and goes in relatively short intervals. There is also a very deep and low rushing from a triangular ventilation device in front of me with visible steam coming out of it. There is no sound detectable coming from Aloy.

To continue the soundwalk I decide to take out the Watcher and access the weapons menu with the L1 button. The soundscapes

mutes, but not completely. The numbing-down of the environmental sounds is at the same time slowing down time, and so do the sounds. Approaching the Watcher, Aloy's armor rustles a bit and aiming an arrow at it, I can hear the tension on the bow and time slowing down again.

The music changes and there is a faint-high pitched electronic beat audible, but at the same time, independently, a cello plays long deep strikes much louder in the forefront. During the two or three shots it takes to take him down I see subtitles of Aloy saying: "That works out fine for me," but the fighting sounds are too loud to actually hear it. Some minor explosions later I can hear the electric air burst sounds of the now "broken" machine and the beats coming to a conclusion, marking the end of the fight. All music backgrounds are gone now, leaving the soundscape to all sorts of artificial electronic and mechanical sounds, some very high-pitched synthetic whistles and one clear deep rushing sound with an explicit source, the turning wheel in front of me.

If I want to keep following the tunnel, I have to climb it and let it carry me over the deep. For the first time in this passage, I can hear Aloy breathe under the physical effort, and she still breathes heavily a few seconds later standing still. "That rushing sound again," Aloy says a few steps further, but I cannot make out any difference in the soundscape, even rather less rushing in my ears and more natural sounding water drops from the rocky cave I am entering now.

Still, most distinct sounds are synthetic high-pitched noises and infrequently a very low metallic creak like I would expect on a large ship made of iron. Coming to a tunnel made completely out of massive wires, the acoustic feeling of being inside a big ship's bow intensifies, Aloy's armor rustling rhythmically while proceeding. Periodically, about every twenty seconds, there is a sound I would compare with a strike on a metallic plate used in a theater to imitate thunder, beginning with a low hit, decaying on a high-pitched tone. There are distinct layers of rushing sounds, some more rhythmic, some less, sometimes there are also hydraulic machine sounds.

After another pass-through that I have to bypass to open, I enter a huge hall with more mechanical machines and apparatuses shrouded in bluish and greenish steam. A very airy and rhythmic flute plays, in the background there is a high-pitched electric beat, though I do not recognize if it is supposed to be background music or if it is noise coming from the machines.

"I need to find a way to get through that shell," Aloy instructs me indirectly. Beats come and go, as well as other hydraulic and electric patterns and sounds. The single wooden flute strikes are a welcome variety in the cold atmosphere. Under this overwhelming soundscape, not only the rustling of Aloy's movements almost fade, but also my perception of sounds outside this game space is even more out of balance than usual. Dealing with this overload of sound, I stop my soundwalk here, looking forward to getting "outside" after completing the quest.

"That dust storm looks like it could strike a machine." I am now outside in the wet forest of the Jewel region, just near a creak, and the weather is very unpleasant. I do not know if it is because of the daytime or the heavy clouds, but the vision is quite somber, the otherwise very green flora wreathed in gray tones, its surface shiny from the rain.

There are several layers of rushing sounds, very similar in their tone, but clearly distinguishable between the water sounds and the strong wind in the high grass and the trees. And then there is the familiar rushing sound of my office ventilation too, far in the background. Occasionally birds are singing. As Aloy crosses the creak, her footsteps patter loudly. In the background, single notes from a piano, followed by gentle keyboard sounds, provide a warm and almost melancholic atmosphere. For a moment I stay on the spot, Aloy putting up her arms against the wind and rain, letting her armor rustle a bit. I can hear the distinct wind strikes from time to time in the trees. At the same time, I notice the sound of the pen while writing in my notebook. I walk farther towards the trees, slowly, but nevertheless, the armor rattles loudly. Crossing a muddy trail, the sound becomes

even louder. Far on the left side I can hear a fox very briefly, one of the quietest sounds.

Just a second later, also a very faint and airy rattle starts and ends with a little drum beat again: "Machine Site Discovered. Charger," a text informs me on the middle right side of the screen. I try to sneak around the area, there are some heavy hydraulic footsteps audible as well as whale-like vowels. As to intensify the tension, some very high-pitched short but aggressive flute sounds underline this moment of a near encounter with these machines. I manage to walk around them with Aloy's armor rustling loudly again, and as soon as I am at a safe distance, the friendly keyboard sounds come in relaxing again, but with a remaining low drumbeat, almost like a heartbeat. I notice my own physical breath audible from my nose after I was holding it back in tension.

Now, the rushing is narrowed to the wind in the trees, infrequently there is a sound of a wild animal like a turkey or a boar, but also the airy wooden flute I already heard in the Cauldron.

Following the grunting, I approach a boar in the bushes, making it sound like a call and answer tune with the flute.

In the meantime, the rain has gotten heavier and there are almost no sounds detectable from Aloy moving through the grass and the bushes under the rain shower sounds. At the same time, I can hear the birds more frequently now, either because it's daytime or because I am now farther into the woods.

"Aloy, you're very close now," Sylens's metallic voice through Aloy's device gives me a scare. She answers, "I was wondering when you speak up," suspicious, before he gives further instructions where to head next. Here they are again, the church-like keyboard harmonies from the Cauldron, I suspect they are composed over the conversation, it seems well timed. With the already familiar glitch sound, the quest instruction on the left top is updated. Birds and other wildlife get louder. For a short while longer I enjoy the view of the waterfall in front of me in the pouring rain, listening to the raindrops falling on the cliff. Passing the waterfall, its rushing vanishes

slowly behind my back, Aloy's armor rustling loudly now following the trail.

I climb up the rock as Sylens told me and I am rewarded with a beautiful view in new sunlight, the clouds are already gone and the rushing comes solely from the creak as clearly audible, but no more birds up here. For the quest to continue I should take a rest at the campfire here by pressing the △ button and Aloy does not hesitate to tell me several times through self-talk: "I guess I should rest up …"

So I do and dive right into the next quest, unveiling the remaining narrative of the post-apocalypse.

7.2.4 Conclusion

As a first notion on the soundwalks in each case study, it is striking how short they are. This has several intentional reasons:

The first attempt was to do soundwalks that last roughly an hour, but it has been shown that landscape and soundscape proportions in video games need different approaches than in a physical environment. A player can walk a distance in an open-world video game in a few minutes that would take hours to reach in real-time. In these short travels, soundscapes change sometimes radically. It was not my goal to gather as many and diverse soundscapes as possible, but rather to adapt Westerkamp's idea of a soundwalk to video game spaces. Also, despite their astonishing richness in aural textures, video game soundscapes do not change drastically over time and there are no sounds a visitor only hears as rarely as once an hour. They are designed to visit for a short time pass-through, and they are authentic and show at the same time, which is never a contradiction in video games, unlike in tourism.

While the first experiences in the fieldwork involved a lot of the threshold perception of the heterotopia, from entering the magic circle, soundwalks start from within the game space. As waking up in this environment without any imminent ludic quest but the attentive

observation of the aural representation, it is the goal to focus on the minimal sonic interaction between the player and the digital space. Even more, while having the experience in the specific gameplay, how the game mechanics and interaction work, the perspective lies on how the game talks to the player for his mere presence with as little input as possible.

And for this approach, the short sequences provide already enough material to investigate the micro-interaction between player and system, the most basic "dialogue between you and the environment" (Westerkamp 2007). Other formulations of a question could include longer sessions, or, as recorded sequences, every fieldwork in video games could be interpreted as a soundwalk, and Westerkamp's questioning could therefore also be superimposed later.

The starting point in each of the five soundwalks is the passive presence by the player in a specific location in the gameworld at a certain game state, defining the current progress of the game, its quests and character level, time of the day, and location or presence of other variable components as enemies, wildlife, or weather for example.

While there are some sonic actions going on outside the game like me breathing, the sounds of using the controller or room ventilation, they have no direct impact on the game system. That means there is no aural input signal from the user to the interface that could be analyzed by the game system (see Fig. 4.1), no sounds that could be labeled as player action itself.

Nevertheless, they should not be regarded as completely outside the game space, as they can still provide a reflexive relationship to the player as metaphorical interface sounds: Even just a constant ventilation rushing has an influence on the player like background music, it could even be comforting or annoying and influence the player's behavior in the gameworld. The absence of a constant rushing sound outside the headphones while exploring the forest lands of Kashyyyk, for example, certainly added to my calm condition while playing. Hearing my own breath increased the mood of tension or concentration in the gameworld and the immersion.

All other rushing sounds from within the gameworlds then are component or system actions. A distinction between system or component action is sometimes difficult or subjective, but also redundant since all component actions could also just be rephrased as system actions. The presence of the player in a certain area causes the representation engine to present wind in the trees through the according sound for example.

But already the faintest rushing is a tiny component of a conversation between the game system and the player. It might just be reflexive to put me in a certain mood or immersion, but it can also carry a little indicative information, in which location I am currently, where the next creak or ventilation is located. The rushing sounds of representations of nature are irregular enough to feel organic while mechanical rushing sounds are constant, generating regular patterns and rhythms. In the case of the corridors on Kashyyyk and the Cauldron, they produce an overload of sounds that strengthen the feeling of a lo-fi soundscape which fogs the perception of the human sonic proportions. The sources of the distinct sounds are harder here to distinguish.

There are two sequences accompanied with the use of extradiegetic music in *Assassin's Creed*: during the idle animation and while traveling longer distances on the road. Both times, the music is intended to add a certain mood to the soundscape and variety to the scenery. There might be indicative information in it, telling the player in which area he or she is located (there is different exploration music in all regions of the world map). I doubt many users have knowledge of each type of regional background music, but it is certainly reflexive, providing a specific and distinct vibe to the respective environment. Although they are triggered by a certain action (no player input by the player for and traveling longer distances within a specific amount of time), it can be described as keynote sounds.

In *Horizon Zero Dawn*, sequences without music are less frequent. Here, the mere presence in the Jewel jungle or the entrance of the Cauldron trigger the background music, making it an inherent part of the keynote sounds of the soundscape, again in a potentially indica-

tive but certainly reflexive relationship to the player. But there is also background music that is triggered by the proximity to potential enemies, the short high-pitched flutes when approaching a machine site, or when involved in a fight, the fast electronic beats encountering the Watcher in the Cauldron. These are even more reflexive, mirroring the tension of the situation the player is in, and have a stronger indicative function as well.

Although the only music played in the *Star Wars Jedi* sequence is also triggered by the presence in a certain area, it has a slightly different function. In his quest to find the device that contains a list of all Force sensitive children of the galaxy, Cal has to travel to the Shadowlands of Kashyyyk to find further clues. As well as functioning as a cinematic instrument to emphasize this moment, he finally catches the sight of this impressive location; it is also a rewarding sound for the player who has reached an intermediate goal and an indication that he or she is on the right path. By playing the reoccurring orchestral main theme, it gives the player the feeling of reaching an important moment in the overall narrative. In the further course, this initial sound signal shifts seamlessly to background music as a keynote sound, before disappearing completely. Unlike the other musical parts heard in the soundwalks, this fixed composition can only be triggered once.

Next to these (partly) constant keynote sounds, there is in each soundscape a complex layering of sounds whose source can be clearly identified to specific components. While the little footsteps and squeaking of mice in the refinery corridor of Kashyyyk might theoretically be just a part of the sound loop that also contains the complete rushing of the ventilation in this area, I would still attribute the sound to a concrete component of the gameworld that represents these mice, although they do not possess a visual representation of themself in their synthesis. Other similar examples are the bird, frog, and other wildlife sounds in all three case studies.

But some of these component sounds also have a visual representation. For example, the high-pitched fox, a loud turkey or the

low grunting of a boar indicates their presence nearby. As part of the gameplay in *Horizon Zero Dawn*, Aloy can hunt small animals in the wild to collect components like leather to craft and improve her equipment. Despite hearing these sounds as signals that reflexively represent the richness of the respective wildlife, being able to hear them nearby hiding in the bushes is a very useful indicator for playing the game.

Component sounds that react most directly to the user inputs are the reactive sounds of the character's movements. They are also the closest and most imminent sonic connection between the game-world and the player, immersing him or her in the environment. Having specific sonic feedback from the texture of the environment in footsteps and other body movements can lead to conclusions about the space around him or her and include the avatar as a part of the soundscape.

While most sounds produced by the avatar are a direct reaction of the player's input, like the rustling of the armor and footsteps while walking, some are less imminent, like Eivor exiting the water and shaking it off, or Aloy's heavy breathing seconds after the effort of climbing. These further intertwine the user input with the sonic environment around the character and support the sensory immersion. Idle animation sounds, for example Cal reaching for his hair or Eivor stepping from one foot to the other and welcoming Sýnin on her shoulder, also belong to this category, since they are an implicit reaction to the user input, namely explicit non-input for a certain amount of time.

7.2.4.1 Sonic Challenge Guideposts

As mentioned in the beginning of this section, the goal of these soundwalks was initially the attentive observation of the aural representation of the game space without following explicit ludic quests or challenges. Listening to the basic elements of the sonic interaction between player and video game explicitly without participating in the

designated narrative and game, this approach was also chosen to investigate the faintest elements that direct the player to the ludic character of the game space: the border between a simulation and a video game. The presumption "a gameworld is designed to play a game" has been repeated and rephrased many times throughout this book, and this may provide a first step to answering the question: "How?"

Taking a closer look (listening) to the soundwalks, the environment is full of sonic invitations for the player to participate in ludic actions. Several are already mentioned above, some require ludic experience or instructions in the respective game like the need of hunting game, or, they may be more intuitive or conditioned through other media like movies, like the example of the orchestral leitmotif in *Star Wars Jedi*.

Coming back to the sounds produced by the player's avatar, there are further sounds that are not direct or implicit reactions to the input, or more precisely, they are implicit in another sense. Reaching a certain area, Aloy tells herself: "I need to find a way to get through that shell." Or, if the player does not follow the quest right away at a certain location, she reminds herself: "I guess I should rest up…" Using monologues as instructions is a very simple and common instrument, especially in action-adventure games, to support the player in his or her ludic experience, that might also get him or her back in the game narrative. They can be subtle but also become very pressing, as Aloy rephrases her urge to continue the quest about three times within about half a minute.

Revisiting Aarseth's components of a generalized, role-playing cybertext (Fig. 4.1), the question arises as to which part triggers these component actions (and their respective sounds). As part of the database, Aarseth lists namely "world rules", "characters", "other objects" and "world maps," but none of these refer to game quests and challenges and their goals. This model just as well describes a pure simulation of a digital space.

Challenges in video games also build the framework for their narrative, to reach a certain goal, to experience not only a spatial environ-

ment but a story. A goal is defined as a potential game state that has to be reached by fulfilling specific challenges, to change the current game state to correspond to that destination. But goals themselves are not like objects or data, they are always an arrangement—in video games between the player and the system—and the system is the side that proposes them (in the case of open-world action-adventure games).

