Introduction

Prospect onto the Architectonics of Computer Games and their World Properties

Marc Bonner

This anthology comprises written versions as well as extended case studies of talks from the international two-day workshop "Architectonics of Game Worlds—On Aesthetics and Mechanics, Spaces and Places, Rhythms and Philosophies" at the University of Cologne in March 2019. The contributors do not only come from across Europe but also cover diverse research disciplines through their respective professions. To name numerous and yet not all disciplines, the workshop welcomed presenters of Media and Game Studies to History of Art, Cultural Studies and Public History to Literary Studies, Philosophy and Sound Studies to Aesthetics and Design Studies, Architecture and Game Design. It was a compelling challenge of the workshop and the anthology at hand to bundle the versatile approaches around the topics of space, architecture, perception of and worldbuilding in computer games and their media-specific properties. Thus, the authors focus on digital game worlds by providing a diverse corpus of chapters, ranging from fundamental theoretical research as well as case studies and close readings. In such a way, they depart from the beaten tracks of media and game studies, focusing on spatial, architectural and world-shaped phenomena within current digital media culture. The book is then not only suited for game, media, and culture scholars but also extends discourses of adjacent disciplines with new findings and additional aspects.

In its current digital, pictorial, and viral ubiquity, architecture no longer has to be bodily present, but "it always has a mediating role instead of being the end itself" (Pallasmaa 2011, 100). Wolfgang Sonne, among others, states that architecture only fully exists together with the images, pictures, graphics, renderings, models, and all the other types and formats of mediating or representing it (2011, 7). In particular, the enactment of architecture and the perception of three-dimensional game spaces are tightly interwoven, as performative interaction within non-linear environments and spatial involvement is crucial. This anthology then starts with the finding that

architecture has to be understood as *medial hinge* (see Bonner 2015a; 2015b; 2019). This stance loosely refers to Hans Hollein's postulate that everything is architecture (1968). Architecture then has to be understood anew in its medial possibilities and how it can mediate and regulate the environment to the observer by enabling new spheres of action. It is a predominant means ("Agens") of understanding and perceiving reality, as well as the fictional worlds of mass media: Architecture as the all-encompassing medium "has always fictionalised reality and culture through turning human settings into images and metaphors of idealised order and life, into fictionalised architectural narratives" (Pallasmaa 2011, 19). In the narrower sense of this anthology, it also refers to the corresponding *architectonics* of built reality and digital game worlds: as a *medial hinge*, architecture merges different disciplines of media and art with the realm of the everyday, folding them onto each other and enabling them to encapsulate one another (see Bonner 2015a, 2015b, 2019 and the chapter in this book).

From this vantage point, the idea of architectonics can be understood as the architectural implications of computer games to address the matter of (1) architecture in game worlds in the sense of its media-specific spatialisation, structural topoi, architectural layouts, and the (ambient) role of architecture, as well as (2) the architecture of computer games themselves in the sense of systematics, structures, and media-specific logics as well as logistics between multiple algorithms, databases, and their audiovisual staging of game worlds to be performed on the screen. Lev Manovich describes this process as the transcoding between the "cultural layer" and the "computer layer" (2002, 45-46) while Frieder Nake compellingly demonstrates the double constitution of the digital image divided into the "surface" ("Oberfläche") and the "subface" ("Unterfläche") (2005, 44-48; 2008, 104-106) with the example of Ivan Sutherland's first graphic software Sketchpad (1962). With the ever bigger and more complex game environments of today's computer games, algorithms merely compute fragments of the game world and its buildings in order to fill the field of view of the virtual camera. Multiple techniques are at work to stage an audiovisually seamless game space and thus a coherent world.

Algorithms then are the infrastructure or framework of the *architectonics* specific to computer games, and *architectonics* refer to the fragmental and processual state of an ever-changing navigable, three-dimensional but immaterial structure and all filters, effects, data, and objects allocated to it. Juhani Pallasmaa defines architecture as a world-regulating medium which organises and governs humankind's sphere of action (2012, 68). It is thus not a far-fetched step to link the aforementioned understanding of *architectonics* with the systematics and infrastructure of software. According to Manovich, the latter "has become our interface to the world, to others, to our memory and our imagination—a universal language through which the world speaks, and a universal engine on which the world runs" (2013, 2).

Andri Gerber develops a similar understanding of the term architectonics by contextualising it with Immanuel Kant's use of architecture as a metaphor in order to think about philosophy (2019). Kant was interested in the very system of buildings beyond cursory metaphors focusing on pictorial properties (ibid., 137). He uses architecture not only as a metaphor in order to grasp philosophy but also as a construction of reason based on a firm foundation, leading to an ontological problem: only by completing the structure is its stability proven (ibid., 138). Gerber states that "[t]he term 'architectonics,' or 'the art of systems,' thus encompassed the impossibility of the a priori innate to this kind of endeavor" (emphasis in the original, ibid.). In order to fully understand architecture and all its criteria, then, it must be designed, planned, and built at the same time. In actuality, this simultaneity is impossible to accomplish. As far as architectural practices are concerned, Gerber thus concludes that buildings are "always doomed to ruins" and the architectonics of Kant "mean an understanding of architecture as something impossible and unstable" (ibid., 139).

