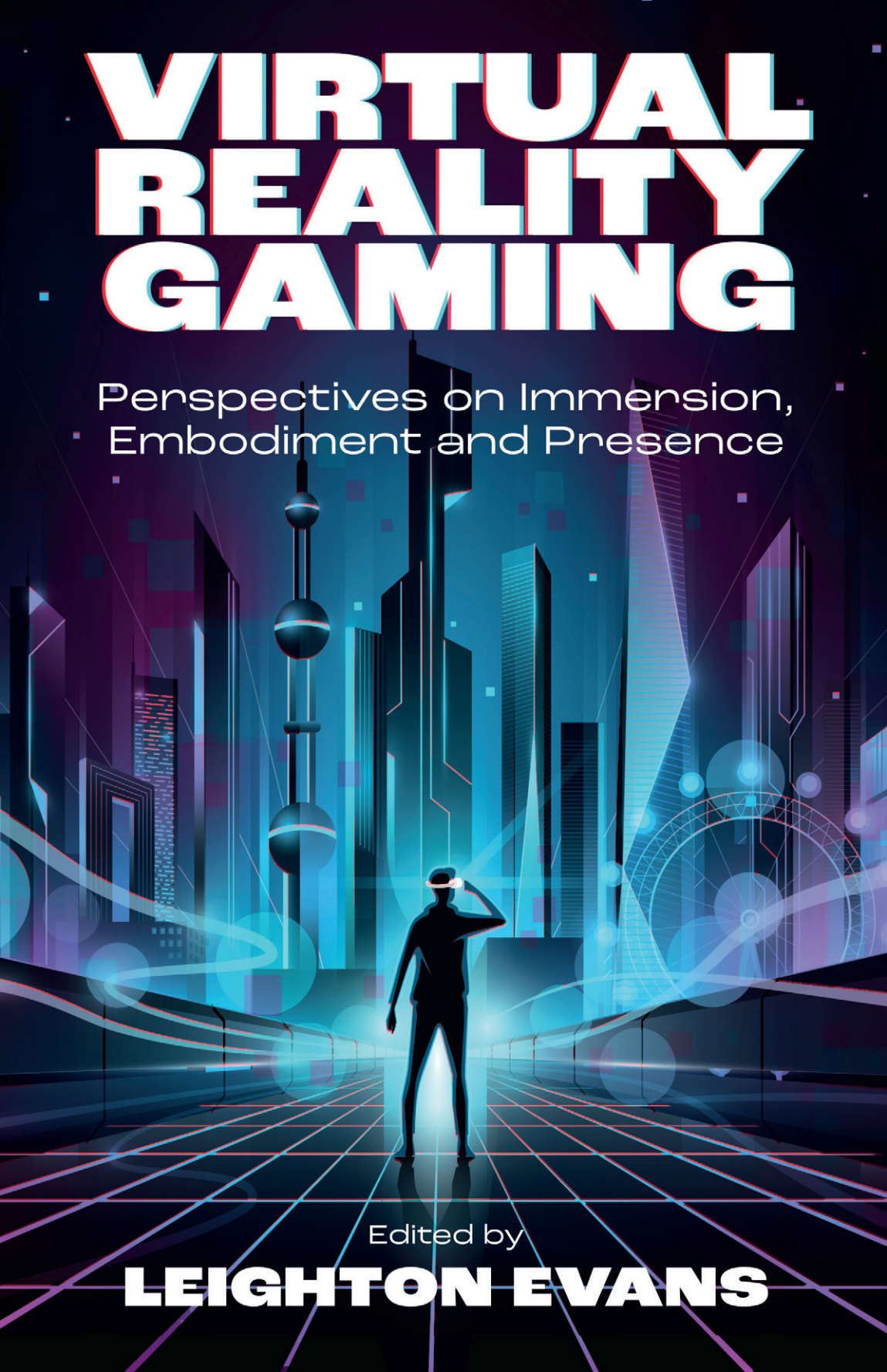
VIRTUAL REALITY GAMING

Perspectives on Immersion, Embodiment and Presence



Edited by

LEIGHTON EVANS

Virtual Reality Gaming

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Virtual Reality Gaming: Perspectives on Immersion, Embodiment and Presence