The database of an action-adventure game needs, in addition to world rules, characters, other objects, and world maps, a challenge framework, consisting of motivation and guideposts. Motivation is mostly constructed of rewards and advancement in the narrative, and their combination. Guideposts consist of a first step in the formulation of a goal and secondly in waymarkers to help the player.

It could be argued that challenge motivations and guideposts are a part of the "world rules," as listed in Aarseth's figure. But I propose, for the study at hand, to regard them as autonomous and initial entities in the first layer of this theoretical model and in video game heterotopias in general. Ascribing the remark "I guess I should rest up …" as a component action to a challenge framework, triggered only once in a certain game state (being present in that specific location in a specific state of progression of that quest/challenge) is more informative about how the interaction between player and user system works than incorporating it implicitly into the "world rules."

But being able to pinpoint these challenge-directed interactions between user system and player more accurately does not mean that these elements are absolute, as a conversation often leaves room for interpretations and often also depends on the experience and knowledge of the listener.

The semantic meanings of monologues by the player's avatar are difficult to miss, as they often give clear instructions on what to do in the gameworld. *Horizon Zero Dawn's* two soundwalks provide several examples. The two verbal announcements from *Assassin's Creed* ("Alright, just a little break") and *Star Wars Jedi* ("Stay with me, these things look fast!") to the protagonists' respective companions do not

seem to be direct instructions, but they remind the player that he or she is on an ongoing quest that has to be followed at some point.

Non-verbal sounds can be more open to different interpretations: the wildlife sounds in *Assassin's Creed* and *Horizon Zero Dawn* are part of the soundscape that could serve purely as immersion in the simulation of the gameworld. But as the player gets introduced to the game mechanics of crafting updates for his weapons or other equipment by hunting game and also gaining experience points through these actions, which finally helps him or her reach higher character levels, the grunting of a boar nearby provides additional indicative information that concerns the challenge framework. In *Star Wars Jedi*, where there is no such game mechanics, sounds of wild animals have no further indications other than being part of the simulation and do not invite the player for interaction.

The information carried by most sounds with an extradiegetic source is much clearer. The metallic rattle when Eivor discovers a new location and the tinkle of coins indicating the XP gained through that are obvious guide signs and reward sounds that address the challenge framework. And the same applies to the glitch sound a player hears in *Horizon Zero Dawn* when the quest log is updated, or the airy rattle when discovering a new machine site.

While sonic challenge guideposts with a diegetic source add to the sensory immersion of a soundscape, those with an extradiegetic root may interfere with the perceived immersion of the pure gameworld by the player. These sounds strengthen the intertwinement of the challenges and the gameworld and therefore strengthen the challenge-based immersion that connects the game space with the gameworld.

Having established a focus on these sonic invitations for game challenges, which ultimately motivate the player to be further involved in the ergodic reading of a cybertext (in participating in the video game heterotopia) and discover more of its potential experiences, the next sections will concentrate on these different levels of interaction between player and system, between simulation and challenge posts.

8 The Constant Conversation

Before analyzing further soundscapes from the different case studies in different locations encountered during fieldwork, I will round up the theoretical framework through the combined premised theories and methodologies as well as the findings compiled in the initial fieldwork samplings above and take a look at the development side of game audio design.

In the following I will address all interactions between the video game system and the player as a conversation. The concept of the constant conversation, a term initially introduced by the game audio designer Bjørn Jacobsen (2016: 21), is not necessarily meant to outline a new theoretical framework, but is rather a rephrasing of existing theories, adapted as a tool for soundscape studies in video game heterotopias.

8.1 The Conversation

In his master's thesis on informant diegesis, Bjørn Jacobsen introduces the concept of the constant conversation as the base of how video games work. He defines it as a combination of the communication models by Bordewijk and Van Kaam (2003): allocution, conversation, consultation, and registration:

> "A game may be considered a constant conversation, created from the actions, player persona and everything from the player, registered by the game.

> Various requests are made from the game to the player, asking the player to make choices and depending on the answer; the game could change the visual and audio experience provided as feedback to the player's persona and controls/movement.
>
> The constant consultation takes it[s] [sic] form from the moment *that* [sic] the player steps up and starts the game, the player most likely being aware of any input he or she provides to the game through the controls, but unaware of the constant registration of other data going on under-the-hood." (Jacobsen 2016: 21)

Despite repeatedly mentioning it throughout the thesis, sadly, he misses elaborating the concept any further than the description given above—although I find it much more interesting than the informant diegesis itself, which is, in my opinion, redundant, since all sounds could be interpreted as carrying information.

His description of the constant registration and the answer from the player and the system to any change can be very well translated into Aarseth's model of a role-playing cybertext (Fig. 4.1). As the model demonstrates, the simulation engine has a direct as well as an indirect impact on the representation engine, which is what he calls the data going on "under-the-hood." Then, "[t]he player may again perceive this output and respond to it, creating a new cycle of information between the computer and the player, therefore a conversation" (Jacobsen 2016: 23).

A conversation may be an even more precise term than the ergodic process introduced by Aarseth, because it requires two participants rather than an ergodic reader and a (presumably) passive text. Although it is true a video game is only experienceable through the least player input by being present, there are several ways how the game system starts and guides the conversation in certain directions on its own.

It might be argued that these component or system actions that start the conversation are actually just pure data (texts) algorithms, a cybertext waiting to be read by the ergodic reader, and that is true.

As has been shown in the first entering into the heterotopias on the first day in the field as well as in the soundwalks, these algorithms are programmed to initiate the conversation on their own in the form of sonic challenge guideposts and also by means of sensory immersion.

Another objection may be that this conversation is no different from any interaction or experience in the real world. And this is also true. But while the real world can be described as a constant conversation with a very complex environment that includes uncountable distinct participants, in playing (single-player) video games, there are two participants, the player and the system. Further, just as could be argued that every existing social space in the world is a heterotopia, it is a question of the perspective and why certain models are applied to a space in question. And for the video game heterotopias the concept of a constant conversation helps to untangle the complex (not exclusively) sonic interaction between player and system by means of ludic, narrative, and immersive functions.

As has been declared in the introduction on cybertext, a cybertext is not a representation or a description of a fictional (digital game) world, but rather this world itself (Section 4.1). Something similar applies to the constant conversation: the conversation is everything perceived in the game space by the player, plus his or her own input and reaction to it.

The sensory immersion in a video game heterotopia is a direct implication from this conversation. Imaginative and challenge-based immersions are constructed through the topic of these conversations: goals, the gameworld and its fiction.

Back to the question of not what a video game is, but what—and especially how—a (specific) video game does (with the focus on sound), it has to be elaborated how this conversation works. And for a conversation to work for two participants, there has to be some sort of a language that both sides understand.

8.2 The Language

The audiovisual languages allowing the player and game to communicate are very complex and they work on many different levels. It may not naturally be given that every player understands them, as Jacobsen noted as a potentially interesting research field in the interview:

> "[V]ideo games are super unnatural, like probably the most uncanny thing that you can even find […] [W]hat is it that makes some people naturally understand that this [specific gameplay element] is part of the game, while others think that this is not part of the game? Where is it that they misunderstand the communicative process between game and player, whereas others naturally jump in and find themselves completely immersed in this interactive thing even if they have never played games before, and why some people who are incredibly immersed instantly understand the process." (Jacobsen 2022)

He talks about his personal experiences with ex-girlfriends who had never played video games before, and some intuitively understood how video games work, and some did not.

As noted, there are numerous layers of communication going on "under-the-hood," and the synthesis, the presentation of information from the game to the player is an audiovisual bottleneck (fourth layer in Fig. 4.1) compared to all the information coming from the game's database (first layer). And the only way the player can talk back is through his input device, in this case the controller.

To pass information through this bottleneck, the interface, from both sides, translation codes have to be understood. What makes it even more complex are the different ways semantics are carried. Most obvious ways on first instance are written text and spoken words in natural languages, then every other visual and aural representation and their combination. And, as has been shown in the case studies, the semantics of spoken language can be understood on different

layers and have multiple meanings. That means, next to our spoken language, there are not only coded visual and sonic signs, but also their combinations and intertwinements and multiple forms of interpretations of each single sign.

The way a player can answer is even more compressed and coded, in the case of the PlayStation 4 through eighteen buttons. The meaning of each button has to be learned (mostly through in-game tutorials or manuals), but some basic game mechanics like moving the character or the camera around him or her is required as common knowledge or seen as intuitive. This is quite a complex process for a user to be able to act within the video game, as this button layout also defines to a certain point the rule system of said heterotopia. And it is the only way for a player to answer the conversation, to the whole flow of information between the interface and the database.

The better these codes are understood and the better a user understands the process of the flow of information, the more he is immersed in the game, as Jacobsen put it in his observation. And this immersion addresses not only the sensory immersion as an experience in a credible environment, but the wholesome gameplay experience, as immersed in a video game heterotopia, as opposed to a copy of reality. And finally, the more intuitive this language is understood and also "spoken" by the player, the stronger the fictional pact of the ergodic reader with the text becomes.

The first days in the field showed how carefully the player in these cases is introduced to the communication of its respective heterotopia. While many specific characteristics of what could be called dialects are taught in tutorials that are woven into the narrative, a big part is expected to be understood by the player intuitively. As has been noted in Section 6.2, this language in a video game is defined and expected to a certain extent merely through its definition in genre and franchise.

In regard to the topic of this book, this means that the focus on what and how soundscapes do and work in video games can be fur-

ther narrowed, namely, to the one-sided and coded sonic language that is used by the game system and its interpretation for the player. That said, it has to be noted that as part of a complex system of languages, this cannot be discussed by completely ignoring all other layers, how the player talks to the system or the visual coding by the game system for example, since, in a conversation, everything that is perceived and answered intertwines.

Understanding the sonic language of video game system is not just a decryption of what game developers or sound designer created. As will be shown in Section 9, the game sound designers I interviewed do not have fully conscious knowledge about how this conversation works, although they know what and how every single sound works.

8.3 The Vocabulary

Following the picture of video games as constant conversations, visual representations, single sounds, but also pressing buttons would be their vocabulary. It may be possible to collect all "words" and put them in categories that seem logical in a specific context, like their diegetic implementation or their interactive function for the player, but this cannot explain other, additional contexts in the video game heterotopia or even explain the topics in that conversation.

I used to play *Super Mario Bros.* (Nintendo 1985) on the NES console with a classmate when we were probably around ten years old. One time, his father with no video game experience at all came by and watched what was happening on the old television screen. He asked me how the playing and controlling worked if we just pressed the right buttons with the right timing. He imagined there had to be some sort of a sequence we pressed the buttons, kind of like a Morse code, and as long we did that in the correct order, the action on the screen continues like a movie sequence. It took me very long to comprehend this misunderstanding.

Without understanding the code of the language, this is exactly what is happening: if the player does not know that the translation for the command "jump" is pressing the "A" button and "→" for walking right, it looks like a mysterious sequence of buttons, comparable to a sequence of incomprehensible syllables of an unknown language. But an experienced jump'n'run game player, the transcription "→ A" automatically translates into the avatar jumping right in a platformer. But without knowing the context of the conversation, it is still unclear if this means that Mario will jump over an obstacle, on a turtle or into the abyss.

This may sound self-explanatory, but as the video game interactions become more complex, this context becomes more important. In the played sequences of *Assassin's Creed*, "△" can mean petting a cat, synchronizing on a safe spot, or even raiding a village, depending on its context. For a game system, the understanding of the "word" △ depends completely on the context and is not open for interpretations, and if it is well designed, it is also unmistakable for the player's intention.

The other way round, a sign like a single sound of a wild animal hiding in the bushes, produced by the video game system, can be heard by a player in distinct contexts, and therefore, its interpretation can vary.

In my master's thesis (Mauch 2016), I argued that all 30 different sounds introduced in the final analysis represent a distinct category of function, connecting the player and system, when actually the biggest difference was made by the context:

> "[Every game sound presented here differentiates itself in its function to the player and can be considered as representative for its own functional category. The player does not need to understand any theory about gameworlds, interaction and immersion, or interface sounds and diegesis to decipher and process the functionality and information carried by a game sound. The complex framework of different layers of how sound carries information is in most cases intuitive or

> conditioned comprehensible for the player, as also has been shown by the interviews of the participants.]"[66] (ibid.: 80)

Regarding the concept of the sound-strand introduced in Section 4.4, the same categorization could have been accomplished by listing all combinations of the five units Fig. 4.3). The trick, however, is that units three, four and five are mostly subjective perceptions (mostly because there is, depending on the game design, strong guidance, and evidence for its interpretation). And that is why in the listing of said 30 categories, the description of the context was so essential. The reason why the player does not need to understand the complexity of possible numerous functional categories or theories of sound is because he or she has the context.

Now by adding the meta data to the sound-strand of any given game sound, it is still possible to create and analyze distinct categories of different perspectives on the theories introduced in this research if desired, simply by sorting them by its respective units. The units *trigger, source,* and *information* (reduced to the diegesis of the information) for example result in Jørgensen's interface sounds model (Jørgensen 2011) introduced in Section 4.3.

In this sense, analyzing sounds, soundscapes, and sonic immersion in video games with the focus on information that is carried and its function between player and game system, only makes sense by including the respective *grammar* (the sound-strand) with its meta data, and in perspective to the overall constant conversation.

66 Original German text: "So unterscheidet sich jeder hier vorgestellte Game Sound in der Funktion dem Spieler gegenüber und kann stellvertretend für eine eigene Funktionskategorie betrachtet werden. Der Spieler muss keine Theorie der Gameworld, der Interaktion und der Immersion oder der Interface Sounds und der Diegesis verstehen, um die Funktionen und Informationen der Game Sounds richtig zu entschlüsseln und zu verarbeiten. Das komplexe System der verschiedenen Ebenen, auf welchen über den Sound Informationen getragen werden, ist in den meisten Fällen intuitiv oder konditioniert für den Spieler verständlich, was auch die Befragungen der Probanden bestätigt haben."

8.4 Conclusion

It has been shown that in video games the whole process of reading a cybertext can be rephrased as a constant conversation between the player and the game system. This approach shifts the perspective from a single interactive user to an interaction between two actively involved participants with genuine intentions, whether programmed, spontaneous, planed, or intuitive. The conversation does not work through the same channels in both directions, so codes have to be understood and learned on different levels: haptic, physical, visual and auditory features work together to communicate between player and game through the interface bottleneck (Fig. 4.1).

By picturing the ergodic process of playing a video game as a constant conversation, all theories introduced here so far, from the anatomy of games, gameworld and interface characteristics, diegesis, soundscapes and soundwalks, immersion models and games as heterotopias can be seen as part of it and can be described within this framework.