In context of playing computer games, the game world's code, algorithms, and database embody a blueprint with the associated building elements or, metaphorically, the game world can be understood as ruins with its dismantled fragments in the "subface". At the same time, parts of its level structure or topography are traversed and navigated by a player-character perceiving the "surface" of the game world through pixels, textures, polygon-meshes, and diverse guidance strategies and systems of meaning. The pictorial build-up of the "space-image" (Günzel 2008, 172) is governed through the current field of view of the player-character, whether it is controlled by the player herself or by the software. Thus, the game world is staged only in parts or fragments, dependent on the current game state or position of the player-character. The numerous concurrent and complex strands of the computer game braiding and unbraiding its audiovisual perceivable structure lead to simultaneous dichotomies of designed/coded, build/unbuild, at-hand/stored in database, construction/deconstruction, in close vicinity to/far apart from the player-character, entering/exiting the memory buffer—that is the very 'nature' of the immaterial architectures in/of digital game worlds.

Let us briefly take a step back from this vantage point and look back in time: When game studies slowly established itself as a discipline, Espen Aarseth highlighted the indispensable property of digital game worlds by stating that "[m]ore than time [...] [and] more than actions, events and goals [...] games celebrate and explore spatial representation as a central motif and raison d'être" (2001, 161). Shortly after that, Ernest Adams formulated first thoughts to an understanding of *The Role of Architecture* in Video Games (2002) and Henry Jenkins used architecture (or is it architectonics?) as a metaphor in order to categorise the properties and types of game spaces in Game Design as Narrative Architecture (2004). Two publications deriving from former scholars of the Swiss ETH Zurich then expanded on the transdisciplinary discourse between architectural theory and history, urbanism and computer games: Space Time Play. Computer Games, Architecture and Urbanism: The Next Level (von Borries, Walz and Böttger 2007) and Towards a Ludic Architecture (Walz 2010). Both provide cursory overviews that were furthered by Christopher W. Totten's compelling monograph An Architectural Approach to Level Design (2014). The topic of game space and its properties as well as architectural implications inlof computer games still are crucial in game studies, as the recently published anthologies Ludotopia. Spaces, Places and Territories in Computer Games (Aarseth and Günzel 2019) and Architectonics of Games Spaces. The Spatial Logic of the Virtual and Its Meaning for the Real (Gerber and Götz 2019) as well as Mathias Fuchs' monograph Phantasmal Spaces, Archetypical Venues in Computer Games (2019), among numerous papers and conference proceedings, verify.

Algorithms, databases, level structures and non-linear topographies are the very *architectonics* that provide, like architecture in actuality, "the ground for perception and the horizon of experiencing and understanding the world" (Pallasmaa 2012, 19, 44). This is also true for the role of designed space, for architecture *inlof* computer games: Michael Nitsche states that "[e]vents need to be defined and realized in their spatiotemporal setting by the player. [...] The necessary eye of the virtual camera makes these spaces cinematic and the interaction makes them accessible much like architectural structures" (Nitsche 2008: 51, 58). In line with this, Stephan Günzel understands computer games as media enabling "artificial navigation" (2008, 172) which is complemented by Gordon Calleja's summary:

There is an important difference to be appreciated between ergodic, simulated landscapes and non-ergodic representation of landscapes. Although one can imagine roaming around the represented space described in a piece of literature, traversal is limited to mental imagery. To move from one point to another in a game world, players must literally navigate their way, not merely imagine it (Calleja 2011, 74).

Therefore, it is all about movement, traversion, exploration, and navigation—whether it is the avatar within the staged game world, the digital image and its double ontology or the algorithms and data sets. Playing a computer game and experiencing the game world is heavily dependent on the appropriation of space (e.g. solving a puzzle, acquiring an item, freeing the princess, summiting a mountain) and on progression within game states that are mostly rhythmised by single windows or scrolling screens, individual levels leading to boss fight arenas or coherent "open landscapes" (Aarseth 2005, 505) staging a worldliness in a non-religious/secularly manner. It is all about movement, whether moving a cursor across the screen space and clicking on in-game objects in the "space-image", performing fast platforming or parkours, being pulled into a frontal attack or planning a strategic infiltration by scouting, circumventing hostile NPCs or hazard spaces through stealth gameplay.