EDITED BY

LEIGHTON EVANS

Swansea University, UK

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Contents

Section 2: Embodiment

Section 3: Presence

About the Editor

Leighton Evans is an Associate Professor of Media Theory at Swansea University, a Director of Centre of Digital Arts and Humanities (CODAH) at Swansea and a Co-lead of the Media and Communication department. His ongoing research interests are on the mediation of digital media on culture and everyday life. Leighton is the author of *Locative Social Media: Place in the Digital Age* – Palgrave (2015), *The Re-Emergence of Virtual Reality* – Routledge (2018) and the forthcoming *Media Studies: Industries, Texts and Audiences* – Sage (2025). Leighton is the co-author of *Location-Based Social Media: Space, Time and Identity* – Palgrave (2017), *Intergenerational Locative Play: Augmenting Family* – Emerald (2021) and *From Microverse to Metaverse: Modelling the Future Through Today's Virtual Worlds* – Emerald (2022).

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About the Contributors

Rami El Ali works on the philosophy of perception, technology and phenomenology. He is currently pursuing a second PhD focusing on virtual reality at the University of Arizona's School of Information. He was previously an Associate Professor and Head of the philosophy programme at the Lebanese American University, and received his first PhD from the Department of Philosophy at the University of Miami.

Mila Bujić is a Postdoctoral Research Fellow at the Faculty of Communication Sciences, Tampere University (Finland). Her interests focus on the enmeshment of humans and digital technologies and their impact on individuals and broader societies. Her work entails laboratory experiments, surveys, online ethnographies, meta-analyses and futures research methods. Apart from publishing in top-tier venues such as *Internet Research, International Journal of Human-Computer Studies* and *Interacting with Computers*, Bujić is widely involved in international academic communities including chairing positions (e.g. Academic Mindtrek, GamiFIN, IMX). As a member of a project team, she has been successful in major funding acquisition (Academy of Finland – Postemotion; Kone Foundation – DIAL).

Marcus Carter is a Professor in Human-Computer Interaction at The University of Sydney and an Australian Research Council Future Fellow. His research focuses on digital games and emerging mixed reality technologies, with a particular focus on VR data and VR sociotechnical imaginaries. Since 2019, he has led the Ethical Implications of Mixed Reality Technologies project with Ben Egliston, which received funding from Meta in 2022 to study disability in the metaverse. Their forthcoming MIT Press manuscript – *Fantasies of Virtual Reality* – provides a sustained critical interrogation of VR booster discourses. His other research interests include the monetisation of children in the metaverse, which received a prestigious ARC Future Fellowship award in 2022.

Kate Euphemia Clark is a feminist media scholar researching embodiment in digital media and the accessibility of new media. Her PhD explores a feminist phenomenological account of VRs embodiment. She also is interested in the regulation and governance of new media technologies. Kate is also a founding member of the Critical Augmented and Virtual Reality Research Network (CAVRN), which aims to produce accessible, critical articles on extended reality

and has also worked with film festivals (Melbourne International Film Festival; Castlemaine Documentary Festival) to curate XR exhibitions.

Robert Dongas is a Designer, a Developer and a Researcher specialising in immersive technologies. Previously an Associate Lecturer in the School of Architecture, Design and Planning at the University of Sydney, he has taught web design, information visualisation and interaction design courses. He recently completed a PhD focused on designing virtual reality experiences for education and entertainment. He now consults with brands and organisations to create immersive digital experiences, blending his academic insights with practical expertise.

Ben Egliston is a Postdoctoral Research Fellow at Queensland University of Technology in the Digital Media Research Centre. His research is focused on the political economy and social impact of video games and immersive media (such as VR and AR). Ben currently works across two projects. His first project examines shifting design models in the global game industry, particularly focusing on how data and automation influence production cultures, end-use practices and the cultural role of games. His second project, *The Ethical Implications of Mixed Reality* (in collaboration with Marcus Carter), accounts for how stakeholders in the VR and AR industries consolidate power, and what the impacts of AR and VR are for users across society (with particular focus on those at the margins).

