The Scenographic Potential of Immersive Technologies: Virtual and augmented reality at Prague Quadrennial 2019

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A wide range of works made with virtual and augmented reality technologies was on display at the 2019 Prague Quadrennial. This article discusses these works in the context of a renewed wave of research interest in these technologies. I argue that virtual and augmented reality provides a new paradigm for scenographic practice that differs from other digital media. Furthermore, I contend that a scenographic perspective can provide insights for how immersive technologies might be utilised to create affective audience experiences. Through a description of my own experiences of the works at PQ, I consider the scenographic environments that immersive technologies make possible, the specific affordances that they offer scenographic practice, and the attendant materialities of virtual environments. Rather than focus on presence or immersion in virtual environments as primary goals of immersive technologies, I suggest that a scenographic approach might instead foreground the porous boundaries between different orders of reality or 'worlds', and between bodies and worlds.

Keywords: scenography, virtual reality, augmented reality, immersive technology, affectivity

Introduction

The 2019 Prague Quadrennial (PQ) was marked by a proliferation of works made with virtual and augmented reality technologies. In this article, I contend that these technologies provide a new form of scenographic practice and experimentation with embodied audience experience, distinct from other digital media. Though these technologies have been in existence for a number of decades, there is currently a renewed wave of research activity investigating their applications in a range of disciplines. A body of research on immersive[1] technologies is emerging in theatre and performance, however there is little work examining them from a specifically scenographic perspective.

In this article I bring a scenographic lens to bear on immersive technologies, focusing on their potential to generate affective experiences. Against a backdrop of marketing hype

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[1] In this article I use the term immersive technologies (sometimes called mixed reality, cross reality, extended reality or XR technologies) as an umbrella term for virtual and augmented reality and related technologies. This terminology is undergoing rapid change and is often driven by tech-industry marketing.

about the future potential of virtual and augmented reality, on the one hand, and a general feeling of dissatisfaction with the experiences produced via these technologies to date, on the other, I propose that scenography might intervene productively into this area of practice and research.

I begin by outlining what I see as the key differences between immersive and other digital technologies for scenographic practice, before glossing the broad contexts of research and practice for these technologies. I propose that scenographic thinking could act as a point of departure from most other research interest in this area, particularly that which focuses on notions of storytelling, presence and empathy. Work on embodiment and immersive technologies in performance contexts is of key relevance to this discussion. By describing my own experiences of a selection of works created with immersive technologies that were exhibited at PQ 2019, I consider what kinds of scenographies these technologies make possible that can't be realised in other scenographic environments, the specific affordances that immersive technologies might offer scenographic practice and the attendant materialities of virtual environments. Rather than focus on presence or immersion in virtual environments as primary goals of immersive technologies, I argue that a scenographic approach might instead foreground the porous boundaries between different orders of world, and between bodies and worlds. In deploying a concept of world, I am referring to both the different orders of space that immersive technologies allow contact with, and the way in which scenography always involves multiple layers of world (Hann, 2019) – both fictive and material.

Counter to an association of digital technologies with disembodiment and immateriality, Maria Chatzichristodolou suggests that new digital technologies in performance facilitate 'a return to the material realities of the body and its environment' (Chatzichristodoulou 2017, 323). Given the abiding interest in bodies, space and materiality

for scholarly work in scenography, immersive technologies represent an opportunity to experience and think these matters afresh. Scenography might then also provide a particular perspective on research and practice with these technologies.

Immersive Technologies

Immersive technologies offer novel possibilities for scenographic practice and for audience experiences of scenographic environments, distinct from other kinds of environments or other digital media. Scenography has always incorporated technology, and there is a large body of research on the relationship between the two, particularly on the use of digital projections as part of scenographic environments (Aronson 2005; Hunt 2010; Baugh 2013; Aronson and Collins 2017). Nonetheless, immersive technologies differ in that they intervene directly into the body through either handheld or head-worn devices, extending or altering its sensory capacities. Marhsall McLuhan designated all media as 'an extension of ourselves' (McLuhan 2001), and in that sense projection technology could also be seen to extend the sensory capacities of the body through its ability to, for example, render distributed spaces and bodies co-present. However, this sensory re-configuration is more fundamental in the case of immersive technologies. Placing screens directly at the boundaries of our bodies' contact with the world – at our fingertips or in front of our eyes – constitutes a more significant shift in the embodied audience experience of performance environments. In the case of hand-held AR, the device becomes a posthuman extension of the eyes;[2] for AR or VR experienced through a head mounted display (HMD), it replaces or partially replaces the field of vision. Following this, immersive technologies might provide novel spatial experiences or scenographic environments with which to experiment.