Whilst still referring to the above-mentioned vantage point, it is only consequential to use Swiss architect Peter Zumthor's definition of physically real buildings in order to further clarify the simultaneity and fragility of computer game architectonics. According to him, architecture is the shell and background of life passing by and a container for the rhythm of movement (2010, 12). The consensus is evident: Shell and background are navigable, walkable, and playable level structures as well as non-walkable level geometry adding to the scenery and the enclosing skybox (for more on that, see my chapter in this book). The player-character represents life passing by. Rhythm refers to the modes of gameplay—motion patterns and spatiotemporal appropriations which derive from the coded game mechanics. Again, it is all about movement. The mode of spatiotemporal experience depends heavily on the "person-environment dynamic" (Strange and Banning 2001, 75; for an application on digital media, see McArthur 2016, 6-11; Bonner 2019) established by gameplay mechanics, quest topologies, and genre topoi. Finally, coming full circle, the architectonics of computer games do not only refer to the processes of play as well as to the game itself but also to the digital image and its algorithmically governed imaging procedures (Manovich 2002, 45, 46). It is this correlation paced in milliseconds and staging a fragmented view into the staged game world as well as enabling restricted courses of action within it that constitute the architectonics of game worlds. Under the Kantian take of 'architecture as a system' and 'model of thinking' Gerber concludes: "[a]rchitectonics [...] is more a condition than an object, and one that conveys the impossibility of the plan and the inescapable condition of ruin. [...] Video games, in a sense, represent both progress and impossibility, because the pace of the game does not allow to look backwards" (2019, 151).

While clinging to the prospect of the now well-known vantage point, it is of interest to understand the architectonics of computer games also on a more general level of perception and phenomenology under the idea of a 'world'-or worldliness in a secularly meaning. In this way, the "person-environment dynamic" of computer games is indispensably linked to the concept of environmental storytelling as a crucial means in game design, which "fundamentally integrates player perception and active problem solving, building investment" (Smith and Worch 2010, 26). The concept of worldbuilding and understanding fictions or works of art as worlds is not new to Literary, Cultural, Media and Game Studies (e.g. Goodman 1978; Mitchell 1989; Fuller and Jenkins 1995; Pias 2000, 2017; Wöhler 2005; Finkelde 2007; Pietschmann 2009; Lukas 2013; Yacavone 2010, 2015; Gualeni 2015; Jones 2015; Wolf 2012, 2017; Ryan, Foote and Azaryahu 2016; Asendorf 2017; Reinhard 2018). In 1978, Nelson Goodman published with Ways of Worldmaking a crucial basic work in which he dives deep into the five processes involved in creating worlds—composition and decomposition; weighting; ordering; deletion and supplementation; deformation (1978, 7-22). He defines worldmaking as a "remaking" as it "always starts from worlds already on hand" (ibid., 6) and concludes:

Furthermore, if worlds are as much made as found, so also knowing is as much remaking as reporting. All the processes of worldmaking I have discussed enter into knowing. Perceiving motion, we have seen, often consists in producing it. Discovering laws involves drafting them. Recognizing patterns is very much a matter of inventing and imposing them. Comprehension and creation go on together (ibid., 22).

Jumping to the year 2008, Goodman's understanding of creativity, world creation, and properties of worlds fits with Lars Zumbansen's idea of computer games which he critically defines as dynamic worlds of experience ("Dynamische Erlebniswelten") in context of the discourse of event society (2008, 21-32, 102). Zumbansen thus indirectly echoes Goodman's elaborated critical reflection on the aesthetics and "rightness" of worldmaking (1978, 91-133). Since then, the idea of understanding game worlds as products or at least interwoven with capitalism or neoliberalism was furthered by crucial studies (e.g. Dyer-Whiteford and de Peuter 2009; Möring and Leino 2016; Bailes 2019). Only recently, did Josef Köstlbauer, Eugen Pfister, Tobias Winnerling, and Felix Zimmermann define computer games as world machines ("Weltmaschinen") with a twofold meaning: on the one hand, they produce virtual worlds in which players (inter)act. On the other, they are machines contributing to the creation of the allegedly 'beautifully' globalised world of digitality in our actuality (Köstlbauer et al. 2018, 9). With this take, they question the allegedly apolitical, external, and location-independent status of digital games worlds within the in fact globalised and digitally ubiquitous world that the game industry is part of. The editors call for a rethinking of the role and impact of game worlds in today's society (ibid.). Another critical usage of the worldliness concept in order to understand, work with, and analyse computer games under aspects of philosophy, especially existentialism and phenomenology, is provided by Stefano Gualeni (2017, 2019). According to him, game designers configure the players' "possibility horizon" within a given game world. Gualeni wants to highlight the aspect of "frontier" or spatial restriction that is rooted in the term and reveals "the limited perceptual and interactive scale" within a computer game (2017, 127). Thus, in experiencing an 'ideal' game world with all its shortcomings, repetitions, and being independent from the grade of (non-)linearity, Gualeni also writes about feeling a certain "world weariness" ("Weltschmerz") due to the media-specific worldliness (ibid., 117, 125, 131):

Digital environments are, I argue, better understood as existential tools: not as contexts in which we pursue complete happiness and satisfaction, but as instruments that allow us to negotiate various aspects of our (individual as well as collective) existence, in new and unexpected guises. [...] [W]e are constitutively bound to dissatisfaction, and inherently driven to explore and

experiment with new worlds and unfamiliar possibilities of being. Virtual environments, in their peculiar ways, arguably provide those experiences and possibilities. [...] [T]hey contribute to our existential struggle, both allowing us to transcend some aspects of our everyday relationship with the actual world, and in disclosing new ways in which our very incompleteness can be experienced and understood (Gualeni 2019, 165).