To understand the soundscapes of the case studies in focus of this book, their function in the heterotopia and between game system and player, their individual primitives[67] cannot be analyzed in an isolated way, but in the frame of the whole conversation. By characterizing distinct sounds with the help of the sound-strand, interactions, and relations of what is going on "under-the-hood" can be defined and help analyze and compare the interpretations and the immersive and challenge guidepost functions for the player.

Therefore, with this new, or rather crystalized understanding of sound as a part of the constant conversation, in the following, sounds are not only analyzed through the sound-strand, but also interpreted as a vocabulary of a broader language that enables the interaction between player and game.

67 In the case of the present case studies, all sounds can be characterized as component and system actions (see Section 4.2, p. 31).

9 Game Audio Development

As mentioned in the section above, the game sound developer interviews are not meant to decipher the exact meaning behind all created sounds and soundscapes or how they are meant to be functioning for the player's perception. I am aware that their intention behind creating the sound and its meaning for a video game is not superposable with the experience by the user. Otherwise, there would be no point in writing this book. Further, they are a qualitative representation of highly subjective views of the participants and not meant as representative for the whole industry of (action-adventure) video game audio development.

Although all interviewed game sound designers started by recording music at some point before turning to video games, they are in very different stages of their careers and work in very different settings in different regions of the world: Claudio Beck works alone most of the time and is responsible all by himself for all sound and music in the small indie-game studio Stray Fawn; and Bjørn Jacobsen, who also shares an academic background in game sound design, lives in Copenhagen and founded his own company to work only on projects, local and international, that he really likes and in the way he wants to:

> "[A]bout three years ago I decided to make my own sound studio to sort of move home and work on, because I found it quite limiting to work at studios all the time where production is quite slow but also it was a bit of a tiresome process to, when you work in AAA to have a game released, you know every five years or something. I found it much more intriguing too, to like work when help was needed, so

> then I could focus on other things on other projects when one project was in production for, let's say the actual game, then I could do the sounds for another game and so on." (Jacobsen 2022)

The insights from the different approaches and backgrounds in game sound development show the diversity of backgrounds in this professional field, and there might be just as many more philosophies behind it as there are development studios worldwide. But as the interviewees emphasized, they both enjoy the diversity in this field. Despite, or maybe just because, of this diversity, they feel a strong bond between them, sharing their different insights and benefit from each other.

According to Jørgensen, a common constraint in game sound development that all sound designers share is that sound usually comes last in the development process:

> "Due to the nature of computer game development process, the game concept needs to be developed before any sound can be added. This means that it would not be fruitful on game audio before central gameplay ideas and certain graphical features have been developed. In this sense, audio development becomes the disciple of gameplay and graphics development. Nevertheless, it is desired that audio should be part of the process from an early stage, and the idea during the development process is that sound should be supportive of what is going on in the game." (Jørgensen 2009: 141)

The game sound developers and programmers she interviewed wished that sound therefore not only supports the mood, but also that it should be taken into account for "its functional value" (ibid.). Now, more than ten years later, game sound designers still express the same feeling, but also value this process as a convenience.

Claudio, working on *Wandering Village* (Stray Fawn 2022), a city-building simulation game, has to wait for the single graphic design assets coming from the art team before he starts creating their sound:

> "The process actually always depends on the art team – those creating the designs or the 3D-objects. It is actually very important that there is a visual element, because, for example, a house can be one room tall or it can be have five floors, it sounds different if there is one person working in there or twenty." (Beck 2022)

For Bjørn on the other hand, this process has been something that bothered him in the industry before he became self-employed, as he repeatedly mentions throughout the whole interview:

> "[W]e have to wait until mechanics and everything was put into the game before we can do it, which means that we will be very busy towards the end of production." (Jacobsen 2022)

> "[P]rocesses have always been that sound design comes last, and we're like postponing everything that we do as part of, let's say, post production, but I would very much try and advocate that and that everything should start as early as possible." (Jacobsen 2022)

When asked about the specific work on distinct sounds and soundscape, if there is a concrete idea they realize or if it is more of a creative process, they shared similar mixed approaches.

Claudio, for example, has very specific sources for his inspiration, which he mainly finds in Japanese Anime, particularly in movies from the Studio Ghibli, who, in his perception, have a very different, more abstract, approach to sound design than the rest of the world, but also from Drum'n'Bass productions, where he was part of the scene for a long time. Bjørn takes his inspiration next to movies and other games from real-world soundwalks and inspires his students to do the same and provides video tutorials on his YouTube channel Cujo Sounds.[68]

Before leading the interview more transparently in the direction of my own ideas of interactive functions and information carried by sound, I was interested in what makes sound design special for them

68 https://www.youtube.com/channel/UCDe59ZJaYVueCUH55POlW3g.

in comparison to other game design elements, and, production-wise, if they distinguish different categories in sound and how, if, its respective assignment is done in a team. In this way I was hoping to find out if there are different approaches from the perspective of developers on thinking about game sound characteristics that I and other game sound theories have not focused on.

For Claudio, there are two special elements to game audio: repetition and variation, as in comparison to a linear composition, and the creation of a sonic brand recognition:

> "In a game you have different sounds that are not coordinately played on top of each other, Because some things happen randomly, sounds have to be well layered. And by designing sounds, one has to pay very much attention that there are no conflicts afterwards, overdrive for example, or generally that the player does not have to suffer hearing damages. […] You want to match very well the character of a game, creating soundscapes that have a brand recognition." (Beck 2022)

Bjørn had a really interesting answer when I asked him about the game sound development process and if they divide sounds and soundscapes into categories within a team:

> "No, not really. But that's, I guess, that is sometimes because the theory behind all this isn't developed enough. So if this was a thing that was, let's say, like with game design taught in schools and so on, then I think a lot of the next coming generations and video games would definitely sit down and say: 'Where do we need information and where don't we?' […] I don't, and I know others don't either, that don't sit down and try to talk about what are we trying to communicate other than we want it to sound like a cool soundscape." (Jacobsen 2022)

For him, there is a huge need to catch up in the video game industry on behalf of game sound. Throughout the whole interview I got the impression he made it his mission to emancipate game sound in the

development process, through his personal way of working in the industry, but also through talks at game development congresses and video tutorials online. So, when I asked him about the key characteristics of sound in game design, he said:

> "I think one of the things that is quite often misunderstood with audio is that audio, in many cases, like with movies, have been treated like something that is just an add-on, because people can hear so therefore we need audio. But I think games nowadays are more and more opening up to the fact that, let's say, level Design, for example, is not only architecture and visual design. […] I think video games lately more and more are starting to understand that audio can really do something also that you've seen big modern games come out these days where one of the main praises is that oh, the sound design is awesome." (Jacobsen 2022)

A broader awareness of sound quality in video games through press, reviews and awards also creates the possibility to emancipate game sound further from the role of a mere add-on to a feature on its own.

Having read his thesis on informant diegesis (Jacobsen 2016), I was very interested in how he implements his background theory practically—especially how he implements concrete information in specific sounds:

> "That's a really good question, because normally you don't. Because many game designers, they design their game before they talked to the sound designer. […] As I started, both at CD Project Red but also at IO Interactive, I came up with the idea instead of some director having an idea and then some concept artist draws a picture and then we make a mechanic or similar, then maybe it would sometimes be nice if the concept artist says that they don't know what to draw, they don't know what this forest is supposed to look like, but then maybe, if the sound designer has a great idea for types of birds or something, maybe that will help them have ideas." (Jacobsen 2022)

At both studios, they created groups that discussed all sorts of game features early on, with participants from all areas of the game development. As an example, he mentions the design of a car pursuit through the rain in *Hitman 2* (IO Interactive), where the way the rain sounds in specific missions laid the foundation for how they drove through the rain.

As a final thought experiment, I asked the game audio developers to imagine themselves being perfectly immersed in a video game. How could they tell, only sonically, that they are in a video game and not in reality? It was my intention to make them think about specific game sound features and characteristics from another point of view, but with their differentiated development knowledge.

For Claudio, this is still a technical issue (albeit not following the thought experiment entirely as "perfectly immersed") of sound quality that makes it distinguishable from reality:

> "This depends on how sound is fed in the system. If it is purely auditory, then you would notice based on the fact that you are located in another room, which has another sound quality than the effective location. […] Let's say you are on an open field and a whale flies by: sound goes out and reflects in the room where you are in. By this reference you could tell that it is not real. […] You could counteract by directly target the eardrum, or the brain or something alike." (Beck 2022)

While pointing out that everything is much louder than in reality, Bjørn notes that he has not been able to determine where the uncanny valley for sound is. He compares the thought experiment with a person from the 1950s, watching a modern movie like *Inception* (2010)—for this person everything would sound "super unnatural," whereas for someone watching it today it might be loud, but still natural.

> "I don't know how to make something sound like a video game. I think a video game only works if visuals and sound and everything

> fit together. And it depends on the genre, because if it's Super Mario, then it's, you know, the jumping sound is definitely unnatural but sounds so much like him jumping, whereas in a more natural style video game then the sound of someone jumping would have to sound like someone actually jumping and landing." (Jacobsen 2022)

And finally, when asked about the future of game sound design, the focus was again on technical realism. While for Claudio this includes the perfection of and advancement in VR (virtual reality), for Bjørn, it is granular soundscapes, as opposed to procedurally generated soundscapes:

> "In terms of that, rain is not a five minute rain loop, it will become rain sounds that is generated through samples and so on. […] Your experience will be different from mine because the rain will never be looping and so on. That would be pretty, that's definitely part of the future." (Jacobsen 2022)

This way, every video game experience becomes an even more unique experience for each player or playthrough of a game.

Although both game audio developers strive for an immersive sonic game experience, the interviews once more emphasized the fact that game soundscapes are not, nor do they tend to be, best possible copies of (physical) reality, but rather believable as video game environments. Soundscapes are therefore a compromise and balance between an immersive experience of a fictional world and functional perception of sonic key features. There are different levels of awareness of the uniqueness of video game soundscapes, but there seems to be a common understanding of its function between immersion, information conveyance and emotional impact. Bjørn strongly advocates for a deeper impartation of a broader understanding of video game sound functions between player and system, but also a more sophisticated approach in its development to emancipate the role of sound from a mere add-on to visuals and game mechanics in the video game industry.

10 Soundscapes and Immersion

With the sharpened focus on soundscapes as a part of a complex system building a constant conversation that defines the heterotopia of a video game, in this section, different sonic spaces within the case studies will be further explored and illuminated through the gathered theoretical realizations and proposals concerning the functional, immersive, and informative features of sound.

Exemplary in different soundscape-settings of each case study, two or three distinct sounds will be put in closer context and analyzed through the sound-strand model introduced in Section 4.4. The settings are divided into open-air areas, the inside of buildings, caves, vaults, dungeons or similar places, and further, game spaces that reach out of the gameworld.

10.1 Locations Within the Gameworld

10.1.1 Open-Air Areas

10.1.1.1 Assassin's Creed Valhalla*: Forrest Legracæsterscir*

Standing aft on the longboat, Eivor is guiding her boat crew along the Trena northeast of Mercia, England, from the region of Legracæsterscir to Lincolnescir as part of the main quest *The Kingmaker's Saga.* The airflow blows dominantly in waves, overlapping alternating with the rushing sound of the boat carving in the water. While the skáld starts to play a wordless tune on his lyre, I hear the wood creaking as

the boat turns and the crew lowers and raises the mast to pass under a bridge. The water splashes calmly under the oars.

As soon as Eivor leaves the boat I can hear the crew chatter, but its echo is soon drowned out by different rushing sounds of water, wind, and trees. But the loudest noise is produced by her own footsteps, which are only topped by the swish of small bushes she crosses through.

A bit inland I am surprised by three soldiers aiming their arrows at a white wolf, but they have not yet spotted Eivor. Instead, I can hear the swinging of their clubs and swords dominating the soundscape for a moment. Seconds later, a signal that sounds like a sword that is drawn out of its scabbard shrills with massive reverb, followed by a man shouting: "Stay away from me!" Immediately Eivor is attacked by two of the soldiers. The mood seems cold, dry and harsh, the soundscape is reduced to the mere footsteps, fighting uproar and men screaming in the background.

It is not a very wild fight, since the soldiers are scattered through the woods, but every now and then, the combat leaves brutal sounds of steel in flesh and blood and people screaming. Light chimes ring in moments when Eivor is out of sight of any soldier, and finally, with enough soldiers in the battle, a fast-paced combat music sets in. Once in the small soldiers' camp I activate Odin's Sight, which triggers an airy bass drum sound, to find any treasures hidden nearby, which are revealed with a jingling sound of gold coins.

Just before the last soldier is defeated and the fighting music comes to an end, a trumpet-like jingle marks the leveling up of my character, meaning I have earned enough XP through combat to improve the skills of Eivor.

Back in the woods, it starts raining, which adds another layer of rushing to the keynote. In front of me I can hear a fox howling. Another light metallic jingle makes me aware that some possibly aggressive wild animal spotted me, also indicated by white arcs around Eivor with arrows pointing to the spatial location of its origin.

My way leads me out of the woods onto a small rock cliff, which renders the rushing soundscape more open and single raindrops can

be heard now on the stony ground. Before calling Eivor's horse by loudly whistling and following the road to the next quest marker, I smash the shining small peaks of iron metal on the rock, exposing collectible little pieces of iron ore, which are buzzing in high tones until I collect them with another metal jingling sound. As the night finally sets in completely, wolves are sporadic howling (Mauch 2023: Assassin's Creed 07 [01.21.2022]).

Although this scene is a very short insight of the complete map and no special event is happening during these five minutes, it represents most of the playtime, wandering from quest mark to quest mark, randomly stumbling into minor battles. It also represents most parts of the map. There are local varieties between the distinct regions, as it seems colder and harsher towards the north with increasing snow, and milder in the south, and differences in daytime and weather, but the diversity is very narrow compared to the other two case studies, not only since it also reflects most parts of the historical regions of England.

There is strikingly little background music and most of the time the soundscape can be defined as hi-fi, where the individual sounds are clearly distinguishable. The keynote sounds are shaped through different layers of rushing sounds: strong winds and surface waves on the boat, wind in the trees and footsteps in tall grass and bushes, and finally, the strong and noisy rainfall. Furthermore, smoke bombs, flying arrows and other fast combat movements add rushing noises on top as sound signals, but still not perceived as a sonic overload.

Only when the music sets in does the sonic environment tend to become lo-fi, especially the forward-driving different layers of tal-harpas accompanied by the low male chorus and fast drums during combat music aiming to overwhelm the sonic perception in the chaotic mist of a battle. Put into context with the sound-strand model (Fig. 10.1), this musical loop is triggered by the game system, when the battle has reached a certain stage, duration or number of participants, and the source is clearly outside the gameworld, thus extradiegetic.