Kazjon Grace is a Senior Lecturer in Computational Design and the Director of the Designing with AI Lab at the University of Sydney's School of Architecture, Design and Planning. His research interests include computational creativity, human–AI collaboration and design cognition. He was a 2018 recipient of a Discovery Early Career Research Award and is the lead on a follow-up ARC Discovery Project in creative AI. His current projects include Q-chef, an AI-powered mobile app that recommends surprising recipes in order to diversify your diet, and the Collaborative, Interactive Context-Aware Drawing Agent (CICADA), a real-time interactive AI drawing tool.

Yueyao Hu is a Lecturer at University of Wales Trinity Saint David and is also a PhD candidate in the Department of Media and Communication at Swansea University. Her research explores how VR environments impact user experiences, communication patterns and the broader implications for media and society. Her doctoral research focuses on virtual interaction and user identity, with a particular focus on impression management under the framework of microlevel social interaction theory. In her teaching, she combines emerging technology research with design education, aiming to bridge the gap between theoretical advancements and practical applications in the future.

François Martel Lacoursière is a Teacher at the Royal Military College Saint-Jean and a Doctoral candidate in the Department of Art History, Cinema and Media Studies at the University of Montreal. His main interests revolve around the immersive phenomenon experienced through a wide range of ludic media including virtual reality, video games, role-playing games, board games and pinball. His latest

research focuses on the existence of a metaludic form of immersion. François believes that games possess a unique potential for entrancing players in spatial narratives and eliciting empathy for non-player characters.

Katherine A. Loveland is the Landmark Charities Professor of Autism Research and Treatment and the Director of the Lifespan Autism Clinic in the Louis A. Faillace, MD Department of Psychiatry and Behavioural Sciences, McGovern Medical School, at the University of Texas Health Science Center at Houston (UTHealth). Dr Loveland is an internationally known researcher and clinician specialising in autism spectrum disorder (ASD). She is best known for her work on social–emotional development and the neuropsychology of ASD. Her current research focuses on application of new technologies, such as virtual reality, to the treatment of mental illness in ASD, particularly in adults. Dr Loveland received her bachelor's degree from the University of Virginia, Charlottesville and her doctorate in Psychology from Cornell University.

Joanne Mills is an artist and an early career researcher whose research and practice concern the liminal space between the real and unreal and the relationship between spectator and artwork within physical, digital and hybrid spaces. She received her PhD from the University of Wolverhampton, where her investigation considered how two discrete areas within minimalism, music and the visual arts, contributed new knowledge on immersive forms of practice, placing the subversion of audience and performer from the 1960s within the concept of the expanded narrative – further exploring how advances in technology led to new affordances in immersive experiences through the creation of innovative, engaging works.

Saikrishna Srinivasan is a PhD graduate from the University of Waikato, specialising in VR applications in games and arts. His research focuses on VR's impact on space, subjectivity and presence in theatre performance compared to VR games. Saikrishna has a robust background in animation, visual effects and game design and has published articles and presented at international conferences. He has also worked as a VFX artist on Hollywood films like Avengers: Infinity War and Guardians of the Galaxy Vol. 2.

Juliana L. Vanderburg is a licensed Clinical Psychologist at OU Health/Oklahoma Children's Hospital and an Assistant Professor at the University of Oklahoma Health Science Center. Her research interests include the application of novel technologies to clinical psychology, such as the use of virtual reality in engaging clients in psychotherapeutic treatment; autism spectrum disorders (ASD) across the lifespan, especially with regard to the presentation of severe mental illness in ASD; and community-based, participatory action research methods. Dr Vanderburg received her Bachelor's and Master's degrees in Psychology from Tulane University and her doctorate in School Psychology from the University of North Carolina at Chapel Hill, completing her doctoral internship at UTHealth Science Center and her postdoctoral fellowship at Boston Children's Hospital/Harvard Medical School.

Michael Walter's PhD in Digital Culture & Media at the University of Pretoria, South Africa, focuses on the multidimensional experience of immersion in video games and virtual reality (VR). In his thesis, Walter proposed *The Player's Immersive Experience* (PIE) Model, a framework he developed from which to analyse the complex nature of the immersive experience in (VR) video games. Drawing from earlier models as well as his autoethnographic research, the model is sensitive to the unique immersive experience of VR. Walter, a South African academic, currently lectures in the Media & Creative Industries Department at the United Arab Emirates University in the United Arab Emirates.

