



Virtual Reality Narratives Embodied Encounters in Space

Kath Dooley

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Virtual Reality Narratives

“With *Virtual Reality Narratives*, Kath Dooley consolidates her status as a leading scholar and practitioner in the field of VR storytelling. Incorporating up-to-date case studies, the book effectively demonstrates how advances in VR technologies have led to uniquely interactive and embodied narrative forms. Dooley explores entertainment-based VR as a medium that alternates between the intimately personalised and the confrontational and participative, with valuable attention paid to what this means for users’ agency and their bodies.”

—Dr Jennifer O’Meara, *Associate Professor in Film Studies,
Trinity College Dublin, The University of Dublin*

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—Professor Jenna Ng, *Subject Head of Creative Technologies and
Professor of Digital Media and Culture, University of York*

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Kath Dooley
UniSA Creative
The University of South Australia
Adelaide, SA, Australia

ISBN 978-3-031-64964-6 ISBN 978-3-031-64965-3 (eBook)
<https://doi.org/10.1007/978-3-031-64965-3>

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In memory of Janet Elizabeth Dooley

ACKNOWLEDGEMENTS

The research that is presented in this book has been undertaken over several years with the encouragement and support of a range of colleagues, friends and family. It started life as a project aiming to catalogue and explore the innovative work of contemporary virtual reality storytellers and morphed into a more focused examination of VR as a narrative form. This has involved a scholarly journey that has been challenging but hugely rewarding.

I would like to acknowledge the traditional owners of the land on which the book was written, the Kurna people of the Adelaide plains in South Australia, and pay my respects to their elders, past and present. I recognise the ongoing spiritual connection that the Kurna people have with this land and their status as the first storytellers of this place.

A number of individuals deserve my special thanks for their contributions and/or collegiality, which has shaped this book in one way or another. I express my gratitude to my UniSA peers—in particular, Kim Munro and Ben Stubbs of the Expanded Storytelling Lab, Professors Craig Batty and Adrian Franklin, and my PhD student, George Martin. I'd also like to thank the extended community of researchers and practitioners working on VR storytelling who have provided general advice and feedback: in particular, Nathan Anderson, Stephen Butchko, Alex Munt, Deirdre V. Lyons, Mirjam Vosmeer and Simon Weaving. For generously granting interviews, I thank Stephen Butchko, Christopher Lane Davis, Deirdre V. Lyons and Lyndsie Scoggin. For granting permission for the use of images, I additionally thank Sparsh Ahuja (Project Dastaan), Nathan Anderson (New Canvas), Mike Brett (38 Minutes), Stephen Butchko

(Ferryman Collective), Daniel Cannizzaro (Tender Claws), Nonny de la Peña (Emblematic Group), Yasmin Elayat (Changing Same Collaborative), Peter Hegedus (Soul Vision Films), Leonardo Lami (Anagram) and Chin Hsuan Sung (The Walkers Films).

Most importantly, I wish to acknowledge the ongoing support of my partner Jamnes and my son Ren. Thank you for tolerating my extended writing sessions and for providing distractions along the way.

Portions of Chap. 5 appeared in ‘Traversing Space in The Under Presents’ (2019), a VR Game, in *International Conference on Interactive Digital Storytelling* (pp. 442–453), Cham, Springer Nature Switzerland. Material from Chap. 2 was presented as part of the 2024 Interactive Film and Media Conference (online).

I have no competing interests to declare regarding this publication.

Human Ethics Approval for interviews conducted as part of this book’s research was granted by Curtin University (HREC number 2017-0032).

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ABOUT THE AUTHOR

Kath Dooley Associate Professor is a researcher and writer/director of film and virtual reality projects based at the University of South Australia (UniSA). Her creative work has been screened at events such the Busan International Short Film Festival and the International Festival of Virtual and Augmented Reality Stories (FIVARS), Toronto. Kath is the author of *Cinematic Virtual Reality- A Critical Study of 21st Century Approaches and Practices* (Palgrave Macmillan, 2021) and co-editor of *Screenwriting for Virtual Reality: Story, Space and Experience* (Palgrave Macmillan, 2024). Her research interests include embodiment in the context of screen media, virtual reality and screenwriting, women's screen industry practice, and diversity in the screen industries. Kath is a member of the Expanded Storytelling Lab (XSL) at UniSA.