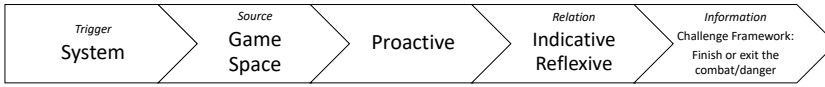

Figure 10.1: Sound-Strand: Combat Music in *Assassin's Creed Valhalla*

Informing the player that he or she is in an unavoidable fight, it asks for a proactive action to survive; therefore, it is also indicative. Further, there is a reflexive relationship to the player, producing an aggressive, restless, and chaotic mood, overloading him or her sonically. The information the combat music conveys is straightforward: the player is in danger if he or she does not act.

Focusing on different sound signals, like the chattering of the boat crew or wild animals in the forest, shows that the audible radius around Eivor is very narrow, meaning sounds originating in the gameworld (diegetic) near her are very loud, but they fade away very suddenly and abruptly in the distance. The reason may be that otherwise there is an overload of sounds to process for the player, and the dynamic range would be far too big for sound systems and the player's ears, as game audio developers emphasized. But it also renders the sonic environment more compressed, harsh, and dry, and underlines the hi-fi character of the soundscape.

Sound signals with extradiegetic sources, metaphorical, overlay, and integrated interface sounds in Jørgensen's terminology (Jørgensen 2011), seem very close, mostly somewhere a bit on the top right, kind of perceived as in the head of the player, as for example the signal informing the player that Eivor has been detected by enemies or the discovery of collectibles through Odin's Sight.

Exceptions are integrated interface sounds that are spatially located within the gameworld like the presence of collectable pieces of iron ore (Fig. 10.2).

The buzzing sound is triggered by the player who smashes the concrete fixed units of iron found on rocky surfaces into collectable pieces. The source can be spatially located in the gameworld by the

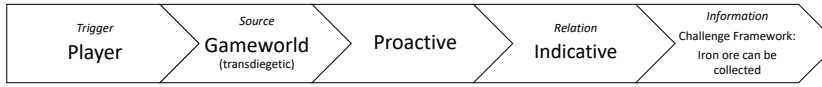

Figure 10.2: Sound-Strand: Collectable Iron Ore in *Assassin's Creed Valhalla*

player, but not by Eivor or anyone else inhabiting the fictional gameworld; therefore, it should be defined as diegetic in the heterotopia of the game, but not within the fiction. The signal that there is ore to be gathered nearby can be interpreted as an indicative and proactive challenge guidepost.

10.1.1.2 Star Wars Jedi: Fallen Order: Shadowlands on Kashyyyk

In *Star Wars Jedi*, the level design is slightly different and open areas do not provide the same freedom as in *Assassin's Creed Valhalla* and *Horizon Zero Dawn* to explore every spot visible. Although maps simulate an open-world environment, the paths the player can follow are predefined and limited by impassable obstacles, albeit sometimes designed more like labyrinths or dungeons. Technically, the Shadowlands are not fully open-air, but because of the huge size and height of the arches, they feel more open than for example the inside of buildings or caves.

For the second time on Kashyyyk, Cal is on his way to the Shadowlands in search of the Wookie chieftain Tarfful. The light-giving lightsaber is gently humming, and the footsteps resound softly off the wet stony walls while traversing a cave tunnel. I can faintly detect the sound of crickets or frogs hidden somewhere and roots creaking.

The second Cal steps into the open, which is still a covered place, a huge organic arch, the deep string section of the orchestra sets in with an ascending second, followed by the higher string section accompanied by oboes.

"What's that? … Smells like …" Cal begins. BD-1 replies with a single, for his spectrum low pitched "uw," which I interpret as: "Me neither."

In front of Cal is a natural bridge of mud and rock on a grown root, and in the distance I glimpse more organic cliffs and paths. The sunlight breaks through several openings and illuminates the slight mist hanging over the whole cave valley, which is colored in darkish gray and green tones with splashes of orange, mostly by exotic flying and growing creatures. The path is blocked by man-sized carnivorous plants that swish loudly and snap when stepping on it. I try to kill the first one with a loud buzzing force-push and the lightsaber, and I succeed. After a splash of green-gray plant liquid, it stays motionless on the ground.

Another beeping sound from BD-1, this time bi-syllabic, tells me there is a scan he can perform, as also the written information at the bottom middle shows:

↓ Scan.

"Let me see," Cal replies, another beeping answer from BD-1 after he's scanned it with green and red lasers and a typical scanning sound. Meanwhile the creaks continue to clatter continuously and an invisible small creature is flapping away.

While I watch red glowing blossoms approaching Cal and attacking him, producing slimy sounds, especially when thrown back with force-pushes, I detect a stormtrooper in the background running into a carnivorous plant and getting killed by it with a loud snap. The blossoms squeak at a very high pitch when drawn back, it seems they cannot be defeated. Reaching the fallen stormtrooper, Cal is attacked by huge flying insects, and he notes in astonishment: "Huh, the whole forest lives!" The soundscape is filled by the orchestra, the buzzing of Cal's force-pushes and the irregular humming and hissing of the lightsaber while defending himself. After the combat is over, it is reduced to long string bows and chirping of hidden small creatures and possible tiny footsteps of mice or something similar.

Following the path further, the slimy, flattery, creaky sounds of the living forest intensify until Cal reaches a shiny spot where I can activate a Force Echo the same way as in the soundwalk, which reveals an argument between Saw and another resistance fighter about whether they should stay and help the Wookies and find Tarfful or abandon the planet. The voices reverb and echo in a ghostly manner from the recollection. A very faint digital signal accompanies the written information on the left side of the screen that the note has been added to the system.

After a few fights with stormtroopers, Cal falls off the path, deeper into the organic cove of the forest with luminous living plants and the orchestra plays even more somber notes and noises now.

Coming to the next arch, which glooms in misty green tones from luminescing plants or fungi and jumping into the algae colored water, Cal asks: "Have you ever seen such a place?" "Beep beep!" "Me neither," the still water is splashing loudly while Cal is swimming.

In the labyrinth made of muddy platforms, water and big round luminescing plants that function as far-jumping mechanisms to reach higher levels, gently purring like a cat when he approaches, Cal is occasionally confronted by hostile creatures like Slyyygs, man-sized slugs with horns, and Wyyyschokks, equally tall spiders. The combat sounds are shaped most prominently by the hissing and hits by the lightsaber, Cal's heavy breathing, occasionally some snorting and howling from the creatures, while the orchestra peacefully continues to play in slow bows.

"We should meet Tarfful there," Cal tells BD-1, as soon as I spot the small group of rebels some levels higher. Another jump on one of these purring plants, he catches a nearby liana and lands just in front of them with a loud roll on the wooden platform.

"Glad you're here," the female rebel that functions as a Wookie translator welcomes him as a response to me pressing the R3 button to interact, as I am instructed in written text onscreen, "this is chieftain Tarfful" (Mauch 2023: Star Wars Jedi 08 [01.24.2022]).

While the distinct planets visited in *Star Wars Jedi* are very diverse in their visual appearance, their sonic difference is less striking.

Crickets, frog noises and tapping of very small creatures adding to the keynote sounds can be heard not only on Kashyyyk, but also on Bogano (Mauch 2023: Star Wars Jedi 09 [01.26.2022]), Zeffo (Mauch 2023: Star Wars Jedi 10 [01.06.2022]), and even on some places on Dathomir (Mauch 2023: Star Wars Jedi 11 [01.19.2022]) with the addition of wind rushing on each other planet. Nonetheless, with the absence of wind or creaks rushing and the louder, but also more diverse and exotic sounds of nature, the soundscape is perceived as more intense and organic on Kashyyyk, representing a single living biological organism. The soundscapes made of sounds of animals, insects and plants are in fact very unique to each planet, but it is something different that makes it feel akin to each other.

The soundscape is predominantly defined by the almost uninterruptedly accompanying orchestra, underlining everything like a movie score, which makes it feel very lo-fi, rendering individual sounds difficult to tell apart. This also adds to the feeling of sonic similarity, although the score is different on every planet, its timbre and use of instruments stays resemblant, and the main theme (Fig. 7.3) reoccurs frequently. The string section also uses a lot of ascending seconds and other harmonies that produce a feeling of tension, emphasizing the lo-fi character of the soundscape.

Because the orchestra is such a natural part of the soundscape of the heterotopia of the game, its absence makes sequences stand out. On the snow-covered planet Ilum (Mauch 2023: Star Wars Jedi 12 [02.04.2022]), where Cal finds his personal kyber crystal to power his lightsaber, he is confronted by a cold and unforgiving blizzard before finding shelter in the entrance of the abandoned Jedi temple for Padawans. The nonappearance of the orchestra has the effect of a sound itself, with a reflexive relationship to the player by intensifying the mood created by the sound of the ear-shattering cold wind blowing around the icy rocks and cliffs. Only once he finds a first shelter from the wind in a very narrow passage, does the

warmth of the string section come back to the sonic environment of the player.

While I have experienced the background music become more tense and faster paced in combats in other places, in the Shadowlands it continues steadily in its ambient character. But even if music intermits sometimes during a fight, the buzzing and hitting and number of movements of Cal and enemies are filling the sonic space to an unresting lo-fi feeling too.

Although the soundscape is very filled out, the sonic radius around Cal is much wider than the one perceived in *Assassin's Creed Valhalla*, as for example the stormtrooper screaming and being eaten by a carnivorous plant in the distance is clearly audible.

Cal is talking to BD-1 frequently, and most of the time this has the mere function of strengthening the immersion into the gameworld; and although it sometimes feels unnatural, it further colors the characteristics of the fiction, its environment and narrative. His expression about the stench at the beginning of the scene gives no further clues as to the progression of the game but adds to the imagination of the gameworld through a sense that is not part of the heterotopia: scent.

The monologue (Fig. 10.3) is triggered by the system when Cal reaches a certain area the first time on the map. It indicates that this place not only looks and sounds like a single living organism, but also has the smell of it, though addresses the sensory immersion in this place. It is neither proactive, a request to act in a certain way, nor reactive to any player input, except for being present in a certain location of the gameworld. Other dialogues between Cal and BD-1 like the astonishment about the whole place serve the same function.

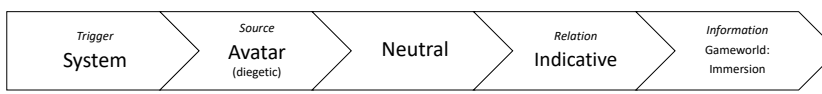

Figure 10.3: Sound-Strand: "What's that?... Smells like..." (*Star Wars Jedi*)

There are very few extradiegetic sounds in this scene, as in the overall game, and they are easily missed. After Cal defeats two of the Wyyyschokks near the lake, the player has earned enough XPs to appoint a new skill to Cal's skill-tree, which is signaled by a very long and airy sound like a stroke on a singing bowl (Fig. 10.4).

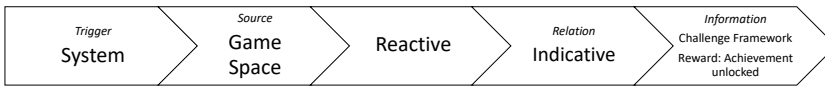

Figure 10.4: Sound-Strand: Skill-Point Earned in *Star Wars Jedi*

In the played sequence, the chime is almost completely drowned out by the sound of a lightsaber strike, the creature sound, and the orchestra. The signal chimes as soon as the orange XP bar on the middle top of the screen is full, thus triggered by the game system. The sound is only audible for the player outside the gameworld and reactive to the achievement. It indicates the reward of a certain game challenge, the completing of the XP bar for leveling up the character.

Most other sonic challenge guideposts in *Star Wars Jedi* are more integrated into the gameworld, for example when Cal tells BD-1: "We should meet Tarfful there" (Fig. 10.5).

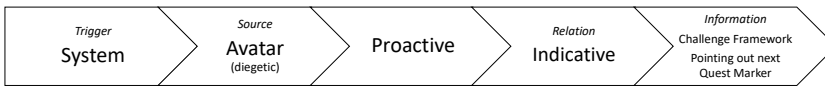

Figure 10.5: Sound-Strand: "We should meet Tarfful there!" (*Star Wars Jedi*)

This dialogue can be characterized nearly identically like Fig. 10.3, with the exception that it is not purely enhancing the immersion, but also informing the player how to progress the narrative. Throughout the whole game, these two forms of dialogue are used often and alternating, which not only strengthens the sensory, but also the chal-

lenge-based immersion through its intertwinement that absorbs the player further into the fiction of the game heterotopia. And because of its continual occurrence, the fact that Cal is speaking many of his thoughts out loud does not feel unnatural after a short while, just like the constant accompaniment of the orchestra.

10.1.1.3 Horizon Zero Dawn: *Around Brightmarket*

Pursuing the main quest "To Curse the Darkness," Aloy follows the road from Brightmarket to the wet forest of the Jewel region, northwest of Meridian, the capital of the Carja. Bushes make rushing sounds when she walks through them and the footsteps give a wooden feedback sound while crossing a little bridge, the stream gently pattering underneath. The scenery is underlined by the slight ambient music of flutes, synthesizers and occasionally some faint and soft drums. Passing a guard post of the Sun Carja I can hear soldiers talking to each other on Aloy's left side but cannot make out the exact words. Passing the next stream, this time just next to the bridge through the water, which produces a loud splashing sound, I detect the noises from small animals: birds, ducks, frogs and possibly crickets.

Traversing yet another bridge, this time audibly clearly recognizing it as a stone bridge, I blink to the right side where I can spot a watermill making loud rushing noises. Between the loud noise passing from this stream and the next one, the airy rattle announces: "Machine Site Discovered. Charger." Aloy kneels to gather some yellow Corruption Glaze Roots, which she comments with: "Good for an old remedy," the plant snapping loudly when being plucked.

On the other side of the raisable bridge made of stone and wood, I detect a Charger about twenty meters away, peacefully baaing metallically with even louder snorting or rather puffing off steam while shaking his head. Accompanied by a high-pitched glitch sound, I activate Aloy's ancient ear device to scan the machine, which is signaled by another, yet even higher pitched glitch sound. This results in

his horns and the round container on his back glowing yellow, even when I turn off the device again, marking them as weak spots for an easier attack with the bow.

As if the system reads my mind before I take any further steps, a faint high-pitched electronic beat starts to play, which is almost drowned out by a much louder cello playing a low successive fourth. The first hit misses the cylinder, but the second strike hits a weak spot, producing a much longer sound like a hydraulic puffing explosion with a lot of reverb. The Charger's nose is now glowing red, signaling he is in an aggressive fighting state, instead of blue while peacefully grazing. What follows is an overlapping of loud hissing and machine noises and the combat music dominating.

After a chaotic battle with three Chargers who drew Aloy back on the bridge, forcing her to defend herself by spear, the victory chime, which sounds a bit like a bowed guitar with reverb and slightly distorted, signals the end of the fight and I can gather the resources left behind and intact from the machines: metal shards, Charger lens, blaze, sparker, and wire. In the overlaying menu that lets me search the inventory of the fallen Chargers, there are generic metallic workshop sounds audible in the background, and each resource gives another feedback sound when collected: metal shards, which are used as the common currency in *Horizon Zero Dawn*, produce the familiar jingling sound of coins for example, while blaze, the biofuel produced by herding machines, sounds like a cork popping from a very big empty bottle.