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This book is a product of the MultiPlay network. The network exists to foster collaboration between games researchers across disciplines and to develop the research of early career researchers in conjunction with experienced scholars. The range of chapters in this book is a testament to those aims. The discussions, shared resources and collective efforts of the MultiPlay board and editorial board helped this book become a reality. My wholehearted thanks go to Stephanie Farnsworth (founder) and Lisa Meek, Co-chairs of the MultiPlay network. In addition, my thanks go to my fellow editorial board members: Greg McGuinness, Adam Jerrett, Matthew Higgins, Jack Orchard, Elena Pasquini, Daniel O'Brien, Karl Hodge, Kevin Veale, Ewan Kirkland, Lewis Alcott and Austin Anderson.

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Leighton Evans
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Introduction

Leighton Evans

Swansea University, UK

Keywords: VR gaming; immersion; embodiment; presence; conflation

When introduced to a new volume, it's natural to ask, 'Why?' In this case, why focus on virtual reality (VR) gaming? There are two answers to this. The first is prosaic – it's not been done before, in this form. The second is important. The promise of VR has always been that the medium will improve immersion, embodiment and presence on the part of the user. Video games have always been differentiated from other media in terms of these qualities though, so there is a major question as to whether VR can bring anything new with regards to this. This book therefore investigates what, if anything, VR can bring to immersion, embodiment and presence in line with this historic promise. While VR isn't new – its roots trace back to the 1980s and 1990s with early devices like the DataGlove and Audiosphere – it hasn't always lived up to its hype, particularly in terms of immersion, embodiment and presence (Evans, 2018; Shields, 2005). Early VR couldn't create a truly convincing sense of being in a digital world. That has now changed. Today's VR landscape, with advanced systems like Sony's PSVR2 and Meta Quest 3, offers affordable, sophisticated technology that provides genuinely new gaming experiences. Successful VR games like *SuperHot VR*, *Beat Saber*, *Boneworks*, *Half-Life: Alyx* and *Job Simulator* demonstrate the medium's potential and have shown that there is a market for gaming in the medium. This volume explores how contemporary VR is transforming immersion, embodiment and presence in gaming. The emergence of VR in gaming poses challenges to researchers around rethink the relationship between system, player and gameplay, much like the techno-utopian visions of the 1990s envisioned but did not realise.

However, the idea that VR inherently guarantees immersion – a pervasive discourse around VR which characterises many concepts about the medium (Evans, 2018) – is misleading. Immersion, embodiment and presence are interconnected yet distinct experiences that VR mediates to varying degrees according to the nature of the VR. This book examines how VR influences these qualities in gaming, acknowledging that digital games already offer immersive, embodied

Virtual Reality Gaming, 1–11

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experiences. The goal is to understand VR's unique contributions and potential improvements in these areas.

Immersion in VR Games

VR has the potential to significantly enhance immersion in digital games due to its ability to create highly convincing digital environments. Unlike traditional games, where the player's focus is divided between the game and the real world, VR can envelop the player entirely, blocking out external distractions and enhancing the sense of being in the game. The immersive power of VR comes from its capacity to project stimuli onto the sensory receptors extensively and interactively (Slater, 2003). Immersion in VR stems from the technology's ability to create a convincing digital environment (Slater, 2003). Early theories, like Csikszentmihalyi's concept of flow, focused on optimal experiences where the user loses themselves in the activity (Csikszentmihalyi, 1990). In VR, immersion is not just about visual dominance but also about creating non-obtrusive interactions. Games like *Beat Saber* show how VR can create compelling immersive experiences through intuitive gameplay.

Examining immersion in the context of VR involves questioning the assumption that immersion is a product of the medium. Slater and Wilbur (1997) argue that immersion in VR is the degree to which VR projects stimuli onto the sensory receptors of users in an extensive, matching, surrounding, vivid, interactive and plot-forming manner. This detailed sensory engagement is key to the immersive experience unique to VR gaming. Bortolussi and Dixon (2003) emphasise that immersion is a hybrid, dynamic and interactive phenomenon involving convergence and divergence to the state of immersion. This view highlights the role of the individual in constructing immersion, which involves an orientation towards engagement with the mediated experience in question. The role of the construction of elements of VR games and the engagement of the player, therefore, are critically important in understanding immersion as a facet of VR gaming. The first section of this book will assess these elements.