On the Chapters of this Anthology

With the above findings in mind, the complex media-specific constitution of digital game worlds calls for critical transdisciplinary research beyond restricted framings of individual research fields. The contributions of this book aim to show how and under which aspects digital game worlds are constituted as well as how they are believable or all-embracing, disorientating or unsettling for players. The chapters then are less concerned with the use or depiction of certain architectural styles or historic antetypes in the sense of a pure motif history. Rather, the structures and mechanics, levels and spaces, aesthetics and perception are researched bundled by the concept of architectonics. Said chapters are divided into four parts. Although most of the authors tackle several topics or approaches and can therefore be included in more than just one of the four, the grouping will help to give structure to and an overview of the transdisciplinary multiperspective character of the anthology's principal topics—namely spatial, architectonics, and world-shaped phenomena.

Part one "Authenticity, Historicity and Cultural Practices—Experience in and of Game Worlds" is constituted by three diverse approaches on the perception and experience in/of game worlds with focus on spatial and pictorial representation and adaptation of the physically real. In his chapter "Historical Digital Games as Experiences—How Atmospheres of the Past Satisfy Needs of Authenticity," Felix Zimmermann understands historical computer games in the broader sense of an experience economy as "emodities", especially dealing with the past. He critically contextualises terms like historicity, authenticity, and accuracy, including their respective discourses, with the aesthetic concept of atmospheres. In such a way, Zimmermann expands the field of historical game studies into new areas by implementing aesthetics and phenomenology. He provides an analytical method in order to properly analyse situations and environments of historical in-game settings. Derek Price is also concerned with heritage practices when he investigates a specific kind of user-created content dealing with adaptations and representations of cultural landscapes and places of actuality. In "Agricultural Spaces and Places: Studying User-Created Maps for *Farming Simulator 15* at Scale," Price investigates the mods as well as the national or pop-cultural images players create of regions by collecting and analysing metadata and using the methods of 'distant reading'. The specific means of staging national identities and the role of distinct topographies within the simulation of industrialised agricultural management lead to findings heavily linked to the player community. A different kind of user-generated content is examined by **Vladimir Rizov** in the third chapter titled "PlayStation Photography: Towards an Understanding of Video Game Photography." He reconsiders the remediation of photography in digital games by stating that in-game photography has to be understood as a continuation of the general photographic discourse and in its current form, photography is an "in-between act." Understood this way, computer games "themselves [...] are a fundamental remediation of the photograph, the image." Thus, Rizov critically investigates multiple discourses and practices of photography in game worlds as well as in actuality in order to propose a new model for research and analysis based on gamic action and quest mechanics.

The four chapters of part two, "Topoi, Topographies, and Topologies-Spatial Structures Of Game Worlds," then further the study of properties of media-specific architectonics of digital game worlds with a focus on the spatial constitution, systematics, and mechanics of a (secularly) worldliness. In the second part of his chapter, "The World-Shaped Hall: On the Architectonics of the Open World Skybox and the Ideological Implications of the Open World Chronotope," Marc Bonner uses Mikhail Bakhtin's concept of the chronotope in order to provide a twofold analysis model of the spatiotemporal dynamics of open world games under topographic and topological aspects. He exposes an ideological differential of power between players and designers/ developers that is inscribed in the coherent landscapes of open world games and thus in the oscillation between different play modes. Bonner contextualises this finding with Gilles Deleuze's and Félix Guattari's concept of smooth and striated space. Prior to that, Bonner first defines open world games as world-shaped halls in reference to Rainer Maria Rilke and Peter Sloterdijk with the example of the *Crystal Palace*. In such a way, Bonner provides an understanding of the very structures and architectonics of open world games, emphasising their function as a base for future analysis of game worlds under the aspect of prospect pacing. Although this contribution is more than double the size of the other chapters, it is not meant to be the 'main body' of the book or a hierarchical statement in general. It is just due to the fact that the two intermingled theories crucial to the initially DFG-funded research project (that made the workshop and anthology possible) have the possibility to be expounded adequately here. In the second chapter of part two, "Square, Marketplace, Tavern: Contested Spaces in Single-Player Neomedieval Role-Playing Game Cities," Krista Bonello Rutter Giappone and Daniel Vella explore specific places and building types as topoi within "neomedieval" urban spaces in game worlds. Both authors investigate today's power structures embedded in the seemingly distant medieval sign system. They contextualise Christian Norberg-Schulz and Henri Lefebrve, among others, in order to not only shed light on the role of the player as tourist but also on the political implications of cities in computer games and their narrow linkage to today's discourses on politics and society in actuality. In her chapter "Taking a Breath of the Wild-The Concept of Airness in an Open World Game," Cornelia J. Schnaars undertakes a case study in order to expose the latest Zelda game and Nintendo's design concept of airness as a new take on the open world phenomenon off the beaten track. She focuses on navigation in, experience of, and the overall agency within a non-linear game world. In identifying three interlocking aspects, Schnaars develops an understanding of the distinct staging of the players' freedom based on a balance of player-induced and developer-induced gameplay and its potential for future open world design beyond the Zelda franchise. In context of Schnaars' investigation and Bonner's concept of prospect pacing, Rolf F. Nohr shows a further layer on navigation and decision-making in game space the bare bones of game worlds. In his chapter "The Labyrinth: Video Games as Media of Decision-Making," Nohr critically examines the logics and mechanics of the maze or the labyrinth, respectively, as the most established spatial architectonics underlying most level structures and thus most game worlds. He states that the labyrinth is the architectural embodiment of "a kind of decision support system", intrinsic to algorithmic media and today's society. Therefore, Nohr questions whether decisions made in the players' labyrinth of possibilities are subjective. As a core feature, the labyrinth then characterises the constitution of game space as digital media. Nohr's close reading of the most crucial spatial topos of level structures is therefore a transition to core aspects of the subsequent part.