The last tones of the victory chime are still fading out, I activate the weapon wheel, an overlay interface that allows me to select different arrows and weapons, by holding L2 to craft new arrows with the gained resources since I used up several during combat. By pressing the x-button for a moment, arrows are crafted in dozens, which I repeat three times, each one sounding like a mechanical pocket watch being wound up, while the soundscape around me is dampened and slowed down.

A few steps further, Aloy mounts the Charger she was overriding during the fight, which is now rideable, and trots forward, sounding

essentially like a horse ride, right into the next fight, this time with Sawtooths. After the same procedure, just louder and more chaotic, since these are big deadly combat class machines, I am very happy to find Ochrebloom and Hintergold plants nearby, which restore the health bar when collected. After the relieving snap the collecting of the plants produce, Aloy notes: "I need this!"

With a loud and short whistle, I summon her riding Charger, and even before I can spot it, I can hear it running through the water of the stream. With rattling sounds, I mount again and continue on the path (Mauch 2023: Horizon Zero Dawn 07 [02.10.2022]).

Like in *Assassin's Creed Valhalla*, this sequence represents a big part of the playtime while exploring the lands of *Horizon Zero Dawn*, but the environmental diversity, visual as well as sonic, is much wider.

Although there is infrequently background music playing and layers of water rushing through several streams around, I would characterize the soundscape as hi-fi, except when Aloy is caught up in combat. The synths, flutes and even the drums are very lightly used (except in combat music) and smoothly integrated, lifting the keynote to a lighthearted mood. Bjørn Jacobsen noted on a game audio talk about the game on his YouTube channel:

> "The game features some very upfront music which is actually quite loud during most of the game, yet it's really well mixed and therefore there is room for such loudness without the soundscape being totally cloaked or saturated." (Jacobsen 2018b)

There are very few consciously perceived sonic elements near Brightmarket that differentiate the soundscape from farther on, but the environment, while passing the town for a very brief moment, feels more inhabited. The background music switches to only slightly more rhythmic patterns with a few soft drumbeats, and there is a sound signal of someone working or handling something made of wood, audible for about two seconds before crossing the first bridge.

And after hearing the soldiers chat, that ambience is already gone, replaced by small animal sound signals that could be found just outside of town but not completely in the wild.

Only when Aloy looks to her right for a moment, the soundmark of the watermill becomes apparent with the faint sound of wood moving and touching in the water. Additionally, the rushing of each stream she passes could be seen as further soundmarks (there are eight in this sequence), but together with birds chirping and the sound of frogs and crickets, their omnipresence also defines a major part of the keynote sounds.

In the game audio talk, Bjørn Jacobsen describes the technical aspect of the design of these water and river sounds through the application of multiple emitters of single streams, which makes the transition from a keynote sound to a distinct soundmark feel more natural. In the distance, one emitter produces a filtered stream sound, an overall river ambience that is perceived rather a keynote sound, and when approaching the water, more detailed emitters take over (Jacobsen 2018b).

Sound signals like the baaing of the Charger herd and other noises these machines produce can be perceived more distinctly than the keynote sounds and could also indicatively serve the function of locating them. But at the latest when the electric drum beat sets in and they start bawling while rushing towards Aloy, the player should get the sonic hint that he or she is in danger. As Bjørn Jacobsen points out, each creature in *Horizon Zero Dawn* has its own pre-attack sound, which makes them sonically recognizable: "So, just by listening, you can know when to duck or otherwise move out of the way" (ibid.).

Distinct exploding airburst sounds signal that a specific weak spot, revealed through Aloy's ancient device scan, has been hit (Fig. 10.6).

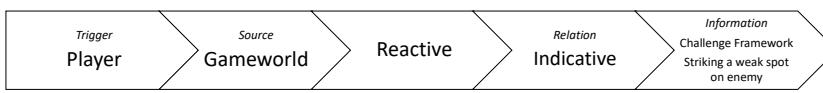

Figure 10.6: Sound-Strand: Striking a Weak Spot in *Horizon Zero Dawn*

The sound is a reactive result of the player aiming an arrow at the machine and clearly located diegetically within the gameworld. It indicates that he or she succeeded in fulfilling a part of the challenge of that combat. While the first four layers of the sound-strand could be purely located within the gameworld, the information conveyed through that sound reaches out to the broader heterotopia space that notifies the player of the challenge-based progress rather than just the fictional character. And since it has to stand out during battles, which tend to become very acoustically overwhelming and chaotic, this is a very clear and loud sound, clearly distinguishable from other overlapping noises.

While the victory chime sound that signals the end of the fight can be described as purely extradiegetic in every layer, the sounds of collecting resources through the overlay inventory interface (Fig. 10.7) seem like they originate within the gameworld, but they do not (in my interpretation):

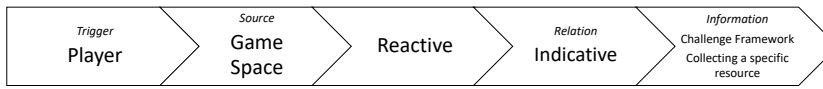

Figure 10.7: Sound-Strand: Collecting Resources in *Horizon Zero Dawn*

When the player activates the overlay interface by pressing △ near the machine's corpse and collects the items by pressing x, there are different reactive sounds to that action, depending on the respective resource that is selected. The way these sound, they are not abstract signals, but oriented toward how these elements could sound within the gameworld. There are two signs that they originate not in the gameworld, but in the broader space of the heterotopia:

First, the sound is not spatially located in the gameworld, it is perceived panoramically in the head of the player, slightly on the bottom left. And second, the sound has no variation and is marginally louder and clearer than other diegetic sounds. This could be just a bad audio

design decision, but for the player, this makes the source of the sound feel more extradiegetic. Further, the sound is an immediate reactive answer to pressing the x-button and indicates the success of collecting a specific resource, thus concerning the challenge framework.

Just as in the other two case studies, Aloy often comments on events or gives hints on challenges in the game out loud, for example when she gathers plants that fill up the health bar again: "I need this!" These are also diegetic system triggered and indicative dialogues, meant to deliver challenge-based or narrative information to the player.

10.1.2 Vaults and Tombs

Dungeon-like level designs have a long history in video games, where the term dungeon is used for all kind of closed caves, castles, crypts, or tombs and not necessarily connoted with prison and/or torture setups. Especially RPGs like *The Legend of Zelda* (Nintendo 1986) shaped its puzzle-filled labyrinthine characteristics, contrasting the friendlier and open overworld filled with daylight.

Although modern video games tend to blend these settings and do not divide them as obviously, if watched closely, it is striking how accurately these environments can still be identified and characterized as such, even in the case studies at hand which do not represent classical RPGs in that sense. Typically, dungeons end in boss fights, which can also be observed in the following settings (though these are not part of the analyzed sequences).

10.1.2.1 Assassin's Creed Valhalla: *Old Vault in Offenchirch*

To forge an alliance with Ceolwulf II. and help him become the new king of Mercia, Eivor has to find Burgred, the former king who apparently betrayed and used his people to remain in power. As she found out, he is hiding in an old vault in Offenchirch to escape the

confrontation with his former thane, Ceolwulf. After invading the enemy territory of the small location, Eivor finds herself in front of a small church which represents the entrance to the cellar vault he is hiding in. Two torches illuminate the stony entryway.

Right in the entrance, a central whooshing sound signals I have entered the "Exploration Area," as the written text on the left top of the screen confirms. Eivor puts aside shield and weapons automatically with a loud wooden and metallic sound and I activate Odin's Sight with another whoosh that sounds like it originates right in my head to reveal any potential collectables nearby, which are marked sonically with yet another signal like two coins stacked on each other with reverb. The bigger and rarer treasures keep buzzing like bowed singing bowls for a moment, visually revealing their location with a golden glow afar behind walls. For a very short moment, I can hear the rushing of the torches before I descend the steps down into the cellar, my footsteps loudly hitting the stairs made of stone.

Downstairs I press the o-button to duck, so Eivor is sneaking instead of loudly moving, avoiding unnecessary attention by potential enemies lurking around, which results in the footsteps being less noisy, reducing the sounds she produces mainly to the rustling of her clothes. A group of six or seven mice take flight, squeaking upon spotting Eivor. Beside those, the soundscape is shaped altogether by Eivor's movements alone. I am almost startled by the sudden loud noise caused by her putting away her shield and weapon again.

Trying to smash a wooden box, I wield the battle axe, which causes her to groan under the effort, echoing from the stone walls. I hear her recalling: "He's got to be down here. Where are you hiding, Burgred?"

Before I descend to the next level, background music sets in, a short melody played by gongs panned slightly to the top-left and faint, but strong distortion from far right, occasionally panning to the far left.

I spot an enemy soldier in front, inspecting something in the walls and hitting against it. Mice squeaking again while my footsteps silently touch the stony floor sneaking up on him. As I approach, the distortion becomes more intense. Standing right behind him, a small

text appears in the middle of the screen: "R1 Assassination." As I do so, Eivor grabs him and stabs him with her hidden blades, which triggers a loud confirmation sound of a pistol shot, on the right top I detect my experience bar filling up "+ 22 EP," the soldier giving away a faint death scream. Leaving me again with the soundscape of my sheer movements, the background music fades.

Part of the wall the soldier was checking is a movable obstacle, which Eivor is able to slide sideways, groaning under the effort. Walking around the room, the sound under her feet changes from wooden to stony tones, occasionally stepping audibly in wet puddles. Passing a steaming big pot of food, a ghostly noise like exhaling after drinking something hot signals that Eivor's health bar is raised again, leaving the pan lid open and the steam gone to show that the resource has been used and is not available anymore.

Nearby I can hear the buzzing of a rare collectable treasure again, glowing golden behind the next wall. While I jump from box to box (Eivor does it automatically, because the room is so small) the sound of her movements echo from the walls. Through a hole in the mural, I reach a small hidden room where the background music sets in again—because of a hostile snake, as it turns out. Around the corner, in an even smaller hideaway, through thick spider webs making a loud rushing noise as Eivor passes, I finally discover the source of the buzzing: a huge golden treasure chest, sparkling golden.

"△ Loot Chest," and as if the effort is bigger for rarer collectables than others, I have to press the button for a second to actually open it. Releasing audibly pressure by opening it, an explosion sound follows, accompanied by a male chorus repeatedly shouting "Ugh! Ugh! Ugh!" ten times. A big notification shows up in the middle of the screen with the symbol of a coal bar and a golden glow around it: "Wealth Collected" (Mauch 2023: Assassin's Creed 08 [02.15.2022]).

Not just in missions, but almost in every small location with a few dwellings or in old Roman ruins, Eivor finds vaults similar to this one, the interior with hay lying around, spider webs, mice and wooden

boxes resembling each other, Roman ruins, Norwegian cellars and church vaults alike. Even in long-forgotten ruins, for obvious level design reasons, torches are always lit, and certain objects reoccur, like red explosive pottery vessels (to reveal hidden rooms through specific wooden or brittle walls), or the moveable obstacles as seen in the sequence above. Thus, although these passages are usually rather small, they fulfill the characteristics of recurring video game dungeons with very similar level design. This also applies to the sonic environment.

The soundscape almost entirely consists of self-produced sounds and their echo from the stone walls around, which makes the sonic perception very hi-fi. Even the sporadic sound of mice is provoked by the movement of the player (Fig. 10.8). They are very characteristic sound signals, conveying the ambient mood of the vault, but not constant enough as steady keynote sounds.

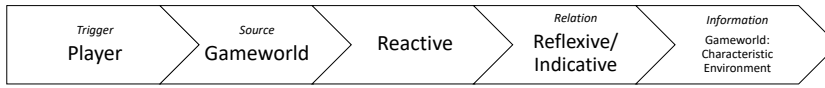

Figure 10.8: Sound-Strand: Mice Taking Flight in *Assassin's Creed*

The sound the mice produce when taking flight are triggered by the player approaching them; otherwise, they are just sneaking around the room silently, as can be observed in the beginning of the sequence. All five layers can be identified as diegetic. The relationship is mostly perceived as reflexive, adding to the feeling of the ambience rather than to indicate the diegetic event of these little creatures, unless the player really has a focus on them, which is usually not the case.

Despite most sounds being reactive to the player's movements, the soundscape is actually very rich, since it is almost impossible to avoid walking into distinct sounding obstacles, spider webs, small puddles and so on. This results in an even more effective sensory immersion than just a fidelitous but generic soundscape, by including and intertwining the player's presence sonically with the environment.

Eivor's monologue, which can be characterized the same way as Cal's dialogue with BD-1 (Fig. 10.3), conveys, in addition to its semantic meaning, information about the environment and the situation she is in. First, she is whispering, which suggests a rather sneaky approach for the quest than an aggressive action and second, even while whispering, there is a massive reverberation of her voice from the walls, which gives a feeling of the spatial room around her and the noiselessness of the environment.

Only when the background music sets in, although a very ambient one, intensifying the tension, does the soundscape become more lo-fi, especially through the extradiegetic faint but strong distortion panning from right to left. And coming back to the stillness of the vault after the guard has been assassinated emphasizes the general abandonment of the vault anew.

The buzzing of the treasure chests nearby is again similar to the sound of iron ore described in the *Assassin's Creed* sequence above (Fig. 10.2), only triggered more indirectly by the player by unveiling their location by using Odin's Sight. The chime played after opening the rare chest on the other hand is a very direct reaction of the player's action (Fig. 10.9):

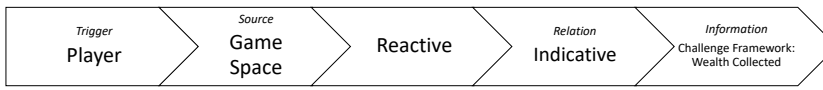

Figure 10.9: Sound-Strand: Wealth Collected in *Assassin's Creed*

The very long, loud and domineering chime, signaling that a collectable wealth of the region Legracæsterscir (there is a fixed amount of wealth that can be found in each region) has been found, is clearly extradiegetic and not noticeable from within the gameworld. It indicates that the chest that just opened is not merely a simple resource or treasure, but a specific rare one.

With the appearance of the wealth bar with twenty-eight golden checkboxes on the bottom right, as the tenth box shows as checked, another signal, composed into the main chime with a high-pitched bell stroke and an extra shout from the male choir, signals the progress of the challenge framework of special wealth collectables gathered.

For a short moment, this sound is drowning the complete soundscape of the vault, as also the visuals of the player's achievement dominate the screen, communicating a guidepost of a challenge that is not related to the current quest and therefore standing completely out of it.