ABBREVIATIONS

3DoF	Three degrees of freedom
6DoF	Six degrees of freedom
AI	Artificial Intelligence
AR	Augmented Reality
CAVE	Cave Automatic Virtual Environment
CG	Computer Graphics
CGI	Computer-Generated Images
CVR	Cinematic Virtual Reality
HCI	Human Computer Interaction
HMD	Head Mounted Display
IDN	Interactive Digital Narrative
IDS	Interactive Digital Storytelling
LARP	Live Action Role Playing Games
MR	Mixed Reality
UI	User Interface
UX	User Experience
VE	Virtual Environment
VR	Virtual Reality
XR	Extended Reality

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Introduction

In November 2022, as a remote attendee of the Raindance Film Festival, I experienced *Gumball Dreams* (Ferryman Collective 2022) an approximately one-hour-long virtual reality (VR) experience that was delivered through the online social VR platform, VRChat. Wearing an Oculus Quest 2 headset and holding hand controllers, I became immersed in a fictional, animated universe full of psychedelic colours and dazzling lights. The narrative of this work revolved around Onyx, a blue, non-gendered alien with large eyes and antlers, who was approaching the end of their life. Like another audience member in this participatory drama, I was cast in the role of a fellow alien who was called to assist in Onyx's transition to the next world.¹ After adopting an avatar and completing a number of game-like challenges designed to acclimate me to my new body and world, I passed through an obelisk and found Onyx housed within a castle constructed from a giant gumball machine. My mission, it seemed, was to retrieve batteries that would power the protagonist's space mission. The most remarkable aspect of the experience was that the character of Onyx was played by a live actor who engaged me in one-on-one conversation. 'What is your dream?' the alien asked after separating me from the other participant. While somewhat confronting, I found this intimate discussion

¹ *Gumball Dreams* is designed to be experienced by an audience of three participants; however my own experience of the project involved only two audience members. For more information on the project see: <https://www.ferrymancollective.com/gumball-dreams>

to be the most memorable part of the experience, which ended with Onyx's peaceful transition to another realm. Drawing on the conventions of immersive theatre, the project's fantastical world and participatory narrative presented a personalised and intimate experience for the remote participant.

Upon later contemplation of the project, I recalled VR pioneer Jaron Lanier's assertion that virtual reality can

take away a room and replace it with Seattle. Then take away your body and replace it with a giant body. All of the pieces are gone and yet there you are, still experiencing what is left. [...] Your centre of experience persists even after the body changes and the rest of the world changes. Virtual reality peels away phenomena and reveals that consciousness remains and is real. Virtual reality is the technology that exposes you to yourself. (Lanier, 2017, p. 55)

The notion of 'exposure' that Lanier writes about resonated with my experience of *Gumball Dreams* on multiple levels, but most notably in regard to my feelings of vulnerability when directly questioned by the ancient alien, Onyx. Despite my inhabitation of a fictional alien avatar, and my freedom to respond in any manner conceivable, I found myself compelled to tell the truth. As the narrative moved on to the next sequence, I was stuck thinking, *Why did I do that?* My experience as the work played out was thus one of deep introspection, which left me with many questions as to the power of the project's artistic approach, immersive qualities and my role within the narrative.

Gumball Dreams is one of numerous entertainment-focused and narrative-based VR experiences that has been offered to a global audience in recent years. I use the term 'entertainment-focused' here to describe creative works that have the primary goal of engaging users in stories for pleasure, amusement or to expand their worldview, as separate from VR narratives produced in other contexts, such as for healthcare or defence. Such entertainment-focused works may have experimental, artistic and/or commercial drivers. Contemporary VR experiences are dynamic and multifarious, adopting a range of production technologies and delivery platforms. While VR, as an entertainment technology, has existed for some time, developments in the second decade of the twenty-first century led to the release of consumer-grade products, giving rise to a 'third wave' of VR (Heim, 2017), fostered by a convergence of art forms, evolving digital technologies and an expanding global consumer base. Writing on electronic narrative forms in 2006, narratologist Marie-Laure Ryan suggested