Hereafter, the three chapters of part three, "Identity, Reflection, and Spatial Challenges—Navigating Self-Reflexive Game Worlds," focus on media-specific uses of space and architecture in computer games under the aspects of their self- and/or meta-reflexive potential. Most of these chapters are case studies, enabling not only a close reading of a certain game world but also illustrating that today's computer games self-consciously address their own medial as well as gamic constitution and thus the role of the player. Subsequently, to the properties and means of the labyrinth in Nohr's chapter, Hans-Joachim Backe investigates the defamiliarisation of game space and its function to unsettle players in "The Aesthetics of Non-Euclidean Game Spaces-Multistability and Object Permanence in Antichamber and P.T." By focusing on the structure of the corridor or hallway as architectural features and established level structure, Backe merges discourses like Game Studies, Neuroscience, and Psychology in order to analyse the visual illusions and spatial paradoxes players are confronted with. Here, the experience of disorientation not only shatters the players' fundamental behaviour built by experiencing the physically real but it also becomes the crucial entertainment of such computer games. In his chapter "I love how you can see the bottom of the universe from this room.' The Real-Virtual Architecture of Davey Wreden's The Beginner's Guide," Benjamin Beil is concerned with unfinished level structures and the exposure of the artificiality and scenic properties of game space in general. In his critical analysis, Beil questions the role of in-game architecture, its glitches, and the authorship of the game designer. From here, he investigates the idea of game space as an exhibition space and as an object—a somewhat distinct material culture nested between the virtual and the real. **Theresa Krampe** provides the third chapter of part three. In "The World Machine: Self-Reflexive Worldbuilding in *OneShot*," she investigates the aesthetics and mechanics of worldbuilding of the indie game *OneShot*. Krampe critically addresses the game world's expansion beyond the in-game screen into supposedly 'extradiegetic' windows on the desktop. She understands this (de)construction of the two-dimensional game world by exposing contained game space, code, and database as pars pro toto resonating with the *Zeitgeist* and the properties of today's indie games. In such a way, players are confronted with the software logics of digital media on technological, narrative, and cognitive levels, and consequently with their own role.

Concluding the anthology, the three contributions of part four, "Sound, Haptics, and Artistic Research—Approaches Beyond The Brinks Of Game Space," significantly complement the prior parts of this book as well as the understanding of the architectonics of computer games as defined above. They expand the horizon of interdisciplinary research approaches towards game space, architecture, and game worlds. In his chapter titled "Borderless Sound," Marcus Erbe calls for a focus on analysing and thus experiencing game worlds aesthetically through their audiovisual situations and the accompanying interrelations between audio and video. He refers to Michel Chion, among others, in order to show the computer games' state as software and an ever-changing process that is "prone to all sorts of unintended relationships between image and sound." Thus, his vital investigation sheds new light on the understanding of the architectonics of game worlds through its media-specific potential and shortcomings between perceived image and sound that stage the game world together. Carolin Höfler goes beyond the analysis of computer games themselves and delivers a critical study on the role of the sense of touch in several fields of human computer interaction. In "Image Contact. Haptic Actions in Virtual Spaces," she presents current technical developments, which enable the perception and navigation of virtual reality through haptic as well as ultrasonic feedback. This new take on illusionary spaces propels not only the idea of a digital space experienced beyond the long established supremacy of sight as a dominant sense but also enables a glimpse of the potentials of virtual reality as a haptic multi-sensory realm beyond the head mounted display. Höfler is interested in the liminal space that enables digital-physical interactions and thus a bodily immersion in 3D spaces. She traces early developments back to art history around 1900 as well as to the Bauhaus and its artistic research in tactile feedback systems. She questions the technical circumstances and developments in current VR games and research environments by compellingly combining discourses of architecture, design, aesthetics, and phenomenology. One crucial achievement of Höfler's study is the call to alternative design