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[2] Dorita Hannah (2017) has discussed this posthuman extension using handheld technologies in the context of scenography, following posthuman theorists such as Donna Haraway (1991)

My discussion departs from what I see as three central concerns around which research and practice in immersive technologies have coalesced. The first is a preoccupation with storytelling. This emphasis can be seen in the names of various research centres devoted to this area – such as the National Theatre's Immersive Storytelling Studio, Royal Holloway's StoryFutures project and University of York's XR Stories. It can also be seen in the language of immersive content creators such as Breaking Forth, who state on their website that 'storytelling always comes first'. The second is the notion of 'presence' (Slater 2003), and relatedly, immersion – or the extent to which participants feel that they are really inhabiting realistic virtual environments. The third is a focus on the potential of immersive technologies as 'empathy machines' (Milk 2015) through their ability to transport users to other places or allow them to inhabit other bodies (Jarvis 2019). These concerns overlap through a desire to locate appropriate narrative strategies for these media, and the extent to which they are able to convincingly simulate 'real' experiences and environments. Instead, a scenographic perspective on these technologies might forgo a fixation on narrative and realism in favour of a consideration of spatiality, materiality and embodiment.

Of relevance here is a body of work that centres on the potential affects generated by these technologies and the possibilities inherent in them for experimenting with embodiment. A key theme that has emerged in this work is the creative potential of perceptual gaps, or disjunctive experiences where sensory information from physical and virtual environments do not align. Melissa Trimingham considers sensations of 'mild vertigo' and 'haptic confusion' as 'strong affects' (2019, 18) that provide new modes of embodiment in VR, while Lisa Thomas and David Glowacki discuss how gaps between what is seen and what is felt might facilitate an attunement to embodied, somatic processes of perception and movement (2018). Similarly, Sita Popat complicates notions of 'presence' by arguing that through such gaps, the body is perceived as both present and absent in virtual environments.

For Popat, this provides affordances to the body, allowing it to 'do the undoable, to rehearse the unrehearsable' (Popat 2016, 370). These writings suggest that, rather than attempting to create seamless and realistic experiences, artists working with immersive technologies might instead understand the disjunctures of layered experiences of physical and virtual environments in terms of their potential to generate novel bodily experiences. Building on this, we might consider how such disjunctures might also create novel spatial and material possibilities for scenographic environments. In what follows, I discuss some of these possibilities and suggest that a scenographic approach to working with these technologies might foreground points of relation between physical and virtual worlds and bodies.

Prague Quadrennial

The 2019 Prague Quadrennial (PQ) contained multiple instances of immersive technologies. While 2015 was marked by the proliferation of small screens such as phones and tablets (Aronson 2016), the widespread use of AR and VR in 2019 was a departure from previous editions. A number of national exhibits utilised these technologies, and one of the central projects of 2019 was *36Q°*, a large-scale multi-media installation that incorporated a number of VR works within it. Through a discussion of my own audience experience of some examples of these works, I trace some emergent trends. This discussion attends in particular to the affective materialities and spatialities of the environments produced through these technologies.[3]

Aporia, or The City is The City

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[3] In beginning the analysis from these standpoints I am drawing on frameworks for understanding scenography that prioritise affectivity, materiality, relationality (McKinney and Palmer, 2017) and spatiality (Brejzek, 2011; Hannah, 2011).

The Polish national exhibit, curated by Aleksandra Wasilkowska and Krzysztof Garbaczewski, consisted of an installation of textured white blocks arranged in levels on which an audience could sit during a VR experience. Once wearing the VR goggles, I found myself floating through a dream-like, utopian city as a voice guided me. Conceptually alluding to the virtuality of its form while also drawing on familiar urban and architectural binaries (e.g. public/private), this work presented a 'hybrid' space in which 'two functions and two spaces co-exist simultaneously' (Prague Quadrennial 2019). For instance, the voice playfully described the final space as both 'temple of contemplation' and 'public outhouse'. I was guided through the different spaces of the city, such as waste disposal areas, markets and tombs.