Embodiment in VR Games

VR can, in principle, revolutionise the sense of embodiment in games by providing a more direct connection between the player's physical actions and their in-game avatar. Unlike traditional games that rely on button presses or joystick movements, VR allows for full-body tracking, enabling more natural and intuitive interactions within the game world. This can make players feel more physically present in the game, enhancing their overall experience. According to Grodal (2003), video games are stories for the eye, ear and muscles, where our embodied sense of perception constitutes the phenomenon of gameplay. Embodiment, while frequently considered a form of self-presence (Biocca, 1997; Lee, 2004), can also be used to describe the ensemble of sensations associated with having and controlling a body (Kilteni et al., 2012). In VR gaming, the player's own prosthetic

body becomes a vehicle for action in a way that is not typically a feature of digital games. Even on systems like Nintendo's Wii or in arcade-based dance games, the motion of the body is interpreted and replicated on a 2D display. In VR, the assemblage of graphics, space and the novel configuration of the body produces a new feedback loop that creates a new sense of embodied interaction.

Embodiment in digital games is closely linked to the experience of a game. Movements made by the body (through the control interface) are reflected in the virtual body within the game world, providing a visceral level of character experience. VR has already provided some interesting examples of how that medium can alter that visceral experience. For example, in *SuperHot VR*, the bodily control of the avatar is an essential part of the game mechanics. When I stop, time stops. Skilfully deploying and adapting this embodied control dynamic is essential to progress in the game. This mechanic also draws attention to my own body while feeling immersed and present in a different 'world'. Certain strategies, actions and reactions are rewarded over others through designer choices about game mechanics and outcomes, offering a cognitive level of embodied experience. In a VR game like *Job Simulator*, with its interactive and humourous approach to virtual tasks, players gain a strong sense of embodiment that emerges from the visceral and experiential aspects of embodied gameplay. While this is true of other games, looking down at the avatar's hands in *Job Simulator* and seeing them perform the ridiculous mundane tasks the game involves invokes a sense of character experience that is quite different from seeing an avatar on a 2D screen.

Inhabiting an avatar's social persona in a game allows players to explore social qualities they may not normally possess, providing a social level of experience. These design choices can enable players to explore alternate fantasy selves through actual in-game performance, providing a fantasy level of experience. Over the course of gameplay, players extend themselves further into the motivations and possibilities of the avatar, forging an identification grounded in observation, action and experience. This joining of player to virtual self through avatar-based action experientially distinguishes digital games from other media but may well also distinguish VR Games from other games. For example, *VRChat* is a prime example of a VR game that fosters social presence and community building in virtual environments (VEs). The choice of avatar, the customisation of avatars and the ability to interact with others are a co-construction by the user in conjunction with the interface and the software. This degree of customisation is not VR-specific in any way, but the feeling of ownership of that virtual body may well be new thanks to the mirroring of bodily movement, paralinguistic communication and freedom to interact in the game world.

Larissa Hjorth and Ingrid Richardson (2020) highlighted how bodily experience makes a game feel familiar and called this haptic intimacy. The VR game *Boneworks* is often cited as a paragon of VR embodiment because of the degree of bodily experience. Its physics-driven interactions and realistic handling of virtual objects give players a profound sense of having a physical presence within the game world and a familiarity with that world. The game's emphasis on realistic bodily movements and physical interaction are exemplars of how VR

can enhance the sensation of embodiment in games. In essence, the game is emphasising haptic intimacy. This volume will critically question how embodiment is realised in VR games and what specific aspects of the medium bring to this dimension of gaming.

Presence in VR Games

Presence is a key aspect of VR that can significantly enhance the gaming experience. By providing a highly immersive and embodied experience, VR can make players feel as though they are truly present in the game world. This can lead to a more engaging and emotionally impactful gaming experience. Presence is often simply defined as the feeling of 'being-there'. Along this line, Minsky (1980) defined presence as the sense of being in one environment while physically located in another. Lombard and Ditton (1997) describe presence as 'the perceptual illusion of non-mediation', a view endorsed by the International Society for Presence Research (ISPR) (2000). The failure to acknowledge the role of technology in mediating our view of the world can lead to spatial presence, an illusion of being physically located in a mediated environment resulting in automated responses similar to those exhibited in response to unmediated stimuli (Hartmann, 2015; Sanchez-Vives & Slater, 2005).