approaches to virtual reality settings—towards haptic architectures dethroning the moving images of the VR goggles' displays and towards the user's or perceiver's need to newly relocate in the physical-virtual realm. In his chapter "Dreaming in the Witch House: An Esoteric Approach to Computer Games Research," Thomas Hawranke provides the transcript of his lecture performance held at the workshop. He combines academic investigations with an artistic research approach. His multiperspective essay revolves around the famous encounter with a building from H.P. Lovecraft's short story The Dreams in the Witch House, a contextualised overview on history of science and spatial theories as well as the players' role within game worlds and her agency to exhaust its level geometry. Hawranke reaches beyond the horizon of game studies analysis in providing not only visualisations of the thematised issues and architectures but also in grappling game design practices and the architectonics of digital space by calling for critically informed artistic and esoteric research. He calls for players to perform transgressive play behaviours in order to investigate the game worlds' every nook and cranny and thus explore beyond intentional, artificial borders into the unknown of the digital realm which may enable reflections on the player herself and even on her state as a human being.

Acknowledgements

The workshop as well as this publication were funded by the German Research Foundation (DFG). Thus, I would like to express my gratitude to the committee of the German Research Foundation for accepting my initial project "Open World Structures: Architecture, City- and Landscapes in Computer Games" in 2017 which not only made it possible for me to solely concentrate on researching open world games but also to realise the workshop and publish this anthology.

I also want to thank my current and former colleagues at the Department of Media Culture and Theatre at the University of Cologne for providing me with such a fruitful work environment during my years as a lecturer but also for giving me a home as a research fellow. Many thanks go out to Pablo Abend, Benjamin Beil, Stephan Packard, Peter Scheinpflug, Hanns Christian Schmidt, Sascha Förster, and Tanja Weber.

Overall, I cannot thank my assistant Anh-Thu Nguyen enough, for not only helping with the organisation of the workshop and handling chunks of the correspondence but also for being more than helpful with the proofreading process of all the papers and throwing herself into the shoals of British English and its spellings. Furthermore, I would like to thank those at Heidelberg University Publishing responsible for making this anthology possible, especially Maria Effinger and Anja Konopka.

In addition, I would like to thank my wife Nadine for being there for me all these years, acting as my most crucial critique and being firm as a rock in times of struggle with the academia way of life.

Finally, I want to express my gratitude to all the authors for contributing their studies and research approaches during the workshop in 2019 and for providing the chapters indispensable to this anthology. Thank you for your hard work and the intriguing topics and thus for bringing bricks and mortar to the framework of this volume.

Marc Bonner, März 2021

References

Bibliography

- Aarseth, Espen. 2001. "Allegories of Space: The Question of Spatiality in Computer Games." In Cybertext Yearbook 2000, edited by Markku Eskelinen and Raine Koskimaa, 152-71. Nykykulttuurin tutkimuskeskuksen julkaisuja/Publications of the Research Centre for Contemporary Culture 68. Jyväskylä: University of Jyväskylä.
- -. 2005. "From Hunt to Wumpus to EverQuest: Introduction to Quest Theory." In Entertainment Computing—ICEC 2005 Conference Proceeding, Lecture Notes in Computer Science, edited by F. Kishino, Y. Kitamura, H. Kato, and N. Nagata. Sanda, Japan, September 19–21. Conference Proceedings, 496–506. Berlin, Heidelberg: Springer.
- Aarseth, Espen, and Stephan Günzel, eds. 2019. Ludotopia: Spaces, Places and Territories in Computer Games. Bielefeld: transcript.
- Adams, Ernest. 2002. "Designer's Notebook: The Role of Architecture in Video Games", gamasutra (Website), October 9. Accessed January 2, 2020. https://www.gamasutra. com/view/feature/131352/designers_ notebook_the_role_of_.php.
- Asendorf, Christoph. 2017. Planetarische Perspektiven: Raumbilder im Zeitalter der frühen Globalisierung. Paderborn, Leiden, Boston: Wilhelm Fink.
- Bailes, Jon. 2019. Ideology and the Virtual City: Videogames, Power Fantasies and Neoliberalism. Winchester, Washington: Zero Books.
- Bonner, Marc. 2015a. "Architektur als mediales Scharnier: Medialität und Bildlichkeit der raumzeitlichen Erfahrungswelten Architektur, Film und Computerspiel." Image: Zeitschrift für interdisziplinäre Bildwissenschaft 21 (1): 5-22. Accessed January 2,