that ‘the jury is still out on whether digital technology has bred/will breed major new forms of narrative’ (p. xii). In this book I suggest that more than 15 years later, advances in VR technologies have given rise to an embodied narrative form that can be considered unique, and that this requires further scrutiny. Narrative-based VR experiences draw upon, or in some cases, reconfigure the conventions and properties of older media such as theatre, cinema and/or games. As a form of moving image that might be experienced via head mounted display (HMD) goggles, a dome screen or CAVE environment,² VR dissolves the rectangular frame associated with the cinema, television or computer screen, immersing the viewer in a 360-degree environment that is experienced as a replacement for their real-world surroundings. This ‘engulfment’ that ‘eradicates any perceptible presence of its screen boundaries’ (Ng, 2021, p. 108) demands the participation of the interactor’s whole body.³ I argue that as an inherently interactive medium that places the user *inside* a storyworld in a visible or invisible virtual body, virtual reality offers a means for the creation of narratives that incorporate the user’s body as a storytelling tool, fostering user-centred stories that unfold in three-dimensional space.

This monograph offers an in-depth exploration of recent evolutions in virtual reality storytelling, specifically looking at entertainment-based works created or launched within the last five years. Through the analysis of a range of case studies, this exploration will evidence the increasing diversity and sophistication of narrative-based projects that have been created and exhibited around the world during this time. The majority of the case studies that receive analysis in the book date from 2020 onwards. This milestone year, in which COVID-19 led to widespread lockdowns around the world, marked eight years since a 2012 Kickstarter crowdfunding campaign to fund development of the Oculus Rift HMD generated US\$2.4 million in pledges from VR enthusiasts and other stakeholders. Two years later, after the release of Oculus’ second iteration HMD, the DK2, the company was acquired by Facebook (now rebranded as Meta) for US \$2 billion. These events created market conditions that gave rise to

² A Cave Automatic Virtual Environment (CAVE) is constructed of a set of screens that cover the walls, ceiling and floor of a cube-shaped room, allowing for a 360-degree environment to be projected.

³ Jenna Ng argues that virtual reality can be considered the first instantiation of the ‘post-screen’ due to its confinement of the interactor’s field of view and engulfment of the interactor via large screens, which dissolves screen boundaries. See Ng, J. (2021). *The post-screen through virtual reality, holograms and light projections: where screen boundaries lie* (p. 282). Amsterdam University Press.

the current wave of activity in virtual reality entertainment. Aided by advances in smartphone technologies, consumer grade headsets, ranging from low cost ‘Google cardboard’ models to the high-end Oculus Rift HMD, entered the mass market for use in the home around 2015.⁴ One can observe a flurry of activity in the years that followed, as practitioners and investors explored the new potentials of VR. While take up of headsets by consumers was limited in these years, the COVID-19 pandemic created a new drive for virtual experiences. With a significant portion of the world’s population in lockdown, sales of Oculus’ then latest model, the Oculus Quest, surged in 2020, leaving the company unable to meet consumer demand (Johnson, 2020). This time of increased user uptake stands as a useful point from which to explore the changing nature of narrative-based VR experiences. But further to the increased use of VR in the home, one must note that the technological advances featured in the Oculus Quest headset (and the Quest 2, which was released in October 2020), reflects the increased creation and distribution of VR entertainment offering users six degrees of freedom (abbreviated to 6DoF—the ability to move around within a virtual environment as well as to turn one’s head from side to side, and to interact with objects using hand controllers), further to earlier iterations with more limited capabilities. The Quest headset was the first to allow untethered users the capability to interact with content offering 6DoF for an affordable price.⁵ In October 2022 Meta revealed that more than US 1.5 billion had been spent by consumers on games and apps in its Quest store (Matney, 2022). This availability of new VR technologies and apps, an increased customer base for VR entertainment and evolving user expectations has created the conditions for new narrative possibilities.

Moreover, COVID-19 lockdowns in 2020 impacted upon the development and exhibition of VR-based entertainment in several other significant ways. Widespread lockdowns resulted in a boom for online VR social platforms such as VRChat and the now defunct AltSpace, both of which have been sites for the creation of narrative-based experiences. As Chap. 7

⁴ Google Cardboard-style viewers retailed from around US\$10 and worked in conjunction with a mobile phone screen to offer monoscopic or stereoscopic 360-degree experiences. The prototype was developed by Google and made of cardboard, with the aim of providing a cheap entry point to VR viewing. By contrast the Oculus Rift cost US\$599 to purchase on its initial release in 2016.