10.1.2.2 Star Wars Jedi: Fallen Order: *Tomb of Miktrull*

Escaping the confrontation with Trilla, Cere's former Padawan now turned on the dark side as Second Sister, Cal enters the Tomb of Miktrull, an ancient Force master of the Zeffo. In the aftermath of the duel, Trilla hacked the communication system between Cal and the Mantis and is interfering him by radio sporadically.

After regenerating and saving the game progress on a meditation spot, I take a brief look at the stony cave around Cal who just stood up again, noticing a deep unlocatable buzzing, the whistling of the wind through small openings and water dripping from the walls. Continuing the path, I head to the next rift in the wall, forcing Cal to move sideways because of its narrowness, a tapestry of harp sounds fills the soundscape, leaving only room for the sound of Cal's hands touching the wet walls, water drops and BD-1 climbing on top of Cal's shoulders.

"We're here! It's … different than the other tomb." On the word "here", Cal's voice echoes gloomily in the vast hall, revealing an enormous underground dome in front of him.

"Bebu boo?" BD-1 replies. The sound of the harps morphs subtly into a trumpet section.

"I don't know. I don't like it!" After Cal's last words, a short synthetic earcon signals the update noted mid-screen: "New target added to the holo-map." The trumpets fall silent, and the soundscape returns to the rain-like water dripping underground and another irregular buzzing on a higher pitch is added to the now quieter deep buzzing, creating a cold and mystical sonic atmosphere combined with single bows from the low string section.

In the following radio dialogue between Trilla and Cal, all while he climbs the only way to that dome on the walls on the right and jumps the next lianas over the abyss, her voice is audible in the player's head as in headphones, while Cal's voice echoes in the cave. Cal's equipment rustles loudly when he jumps and runs. I fail to keep on track several times, which makes Cal respawn at the last obstacle and forces the dialogue to repeat the last words again before continuing. In between, the soundscape mutes completely as the screen becomes black for a moment. The orchestra intensifies.

Just before reaching out of the next narrow rift in the walls, I hear a stormtrooper nearby: "I also didn't plan to …," his words interrupted in the middle of the sentence from several loud laser gun shots. Around the corner on the left side, I can hear another long laser beam and two stormtroopers scream before falling to the ground. They were fighting some sort of a mechanical tomb guardian, twice as tall as Cal as I can see now. Far away I hear another stormtrooper say: "That's … that's not what I wanted!"

The guardian heads slowly towards me, moving his legs mechanically, with the sound of a stubborn clockwork mechanism. The soundscape is filled by water falling from the walls, interrupted and drown by Cal's lightsaber sounds and occasionally the electric charging and release of the laser canon placed on the guardian's chest. After a final hit with an electric burst, he falls on his knees and to the ground, sounding like a machine that has been unplugged from its power shutting down.

With a short "shhht!", Cal shuts down the lightsaber and stows it away, and for a brief moment the only thing audible is the underground rain.

Not knowing where the next exit of this room is, I activate BD-1's holo-map which reveals a yellow passage; there is a high-pitched beeping when panning the point of view and a pleasant clicking when closing it. With Cal's ability of the force-push, I blast the next crumbling wall, which bursts loudly into small pieces, opening the path to the next room. As soon as I walk through the new opening, the volume of the underground rain sound increases markedly and I can see why: the hall on the other side of the wall is the inside of the dome I just saw from the outside, in which water is pouring down from the upper stories.

The water in the hall is so loud, my footsteps ankle-deep in the water on the ground are barely audible. Heading toward a man-sized iron sphere in a little cupola without water on the other side, the rushing suddenly disappears again. I check the holo-map again which reveals the next crumbling wall to push through, and on the other side, BD-1 tells me with beeping noises that there is something for him to scan. "There is always something to discover," Cal replies, before I can hear the voice of Cordova from an old recording played back by BD-1.

The recording gives hints about the upcoming riddles, telling Cal that the mechanics here simulate the gravity of the planet, as kind of a leitmotif of the tomb. Activating the switch on the platform next to me, the wall in front starts buzzing and shines blue, and now as an activated magnetic field, attracts a small iron ball from the other side, containing a burning lamp, which again fires up the dry vines blocking the stairs to the next level. Passing this wall close, the buzzing intensifies.

Midway up the stairs, I find a new spot to meditate (and save my progress). The soundscape is now back the way it sounded when I entered the tomb, and as if starting a new sequence, Trilla starts talking over the radio again. While she is still misleading him with information about a newly found artifact, Cal is already involved in the next fight against stormtroopers on the next floor (Mauch 2023: Star Wars Jedi 13 [02.22.2022]).

The keynote sounds of this tomb are quite simple yet very effective. The sound of the water falling from the walls and ceilings is omnipresent but always spatially located. Combined with the massive reverb and echoes of all movements, voices and fighting sounds, the tomb is perceived as a wet stony location, abandoned for a very long time. Ghostly sound signals of buzzing mechanic apparatus, powered by the Force of the ancient Zeffo, if I had to guess, attract the attention and merge with the overall mystic atmosphere. And as in the *Assassin's Creed* sequence, Cal and BD-1's own movements, footsteps, voices and rustling of clothes constitute a majority of the perceived soundscape.

The waterfall in the center of the dome is much more dominant than other water sounds; thus it can be described clearly as a soundmark, which allows the player also to locate him- or herself around the different halls and floors leading to the center. It also demonstrates the approach to the third-person sonic perception sound design, where the panning is based on the camera and the attenuation based on the character. The underground rain only gets louder when Cal is actually in that room.

Compared to *Assassin's Creed* and *Horizon Zero Dawn*, *Star Wars Jedi* has very few extradiegetic sounds and sonic challenge guidepost signals are woven deeper into the gameworld, as for example BD-1 scanning objects or opening chests. But some still stand out, for example when Cal falls into an abyss (Fig. 10.10).

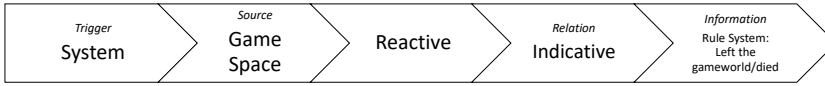

Figure 10.10: Sound-Strand: Falling into an Abyss in *Star Wars Jedi*

The short whooshing sound occurring when Cal meets his end in the abyss not only drowns out everything else, but with its fading, the screen becomes black for a moment and for an instant, everything

turns completely silent, before fading in again just a few seconds back, like a cassette tape that has been rewound. The sound signaling the player's failing consists not only in the sound itself, but also in muting everything else, in muting the complete soundscape. This might be the strongest extradiegetic effect, eliminating everything diegetic for a moment to rewind the gameworld like a tape and respawn a few moments earlier.

The sound is only indirectly triggered by the player, but it is the system that starts it as soon as Cal enters a specific area outside the space in which the player is allowed to be. In other words, the sound (in combination with the visual representation) signals the player outside the gameworld that the sequence of actions he or she performed result in Cal's death within the gameworld—try again.

Within the gameworld, most other characters and creatures are subject to the same rules as the character controlled by the player, thus usually with much less health and strength, only these are controlled through their respective algorithms that form their AI. The moment Cal reaches the end of the first narrow rift and hears stormtroopers talk to each other; the player can locate them spatially. Their voice, footsteps and other actions give away their presence and hint what they are up to within the gameworld. Hearing them shooting their laser guns (Fig. 10.11), the player can assume that these stormtroopers are not only on guard, waiting to attack him, but that they are busy defending themselves or attacking someone or something else.

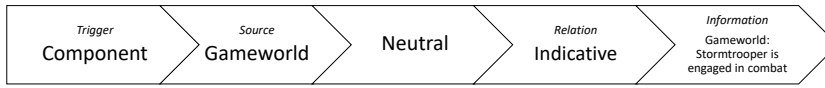

Figure 10.11: Sound-Strand: Stormtrooper Shooting in *Star Wars Jedi*

This sound, produced by component actions of the stormtroopers, is completely diegetic, and the player could assume that this action would happen with or without his presence. Although most certainly

the battle only starts when the player approaches, otherwise, the battle would be long over when Cal arrives. For the player, the sound is neither directly proactive nor reactive, but it provides him or her important information about the situation: The stormtroopers are busy battling another enemy, so when Cal walks into the room, he will not instantly catch their attention. This could lead the player to wait for the fight to be over, so his enemies already dealt maximum damage to each other, or he or she could use it as a distraction tactic.

Almost the same characteristics can be attributed to the component-triggered sound of charging the guardian's chest laser. Although, regarding the third layer, both sounds could be described as more neutral rather than directly proactive or reactive, implicitly, for the player, the information the sound provides, provokes an immediate reconsideration of his or her course of actions; thus, subjectively, they convey proactive indications.

Technically also triggered by a component, namely Trilla, her conversation with Cal over the radio, on the other hand, carries no proactive attributes at all, and its information for the player concerns solely the narrative of the game. It does not in any way alter the behavior of the player within the gameworld, other than maybe as a distraction, because he or she is concentrating on the semantic meaning during a fight, for example. In fact, in its reflexive function for the narrative, as to how Cal thinks about his friends, it resembles more background music than anything else, triggered as Cal progresses the story and reaches specific locations. But it also clearly indicates as yet unknown facts and twists of the narrative, just on a broader level than the imminent action the player might be involved at this moment, like falling into the abyss or battling stormtroopers while chatting with Trilla.

10.1.2.3 Horizon Zero Dawn: *Cauldron RHO*

Cauldrons are underground facilities in *Horizon Zero Dawn*, constructed by a subfunction of the AI GAIA, who controlled the execution of project *Horizon Zero Dawn*, in which the machines inhabiting the post apocalyptical world are build. These machines then would be terraforming the world before humans could re-inhabit the environment again. Mostly as optional activities, they allow Aloy, once she reaches their core and overrides it, to control new classes of machines, either to use them as riding machines or make them attack her enemies.

These facilities are a very good representation of video game dungeons with visually and sonically distinct environments that set them apart from other locations in the gameworld. The entrance is usually hidden and/or heavily guarded. Different rooms are filled with riddles to progress, and once the final boss is defeated and the core overridden, Aloy gets a direct ride to the surface and the cauldron cannot be revisited after completing it.

After I finally found the entrance to Cauldron Rho (right at the end of the first soundwalk, Section 7.2.3), hidden behind the fog of a ventilation shaft, I spot another Watcher in front of me, a small machine guardian, resembling a small theropod dinosaur, on patrol. The moment I enter this hall, I am faced with a very dense soundscape, a cello is playing long bows and there are numerous hydraulic and electric machine sounds, as well as the Watcher producing sounds like a mechanical frog, echoing endlessly from the steely surfaces all around.

Aiming an arrow at the eye of the Watcher, I can hear the leather tension of the bowstring, and a second later, after shooting two arrows, I notice the satisfying sound of an electric burst, signaling it is dead. Aloy comments: "You're not giving away any hint," as a Watcher would otherwise alarm other machines nearby, if not taken down quickly enough.

As I walk further into the hall, the soundscape becomes a little less tense, but still lo-fi, metallic footsteps echoing from everywhere.

Some levels below, I spot yet another Watcher, which I luckily manage to take down in one shot in its eye, bursting loudly and leaving some electric crackling for an instant. The third one already starts charging its blinding and alarming mechanism before it meets the same fate as the others.

Descending the path on the left, all on steely plates filled with thin lines like computer chips, the corridors formed in triangular shapes, I notice the continual buzzing and whooshing keynote sound, accompanying the rhythm of my armor rustling to my footsteps, constantly subconsciously overloading the sonic environment. The cello has stopped playing. Suddenly, on my right side, a small triangular lightbulb activates, sounding like the beat of a water drum. After checking if there is anything more to it, I continue, and two more of those light up in the walls as soon as I approach.

Another dominantly and continuously beeping sound interrupts my immersion from outside the game space, out in the corridor where my office is located. For a moment I wonder if it is a fire alarm and if I have to exit the building. It stops and I shift my focus back to the screen and into the soundscape of the game space.

At the end of the corridor, I discover two containers formed like small pyramids containing useful resources. While time slows slightly down visually and sonically as I activate the weapon wheel to craft more arrows, each one underlined with the sound of a mechanical pocket watch winding up, I can make out synthetic whistling and buzzing from some unknown machineries in the facility. Retrying to collect more resources from the containers, as my personal inventory is full already, Aloy reacts, as if talking to me through the fourth wall: "Got too much already."

I switch to the menu interface to upgrade several ammunition containers and quivers so I can carry more resources with me, confirming every action with clicking sounds that could originate from small insects. The gameworld soundscape completely disappears while navigating through the menus and is replaced with the background music also playing in the loading screen (cf. Section 7.1.3).

I head back to the main hall and loot the fallen Watchers, take a little unintentional loud splashy swim in the pond in the middle before I find the next triangular lock I can override to pass to the next room.

First thing on the other side is yet another Watcher. After I miss with my first arrow, it spots me, stands up with little metallic footsteps, sounding like some sort of a meerkat pointing its attention to something specific. The extradiegetic attention bar sitting on top of his head shifts slowly from yellow to red, signaling the change of its attention about me from "detected" to "attack." With the small circle turned full red, its blue eye turns red, combat music starts, and it starts running towards me. Luckily my next arrow is a critical strike and the Watcher bursts to the ground.

This hall is massively bigger than the other ones with something in the middle that looks and pulsates like giant heart, filled with yellow liquids. A glitch sound signals the quest update on the left top corner from "Explore Cauldron RHO" to "Find a way through the Blaze Processing Chamber."

"The machines collect blaze from the wilds, and it all flows here, like blood to a heart. The Cauldrons run of… life itself," Aloy marvels.

The next Watcher catches me unprepared and after an aggressive charging noise, jumps at me several times. Hydraulic noises mix with chaotic loud bursting sounds and the combat music plays on top of the cello that started again. While the combat music is audible panned to the sides, cut out of its lows, the cello fills the acoustic space on the low, panned to the middle. Two big machines join the combat, a Longleg and a Ravager, in a big confusing clash, with special distracting attacks that specifically overload Aloy's sight and sense of hearing.

After I survived the battle, I am relieved to hear the soothing victory chime and things calming down again. I take a look around and spot boxes like cargo containers in the air, being transported by machines over some sort of magnetic rails. The soundscape is filled with metallic automated industrial factory sounds, several layers of rhyth-

mic hammering, buzzing, and clicking noises, only distinguishable as I walk around the hall.

It takes some more overriding apparatuses to open new paths and climbing and riding those containers, before I finally reach the core that holds the boss machine of this Cauldron, a huge Snapmaw, under a protective shield dome (Mauch2023: Horizon Zero Dawn 08 (02.10.2022).

The first thing that a player notices is the very lo-fi character of the soundscape in the Cauldron, especially compared to the wilds, where every distinct sound is very distinguishably perceptible. Even when there is nothing happening for a moment, layers of different buzzings still overwhelm the player's ears.