The world of the city was strange and surreal, alive with non-human and not-quite-human objects, plants, architectures and beings that bustled around me as I floated by. This work created a detailed, utopian world of enormous scale, containing impossible architectures that disobeyed laws of physics. It harnessed the weird affects of digital aesthetics – for instance, through imaginary beings that moved about in strange, glitchy ways. The world it created was a shifting space that was distinct from the often-homogenous aesthetics of other virtual environments. The curatorial text described the virtual architectures as '…the total fulfilment of Utopia, where the cities undergo unending hybridization and expansion', and the city had a sense of regenerating itself, self-replicating in the manner of a biological organism or digital code. The architecture of the virtual city here certainly had aesthetic echoes of other utopian city projects – such as that of Paolo Soleri or Archigram – but in becoming virtual the city came alive in movement.

My body didn't obey laws of gravity as I floated through the space; though I remained seated, the fact that I appeared to be moving produced a strong sensation of movement in my body. After a short time I found the floating produced a sense of motion sickness. I had a

thwarted desire to take control of the movement myself by standing up and exploring the space on foot, not dissimilar to a desire to walk around after a long, stomach-churning car journey. In this way, the seated experience didn't fully utilise the embodied possibilities of VR.[4] Moments where virtual objects flew towards my head and I felt the urge to duck or close my eyes produced interesting experiences of rupture. While I knew they couldn't, in fact, hit me, keeping my eyes open as they seemingly floated through me took some willpower. Though the steps on which I was seated visually resembled the architecture in the imaginary city, the rough seat felt uncomfortable, rigid and limiting once I was floating through the virtual space – at times drawing my attention away from the virtual space to the discomforts of my body.

Design and Destroy

In opposition to the surreal world of the Polish exhibit, the Irish exhibit, curated by Jo Mangan, integrated realistic 360-degree footage while maintaining an interesting relationship to the physical environment. A shag-pile rug demarcated the space of the installation. Audiences removed their shoes and sat on swivel office chairs placed on the rug. Rather than a digitally generated environment, the world seen through the goggles consisted largely of a series of filmed spaces in which the selected Irish designers usually work. These included studio spaces and theatres as well as some speculative visualisations of designs. The points where I found myself in the middle of designers' studios were for me, the most affective. The mundane accumulation of pencils, paintbrushes, materials, and electronic equipment arranged neatly on shelves and desks resonated with the life of the designer it stood in for, becoming scenographic environments in their own right. There was also a suggestion of the other possible scenographic worlds devised by the designers working in these spaces.

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[4] Mark Hansen, among others, argues that proprioception (movement perception) is key to how virtual space is constituted through the body in experiences of VR (2006, 111).

The notion of these home studios as private spaces was also seductive, I caught glimpses of hallways leading to other (domestic) spaces through the doors.

Once again, the experience of being confined to a chair was somewhat frustrating – I had a strong urge to explore the rest of the house. However, the swivel chair did allow for rotation, making it easier to see the space around me. The scale of the studio spaces seemed slightly odd, as there was a sense that I was smaller than human-scale in relation to the space. This produced an affective feeling of disjunction and rendered the spaces slightly unreal. The texture of the rug underfoot kept me anchored within the physical space, creating an interesting relationality between worlds. As I left the installation and put on my shoes, I realised I had left my bag on the rug. Hovering at the edge, I asked an exhibition attendant if I needed to remove my shoes again in order to retrieve it. She responded that removing shoes wasn't a requirement of the work - that this was something audiences had started to do voluntarily. This reveals that – for audiences about to enter a virtual world – the tactility of the physical environment is seductive, speaking to how embodied relations between physical and virtual space might constitute a key element of such experiences.

Conglomerate/ Te Āhua Tū Wātea

The national exhibits of New Zealand and Bulgaria both contained elements of VR. I will discuss these two works together, as they shared a key characteristic. In both of these examples, VR headsets (HMDs) were transformed into costumes.