⁵ The Oculus Rift and HTC Vive need to be tethered to a computer, unlike the Oculus Quest HMD.

of this book explores, innovative artists and theatre makers looked to these platforms as a new venue for live theatre production in the wake of physical venue shutdowns, producing an array of experimental works that could be accessed from consumers' and performers' homes. In parallel, the loss of physical venues for high-profile film festivals with VR streams, such as Sundance and Tribeca, meant that whole catalogues of entertainment-based VR that may have received limited viewing at a physical site, found larger worldwide audiences through online portals. For example, Loren Hammonds, film and immersive programmer of the 2020 Tribeca Film Festival, offered selected VR experiences to viewers via the Oculus TV app after a physical version of the festival was cancelled. She observed that these projects received approximately 43,000 views whereas no more than 4000 views would likely have occurred during an in-person festival (Kohn, 2020). As the pandemic continues to wane and society moves to a new normal it is useful to consider how these events have affected the evolution of narrative-based VR entertainment.

To date, a considerable number of academic studies of virtual reality storytelling have been conducted by researchers in screenwriting, screen studies, journalism and other disciplines. Many of these have focused on a subgenre of work labelled as 'cinematic virtual reality' (CVR) (see Dooley, 2021; Mateer, 2017; Nielsen et al., 2016; Reyes, 2018; Ross & Munt, 2018; and many others). In my earlier monograph dedicated to this subgenre, I define CVR as encompassing

narrative works that unfold in a 360-degree environment with a fixed story outcome, in which viewer participation is largely constrained to choosing the vantage point of the story, as distinct from open-ended, fully interactive VR applications and 'game' like experiences with limited or no narrative elements. (Dooley, 2021, p. 6)

This earlier study acknowledges the slipperiness of the CVR term, which in the infancy of VR's latest wave of activity was used in varying industrial contexts. Most commonly, however, the term refers to a format that continues to be associated with cinematic codes and conventions or methods of productions (such as live action filmmaking). While 'VR is not cinema' (Lanier p. 236), there is no doubt that CVR draws upon cinematic approaches. These experiences usually offer the viewer three degrees of freedom (abbreviated to 3DoF—the ability to look up and down, and left or right from a fixed position) and encompass pre-rendered 360-degree

video. Academic interest in CVR is not surprising considering the wave of practitioner experimentation that occurred in the second half of the 2010s, much of which was driven by investment from film and journalism organisations. The development of cheap omnidirectional cameras fostered a wave of 360-video content featuring live action and/or computer-generated imagery. Following Facebook's earlier mentioned acquisition of Oculus, film entertainment companies such as 20th Century Fox and Disney invested heavily in the medium, the latter bankrolling VR 'Film' startup Jaunt VR, which pioneered CVR content (Matney, 2019). In parallel Facebook launched its Oculus Story Studio while Google set up Spotlight Stories to explore the narrative possibilities of the medium. VR was subsequently taken up by several high-profile film directors (e.g. Hollywood veterans Doug Liman and Kathryn Bigelow), who experimented with the creation of 'VR films' (Dooley, 2021). High-profile film festivals such as Sundance, Tribeca, SXSW and Venice launched VR streams, showcasing an array of short works. Alongside this, Newspapers *The New York Times* and *The Guardian* launched 'The Daily 360' (2016–2017) and 'The Guardian VR Studio' (2016–2018) online respectively, to experiment with VR from a journalistic perspective (Dooley, 2021). After the completion of innovative programs that played with the capabilities of the new technologies, these programs ended, a move that perhaps signalled a lack of interest from mass audiences. On a similar note, having failed to establish a sustainable business model, Jaunt VR pivoted in the direction of augmented reality (AR) in 2018. The Oculus Story Studio folded in 2017, followed by the axing of Spotlight Stories in 2019. Film festivals (both established and new standalone offerings), however, have continued to showcase an abundance of VR work, with the prestigious Cannes film festival unveiling an official selection of immersive works in 2024.