Visually, the level design team took inspiration from the machine world of *The Matrix* (1999). Addressed to these similarities and asked, where the audio team took inspiration from, Bastian Seelbach, Audio Lead in *Horizon Zero Dawn*, stated in an interview with *The Sound Architect* (Hughes 2018) that their approach to construct the Cauldron's soundscape was mainly driven by its visual aesthetics, contrasting the natural setting of the outside world. They questioned themselves about how a place would sound that was never visited or seen by any human:

> "In the end we kept it rather functional, and designed the soundscape after what we imagined a high tech facility with no need for acoustic protection would sound like. Much of it sounds like how I imagine a factory at the start of the industrial revolution would have sounded, before the introduction of noise and safety requirements: all loud and mechanical. At the same time, there are a bunch of super-slick sounds in the Cauldrons that have an almost alien quality." (Bastian Seelbach in Hughes 2018)

Finally, these different styles were brought together to a coherent soundscape.

As in all soundscapes in *Horizon Zero Dawn*, much like the different emitters of water streams described above or the distinct sources of water falling in the Tomb of Miktrull in *Star Wars Jedi*, the environmental sounds are not compiled generically, but spatially implemented and located in the gameworld, which makes it much more fidelitous. Though the characteristic of a synthetic factory, the loud noises endlessly echoing and amplifying from the steely surfaced around, makes it difficult to actually locally pinpoint the distinct sound signals.

But there are also very significant soundmarks, like the pumping blaze-heart in the middle of the big hall, or the containers transported by magnets through the rooms. These could be easily used by the player to locate themself within the otherwise quite confusing architecture of the Cauldron.

Although the soundscape is designed to be perceived as a sonic overload, functionally important sounds are still clearly identifiable, like the following three examples:

When Aloy draws her bow, the sonic tension of the bowstring builds up, until a fixation point is audible, when it is fully charged (Fig. 10.12), allowing the arrow to strike with full power. The sound varies from bow to bow, and with Aloy's abilities: with improved skills, she can draw an arrow much quicker for example.

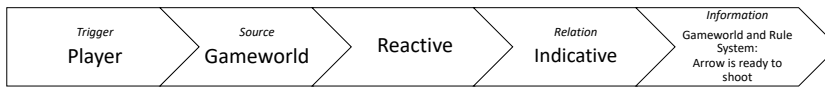

Figure 10.12: Sound-Strand: Tension of the Bowstring in *Horizon Zero Dawn*

This sound is a direct reaction (reactive) to the player's action of aiming an arrow. It indicates how well and when it is fully charged. Although the message can be understood purely within the gameworld, it conveys information about the game rule system, as when it is the

best time to release the arrow (if the tension is kept too long, it becomes audible too, which results in missing the target more probably).

As Anton Woldhek emphasized in the interview mentioned above, it was a challenge for a sound design team who worked only on games with "loud bang" weapons:

> "The first thing I decided to do was join an archery club to experience what it's like to shoot arrows in real life. This gave me a reference point for how it should feel, not necessarily how it should sound." (Anton Woldhek in Hughes 2018)

To emulate different perceptions like the intuitional critical balance when an arrow is shot just at the right moment, the sound of the bowstring releasing upon a successful attack is "fatter and fuller," informing the player on a subconscious level even before the target is hit.

Already mentioned in other examples, some monologues and dialogues are very characteristic for video games, in particular for third-person adventures, demonstrating the constant conversation and the uniqueness of specific elements in video game heterotopias. When Aloy is collecting her resources from the triangular containers in the Cauldron, the count of the available ridge-wood in that specific container is marked red, informing the player he or she cannot collect more in Aloy's personal inventory. But if the player persists and still tries to collect it, she counters: "Got too much already" (Fig. 10.13).

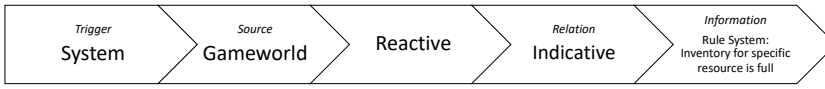

Figure 10.13: Sound-Strand: "Got too much already" in *Horizon Zero Dawn*

This happens only the first time; afterwards, there is a simple, barely audible "click," signaling that the action cannot be carried out, unless the player retries several times. In my fieldwork, I gathered ten distinct versions of Aloy's reaction,[69] but there was no indication as to whether they were repeated after a certain number of attempts or after a certain amount of time, so I assume, it functions based on a randomization code.

For a video game player, this reaction is quite normal in such a situation, but it would seem very strange in any other fictive world of a movie or in literature, seeing a fictive character trying to collect something and realizing that there is no more room in his bags, much less commenting it to herself the way Aloy does.

Aloy's reply to the unsuccessful attempt is triggered by the rule system which defines how much she is able to carry; thus, the information conveyed is also about the rule system. But the diegetic implementation of the source of this signal is within the gameworld, from Aloy herself, and reactive to the player's input.

The last example to demonstrate the implementation of a specific sound in a video game heterotopia through the sound-strand model is the pre-attack sound of a Watcher, as seen later in this sequence, and many, many times throughout the whole game (Fig. 10.14):

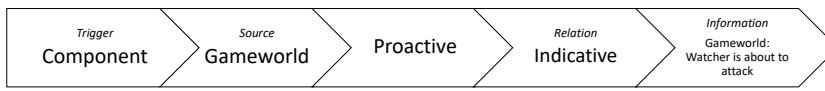

Figure 10.14: Sound-Strand: Pre-Attack Sound of a Watcher in *Horizon Zero Dawn*

69 "I'd have to ditch something", "I can't bear the weight", "No room", "Forget about traveling light", "Full already", "Can't carry more", "I'd have to leave something else behind", "No space", "Should've brought a cart", and "Got too much already".

Just before the Watcher attacks Aloy with its blinding stun flash, it pauses for a moment, powering up its distraction beam: short intervals of high-pitched signals that increase in frequency, pitch, and volume before release. If it is not defeated by then, and the stun flash coming from the Watcher's big eye hits Aloy, it distracts the player for a few seconds by blinding and deafening him or her, which gives the Watcher time to jump-attack in the confusion. Usually, once the powering up is audible, it leaves the player just enough time to dodge and avoid the beam hitting Aloy. Additionally, at this moment, the Watcher also alerts other machines nearby.

Obviously, the sound is triggered by a component, the Watcher itself, and originates from within the gameworld. Advantageously, it should be perceived by the player as proactive to react since it indicates a direct threat to him or her. Yet it does not just signal an imminent attack, but as described further above, it also allows the player to identify the attacker as a Watcher, since every type of machine has its respective specific pre-attack sound.

10.2 The Extended Game Space

Within the presented sequences of the case studies, the extended game space has been touched upon several times; in fact, its intertwinement with the gameworld is an integral part of the video game heterotopia, as has been shown. Without it, the constant conversation could not take place.

As Kristine Jørgensen noted, there is only a gradual progression from diegetic to extradiegetic sounds and other elements in video games (Jørgensen 2007; 2008b; 2009; 2010) which led her finally to the conclusion that all gameworlds are interfaces themself (Jørgensen 2013). Nevertheless, as the focus in the previous sections was set from gameworld settings, the video game heterotopia can also be examined from the extradiegetic side of the player's perspective, from its menu and overlay interfaces. Also here, the gradual implementation

can be observed and varies in all three case studies, from very extradiegetic menus to maps and finally to the quick select menu in *Assassin's Creed Valhalla* or the weapon wheel in *Horizon Zero Dawn* (Mauch 2023: Assassin's Creed 13–15 (03.15.2022); Mauch 2023: Horizon Zero Dawn 09 (03.10.2022); Mauch 2023: Star Wars Jedi 09 and 15 [01.26.2022 and 02.22.2022]).

The clearest sign to be far away diegetically from the gameworld is when the gameworld time is stopped and the gameworld environment is out of sight, and, of course, the gameworld soundscape not perceivable. All three case studies offer such an interface, usually called the pause menu or settings. As demonstrated primarily in the sequences from the first day in the field (Section 7.1), these menu soundscapes are not too far away from the soundscape of the gameworld, and still part of the game space, the video game heterotopia. Here, there are basically two types of sonic elements: background music or ambiance sounds and reactive input sounds to the player navigating through and selecting the menus.

In *Assassin's Creed Valhalla* and *Horizon Zero Dawn*, the background music is a very calm variation from the respective main theme, and in *Star Wars Jedi*, it is reduced to a background noise like the constant and gentle buzzing of the inside of a spaceship. This cuts the player's immersion noticeably off the gameworld but keeps him well within the heterotopia.

The reactive sounds to the player's input reflect and imitate their respective gameworlds, mirroring cultural, crafting, resource and nature materials, the medieval, science-fictional, and post-apocalyptical machine-inhabited setting. While the clean and light click sounds for navigating through the menus are not too different, yet clearly distinguishable, confirming and selecting certain points, items, crafting elements, changing equipment, weapons, or armor, or selecting new skills or abilities have very diverse sets of sounds, representing their respective setting of the game, for example drumbeats and male choir shouts in *Assassin's Creed Valhalla*.

Yet, the sonic indications that a new clothing has been chosen for Cal, a weapon has been upgraded for Eivor, or another quest is selected for Aloy to pursue, has direct implications in the gameworld, thus these signals cannot be defined as purely extradiegetic.

And, as has been demonstrated in the first days of fieldwork, these interfaces also serve, functionally, visually as well as sonically, as the threshold into the video game heterotopia, intentionally or not.

In *Assassin's Creed Valhalla* as well as in *Horizon Zero Dawn*, the map is accessible through that menu, keeping it mostly on the same diegetic level, though *Assassin's Creed Valhalla* accompanies specific locations with characteristic sonic representations of these areas, like church choirs on monasteries, the sound of the waves on shores, birds in forests, etc. (Mauch 2023: Assassin's Creed 13 [03.15.2022]). Due to the generic nature of these sounds, they can be described rather as symbolic representations than a diegetically implemented soundscape.

Star Wars Jedi has two levels of the map, both completely implemented into the gameworld. The first one, an overview of the different planets that can be visited, is located in the Mantis on the holotable. Navigating through the holo-map produces synthetic software sounds of handling it, selecting a new planet to travel to results in a powering up sound. After a new planet has been chosen, Greez usually comments on the action, sometimes more and sometimes less related to traveling, like smelling something funny on board, before requesting Cal to take a seat in the cockpit to enter hyperspace (Mauch 2023: Star Wars Jedi 15 [02.22.2022]). Everything happens directly within the gameworld.

Also, the local holo-map on the planets, projected by BD-1, is completely implemented into the gameworld, without stopping the time or altering the soundscape, thus dampening it just a little bit to leave more room to the same navigating sounds as on the holo-table. This implementation of the holo-map does not go without implications, as the map menu cannot be accessed during a fight or when BD-1 is not available, which is also used as a level design feature, for

example when Cal and BD-1 are captured by the Haxion Brood in different locations, Cal has to find his way without the help of a map.

Then, there are spaces that are partially implemented into the gameworld, spaces on the edge of the gameworld. When Cal sits down on a specifically marked meditation spot, he enters a deep Jedi meditation state, where, in the game, he can learn new abilities and rest, which causes his health bar to regenerate (Mauch 2023: Star Wars Jedi 15 [02.22.2022]). The soundscape slowly shifts from the gameworld soundscape to the pause menu ambience sounds with its respective navigational reactive sounds, until, with a whooshing transition, he leaves his meditation state. For the player, it seems as if time stops during meditation, but, as all defeated enemies (except bosses) respawn during a regeneration, it should be assumed that somehow time passes in the gameworld too while meditating.

The weapon wheel in *Horizon Zero Dawn* has already been introduced in several sequences above, which should also be described as a partially implemented overlay menu. It allows one to quickly change a weapon or craft new arrows or other ammunition during gameplay and even during a fight without completely exiting the gameworld; time runs forward, just slowed down, also represented by the complete soundscape replaying slower, except background music. The navigation and selection/crafting sounds are the same as in the pause menu, also playing in real time, which suggests they are representations of diegetic sounds, rather than originating diegetically from within the gameworld.

The similar quick select menu in *Assassin's Creed Valhalla* (Mauch 2023: Assassin's Creed 14 [03.15.2022]) thus stops time completely, but not its environmental soundscape, which results in not generically produced component sounds like movements or dialogues of NPCs to be interrupted until the menu has been left again. Among other actions like summoning the riding horse, lighting a torch, or blowing the horn (which is used as a signal for allies to attack or withdraw), which are all carried out in real-(gameworld-)time, Eivor has the option to meditate. This action, accompanied by a very low-pitched

male voice singing while she sits on the ground, lets the player pass half a gameworld day in a few seconds, thus manipulates the gameworld extradiegetically.

Finally, spatially, temporally, and also narratively integrated into the gameworld, but functionally for the gameplay characteristically on the edge of the gameworld, are Odin's Sight from Eivor and Aloy's Focus. The augmented reality device in *Horizon Zero Dawn* reveals Aloy tactical information about the environment, dampening the soundscape (but not background music) slightly and highlighting scans with short glitch sounds. Odin's Sight cannot be held for a longer time and activating it results in a loud buzzing noise, scanning the nearby environment for collectables and enemies once, revealing them produces a symbolized sound as in the menu used to identify the type of collectable.

10.3 Conclusion

The initial question of this soundscape study was what a specific video game does (sonically), and how it does it. To get an understanding of the nature of these games, they were considered not as mere artifacts, nor analyzed through pure perception, but rather regarded as an experience-space, with its own rules, narrative and challenges, mirroring or negate parts and interpretations of the real world, as a heterotopia in Foucault's words (Foucault 1971).

A video game not only tells a story or present a fictional world to the player, but it makes it experienceable as his or her own story, which might be its most powerful instrument to convey content, from fiction, interpretations of the world to even ideologies or politics. In order to do so, a constant conversation has to be established with the player, in contrast to a movie for example, where the conversation mostly consists of a monologue, perceived by the consumer.[70] Playing

70 Media is never perceived completely one-sided and works always bilateral. However, in this context, regarding the extend of interactivity, I use this simplified comparison to argue which I am aware of.

a video game lives from conversing through the fourth wall, and that is where the heterotopia is located. This does not mean the fourth wall becomes inexistent; on the contrary, the fourth wall is the matrix on which the codes, the topics of the constant conversation, are conveyed.

The information a player needs for a gameplay experience (i. e., the video game heterotopia) concerns the gameworld, the rule system and the challenge framework, as has been declared through the sound-strand model. Elements such as the narrative, sensory, challenge-based, and imaginative immersion, motivation, but also emotions and finally meanings (cf. Fig. 4.5), can be all characterized through those three categories or their combinations. And sound, as has been shown, plays a pivotal role in this conversation.