Presence is often conflated with immersion and embodiment. The concept of presence can be understood though as a result of immersion and embodiment. This positions presence as an emergent psychological construct that denotes the individual's subjective perception of being in the VE (Schuemie et al., 2001). As such, presence refers to the subjective experience of being in an environment, the 'sense of being there' even if physically the body is in another environment (Fontanesi & Renaud, 2014; Fromberger et al., 2015). VR is a medium that is designed to make us fail to acknowledge the role of technology in the view of the world and feel 'being there' in a computer-generated world. VR should then, in theory, aid the sense of presence in games for the player. As VR incorporates bodily movement and orientation into the game environment, this should arguably improve the sense of 'being there' in the game. The critically acclaimed *Half-Life: Alyx* is an excellent example of how contemporary VR games can achieve high levels of presence. The game's meticulous attention to detail, interactive environments and compelling narrative draw players deeply into its dystopian world. The ability to manipulate objects realistically and the game's responsive environment create a level of engagement that is hard to match in non-VR games. However, it is often unclear whether the success of games in VR in creating this increased sense of presence is not a function of the use of VR as a medium for the game but instead is a function of the design and immersive qualities of the game itself. To address this, more attention is required in understanding the processes of making and experiencing VR games and the spatial, ludic and narrative aspects of games that affect immersion, embodiment and presence in VR games. This volume addresses that lacuna.

Conflation and Resolution

The terms immersion, embodiment and presence are often used interchangeably but mean very different things. Immersion refers to a focal engagement with the media, embodiment relates to the control and sensation of having a body within the media, and presence describes a hermeneutic understanding of being-there because the world feels like home. This volume aims to explore the unique aspects of VR games as they relate to immersion, embodiment and presence, addressing the lacuna in current literature. This volume will examine the processes of creating and experiencing VR games, focusing on the spatial, ludic and narrative aspects that affect immersion, embodiment and presence. The diverse voices collected here, from both experienced and emerging researchers across the globe, provide a sustained and developed discourse on how VR as a medium develops, alters and mediates the experience of gaming. The aim of this book is to improve understanding of these elements in the context of gaming and VR, contributing to the evolving scholarship in this field. The multidisciplinary approach of this volume – drawing from game studies, media studies, art, psychology, sociology, computer science, human–computer interaction and other fields – is intended to provide a range of perspectives that problematise and elucidate how VR as a medium affects our key areas of concern. As a product of the *MultiPlay Network*, an interdisciplinary research network that encourages researchers at all levels of experience across the globe to collaborate on the study of games, we would not have it any other way.

Chapter Previews

The subsequent chapters in this volume are intended to explore the intricate details of how VR gaming achieves – or sometimes fails to achieve – immersion, embodiment and presence. The first four chapters focus (no pun intended) on immersion. Chapter 1 of this volume, authored by Marcus Carter and Ben Egilston, presents a critical argument regarding the trajectory of VR gaming's development, suggesting that its focus on hardcore gamers and their immersive, hypermasculine experiences has limited the medium's potential. The chapter traces the modern re-emergence of VR to Palmer Luckey's efforts and subsequent involvement of John Carmack, which steered VR towards hyper-violent, high-fidelity first-person shooter games – a genre closely tied to hardcore gaming. The authors build their argument through two key case studies. The first, *SuperHot VR*, challenges the hardcore gaming emphasis on photorealism by demonstrating how immersion-through-proprioception can provide a compelling gaming experience. The game's simplistic graphics highlight that VR's strength lies in embodiment rather than visual fidelity. The second case study, *Beat Saber*, examines the casual/hardcore dichotomy, showcasing a game that, despite its casual nature, became the best-selling VR game. By focusing on intuitive, physically engaging gameplay rather than difficulty or competition, *Beat Saber* appeals to a broader audience. This chapter offers a nuanced understanding of immersion in VR gaming by critiquing the current hardcore-oriented

development paradigm and advocating for a more inclusive approach that leverages VR's unique immersive and embodied capabilities. It suggests that VR's true potential lies in moving beyond the traditional hardcore gamer values to embrace a wider range of gaming experiences.