- 2020. http://www.gib.uni-tuebingen.de/ own/journal/upload/5a74255757376eb4a 4602322c55a0458.pdf.
- -. 2015b. "Ambiguous Play Pattern: A Philosophical Approach to the Refuge-Prospect Theory in Urban Open World Games by Merging Deleuze/Guattari and de Certeau." In 9th International Conference on the Philosophy of Computer Games, Meaning and Computer Games. BTK Berlin, October 14–17. Conference Proceedings, 1-16. Accessed October 26, 2019. https:// www.academia.edu/24458160/Ambiguous_ Play_Pattern_A_Philosophical_Approach_ to_the_Prospect-Refuge_Theory_in_ Urban_Open_World_Games_by_Merging_ Deleuze_Guattari_and_de_Certeau.
- -. 2019. "Piercing all Layers of the Anthroposphere—On Spatialization and Architectural Possibilism in Hitman." In Architectonics of Game Space: The Spatial Logic of the Virtual and Its Meaning for the Real, edited by Andri Gerber and Ulrich Götz, 215-32. Munich: transcript.
- Borries, Friedrich von, Steffen P. Walz, and Matthias Böttger, eds. 2007. Space Time Play: Computer Games Architecture and Urbanism; The Next Level. Basel, Boston, Berlin: Birkhäuser.
- Calleja, Gordon. 2011. In-Game: From Immersion to Incorporation. Cambridge, London: MIT Press.
- Dyer-Whiteford, Nick, and Greg de Peuter. 2009. Games of Empire: Global Capitalism and Video Games. Minneapolis, London: University of Minnesota Press.
- Finkelde, Dominik. 2007. "Die Welt als Bild: Zur Domestizierung der Fremde durch den Kitsch im 19. Jahrhundert am Beispiel von Weltausstellung und Interieur." KulturPoetik 7, (2): 166-78.

- Fuchs, Mathias. 2019. Phantasmal Spaces: Archetypical Venues in Computer Games. New York, London, Oxford: Bloomsbury Academic.
- Fuller, Mary, and Henry Jenkins. 1995.

 "Nintendo" and New World Travel Writing: A Dialogue." In Cybersociety: Computer-Mediated Communication and Community, edited by Steven G. Jones, 57–72. Thousand Oaks: Sage Publications. Accessed January 2, 2020.: https://web.stanford.edu/class/history34q/readings/Cyberspace/FullerJenkins_Nintendo.html.
- Gerber, Andri, and Ulrich Götz, eds. 2019.

 Architectonics of Game Spaces: The Spatial

 Logic of the Virtual and Its Meaning for the

 Real. Munich: transcript.
- Gerber, Andri. 2019. "The Architectonics of Game Spaces, Or, Why you should Play and Design Video Games to become a better Architect." In Architectonics of Game Spaces. The Spatial Logic of the Virtual and Its Meaning for the Real, edited by Andri Gerber and Ulrich Götz, 135–52. Bielefeld: transcript.
- Goodman, Nelson. 1978. Ways of Worldmaking. Indianapolis: Hackett.
- Gualeni, Stefano. 2015. Virtual Worlds as Philosophical Tools: How to Philosophize with a Digital Hammer. London, New York, Shanghai: Palgrave Macmillan.
- —. 2017. "Virtual Weltschmerz: Things to Keep in Mind While Building Experience Machines and Other Tragic Technologies." In Experience Machines: The Philosophy of Virtual Worlds, edited by Mark Silcox, 113–33. London, New York: Rowman & Littlefield.
- —. 2019. "Virtual World Weariness: On Delaying the Experiential Erosion of Digital Environments." In Architectonics of Game Spaces: The Spatial Logic of the Virtual and Its Meaning for the Real, edited by Andri Gerber and Ulrich Götz, 153–65. Bielefeld: transcript.

- Günzel, Stephon. 2008. "The Space-Image: Interactivity and Spatiality of Computer Games." In Conference Proceedings of the Philosophy of Computer Games, edited by Stephan Günzel, Michael Liebe, and Dieter Mersch. Potsdam, May 8–10. Conference Proceedings, 170–89. Potsdam: Potsdam University Press. Accessed January 2, 2020. http://pub.ub.uni-potsdam.de/volltexte/2008/2456/.
- Hollein, Hans. 1968. "Alles ist Architektur."

 Bau: Schrift für Architektur und Städtebau
 23 (1/2), 7–16. Accessed October 24, 2019.
 http://www.hollein.com/ger/Schriften/Texte/
 Alles-ist-Architektur.
- Jenkins, Henry. 2004. "Game Design as Narrative Architecture." In *First Person:* New Media as Story, Performance, and Game, edited by Noah Wadrip-Fruin and Pat Harrigan, 118–30. Cambridge, MA: MIT Press.
- Jones, Ian Bryce. 2015. "Enough of a World:
 A Phenomenology of Videogame Weltlichkeit." PhD thesis, University of Chicago.
 Accessed January 2, 2020.
 https://www.dropbox.com/s/eyzua69wnkoa9dn/Jones%2C%20Ian%20-%20Enough%200f%20a%20World%20%28Spreads%2C%20Embedded%20Video%29.pdf?dl=0.
- Köstlbauer, Josef, Eugen Pfister, Tobias Winnerling, and Felix Zimmermann, eds. 2018. Introduction to Weltmaschinen: Digitale Spiele als globalgeschichtliches Phänomen, 7–26. Vienna: Mandelbaum Verlag.
- Lukas, Scott A. 2013. The Immersive Worlds Handbook: Designing Theme Parks and Consumer Spaces. New York, London: Focal Press.
- Manovich, Lev. 2002. *The Language of New Media*. Cambridge, MA, London: MIT Press.
- —. 2013. Software Takes Command. New York, London, Oxford: Bloomsbury Academic.