In this, the sound-strand has been proven as a valuable tool to decipher the functions of specific sounds in the constant conversation. But it has to be kept in mind that these are, to a certain extent, individual snapshots of conversation contexts and could be interpreted differently by another player, who acts and reacts differently within this conversation. For example, for one player, combat music can be proactive and indicative, for realizing he or she got caught up in a fight, and thus be related to the challenge-based immersion. For another player, this could just as well be reactive, for a fight he or she started, and thus stand in a reflexive relationship to the music, which strengthens the sensory immersion into the game space.

Some sounds may also have two or more strands characterizing their function. When Eivor is talking to herself in the old vault, for example, saying, "He's got to be down here. Where are you hiding, Burgred?", there is a narrative context; this addresses the challenge framework too, reminding the player on his or her quest. At the same time, the way she is speaking, calmly whispering, suggests a certain tactic for the quest, plus, the voice echoing from the walls gives away spatial information about the environment, intensifying further the sensory immersion.

When I asked game audio developers, as a thought experiment, how they could tell through the perception of sound if they are im-

mersed in a video game heterotopia (in comparison to reality), they all addressed the quality, fidelity, and abstractness of sound (Section 9). I believe the difference between a video game soundscape and a *real*-world soundscape lies in the nature of the constant conversation, on the information that passes through the fourth wall and how it is coded and conveyed to the player. If I observe someone nearby, trying to collect something and commenting it with: "I'd have to ditch something," I became suspicious and possibly pinch myself to see if I am not in a video game heterotopia.

The soundscapes of video game heterotopias are a part of the coded constant conversation that mediates between the fictional gameworld, the rule system, the challenge framework, and the player. The way these are intertwined and implemented diegetically and how this conversation audio interface is designed characterizes the (sonic) heterotopia.

11 Conclusions

11.1 Summary of the Research Findings and Relevance

Following the main research questions for this research—how to conduct ethnomusicological field research studies in video game spaces and how virtual reality spaces are created, manipulated, and experienced through sound and music—there are two different perspectives on the final findings which are strongly intertwined. These are a theoretical point of view on the functionality of video game sounds and the (sonic) interaction between player and system, and the focus on an adapted methodology for ethnomusicological fieldwork and analysis of video game soundscapes.

For the theoretical aspect, I propose the broader concept of the constant conversation, a term initially defined by the game audio developer Bjørn Jacobsen (Jacobsen 2016), further developed, and concretized within this study, as a clearer and more adequate understanding of the ergodic process with a cybertext (Aarseth 1997). The constant conversation regards the interaction between player and video game as a communication process between two participants (player and system) rather than just "a reader" interacting with an artifact. Towards a comprehensive understanding of this coded multilayered audiovisual (also haptic) language that is used between player and video game, I introduce the sound-strand model to describe the basic sonic vocabulary a player has to interpret and understand in order to play a game, which is understood as a contextualized synthesis of already existing theories in video game sounds and music.

Methodologically, I regard video game spaces as heterotopias, as real spaces that reflect, mirror, or stand in any other direct relation to the (social, cultural, and physical) space we live in (Foucault and Miskowiec 1986), in which fieldwork is conducted similar to any other real environment. In visiting these sites as unbiased as possible for initial samplings, I emphasize these characteristics and strengthen the understanding of gameworlds and spaces as heterotopias. In the manner of grounded theory (Glaser and Strauss 1980), further fieldwork is adapted to the findings and theories and methods are constantly compared and adjusted until a final analysis of the field is done (until future findings may demand for further adjustments). As has been shown in different stages of the fieldwork, although the virtual field can be approached the same way as any other real site, gameworlds and spaces have different foci on distinct layers on how and what specific information is conveyed through sound than what is perceived in a natural environment.

To investigate the perception of and the interaction with sound in action-adventure video games, the first part of this book was dedicated to the theoretical discourse on how video games are understood as a platform for individual experiences and on the functionality and nature of game sounds. Video games are understood as a text, not as a pure artifact, but as a space made for the participation of the player—a cybertext. Herein, Aarseth's model of a generalized role-playing cybertext (Fig. 4.1) proved to be accurate for all case study contexts, even, or especially, in the context of the constant conversation. It also emphasizes the basic perspective on *what* a video game and its respective soundscape *do* and *how* it is done, rather than the understanding of a mere artifact which is narrowed on *what* a video game is.

For this, different theories on the diegesis of video game sounds, immersion through sound, but also Schafer's theory of soundscapes have been discussed and finally brought together and adjusted in my own model of sound-strands, which was developed during the grounded theory process in the fieldwork. In this model, the diegetic characteristics are split into different units, the trigger, source, and

carried information of a certain sound. Although I argue that this systematization allows a more detailed diegetic localization of a specific sound than, for example, Jørgensen's concept of interface sounds (Jørgensen 2011), it is still compatible with these different approaches and their meanings and does not render them obsolete. Through the clear dividing line in the sound-strand that marks where the subjective perception and interpretation by the player starts, diegetic and other characteristics of a sound can be analyzed precisely.

In the methodological discourse I argued that, for this study, there is no adequate approach for ethnographic fieldwork within the digital space or virtual worlds of video games to date. Existing texts either studied gamer communities, social impacts of video games in the real world, or analyzed games as pure artifacts. There are approaches to virtual ethnographic fieldwork in video games (e. g., Miller 2008; Boellstorff et al. 2012; Harvey 2014), but they dismiss the broader space and conceptual understanding of a video game. To overcome this gap, I took inspiration from in-game photography artists like Leonard Sang, Robert Overweg, or Kent Sheely, but also from Johan Huizinga's magic circle (Huizinga 1939), and the notion of video game spaces as heterotopias, to form my own methodology for ethnographic fieldwork within video game spaces, which simplified concludes again in the notion on the question: "What does a video game do and how does it do it?"

The fieldwork was conducted in three different case studies, which share many common genre features and characteristics of third-person action-adventure games, but are diverse in their setting: a North American post-apocalyptical tribal era set in the 31st century (*Horizon Zero Dawn* [Guerilla Games 2011]), the *Star Wars* canon franchise universe (*Star Wars Jedi: Fallen Order* [Respawn Entertainment 2019]), and a historically inspired fictional world during the Viking expansion into the British Isles in the Middle Ages (*Assassin's Creed Valhalla* [Ubisoft Montreal 2020]).

The very first fieldwork trips placed a special focus on the heterotopic aspects of entering and finding the field, which could be

described similarly to real world approaches conceptually, though the specific processes like the threshold between the physical and virtual world is unique to digital spaces. Typically for the first hours in a video game, the game space is introduced stylistically as well as specific earcons and leitmotifs like the main theme that are distinctive for each heterotopia, which starts already with the initial setting menus before the player even enters the gameworld. Extensive tutorials create the impression of finding and entering the final field relatively late, in which a certain freedom to explore the gameworld autonomously becomes possible. As has been shown in each case study, the avatar's voice plays a pivotal role for the identification with the specific game space and is not used solely for conveying semantic information.

To bridge these first unstructured fieldwork sessions to the later in-depth fieldwork analysis, I chose a rather experimental approach by conducting soundwalks, as introduced by Hildegard Westerkamp (2007). The aim was to examine a more focused perception of in-game sounds and the individual and subjective connection to a specific soundscape. The process was guided through several steps Westerkamp proposes, from listening to single quiet sounds produced by the body itself to the final complete composition of a soundscape.

Soon I realized that soundwalks in video games are very compressed, meaning distances between different environments are shorter and the avatar moves faster than a person in the real world, which resulted in much shorter recording sessions. The goal was to focus my perception to the minimal sonic interactions between me and the digital space, to listen to the basic dialogue with as little input from my side as possible. Overall, I noticed a remarkably big number of rushing sounds in each game, from rushing trees, wind, to different water streams, which adds to a natural sonic fidelity of the gameworlds.

Most striking, though, was the perception of the various and numerous sonic invitations for ludic participations within the game space. These sounds motivate the player in the ergodic effort to further explore the cybertext's scriptons and finally distinguish the soundscape of a mere simulation to that of a video game. Some

sounds though could also be part of simulations without any particular objectives but function contextually as earcons, for example the grunting of a boar in the bushes conveys important spatial information of its presence if the player follows a certain objective in hunting wildlife for trophies or crafting items. Other sounds are more explicit, like an orchestra playing a leitmotif to signal that the player has reached a significant location in the narrative, or a chime when the player/character reaches a new level. There is also extensive use of monologues by the avatar in each game that hint at certain challenges or warnings. These sounds could be referred to simply as the "world rules" in the first layer of Aarseth's role-playing model (Fig. 4.1), but for better understanding and line of argumentation in this research, I use the term "sonic challenge guideposts" which are part of a broader challenge framework.

Having gained these insights into different layers of functionality in game sounds, the discourse of soundscapes as part of a constant conversation between player and game system has been re-examined and evaluated. Branching the concept down to its coded audiovisual languages and further to its vocabulary, the sound-strand model proved to be valuable and insightful as a part of the broader framework in which further fieldwork was analyzed. Challenge guideposts can be clearly identified through the sound-strand, analyzing them in their diegetic implementation as well as their relation to the player and finally contextualizing them in the broader challenge framework and immersive function.

With this formulated theoretical framework that I believe contributes to the broader question of what a specific video game does (sonically) and especially how it does it, the gained knowledge was deployed, tested, and analyzed in a last part of fieldwork in distinct settings within the gameworlds of the presented case studies. It has been demonstrated how elements such as the narrative, sensory, challenge-based, and imaginative immersion, motivation, and meanings can be described and analyzed through the sound-strand in the context of the challenge framework and the constant conversation. The

in-depth analysis further revealed that sound-strands (ergo also the functionality of a certain sound) can vary depending on their interpretation, for example if specific sounds imply a pro- or reactive effect on the player, and that certain sounds can be interpreted through two or more sound-strands simultaneously.

Not only to round up this book, but also to broaden the perspective of the perception of video game sounds with the production side, two (initially three) game sound developers were interviewed in this study (2022): Claudio Beck working for the Zurich-based indie studio Stray Fawn, and Bjørn Jacobsen, who founded his own company, Cujo Sounds. While they have very distinct backgrounds and different ways and possibilities in their respective productions, they share an understanding of game soundscapes not as mere copies of reality but believable video game environments, compromising and balancing between a sonic immersive experience and a functional understanding of key game features. Still, game sound and music development are often understood as an additional feature that comes last in the development, usually based on graphics and game mechanics.

Bjørn Jacobsen criticizes this understanding and its consequences for the game industry, which he tries to reply to through his influence with his own company by including sound design aspects from the very beginning in game developments he is part of. Further, in his opinion, academic knowledge of—and interest in—the topic is greatly missing in the game sound development community which also could help to strengthen their role in the overall development process of video games.

In this sense, I hope to not only contribute to a broader understanding of video game soundscapes within the academic field with the crystalized theoretical framework presented in this book, but maybe to provide a bridge to a more nuanced understanding or even inspiration for the future of game sound design in general.

My motivation in writing this book was to contribute a part towards a comprehensive understanding of the nature of video gameworlds and spaces. We are at a point where photorealistic graphics

and the sonic fidelity of digital spaces have the potential to become indistinguishable from reality, not to speak of the fast-developing possibilities that virtual and augmented reality are developing. Nevertheless, it is my firm belief that video game spaces are fundamentally different from other spaces as has been demonstrated, and so are their respective soundscapes and distinct functions of sounds. Within the theoretical and methodological discourse of this research, I was surprised how little this specific aspect of video games is addressed and discussed in the field of game studies.

Furthermore, I was surprised how little conscious knowledge about the multilayered and complex functionality and communication of video game soundscapes there is in the video game industry. Like Jacobsen, I hope to strengthen the exchange between the academic discourse and the experience and the practice from the game development. That said, I believe it could be a great benefit for game sound developers to actually conduct soundwalks, not only in the real (physical) world as Jacobsen does with his students or in his YouTube tutorials, but also in video game environments. Maybe even the implementation of the sound-strand or similar adapted models for conceptual work could become useful in the development processes. At the same time, I believe a broader scholarly interest in the practice of game audio development should be given attention to (like Jacobsen who implemented his knowledge and experience from the game industry in his thesis [2016]).

11.2 Limitations and Future Research

From the perspective of cultural anthropology of music, the findings of this research only mark a starting point for future research in video game soundscapes. The goal was to form a crystalized theoretical framework and a methodological approach to analyze third-person action-adventure video game soundscapes; this has been successfully demonstrated and further refined in the in-depth analysis of the case

studies. Although it was the aim to create the most flexible and comprehensive framework possible, it has to be kept in mind that this is a qualitative study and these approaches could need to be adjusted to other case studies, even more for different genres of video games.

Therefore, future studies should not only explore a broader selection of third-person action-adventure games, but also expand and possibly adapt the concepts and methodologies to different genres of video games. Soundwalks and the sound-strand model define parts that are clearly subject to the player's perception; therefore broader studies from different researchers could be a great benefit and these models and methodologies could be further adjusted, developed, or even be falsified and replaced with new findings if necessary.

I also believe that developing the approach of soundwalks further with different research questions is very promising. And, more general and not only focused on sound, the concept of promenadology by Burckhardt (2006) and walkscapes by Careri (2002), which are only mentioned shortly in context of soundwalks in this book, are promising approaches to adapt to video game spaces.

Not only broader studies with more diverse case studies are important, also the historical perspective adds to the understanding of the nature of (sonic) game spaces. The findings presented here are limited to a very narrow perspective of three case studies of modern triple A video games. Broadening the perspective to the past, from the very first video games until today, could provide new insights. Technical limitations had great influences on sounds and their function in early video game history that influenced how game sounds are perceived still today. It should be considered how methodological findings from this research can be applied and adapted to older video games and from which point on in video game history it makes sense to speak of video game heterotopias and soundscapes.

One special aspect in game audio design was mentioned and pointed out several times throughout the fieldwork conducted here but could benefit from an independent discourse in future video game sound studies: the silence. Not only could (and should) the

contextual complete absence of sounds be treated like a sound itself in many examples, but its meaning goes much further, as its discourse in musicology shows (cf. Lichau 2018).

With the perspective of how video game spaces are perceived by the player, and regarding this perception as the reality for this player, the intention of the qualitative game sound developer interviews was to broaden this understanding and not get answers on how soundscapes are supposed to work in their conception. Nevertheless, as mentioned above, an extended exchange between future research in sound studies and game audio development could be a great benefit for the better understanding of game sounds for both sides.

Finally, by understanding video game spaces as heterotopias, with "the curious property of being in relation with all the other sites, but in such a way as to suspect, neutralize, or invert the set of relations that they happen to designate, mirror, or reflect" (Foucault and Miskowiec 1986: 24), the theoretical framework and the methodological tools proposed in this research provide only a starting point to study—very cautiously—implications of video game soundscapes on our (physical) real world and vice versa. Although I argued earlier that I firmly believe that video game spaces are fundamentally different from our physical everyday world, there is no denying its influence, through gamification, serious games, or the game transfer phenomena (Gortari and Griffiths 2014) for example.

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