As part of a survey of the work of various artists installed in a variety of ways, New Zealand's exhibit, curated by Stuart Foster and Sven Mehzoud, included documentation of performance works in the form of 360-degree films as well as virtual content. This content was viewed through HMDs disguised in larger head-pieces – bulbous or pronged contraptions that rendered the wearer strange. Bulgaria's exhibit, curated by Ognyaya

Serafimova, took place in a hive-like structure where visitors could don helmets shaped like bee heads which contained VR content relating to the selected artists. The heads were heavy in both these instances, which impacted upon the embodied experiences of the works. Nonetheless, the act of wearing the HMDs in these works was rendered performative.

In the Bulgarian exhibit, the bee heads visually rendered visitors as part of the environment of the hive. In New Zealand's installation, one of the HMDs was housed within a structure of thin, flexible poles that created an almost wing-like form that protruded beyond the HMD by a width of almost a metre on either side. Whilst wearing this I was unable to see the busy exhibition space surrounding me. This meant that when turning around to experience the three-dimensionality of the VR content, I was aware that I might inadvertently hit someone with the headpiece's structure as it moved with me. This necessitated slow, gentle movements, constraining my embodied relationship to both virtual and physical space and, in a sense, producing a choreographed performance for passers-by.

In both the New Zealand and Bulgarian exhibits, visitors were rendered performers for audiences in the surrounding space. This is arguably always the case where a participant dons an HMD, in that the movements of their body take on a performative quality for onlookers outside the context of the virtual environment inhabited by the user. In the examples at PQ, the movements of the head and body were expressly highlighted as a performance through the participant's transformed, costumed head. For me, this produced a heightened sense of my body's presence in physical space. Presumably, a realistic sense of presence in virtual environments relies on the HMD receding from a user's awareness. However, in my experience, this never quite transpires. An enduring memory of PQ 2019 for me is repeatedly donning sweaty headsets. A failure to consider embodied experience and atmospheric conditions at a very basic level meant that curators employing these technologies hadn't allowed for the effects of large numbers of people using the HMDs in a hot exhibition

space in Prague in June. In addition, the HMDs were often too large for me, as a small woman with a small head. This meant that an apprehension of the HMD's weight and its contact with my body always figured, to varying extents, as part of my experience. Rather than ignoring this, the New Zealand and Bulgarian exhibits employed strategies that actively drew attention to these HMD as an extension or attachment to the body of the wearer.

36Q°

36Q° was a central project of the PQ 2019 and was curated by PQ artistic director Markéta Fantová together with Jan K. Rolník. It incorporated a number of works within it, including *Blue Hour,* led by Romain Tardy. This was a large-scale light and sound installation spread over an entire sports hall, itself including several VR works as well as physical elements such as pools of water and sand. There were four VR stations installed in four circular areas of sand, in addition to other unrelated VR works at the edges of the space, curated through an open call. For me, the overall experience of the installation didn't cohere into an affective whole. There were a wide range of disparate elements within a large space, and it was not always clear how they related to one another or what the terms of engagement were. However, I will focus here on the central VR experience.

At the beginning of my experience I removed my shoes and stepped onto the sand, where I was fitted with the VR equipment and handed an orb-like object. Once the experience started I found myself in a digitally-rendered version of the *Blue Hour* installation space. The tactility of the sand underfoot contrasted with the smooth appearance of the digital sand I could see. Slowly, the island of sand on which I stood began to float upwards. As in the Polish exhibit, I experienced a sensation of movement in my body as I floated. I stepped hesitantly towards the edge of the sandpit and looked down over it at the space of the sports hall. I could feel and touch this edge as the digital and physical versions corresponded with

one another. The space of the sports hall then transformed as if it had rapidly aged, becoming what seemed to be a future version of the space – abandoned, crumbling, overgrown and graffitied. What the VR facilitated here was the sandpit – fixed to the ground in the physical space – floating free in space and time, virtually. This was a very deliberate overlapping of spaces, using the sand as haptic stimuli that acted as a point of relation between worlds. Following this, small pockets of other worlds opened up. Beach and forest landscapes – captured in 360-degree film – moved towards me as small portals that I could wriggle into with my body, transporting me elsewhere. This change from computer-generated to realistic environment constituted a shift in the materiality of the world. At times, sensory information corresponded; I stood on the beach, my feet on the sand. At other times it was incongruent; I still felt sand under-foot as the ground beneath me transformed visually into a river of ice. Worlds overlapped and opened out onto one another, rendering space unstable. The multiple virtual worlds incorporated the physical through tactile elements. Through the positioning of the participant on the lit platform of sand and the kinds of bodily movements the experience encouraged, experiencers became performers, watched by others moving through the larger installation.