- McArthur, John A. 2016. Digital Proxemics: How Technology Shapes the Ways We Move. New York, Bern, Frankfurt am Main: Peter Lang.
- Mitchell, Timothy. 1989. "The World as Exhibition." Comparative Studies in Society and History 31 (2): 217-36.
- Möring, Sebastian, and Olli Tapio Leino. 2016. "Beyond Games as political education neo-liberalism in the contemporary computer game form." Journal of Gaming & Virtual Worlds 8 (1): 145-61. https://doi. org/10.1386/jgvw.8.2.145_1.
- Nake, Frieder. 2005. "Das doppelte Bild." In Bildwelten des Wissens: Kunsthistorisches Jahrbuch für Bildkritik 3 (2): 40-50.
- -. 2008. "Surface, Interface, Subface: Three Cases of Interaction and One Concept." In Paradoxes of Interactivity. Perspectives for Media Theory, Human-Computer Interaction, and Artistic Investigations, edited by Uwe Seifert, Jin Hyun Kim and Anthony Moore, 92-109. Bielefeld: transcript.
- Nitsche, Michael. 2008. Video Game Spaces: Image, Play, and Structure in 3D Worlds. Cambridge, MA, London: MIT Press.
- Pallasmaa, Juhani. 2011. The Embodied Image: Imagination and Imagery in Architecture. Chichester: John Wiley.
- -. 2012. The Eye of The Skin: Architecture and the Senses. Chichester: John Wiley.
- Pias, Claus. 2000. Computer Spiel Welten. Zürich: Diaphanes.
- -. 2017. Computer Game Worlds. Translated by Valentine A. Pakis. Zürich: Diaphanes.
- Pietschmann, Daniel. 2009. Das Erleben virtueller Welten: Involvierung, Immersion und Engagement in Computerspielen. Boizenburg: Werner Hülsbusch.
- Reinhard, Andrew. 2018. Archaeogaming: An Introduction to Archaeology in and of Video Games. New York, Oxford: Berghahn Books.

- Ryan, Marie-Laure; Foote, Kenneth, and Maoz Azaryahu. 2016. Narrating Space / Spatializing Narrative: Where Narrative Theory and Geography Meet. Columbus: The Ohio State University Press.
- Smith, Harvey, and Matthias Worch. 2010. "What Happened Here? Environmental Storytelling." In Game Developers Conference 2010. San Francisco, March 9-13, Conference Proceedings. Accessed January 2, 2020. https://www.gdcvault.com/play/1012647/ What-Happened-Here-Environmental.
- Sonne, Wolfgang. 2011. Introduction to Die Medien der Architektur, 7-14. Berlin: Deutscher Kunstverlag.
- Strange, C. Carney, and James H. Banning. 2001. Educating by Design: Creating Campus Learning Environments That Work, San Francisco: Jossey-Bass.
- Totten, Christopher W. 2014. An Architectural Approach to Level Design. Boca Raton, London, New York: CRC Press.
- Walz, Steffen P. 2010. Toward a Ludic Architecture: The Space of Play and Games. Pittsburgh: ETC Press.
- Wolf, Mark J. P. 2012. Building Imaginary Worlds: The Theory and History of Subcreation. New York, London: Routledge.
- –, ed. 2017. The Routledge Companion to Imaginary Worlds. New York, London: Routledge.
- Wöhler, Karlheinz. 2005. Erlebniswelten: Herstellung und Nutzung touristischer Welten. Münster: LIT.
- Yacavone, Daniel. 2010. "Film Worlds: Zur Neukonzeption von filmischer Repräsentation, Temporalität und Reflexivität." Rabbit Eye: Zeitschrift für Filmforschung, no. 1, 109-20. Accessed January 2, 2020. http:// www.rabbiteye.de/2010/1/yacavone_film_ worlds.pdf.
- -. 2015. Film Worlds: A Philosophical Aesthetics of Cinema. New York, Chichester: Columbia University Press.

16 Marc Bonner

Zumbansen, Lars. 2008. Dynamische Erlebniswelten: Ästhetische Orientierungen in phantastischen Bildschirmspielen. Munich: kopaed.

Zumthor, Peter. 2010. Architektur denken. Basel: Birkhäuser.