In more recent times, as hyperbolic claims about the potential of VR technology subside, one can note a continued interest in VR's cinematic potential by practitioners and researchers (see for example, Arcagni & D'Aloia, 2021; Sagot-Duvauroux et al., 2022; Zhang & Weber, 2023); however, VR experiences are now observably more diverse than they were prior to 2020, often blurring the boundaries between the media formats of film, game and theatre. This shift towards cross-disciplinary and trans-disciplinary media approaches has resulted in narrative-based experiences realised via a range of technologies and platforms. As such, they may be featured in festivals under the banner of 'Extended Reality (XR)' or

‘Immersive’ programs, alongside work driven by AR or mixed reality (MR) technologies. To take one example, the 2022 program for Venice Immersive, one of the world’s leading yearly showcases of innovation in VR storytelling, featured 75 works in ‘competition’ or ‘non-competition’ categories. These included 360-video productions, more interactive works offering 6DoF, a VR feature film, and 30 VRChat worlds (some of which incorporated live theatre and other performance). On this selection, co-curator Michel Reilhac commented that ‘we have completely stepped away from categorising between story and interactivity on the other side. [...] It’s all always mixed, so we do not have now any distinction between genres. A 360-documentary experience will be judged on the same level as a sophisticated game-based story’ (quoted in Bye, 2022). In the same interview, co-curator Liz Rosenthal described the festival’s decision to return to in-person (as opposed to online) exhibition as reflecting that VR is ‘all about the social. [...] I think it’s a completely new art form or new experiential form, and that’s why we wanted to find a way in real life of bringing people into it (in person)’ (quoted in Bye, 2022). These comments, on the variety of work that is now categorised as VR entertainment, and its marketability as a social rather than individual experience, demonstrate developments that have manifested in recent years. This book seeks to investigate these directions, drawing attention to the evolution of VR narratives in a range of formats, including 360-degree video.

While earlier CVR works have now received significant academic attention, less work has interrogated VR experiences produced in more recent years, including those with more varied interactive or hybrid elements. The aforementioned platform shift towards more interactive VR experiences that offer 6DoF fostered by the increasing take up of headsets such as the Oculus Quest has meant that many earlier VR works produced for now defunct headsets, are no longer able to be accessed. Meanwhile, the development of software applications that allow for the native authoring of VR experiences in 360-degree space (e.g. *Quill* and *Gravity Sketch*) has allowed creators to design virtual environments with a new understanding of the medium’s affective abilities. Thus, new content demonstrates a greater awareness of VR as an embodied medium and reflects a more mature creative approach to storytelling from the XR community. A number of innovative works that combine documentary-based or fictional storytelling with game design, live theatre and other elements works will be profiled in this book, demonstrating a maturity regarding their use of 360-degree space and interactive devices. I argue that, in the wake of the

initial hype associated with the latest wave of VR, these interdisciplinary works that move beyond the individual practices of older media have much to tell us about the future of VR storytelling.

Before moving on to outline key research questions and methodology, this introductory chapter will chart a short history of VR as a medium that can entertain and expand our worldview. I will then address the term ‘narrative’ and discuss its usage across media and disciplinary contexts. In doing so, I’ll demonstrate the need for virtual reality narratives to be considered as unique.

THE QUALITIES OF VR AND ITS EVOLUTION AS AN ENTERTAINMENT MEDIUM

Virtual reality, as a technology, has a long history of development and application in fields such as medicine, defence, and architecture (to name a few), as well as in arts and entertainment. Shin defines it as a ‘computer-generated experience that can simulate physical presence in real or imagined environments’ (2018, p. 65) while Laurel describes it as ‘a medium in which the human sensorium is surrounded by (or immersed in) stimuli that are partially or wholly generated or represented by artificial means and in which all imagery is displayed from the point of view of an individual participant, even as he or she moves around’ (2013, p. 184). On a similar note Jerald suggests that VR involves ‘psychologically being in a place different than where one is physically located, where that place may be a replica of the real world or may be an imaginary world that does not exist and could never exist’ (2015, p. 45). These definitions foreground the immersive experience of VR, which involves a feeling of presence in a synthetic environment, ‘a complex, multidimensional perception, formed through an interplay of raw (multi-) sensory data and various cognitive processes’ (Riva et al., 2007, p. 46). The terms ‘presence’ and ‘immersion’ are sometimes used interchangeably but are distinct though related concepts (Slater, 2003). The latter, according to Slater, is ‘what the technology delivers from an objective point of view’ regarding the preservation of fidelity in relation to a user’s equivalent real-world sensory modalities (2003, p. 1). Presence is thus ‘a human reaction to immersion’ (Slater, p. 2). In the context of VR narratives, a sense of presence in a virtual storyworld gives rise to an embodied experience for the interactor and is

arguably what defines VR as a distinct medium. These concepts receive further attention in Chap. 2 of this book.