Chapter 2, by Joanne Mills, argues that the immersive qualities of digital games and art share significant similarities, emphasising the active engagement required from participants. The chapter builds on Ernest Adams' and Staffan Björk and Jussi Holopainen's models of immersion, extending these concepts to both physical and digital environments. It suggests that games and immersive artworks both necessitate a level of engagement where the audience transitions from passive spectators to active co-creators, participating in and completing the work. Mills explores the concept of an expanded narrative, which involves creating an 'active' space where audiences engage multisensorially. This approach aligns with historical art movements like the Light and Space Movement and Fluxus, which emphasised audience interaction. Mills illustrates this through case studies, including her own immersive virtual installation 'The Lull' in *Second Life*, and critically acclaimed VR games like *Half-Life: Alyx*, which exemplifies the integration of sensory, cognitive, and spatial elements to enhance immersion. This chapter explains how VR gaming as a form of digital art can expand the boundaries of immersive engagement by leveraging technology not just to replicate physical spaces but to create new forms of interactive, participatory experiences that deeply involve the player.

In Chapter 3, Michael Walter introduces the Player's Immersive Experience (PIE) model to explore the multidimensional nature of immersion in VR video games. Walter argues that traditional models of immersion, such as Ermi and Mäyrä's SCI model and Calleja's Player Involvement Model, are inadequate for capturing the unique immersive strategies in VR games. The PIE model addresses this gap by delineating eight dimensions: sensory, bodily, game feel, affective and empathetic, world-building, narrative, ludological and social immersive strategies, alongside immersion disruption. The chapter emphasises that immersion and presence are qualities that VR amplifies by engaging multiple senses and creating a heightened sense of embodiment and presence. Walter uses his own gameplay experiences from VR titles like *Blade & Sorcery*, *Boneworks* and *Half-Life: Alyx* to illustrate how these dimensions manifest in VR. For instance, the sensory immersive strategies in *Half-Life: Alyx* include high graphical fidelity and haptic feedback, which contribute to a believable VE. The PIE model's strength lies in its comprehensive approach, acknowledging that immersion in VR is not a uniform experience but a blend of various interconnected strategies. This chapter contributes to our understanding of VR gaming by providing a robust framework for analysing the immersive experiences that VR games can offer.

In the final chapter in the section on immersion, François Martel Lacoursière explores the transformative impact of VR on video game immersion, arguing that VR breaks traditional boundaries, or the 'fourth wall', between the player and the game world. The chapter addresses the question of whether VR represents a revolutionary gaming paradigm or merely a novel iteration of existing media, exploring its potential to deliver an optimal immersive experience. Lacoursière begins by discussing the intertwined concepts of immersion and presence in VR, noting the

challenges in defining these due to their overlapping phenomena. Immersion is described as a psychological engagement and sensory submersion into a VE, while presence refers to the illusion of existing within that mediated environment. Lacoursière posits that VR's ability to merge perspective and interaction heightens these experiences, making players feel as though they inhabit the game world. The discussion then shifts to the narrative and spatial structures of VEs, illustrating the debate in Game Studies between narratologists and ludologists. Lacoursière highlights the significance of environmental storytelling and the role of diegesis and fictional worlds in creating immersive narratives. The analysis underscores how open-world role-playing games, like *The Elder Scrolls V: Skyrim VR* and *Fallout 4 VR*, use these elements to deepen player engagement. The chapter concludes by examining points of view, action and interaction in VR compared to traditional games. Lacoursière argues that VR uniquely fuses these elements, offering an intuitive interface that enhances the player's sense of presence. This fusion is exemplified through VR titles like *Horizon: Call of the Mountain*, where physical actions like archery are replicated, creating a more visceral experience. Ultimately, VR video games distinguish themselves through this integration, offering a new level of immersion by merging sensory input, narrative engagement and physical interaction.