Island Invisible

Taiwan's national exhibit, curated by Yi-Shen Wang, was an AR installation. Though it was not the only instance of AR at the PQ – Poland and Bulgaria's exhibits also included elements of AR alongside VR experiences – it was in my view the most affective example. Titled *Island Invisible*, it consisted of a replica of a temple, half buried within a large square of earth. Based on an actual Taiwanese island that is now underwater, it used an augmented reality app to allow visitors to view the site submerged. Seen through the screen of a smartphone, the entire exhibition hall filled with a digital sea. The water not only submerged

the temple, however. Other well-known landmarks appeared: the Statue of Liberty, the Eiffel Tower, the Great Wall of China winding through the exhibition space - all drowning in the waves. Flotsam drifted by – discarded plastic water bottles, sneakers and other markers of throwaway consumer culture. The exhibition invigilator who explained the work to me told me that I could wander around the space, venturing as far as China, and the water could indeed be seen to extend to lap at the edges of the other national exhibits. In this sense, the work posited past, present and future landscapes, while also enacting speculative geographical and geopolitical relations. The parquet floor of the exhibition hall was visible through the water, its pattern gently distorting with the drifting of the waves. This modified the materiality of the physical environment and created an immersive space of experience that extended far beyond the confines of the Taiwanese exhibit.

Virtual Materialities, Porous Worlds, Extended Bodies

Following the description of some of my experiences of these technologies at PQ above, I want to draw out the emergent themes into what I am framing as a scenographic analysis of encounters with these technologies. That is, I want to contemplate what kinds of scenographies immersive technologies might make possible, while simultaneously considering whether particular aspects or possibilities of the technologies might be brought to the fore through specifically scenographic encounters.

The works discussed above harnessed the affordances and materialities of digital environments in a variety of ways. The term affordance was originated by James J. Gibson to describe the particular opportunities or possibilities to humans and animals by a given environment (1979). More recently, it has gained common usage in interaction and experience design, based on Don Norman's co-option of the term as a way to connote the possibilities for action perceived by a user in designed objects and spaces (1988). I use it here

to discuss the scenographic possibilities that virtual space posits that are distinct from other kinds of scenographic environments. As *Aporia, or The City is The City* demonstrated, virtual environments are not constrained by scale. In this case, the city-scale was one of the central aspects of my experience, facilitating a sensation of vertigo as I looked up and around. In *Design and Destroy,* my body's scale was (perhaps unintentionally) out-of-place in relation to what were otherwise recognisable, realistic domestic studio spaces. Virtual spaces also need not conform to the same physical laws. In *Aporia,* architectures, objects and bodies – including my own – floated, untethered by gravity. This ability to transcend gravity was also utilised in the VR experience in *36Q°.* Virtual space has a kind of plasticity that other scenographic environments do not in its ability to rapidly change form, again evident in *36Q°.* If, as Popat argues, VR allows bodies to do the impossible (2016), then *Aporia* and *36Q°* show that it also makes impossible *spaces* possible. In comparison to architectural utopias of the past, suspended in drawing or model form, *Aporia* generated an impossible space that not only moved and seethed with life, but could also be inhabited. This points to some of the spatial and material affordances these environments offer scenographic practice. In discussing virtual space in terms of its potential for staging the impossible, I want to be clear that unlike early understandings of cyberspace (e.g. Benedikt 1991), I do not mean to suggest that virtual space has no limitations, or that inhabiting it is a disembodied experience, or that it is immaterial.