Several key inventions and developments over time have given rise to the VR experiences that exist today. As I've noted elsewhere (Dooley, 2021), Sir Charles Wheaton's innovative design of the stereoscope in 1838 created the means for the individual stereoscopic view that underpins three-dimensional VR (Tricart, 2018, pp. 7–8). More than 120 years later, a 'Telesphere Mask' was patented by filmmaker and philosopher Morton Heiling in 1960. This device offered stereoscopic viewing in an early model HMD but was limited in its ability to respond to the user (Flynn, 2019). Following experimentation with more advanced computer graphics, sensors and head tracking technologies, VPL Research, a Californian start-up company, launched the 'Eye Phone' HMD in 1989 (Lanier, 2017). This product bears some resemblance to the HMDs of more recent times; however, its expensive price tag prohibited widespread sales at the time. While VPL Research dissolved after it was declared bankrupt in 1990, the new decade saw the development and launch of HMDs for computer gaming, such as the 'VR-1' Arcade Attraction by SEGA in 1994 and Nintendo's portable tabletop HMD, 'Virtual Boy' in 1995 (Mowbray, 2022). These devices were considerably more advanced than those that had come before; however, poor optics and visuals resulted in widespread motion sickness and other problems, once again leading to a lack of commercial success.

From the late 1990s until the 2010s, virtual reality more or less disappeared from commercial contexts although experimentation with motion tracking and tactile interfaces in university settings brought advances to the field during these years (Laurel, 2013, p. 185). Moreover, the 1990s saw experimentation with VR's artistic possibilities by several practitioners and academics. In his survey of performative applications of VR in the 1990s, Dixon recalls a number of innovative projects, such as Brenda Laurel and Rachel Strickland's *Placeholder* (1993), the first of nine experimental VR works funded by the Bannf Center's Art and Virtual Environments scheme (2006, p. 27). He describes this work as 'driven by eleven computers from a Silicon Graphics reality engine to a Macintosh powerbook, and using over 25,000 lines of code' opening up 'the potential for virtual "flight" (through the character of a crow)' (p. 28). Also highly influential was Char Davies' *Osmose* (1994–1995), which offered the user an 'advanced sense of fully embodied immersion through the use

of a (then) sophisticated datasuit' (Dixon, 2006, p. 31).⁶ These embodied VR performances that appeared in parallel with advances in 3D cinema, and role-playing, simulation and open-world games, can be viewed as the antecedents to current-day VR as entertainment.

EXPLORING VIRTUAL REALITY NARRATIVES

My quest to articulate the specificity of contemporary VR narratives begins with a search for terms of reference as well as theoretical models that might guide the analysis that is featured in the following chapters. The question of what comprises a narrative is complex and contested by numerous scholars of media and/or narratology (the study of narrative structures, conventions and functions). Writing more than 20 years ago, Richardson observed that 'now, narrative is everywhere' (2000, p. 68), a comment on the expansion of narrative theory and analysis across literary, cultural, performance and film studies at the end of the twentieth century, which has complicated understandings of the term. With this in mind, I will now unpack the notion of 'narrative' across media and disciplinary lines, noting theories that have relevance for VR.

I begin with an attempt to pinpoint a general definition of the term, drawing on the understandings of several narratologists and theorists. Richardson observes that basic definitions of narrative stress its 'temporal, causal, minimal, and transactional' nature (p. 169). This suggests 'the representation of events in a time sequence as the defining feature of narrative' and that 'some causal connection, however oblique, between the event is essential' (p. 169). Considering the position of Gerard Genette, he further observes that 'any statement of an action or event is ipso facto a narrative, since it implies a transformation or transition from an earlier to a later state' (p. 169). Richardson's definition accords with Landa's understanding of narrative as 'a semiotic representation of a series of events connected in a temporal and causal way', which can be constructed using images, written or spoken language, or through gest (2005). This second definition stresses that narrative 'is only a sign', in other words, not a series of events, but a representation of events that can be interpreted by the receiver.

On a related note, Richardson notes a definition of narrative as 'a way of reading a text, rather than a feature or essence found in a text' (p. 169).

⁶I'll offer further exploration of these, and other performance-based VR works, in Chap. 6.