The section on embodiment begins with Yueyao Hu (and myself) arguing that avatar design in *VRChat* serves as a means for users to explore and express their identity, influenced significantly by past experiences, cultural backgrounds and personal ideals. Using Goffman's theory of self-presentation, we explore how avatars allow users to manifest their authentic selves in virtual spaces, reflecting personality traits, interests and sometimes real-life physical attributes like skin tone. These insights are underpinned by original empirical research, based on qualitative interviews and quantitative surveys, which reveals that while avatars often do not replicate users' real-life appearances, they are crafted to reflect an idealised version of oneself. The findings underscore the importance of both conscious and unconscious motivations in shaping virtual identities, illustrating the complex interplay between real and virtual selves. This chapter contributes to our understanding of embodiment in VR gaming by providing an explanation of how VR gaming enables identity experimentation and performance, surfacing the significance of avatar customisation in fostering social connections and self-expression in digital environments.

Chapter 6, by Juliana Vanderberg and Katherine Loveland, develops the previous chapter by arguing that avatar choice in VR gaming reflects complex psychological processes, including identity exploration and the management of interpersonal relationships. These processes can significantly impact real-world psychological functioning and behaviour. The premises of this argument are grounded in the flexibility of avatar design, allowing users to express their 'ideal selves' and explore aspects of identity such as gender, race and disability, in a safe and creative environment. This flexibility helps users with lower psychological well-being or self-esteem create aspirational representations that may influence their behaviour and self-perception positively, a phenomenon known as the Proteus Effect. Additionally, VR environments provide a platform for forming emotionally significant relationships, mirroring real-world social dynamics and

fulfilling psychological needs. For marginalised groups, such as individuals with disabilities or those exploring gender identity, VR offers a unique space for safe exploration and community building. This chapter highlights how avatar choices in VR games are deeply connected to real-world psychological needs and social dynamics, suggesting that VR environments can potentially foster psychological well-being if used responsibly. The chapter calls for further research into how these virtual interactions and identities influence real-life mental health, emphasising the ethical considerations for VR game creators and players.

Kate Euphemia Clark argues that embodiment in VR is predominantly designed with masculine perspectives, marginalising women and others outside this normative perspective. Clark's chapter critiques the myth of VR's capacity to transcend physical bodies, positing that these narratives reflect and perpetuate masculinist assumptions about control and mastery. The chapter asserts that VR's hardware and software often fail to accommodate women's physical characteristics and ways of perceiving depth, leading to discomfort and exclusion. In response to this, Clark proposes a feminist phenomenological approach to VR embodiment, which recognises the body as situated within specific sociohistorical contexts and emphasises the importance of affective experiences. This perspective challenges the notion that VR allows users to leave their physical bodies behind, instead highlighting the inseparable connection between the user's physical body and their virtual presence. By examining the game *Tentacular*, the chapter illustrates how VR can create meaningful and engaging experiences that do not rely on traditional masculine narratives of control. This analysis suggests that feminist embodiment offers a more accurate and nuanced understanding of VR, urging a shift away from the commercialised narratives promoted by tech companies. This approach has the potential to create more inclusive and realistic representations of VR experiences, addressing the limitations and biases inherent in current VR designs.

Mila Bujic explores the current crosscurrents and veins of avatar research. The chapter critically reviews research that has focused on the impact of avatars on users, categorising avatars as tools, objects and personas and examining their significance across psychological, sociological, cultural and human–computer interaction perspectives. Bujic posits that psychologically, avatars influence thoughts and behaviours (Proteus effect) and reflect motivations stemming from self-perceptions (self-discrepancy theory). Sociologically, avatars are seen as active agents in online communities, performing roles akin to real-world social interactions. Player–avatar relationships (PARs) are positioned as parasocial dyads with varying levels of self-differentiation and intimacy. Culturally, avatars are symbols of identity, representing and challenging power dynamics and stereotypes. Human–computer interaction research focuses on avatars enhancing immersion and exploring diverse representations, emphasising the illusion of body ownership and its psychological effects. The chapter critiques this fragmented and reductionist nature of current avatar research, highlighting the need for a transdisciplinary approach. Bujic proposes a future research agenda grounded in the pattern theory of self, emphasising the dynamic interplay of sensory information, experiences, and sociocultural environments. This approach advocates understanding user-avatar interactions as