In contrast to the frequent equation of virtual space with immateriality, we might instead understand it in terms of its particular materialities. Though digital spaces are not made up of matter, material apparatuses are required in order to generate them. Others have pointed out that digital objects aren't merely simulacra, but are ontologically real (Brey 2014, 43). George Dyson insists that '…there really is a universe of self-reproducing digital code…that's not just a metaphor for something else. It actually is. It's a physical reality'

(quoted in Brockman 2012). Thus in this article I have avoided constructing a binary between virtuality and 'reality', instead referring to (multiple) physical and virtual spaces. Discourses of scenography that draw on theories of new materialism (e.g. Barad 2007; Bennett 2010) to emphasise the agency of non-human materials to act on audiences (e.g. McKinney 2015; Bleeker 2017) can thus also be extended to virtual spaces. For instance, where the affective power of scenographic elements such as fog and water might be attributed to their capacity to perform in ways beyond human control (McKinney and Palmer 2017, 12; McKinney and McKechnie 2016), we might also speak of the glitches, flickers and disjunctures of digital materialities as contributing to their affectivity.

In addition, digital objects and spaces maintain distinct aesthetic qualities – and thus limitations. Though computer graphics have grown more sophisticated, they nonetheless retain a slightly synthetic appearance, limited by the materiality of screen, device and processing power. In *Aporia,* this particular materiality was embraced – its shimmers, pixels, glitches and simulated smoothness generated the aesthetic qualities of the world. I propose that rather than using immersive technologies to attempt to replicate 'reality', a scenographic approach might instead embrace the strange affects produced through the materialities of digital environments. In *Design and Destroy,* this occurred through the odd scale my body inhabited in relation to the space, despite its realistic rendering through the 360-degree film. *Island Invisible* provides another example of this. The sea it superimposed over the physical space didn't appear as a 'real' ocean. Instead, its digital materiality altered the physical appearance of the space, rendering it unreal. Rachel Hann argues that scenography operates through 'othering tactics' or a spatial sense of 'unreality' that differentiates scenographic and normative environments (2019, 33). Thus, contrary to other uses of immersive technologies – such as simulating a real-world experience in order to experience another place, body or situation – a scenographic approach might instead harness the possibilities of the medium for

'unreal', impossible spaces that differ from other kinds of spatial encounters. Moreover, *Island Invisible* shows how these impossible spaces are not perceived as singular, unified spaces, but as multiple, overlapping spaces of experience.

I argue that the most affective and scenographic uses of the technology foregrounded porous boundaries between different spaces or worlds. While the term 'aporia' refers to an impasse or uncrossable threshold, other works at PQ emphasised the permeability of the borders between digital and physical. One example of this is how in *360Q,* my body's contact with the sand acted as a point of relation across multiple spaces. Another is the way that the rug in *Design and Destroy* anchored my body in physical space. Existing scholarship helps to conceptualise this as a particularly scenographic and affective strategy. McKinney and Palmer (2017) argue that the concept of relationality is key to understanding how scenography organises bodies and spaces. Similarly, in his discussion of immersive scenography, David Shearing characterises immersion as 'a process that might materialise in the relational encounters between participant and scenographic environment' (2017, 142). In scenographies generated through immersive technologies, this relationality might then extend to how the ruptures in the boundaries between different orders of space – or world – figure as part of such an experience.

Hann advances the idea of 'scenographic worlding' as a distinct process by which 'stage geographies become manifest as perceptual worlds' (2019, 82). She develops this notion of worlding after the work of Kathleen Stewart, who in turn builds on Martin Heidegger's work. For Stewart, worlds are 'lived affects' (2011, 446) – 'palpable and sensory yet imaginary and uncontained, material yet abstract' (445). She speaks of worlding as both a temporal process and a plural 'proliferation of little worlds' (446) that emerge from different conditions and practices, which she terms 'atmospheric attunements.' Hann conceives of scenography as such a practice. She discusses this temporality and plurality, contemplating

how 'worldly thresholds become manifest, albeit fleetingly, in relation to other worlds already transgressed and the worlds that lie ahead' (2019, 83). This account frames scenography as a practice that mediates between multiple, porous and affective worlds – worlds that are at once illusory and corporeal. Following this, intentionally foregrounding the overlaps between different orders of world in immersive experiences might be conceptualised as a distinctly scenographic strategy.

In addition to blurring boundaries between worlds, transforming the HMDs into costume functioned as a scenographic strategy that blurred boundaries between body and world(s). A number of researchers working at the meeting point of media studies and affect theory contend that digital technologies can intervene into the relations between body and environment (Wegenstein 2006; Munster 2006; Clough 2010; Blackman 2012). These theories understand bodies as open and in process rather than bounded and fixed, and in terms of their capacity to affect and by affected. Lisa Blackman and Couze Venn speak of relationality in this context as a term 'that has become part of a different analytic for examining the relationships between what previously might have been thought of as separate entities' (2010, 10). They point to 'sensory apparatuses that afford specific kinds of embodied knowing' (8) – particularly that reveal bodies to be 'always thoroughly entangled processes' (9). I argue that the HMD-as-costume could be seen as such an apparatus. Explicitly designating these wearable technologies as costume draws attention to the way that HMDs extend the boundaries of the body as they simultaneously constitute that body's experience of its environment. Dorita Hannah claims that costume is 'capable of dynamically intervening between the body and space' (2014, 15). In this case this intervention is into the border between the audience's own body and the (digital and physical) worlds. This links back to my initial claim that immersive technologies differ from other digital technologies commonly used in performance – such as projection – in that they directly intervene into the body's

boundary with the world. Rather than simply augmenting space with digital imagery, this intervention prosthetically augments the body while simultaneously transforming its experience of the world. Through costuming this becomes a distinctly scenographic strategy that stages the wearing of such technologies as performance. It is also scenographic in that it attends to relationality – the porous borders between different orders of space and between bodies and their contact with the world.

Scenographic Futures of Immersive Technologies?

I have outlined above what I propose is a scenographic way of thinking about experiences with immersive technologies. I have departed from common concerns such as storytelling, empathy, immersion and presence. Instead I have focused on what kinds of novel scenographic environments are made possible with immersive technologies, and considered how scenography might foreground points of relation between worlds, and between bodies and environments. In attempting to think these technologies scenographically, I am also gesturing towards a range of possible scenographic strategies for designing experiences with these technologies. Hann argues that scenography can be understood as a mode of theatre-making – akin to choreography or dramaturgy – that centres spatial and material concerns (2019). My contention is that a scenographic approach to designing experiences with immersive technologies might offer an alternative to the strategies and concerns that are currently dominant in this area of practice and research.

One thing that seems to drive interest around notions of storytelling and empathy in particular is a desire to consider what such technologies might do and mean, amid anxiety that they are mere gimmick or spectacle. However, research in scenography has pointed out that audience experiences of spectacles can constitute 'a way of [embodied] knowing and a kind of action' (McKinney 2018, 115), and that scenography has an 'essential

role/responsibility to both show things and do things in the world' (Irwin 2017, 111). *Aporia, or The City is The City* and *Island Invisible* provide two illustrations of what that might mean in practice for these kinds of scenographies. Their ability to posit impossible worlds allowed a presentation of possible futures in relation to environmental problems – one utopian and optimistic, the other a warning. These examples point to what scenographic applications of these technologies can *do* as a form of speculative design (Dunne and Raby 2013) that can actually materialise and be inhabited and experienced.

Of course, mixed reality and immersive technologies are currently subject to a range of optimistic pronouncements about their future embeddedness in our lives, often driven by marketing imperatives. Whether or not this future eventuates remains to be seen. There have been a number of waves of interest in these technologies over the last few decades, and it is as yet unclear whether the current one will sustain. There is certainly a widespread sense that the creative potential of VR and AR within artistic contexts has not been fully realised.

It's worth emphasising that my identification of scenographic affect in the works discussed was based on my own individual experience and should by no means be assumed to constitute an attempt at universalising such experiences. PQ artistic director Marketa Fantová noted these pluralities of experience, stating that younger audiences tended to see '*36Q°* as a playground. But the older generations who came to *36Q°* felt it was a dehumanised, post-apocalyptic landscape' (quoted in Awde 2019). Though a strict generational division of experiences is likely to be overly simplistic, it nonetheless points to varying degrees of comfort with technology and the different affects that might emerge for different audiences. This suggests a further role for scenographic research in this area, building on the centrality of audience perspectives and experiences in this field. Furthermore, though the examples discussed above all display scenographic potential in one way or another, clearly there is much scope for further experimentation.

Despite these misgivings, I contend that immersive technologies nonetheless fundamentally reconfigure embodied audience experiences of scenographic space in a manner distinct from other technologies, and provide a fertile ground for scenographic experimentation. Scenography, in turn, might provide a particular perspective from which to think and design with these technologies.

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